COMBINED EFFECT OF PROTEIN INTAKE WITH RESISTANCE AND AEROBIC TRAINING INDUCED ALTERATIONS IN LEAN BODY MASS AMONG VOLLEYBALL PLAYERS LIVING AT ALTITUDE

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ABSTRACT

The intension of this study was to analyze the combined effect of protein intake with resistance and aerobic training induced gains in lean body mass among volleyball players living at altitude. This study was confirmed to forty eight (N=48) male inter-collegiate level volleyball players studying in various colleges, in Kashmir region, India as subjects and their age ranged from 18 to 24 years. The volleyball players who represented inter collegiate level competitions and residing at moderate altitude that is 5000-8000 ft (1524-2438 m) above sea level was only considered. The number of groups for the study was delimited to four and designed as resistance training with protein intake (group-I), aerobic training with protein intake (group-II) and combined resistance and aerobic training with protein intake (group-III) groups and control group (group-IV). The number of subjects in each group was confined to twelve. The data collected from the four groups prior to and post experimentation on lean body mass were statistically analyzed, by paired t test and analysis of covariance (ANCOVA). Then Scheffe's test was applied as post hoc test. In all the cases the level of confidence was fixed at 0.05 level for significance. Intake of protein during resistance training lead to 4.78% of changes, intake of protein during aerobic training lead to 15.93% of changes whereas intake of protein during combined training (resistance & aerobic) lead to 10.38% of changes in lean body mass of the volleyball players living at altitude.

Keywords: *Resistance and aerobic training, Protein intake, Lean body mass, Altitude, Volleyball players*

Introduction

Altitude training has been used by athletes to obtain the physiological adaptations related to acclimatization, a fact believed to allow them to improve performance, both at altitude and at sea level. There are some variables that should be taken into account when training at high altitudes because they influence the intensity of the responses: altitude level and the time spent, intensity and training type, and characteristics like previous fitness level and individual responses to hypoxia and training. Numerous modalities combine natural or artificial hypoxic environment, continued or intermittent hypoxic exposure, as well as different altitude levels. As a result, modalities like living high-training high (Hi-Hi), living high-training low (Hi-Lo), living low-training high (Lo-Hi) and intermittent hypoxia have been studied (Bonetti & Hopkins, 2009).

Volleyball is an aerobic sport with additional anaerobic demands. This will require volleyball players to work both energy systems, making cardiovascular conditioning very important. The aerobic or lower intensity training, help to build a strong cardio base that is needed for a long match. When training to improve the aerobic system, using intervals to improve the anaerobic threshold is helpful. Incorporate short interval training to tap into the anaerobic energy system. A combination of aerobic and anaerobic training in pre-season and during the season will increase overall fitness levels.

Resistance training is a great way to control weight and allows volleyball players to improve their performance on the court dramatically and achieve better results. Every volleyball player needs aerobic fitness (traditional cardio workouts) to some degree. Play in volleyball is not continuous, but matches or tournaments can last long enough that if they do not have a basic level of aerobic endurance their volleyball performance can be affected significantly. They will have enhanced their endurance which means they can play a longer time without feeling the effects of fatigue. It is very much important for a volleyball player to have various types of fitness elements for enhancing performance. The influence of combined effect of protein intake with resistance and aerobic trainings induced gains in lean body mass among volleyball players living at altitude has received little attention and not completely

understood. Hence it was decided to take-up this study.

Methodology

Subjects and Variable

This study was confirmed to forty eight (N=48) male inter-collegiate level volleyball players studying in various colleges, in Kashmir region, India as subjects and their age ranged from 18 to 24 years. The volleyball players who represented inter collegiate level competitions and residing at moderate altitude that is 5000-8000 ft (1524-2438 m) above sea level was only considered. The number of groups for the study was delimited to four and designed as resistance training with protein intake (group-I), aerobic training with protein intake (group-II) and combined resistance and aerobic training with protein intake (group-III) groups and control group (group-IV). The number of subjects in each group was confined to twelve. All 4 groups were assessed before and immediately after 12 weeks of training period on lean body mass by using the formula LBM=Body weight- Total fat mass. .

Training Programme

The experimental group-I performed resistance training with protein intake, group-II performed aerobic training with protein intake, group-III performed combined resistance and aerobic training with protein intake. The experimental groups performed these training three alternative sessions per week for 12weeks. Resistance training involves the following exercises namely military press, bench press, squat, lat pull down, standing calf raise, leg curl respectively. The resistance training programme was a total body workout consisting of 3 sets of 6-10 repetitions on 6 exercises that trained all the major muscle groups. A percentage of each subject's one-repetition maximum for each exercise was used to determine the intensity of each week. The intensity (70- 95% of 1RM) and number of repetitions performed for each exercise was progressively increased. The intensity was increased as training progressed.

The experimental group-II performed aerobic training alternatively three days in a week for twelve weeks. In this present investigation continuous running was given to the athletes as aerobic training. To fix the training load for the aerobic group the subjects were examined for their exercise heart rate in response to different work bouts, by performing continuous running of two minutes duration for proposed repetitions and sets, alternating with active recovery based on work-rest ratio. The subject's training zone was computed using Karvonen formula and it was fixed at 70%HRmax to 95%HRmax. The rest - work ratio of 1:1 in-between exercises and 1:3 between sets was given.

The subjects of experimental group-III performed combined resistance and aerobic training alternatively three days in a week for twelve weeks. The resistance training programme was a total body workout consisting of six exercises that trained all the major muscle groups. The resistance training load was fixed based on one repetition maximum (1RM) of each participant. The aerobic training consists of continuous running of two minutes duration for proposed repetitions and sets, alternating with active recovery based on work-rest ratio.

Protein Supplementation

The subjects of experimental group-I, II and III was recommended to take protein as designed for them by expert dieticians during the 12-week treatment period. The review of literature shows that 0.8 to 1.5 g/kg protein supplementation is adequate in the players (elite). Based on this 1.2 g/kg protein drinks (solution) was supplemented for subjects half an hour before dinner approximately 7.00 pm for three days during training period. Similarly placebo was given to non supplementation group i.e. (control). The placebo contains sugar (Glucose) solution; which does not have any effect.

Statistical Procedures

The collected data was statistically analyzed by paired 't' test. Further, percentage of changes was calculated to find out the alterations in selected dependent variables due to the impact of experimental treatment. Further, the data collected from the four groups prior to and post experimentation on lean body mass were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since four groups were involved, whenever the obtained 'F' ratio

value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 level for significance.

Results

The lean body mass data (pre & post) of the chosen four group's volleyball players living at altitude are analyzed by ''t' test, ANCOVA and post hoc test statistics and the derived results are displayed in table I-III.

Table-I: Descriptive Statistics and Dependent 't' Test Results on Lean Body Mass Data (Pre & Post) of the Chosen Four Group's Volleyball Players Living at Altitude

Group's Name	Testing Periods	N	Mean Values	SD Values	DM	changes in %	't' - ratio
Resistance Training with Protein Intake	Pre	12	60.93	0.77	2.91	4.78	15.26*
	Post		58.01	0.63			
Aerobic Training with Protein Intake	Pre	12	61.30	0.79	9.76	15.93	46.40*
	Post		51.53	0.88			
Combined Training with Protein Intake	Pre	12	61.20	0.80	6.35	10.38	19.92*
	Post		54.84	0.65			
Control	Pre	12	60.85	1.09	0.06	0.11	0.14
	Post		60.92	1.20			

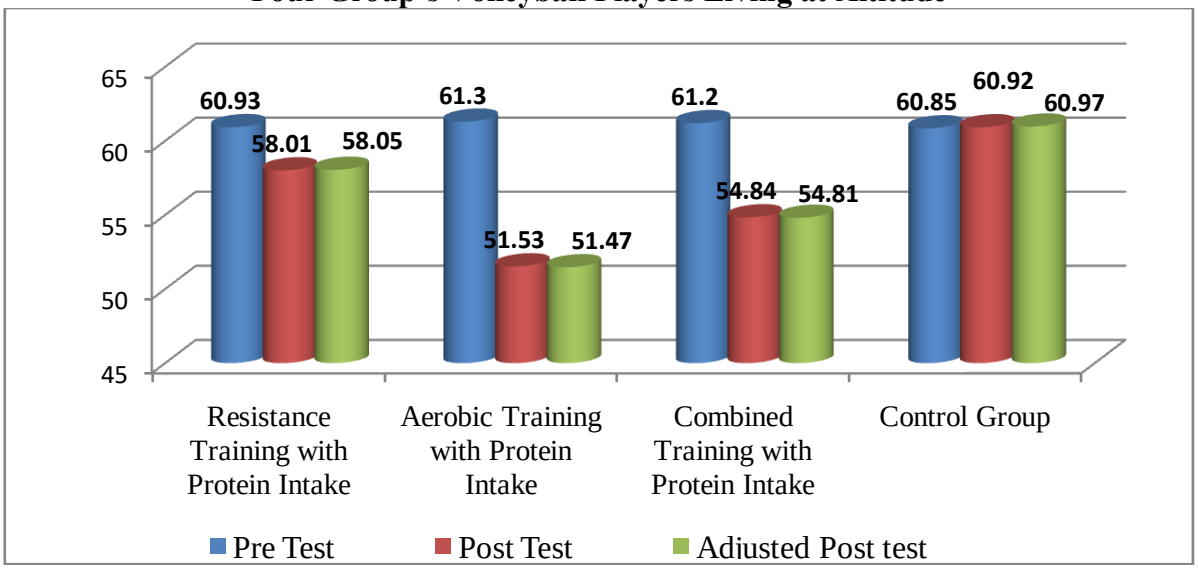
*Table value for df 11 is 2.20(*significant)*

The lean body mass data (pre & post) of the chosen three treatment group's volleyball players living at altitude vary clearly because the dependent 't' test values resistance with protein intake (15.26), aerobic with protein intake (46.40) as well as combined training with protein intake (19.92) groups are more than 2.20 (table value needed for 11 df).

Intake of protein during resistance training lead to 4.78% of changes, intake of protein during aerobic training lead to 15.93% of changes whereas intake of protein during combined training (resistance & aerobic) lead to 10.38% of changes in lean body mass of the volleyball players living at altitude.

The lean body mass data (pre, post &adjusted) of the chosen four group's volleyball players living at altitude are graphically represented in figure-I.

Figure – I: Figure Showing the Lean Body Mass Data of the Chosen Four Group's Volleyball Players Living at Altitude



The lean body mass data (pre & post) of the chosen four group's volleyball players living at altitude are analyzed by ANCOVA statistics and the derived results are displayed in table II.

Table – II: ANCOVA Results on Lean Body Mass of the Chosen Four Group's Volleyball Players Living At Altitude

Mean	Resistance Training with Protein Intake	Aerobic Training with Protein Intake	Combined Training with Protein Intake	Control Group	S o V	SS	df	MS	'F' ratio
Adjusted-Post-test	58.05	51.47	54.81	60.97	B	579.01	3	193.00	261.85*
					W	31.69	43	0.73	

*(Table value for df 3 & 43 are 2.82)*Significant (.05 level)*

The results derived through the application of ANCOVA statistics proved that the adjusted (post test) means on lean body mass of resistance with protein intake (M=58.05) aerobic with protein intake (M=51.47) combined training with protein intake (M=54.81) and control (M=60.97) groups volleyball players living at altitude resulted in 'F' value of 261.85 which is better to 2.82 (*Table value needed for df 3 & 43* =2.82).

As the adjusted (posttest) means of chosen four group's of volleyball players living at altitude differ from each other, the Scheffe's statistics was applied (table-4.6).

Table – III: Post Hoc (Scheffe's) Test Results on Lean Body Mass of the Chosen Four Group's Volleyball Players Living at Altitude

Resistance Training with Protein Intake	Aerobic Training with Protein Intake	Combined Training with Protein Intake	Control	MD	CI
58.05	51.47			6.58*	1.01
58.05		54.81		3.24*	1.01
58.05			60.97	2.92*	1.01
	51.47	54.81		3.34*	1.01
	51.47		60.97	9.50*	1.01
		54.81	60.97	6.16*	1.01

**Significant (.05)*

It (Scheffe's test result) established that due to resistance training with protein intake (MD=2.92) aerobic training with protein intake (MD=9.50) combined training with protein intake (MD=6.16) the lean body mass of the volleyball players living at altitude decreased to a large extent. Though, aerobic training with protein intake group was much better than combined training with protein intake (3.34>1.01) and resistance with protein intake (6.58>1.01) group. Further, combined training with protein intake was much better than resistance with protein intake group (3.24>1.01).

Discussion

The result of the present study shows that, due to protein intake with resistance training and aerobic training the lean body mass of volleyball players living at altitude altered greatly. A recent study found that provision of a protein/creatine/carbohydrate supplement just before and just after a resistance training programme that was carried out three times weekly for 10 weeks was more effective in promoting lean body mass. Although resistance training is beneficial in improvement body composition, people around the world spend millions of dollars on supplementation to improve the effects of resistance training

(Schumacher, Schmid, Konig, & Berg, 2002). Improving athletic performance, reducing fatigue, changes in body composition and fitness are the increased requirements for the consumption of nutrient supplements (Nemet, Wolach, & Eliakim, 2005). Results showed that fat free mass increased significantly in participants who consumed the whey protein and casein during resistance training than participants who consume carbohydrates (Ballard *et al.*, 2006). However, another study (Baer *et al.*, 2011) showed similar results but on overweight and obese adults. Compared to carbohydrates, whey protein and peptides decrease body weight and fat mass after 12 weeks of resistance training (Frestedt, Zenk, Kuskowski, Ward & Bastian, 2008).

Elite volleyball players, in keeping with many other elite athletes, tend to be lean and muscular (Lidor & Ziv, 2010; Portal *et al.*, 2010; Sheppard *et al.*, 2009). The possible reason of reduction of body fat was endurance training which increased greater utilization of fat for energetic (Carbuhn *et al.*, 2010; Malousaris *et al.*, 2008). After 60 min of aerobic running on 3 days per week for 4 weeks without dietary behavior intervention, no significant change and similar reductions of body weight (<2.0%) were observed in both hypoxic group and normoxic group but there was an added decrease of body FM content (Haufe *et al.*, 2008; Wiesner *et al.*, 2010). Under moderate hypoxia employed by LLTH with a normal diet, 90 min of low-intensity aerobic training on 3 days every week for 8 weeks resulted in 1.14 kg or 1.3% reductions in body weight and additive improvement exhibited but no weight loss in the control group (Netzer, Chytra & Küpper, 2008). The reduction in body fat might be due to the fact that the sportsmen underwent high intensity and volume of training over a period of time, which resulted in lowering of body fat percentage.

Conclusion

Intake of protein during resistance training lead to 4.78% of changes, intake of protein during aerobic training lead to 15.93% of changes whereas intake of protein during combined training (resistance & aerobic) lead to 10.38% of changes in lean body mass of the volleyball players living at altitude. Though, aerobic training with protein intake group was much better than combined training with protein intake and resistance training with protein intake group. Further, combined training with protein intake was much better than resistance training with protein intake group.

Therefore, it can be stated that volleyball players can lose body fat more, this might be due to intensive training and competition schedule. Since volleyball players, even at the highest levels, tend to have depots of body fat higher than optimal, it seems rational to advise the volleyball players to keep their activity profile relatively high especially during the off-season with the aim to stay fit and to prevent increased body adiposity.

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ANALYSIS OF THE CHANGES ON MEAN ARTERIAL PRESSURE IN RESPONSE TO YOGA NIDRA AND TRANSCENDENTAL MEDITATION AMONG POST MENOPAUSAL WOMEN

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ABSTRACT

The purpose of this study is to find out the effect of Yoga Nidra and Transcendental Meditation on mean arterial pressure of postmenopausal woman. For the purpose of the present investigation 60 postmenopausal women were selected from Vaniyambadi town, Tamilnadu, India and gave them Yoga Nidra relaxation technique and transcendental meditation. The age of the subjects ranged from 50-55 years. The subjects were divided into 4 groups of 15 subjects each of which one control and three experimental groups. Group I -Yoga Nidra group (YNG) underwent Yoga Nidra practice, Group-II - Transcendental Meditation Group (TMG) underwent Transcendental Meditation practice, Group-III underwent combined Yoga Nidra and Transcendental Meditation (CTG) and Group IV acted as Control (CG) they did not undergo any kind of Yogic practices. The data on mean arterial pressure was collected prior to and immediately after 12 weeks of training from the experimental and control groups. The data collected from the experimental and control groups on mean arterial pressure was statistically analyzed by paired 't' test. Further, percentage of changes was calculated. In addition analysis of covariance (ANCOVA) was applied to find out the significant difference between groups. Whenever the adjusted 'F' ratio value was found to be significant, the Scheffe'S test was applied. The post menopausal women's mean arterial pressure level was lowered greatly due to regular practices (12 weeks) of yoga nidra (YNG=2.86%), transcendental meditation (TMG=2.04%) and combined practices (CT=4.28%).

Keywords: *Yoga Nidra, Transcendental Meditation, Mean arterial pressure and Postmenopausal woman*

Introduction

Menopause is an episode in women's lives that has physical, psychological, and social consequences, and thereby affects quality of life. Symptoms experienced during menopause and socio-demographic characteristics affect quality of life in postmenopausal women (Schneider & Birkhäuser, 2017; Gobbens & Remmen, 2019). The primary effects of menopause are associated with estrogen deficiency. The main health concerns of postmenopausal women include vasomotor symptoms, urogenital atrophy, osteoporosis, cardiovascular disease, cancer, decreased cognitive function, and sexual problems (Berek, 2019).

Women are considered to be postmenopausal when they have not had their period for an entire year. During this time, many of the bothersome symptoms a woman may have experienced before menopause gradually decrease. But as a result of several factors, including a lower level of estrogen, postmenopausal women are at increased risk for a number of health conditions, such as osteoporosis and heart disease. Medication and/or healthy lifestyle changes may reduce the risk of some of the conditions associated with menopause.

The integrated approach of *Yoga* therapy can improve hot flushes and night sweats. It can also improve cognitive functions such as remote memory, mental balance, attention and concentration, delayed and immediate verbal retention and recognition test (Chatha et al., 2008). A pilot study of a Hatha *Yoga* treatment for menopausal symptoms also showed improvement in menopausal symptoms except hot flushes (Force & Thurston, 2007). Even eight weeks of an integrated approach to yoga therapy resulted in better outcome as compared to physical activity in reducing climacteric symptoms, perceived stress and neuroticism in perimenopausal women (Chattha & Raghuram, 2008).

There is increasing evidence suggesting that even the short-term practice of *Yoga* can decrease both psychological and physiological risk factors for CVD and may reduce signs, complications and improve the prognosis of those with clinical or underlying disease

(Innes, Bourguignon & Taylor, 2005; Innes & Vincent, 2007). *Yoga's* rapidly increasing popularity amongst older women in the Western industrialized world, coupled with numerous recent studies suggesting that *Yoga*-based programs may improve CVD risk profiles in older adults indicate that *Yoga* may represent a promising intervention for postmenopausal women at risk for CVD and related chronic disorders (Innes, Selfe & Taylor, 2010).

As mentioned earlier it has been demonstrated that meditation increases plasma melatonin levels and it seems that melatonin effectively improves sleep quality. Studies have demonstrated the effectiveness of *Yoga* in improving sleeping patterns suggesting its effective use in a clinical setting to combat symptoms of insomnia and other sleep disorders in post-menopausal women (Cohen & Wameke, 2004; Khalsa, 2004). Thus from all these studies we can conclude that *Yoga*, a free-of-cost noninvasive method, is fairly effective and is strongly recommended to all women of menopausal age. *Yoga* does have the potential to provide physical, mental and emotional health benefits to those who practice it with proper guidance. By considering the above literature, in this study, an attempt has been made to analyze the changes on mean arterial pressure due to the effect of performing Yoga Nidra and Transcendental meditation among postmenopausal woman.

Methodology

Subjects and Variables

For the purpose of the present investigation 60 postmenopausal women were selected from Vaniyambadi town, Tamilnadu, India and gave them Yoga Nidra relaxation technique and transcendental meditation. The age of the subjects ranged from 50-55 years. The subjects were divided into 4 groups of 15 subjects each of which one control and three experimental groups. Group I -Yoga Nidra group (YNG) underwent Yoga Nidra practice, Group-II - Transcendental Meditation Group (TMG) underwent Transcendental Meditation practice, Group-III underwent combined Yoga Nidra and Transcendental Meditation (CTG) and Group IV acted as Control (CG) they did not undergo any kind of Yogic practices. The data on mean arterial pressure was assessed by using digital blood pressure monitor.

Training Protocol

Subject were divided in to four groups namely yoga nidra a six days in a week for 12 weeks. The Yoga Nidra meditation was performed in six different stages and these stages were changed once in two weeks. The first stage was physical preparation stage, the second stage was chanting the resolve or sankalpa, the third stage was Rotation of awareness through the body part systematically, the fourth stage was Breath awareness, the fifth stage was mental awareness and the sixth stage was ending the practice. Similarly, the Transcendental Meditation was performed in six different stages and these stages were changed once in two weeks. The first stage was physical preparation stage, the second stage was meditation on the breath, the third stage was mediation on the mind, the fourth stage was Visualize the breath, the fifth stage was chanting the mandra and the sixth stage was ending the practice.

Experimental Design and Statistical Technique

The experimental design used in this study was random group design involving 60 subjects, who were divided at random into four groups of fifteen subjects each. The data collected from the four groups prior to and post experimentation on MAP was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since four groups were involved, whenever the obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 for significance.

Results

The result derived by paired 't' test as well as the improvement found (percentage) on post menopausal women's mean arterial pressure of the Yoga Nidra, Transcendental meditation, combined and control (YNG, TMG, CTG & CG) groups are in table-I.

Table--I: Paired 'T' Test Results on Post Menopausal Women's Mean Arterial Pressure of Treatment and Control Groups

Group	Test	N	Mean	SD	DM	't' - ratio	%
Yoga Nidra Group (YNG)	Pre	15	97.87	3.46	2.80	7.90*	2.86
	Final		95.07	3.06			
Transcendental Meditation Group (TMG)	Pre	15	98.20	2.14	2.00	4.18*	2.04
	Final		96.20	1.21			
Yoga Nidra & Transcendental Meditation Groups(CTG)	Pre	15	98.13	2.20	4.20	8.25*	4.28
	Final		93.93	2.69			
Control Groups	Pre	15	97.80	1.74	0.27	0.58	0.28
	Final		98.07	2.37			

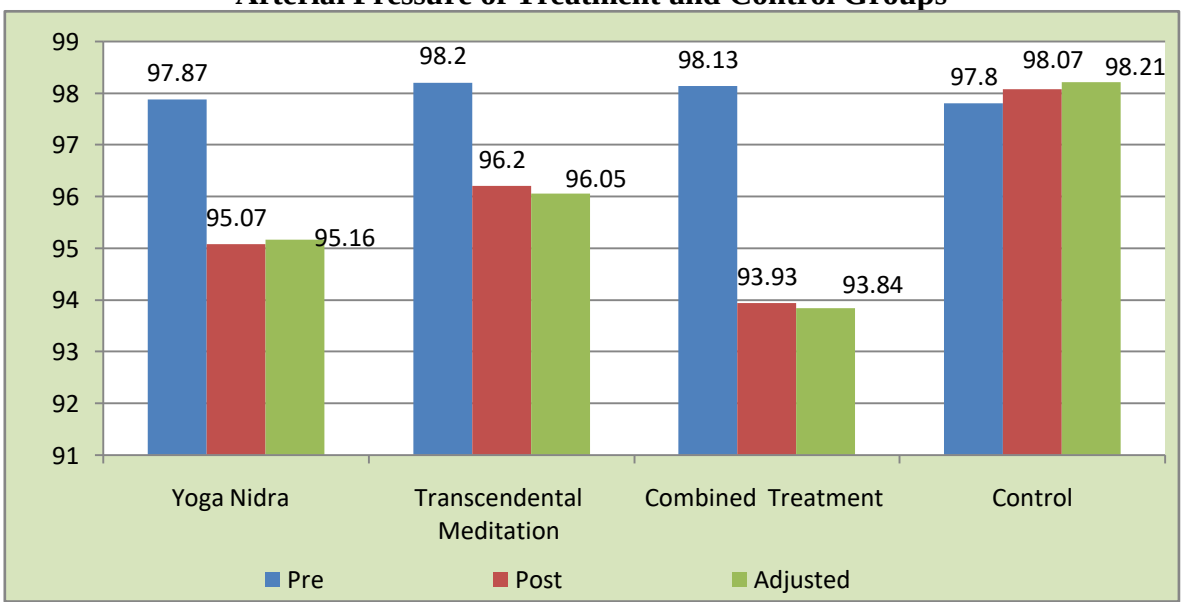
*Table value for df 14 is 2.14(*significant)*

The yoga nidra(YNG), transcendental meditation (TMG), combined treatment **(**CTG**)** and control (CG) group's two different testing period (pre&post) data on mean arterial pressure level vary to a great extent since the yoga nidra (YNG=7.90), transcendental meditation (TMG=4.18) as well as combined treatment (CTG=8.25) group's derivative 't' values are better than table value (df 14 =2.14).

The post menopausal women's mean arterial pressure level was lowered greatly due to regular practices (12 weeks) of yoga nidra (YNG=2.86%), transcendental meditation (TMG=2.04%) and combined practices(CT=4.28%).

The displayed figure-I shows the mean arterial pressure level mean scores of Yoga Nidra, Transcendental meditation, combined and control (YNG, TMG, CTG & CG) groups.

Figure – I: Graph Showing the Post Menopausal Women's Mean Arterial Pressure of Treatment and Control Groups



By using ANCOVA statistics, the post menopausal women's mean arterial pressure level of yoga nidra(YNG), transcendental meditation (TMG), combined treatment **(**CTG**)** and control (CG) group's were analyzed and given in table –II.

Table—II: ANCOVA Results on Post Menopausal Women's Mean Arterial Pressure Level of Treatment and Control Groups

Mean	Yoga Nidra Group (YNG)	Transcendental Meditation Group (TMG)	Yoga Nidra & Transcendental Meditation Groups(CTG)	Control Group (CG)	S o V	SS	df	Mean squares	'F' ratio
Adjusted Post test	95.16	96.05	93.84	98.21	B	151.95	3	50.65	18.72*
					W	148.79	55	2.71	

*(Table value for df 3 &55 = 2.77) *Significant(.05 level)*

The derived ANCOVA statistics results established that the yoga nidra(YNG), transcendental meditation (TMG), combined treatment **(**CTG**)** and control (CG) group's adjusted (posttest) mean (95.16, 96.05, 93.84 & 98.21) data on mean arterial pressure level vary to a great extent because the found 'F' value [F=18.72(df 3&55 =2.77)] is higher.

The derived post hoc (Scheffe's) test result on mean arterial pressure level of yoga nidra(YNG), transcendental meditation (TMG), combined treatment **(**CTG**)** and control (CG) groups are displayed in table-III.

Table-III: Scheffe's Test Results on Post Menopausal Women's Mean Arterial Pressure of Treatment and Control Groups

Adjusted Post Test Means				DM	CI
Yoga Nidra Group (YNG)	Transcendental Meditation Group (TMG)	Yoga Nidra & Transcendental Meditation Groups(CTG)	Control Groups (CG)		
95.16	96.05			0.89	1.73
95.16		93.84		1.33*	1.73
95.16			98.21	3.05*	1.73
	96.05	93.84		2.22*	1.73
	96.05		98.21	2.16*	1.73
		93.84	98.21	4.38*	1.73

Significant

The post hoc (Scheffe's) test result proved that, because of yoga nidra(YNG), transcendental meditation (TMG) and combined treatment **(**CTG**)** the post menopausal women's heart mean arterial pressure level decreased to a great extent, since the observed differences in means (3.05, 2.16 & 4.38) are greater to CI (1.73) value. However, combined treatment **(**CTG**)** was better than isolated yoga nidra(YNG) and transcendental meditation (TMG) groups. Further, insignificant difference was found between yoga nidra(YNG) practice and transcendental meditation (TMG) groups in decreasing mean arterial pressure level.

Discussion

Yoganidra centrally acts upon the brain to induce complete relaxation throughout the nervous system, and it improves the resistance levels of the physiological and physical systems of an individual. It controls the autonomic nervous system, influencing the brain's electrical rhythms, heart rate, and systolic and diastolic blood pressures. A significant reduction in MAP was observed after 12 weeks of supervised yoganidra practice in postmenopausal woman. Our observations are in line with earlier studies (Kumar, 2005; Deepa, Sethu & Thirrunavukkarasu, 2012; Devi & Kala, 2015). Researches also show that the practice of yoga nidra lowers the elevated

blood pressure levels of hypertensive patients (Datey et al, 1977; Bali, 1979).

Transcendental Meditation has been shown not only to improve blood pressure but also the insulin resistance components of the metabolic syndrome and cardiac autonomic nervous system tone (Vogel et al., 2007). Research reviews also suggest that Transcendental Meditation may reduce cardiovascular disease (Devries, 2011). Concurrently, there were improvements in BP and psychosocial distress factors. Regularity of TM practice was associated with increased survival. The average BP reduction of 5 mmHg is similar to that found in meta-analyses of shorter term trials of the TM program (Anderson, Liu & Kryscio, 2008; Rainforth et al., 2007). Reduction in systolic BP may be physiological mechanism for reduced clinical events in this trial because this magnitude of reduction has been associated with 15% reduction in cardiovascular clinical events (Law, Morris & Wald, 2009).

Conclusions

The post menopausal women's mean arterial pressure level was lowered greatly due to regular practices (12 weeks) of yoga nidra (YNG=2.86%), transcendental meditation (TMG=2.04%) and combined practices(CT=4.28%). However, combined treatment (CTG) was better than isolated yoga nidra (YNG) and transcendental meditation (TMG) groups. Further, insignificant difference was found between yoga nidra(YNG) practice and transcendental meditation (TMG) groups in decreasing mean arterial pressure level of post menopausal women. From the above discussion, it becomes clear that the technique of yoga nidra and Transcendental Meditation has preventive, promotive and curative value.

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PSYCHOLOGICAL WELLBEING OF SECONDARY SCHOOL STUDENTS IN RELATION TO THE FAMILY ENVIRONMENT

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ABSTRACT

This research paper discusses the Psychological wellbeing of secondary school students in relation to the Family Environment. The study has been conducted on 600 secondary school students selected in equal proportion on the basis of Gender, Locale and Type of School from the Malappuram district of Kerala. The Stratified Random sampling technique has been employed and the tools used are Psychological wellbeing scale by Sosodia and Choudhary (2012) and the Family Environment Scale by Saini and Kaur(2018). The findings depicted that the Psychological well-being and Family Environment of secondary school students significantly differs on the basis of Gender, Locale and Type of School. Boys possess high Psychological Wellbeing than the Girls. Rural students possess high Psychological Wellbeing than the Urban students and Private school students possess high Psychological Wellbeing than the Government school students. Moreover, the Girls possess High Family Environment than the Boys. Rural students possess High Family Environment than the Urban students and the Government school students possess High Family Environment than the Private school students. Psychological wellbeing is found to have a significant positive relationship with Family Environment. The findings related to Regression analysis depicted that Family Environment have a significant positive impact on the Psychological well-being of secondary school students.

Keywords: *Psychological Wellbeing, Secondary School Students, Family Environment*

Introduction

Adolescence is the crucial phase of every person's life. Adolescence is characterized with major biological, psychological, physiological and sociological changes in the personality. The attitude, behavior, manners, skills, and abilities acquired in this age, becomes the foundation of their quality of life, personality and overall health (Sunitha and Gururaj, 2014). The adolescence age is greatly influenced by various environmental or social factors including their family, peer groups, school, neighborhood, media portrayals and advertisements (Ramdass, Nongkynrih and Gupta, 2017).These environmental factors may exert various positive and negative impacts on the personality of the adolescents. Family is the first agent of socialization for the child and the family provides a greater platform to the children wherein they explore their dreams, learns new things every day acquire life skills and learn to live in harmony and adjustment with others. Proper monitoring by the family at home and teachers at school is important to ensure sound health and personality of the adolescents Psychological well-being consists of positive relationships with others, personal mastery, autonomy, a feeling of purpose and meaning in life, and personal growth and development. Psychological well-being is attained by achieving a state of balance affected by both challenging and rewarding life events. Psychological well-being has been defined by Ryff, (1995) in "Current Direction of Psychological Sciences" as possessing positive self-regard, mastery, autonomy, positive relationship, a sense of purpose in life, and feeling of continued growth. Psychological well-being is somewhat a malleable concept which is to with people"s feeling about their everyday life activities (Bradburn, 1969; Warr & Wall, 1978; Campbell, Converse & Rodgers, 1976). Such feelings may range from negative mental states (dissatisfaction, unhappiness, worry etc.) thought to a more positive outlook which extends beyond the mere absence of dissatisfaction. Family is the basic unit of society and that inculcates the value i.e. caring for others, affections for others, spirit for service and virtue of love (Bhatnagar,1977). Plamentz (1993) stated that family provides all sorts of moral and ethical values, emotional, social and intellectual climate set by the family members that contribute to their wholesome development of the children in the family. The environment provided by the family is the chief instrument to provide good life skills for social adjustment and sound personality in terms of

social, emotional, cognitive, creative, moral and ethical development. The family environment is the important aspect of the individual which help for the development of proper psychological well-being among the individuals, the study of these aspects are significant. The investigator considered the Family environment of secondary school students are very important areas need to be studied and it is very essential to analyse their relation to Psychological wellbeing among them.

Literature review

The review of related literature suggests that the Psychological Wellbeing of Secondary School Students having a relation to the Family Environment. Stimulating family environment encourages the expression of creative potentialities; cognitive abilities, skills, new ideas and perceptual styles are influences on pupil's cognitive styles. Enriched family environment/climate and mental health status promotes novel and concrete ideas, friendly feelings, positive emotions, beliefs, efficacy, self-concept and higher degree of initiative and independence. A large number of studies have been made in Review of Literature on the field of Psychological Well Being, Family Environment in relation to different variables. Due to liberalization, privatization and globalization; now a day's student's life is often subjected to a lot of academic stress and academic adjustment problems. The system of education and type of educational setting especially in government and private institutes are totally different. Studies attempted by comparing the educational setup of the pupils i.e., government and private sectors on creativity in relation to intelligence school environment and mental health status are limited. The studies provide the basic conceptual framework of psychological well-being of secondary school students in relation to the family environment. These studies constitute a wide range of area on Psychological Well Being, and Family Environment. Therefore, these research studies form a strong foundation to the structure and contour of the present study. The present study differs from the earlier studies with respect to the purpose, region and conditions in which it has been conducted. There seems no such research endeavor which could directly appraise about the psychological well-being of secondary school students in relation to the family environment. Therefore, it can be concluded that the scope of research is beyond any limitation and imagination. Thus, on the basis of review, a conclusion is drawn that a fresh relook is needed for filling up the existing research gap in the area related to Psychological Well Being, and Family Environment.

Significance of the study

It is important to study how the Family Environment influence the psychological wellbeing of the adolescents. This study was conducted in the Malappuram district of Kerala. The study was helpful in exploring the psychological well-being, and family environment of the adolescents in the Malappuram district. The study was guiding the parents as to what type of environment should be provided to the adolescents to ensure that they have good psychological wellbeing. The study was guiding the School authorities about the type of family environment they need to provide to ensure sound psychological well-being of the adolescents. From the above mentioned view point, the researcher found it is very vital to investigate psychological wellbeing, and family environment of secondary school students. The researcher believes that the family environment of secondary school students have a tremendous influence on the psychological wellbeing. Hence, the investigator has taken up this study, the psychological wellbeing of secondary school students in relation to the family environment.

Operational Definitions

Psychological Wellbeing: It refers to the sum total of the scores attained by the students in the psychological well being scale, determined on the basis of aspects of well being like satisfaction, efficiency, sociability, mental health and interpersonal relationship.

Family Environment: It refers to the sum total of the scores attained by the students in the family environment scale, determined on the basis of nine constructs which are Communication, Encouragement of the

individuals, Commitment to family, Religious orientedness, Social connectedness, Ability to adapt, Expressing appreciation, Clear roles and Time spent together.

Objectives of the study

1. To study and compare the Psychological Wellbeing of secondary school students on the basis of Gender, Locale, and Type of School.
2. To study and compare the Family Environment of secondary school students on the basis of Gender, Locale, and Type of School.
3. To study the relationship between Psychological Wellbeing and Family Environment of secondary school students.
4. To study the impact of Family Environment on the Psychological Wellbeing of secondary school students.

Hypotheses of the study

1. There exists no significant difference in the Psychological Wellbeing of secondary school students on the basis of Gender, Locale, and Type of School.
2. There exists no significant difference in the Family Environment of secondary school students on the basis of Gender, Locale, and Type of School.
3. There exists no significant relationship between Psychological Wellbeing and Family Environment of secondary school students
4. There exists no significant impact of Family Environment on the Psychological Wellbeing of the secondary school students.

Methodology

This Descriptive Research study has been conducted on 600 secondary school students of Malappuram District of Kerala selected through Stratified Random sampling technique in equal proportion on the basis of Gender, Locale and Type of School. In order to measure the variables under study; two standardized tools were used. Psychological Wellbeing Scale by Sosodia and Choudhary (2012).The scale contains 50 statements measuring the several aspects of well-being. And Family Environment Scale by Kaur and Saini (2018). The scale contains 45 statements that access the Family Environment. The data has been analysed through t test, Correlation and Regression.

Findings of the study

The findings derived through the data analysis depicted that significant difference has been found in the Psychologicalwell being of secondary school students on the basis of Gender, Locale and Type of School. Boys possess high Psychological Wellbeing than the Girls. Rural students possess high Psychological Wellbeing than the Urban students and Private school students possess high Psychological Wellbeing than the Government school students. The findings related to Family Environment depicted that significant difference has been found in the Family Environment of secondary school students on the basis of Gender, Locale and Type of School. Girls possess High Family Environment than the Boys. Rural students possess High Family Environment than the Urban students. Government school students possess High Family Environment than the Private school students. Psychological wellbeing is found to have a significant positive relationship with Family Environment. The findings related to Regression analysis depicted that Family Environment have a significant positive impact on the Psychologicalwell being of secondary school students.

Conclusion

The findings of the present study suggest that there is a significant relationship of psychological wellbeing, and family environment of secondary school students. Family environment has an impact on psychological wellbeing. The findings strongly recommend that family environment of secondary school students should be considered as the important factors which affect the psychological wellbeing of secondary school students. The difference noticed, based on the gender, locale and type of the school in the psychological wellbeing. Psychological wellbeing also given concern, and it should be analysed and proper interference should be made to reduce the differentiations. So that the level of psychological wellbeing and social adjustment

can be improved.Majority of the findings of this study fall in line with some of the results received from previous studies conducted in the country and abroad. The policy makers should realise the fact that family environment is the most important indicator of the psychological wellbeing of secondary school students. It is the prime responsibility of the people who are in the field of secondary school education to analyse the whereabouts of the students, so that their family environment can be traced, if necessary action can be taken to correct, improve and modify the same so that their psychological wellbeing and social adjustment can be maintained in a favourable manner. These findings recommend to all the stakeholders of secondary school system to take certain steps for the development of family environment of secondary school students. The authorities, teachers and all concerned in the field of secondary school system should help them maintain a coordination with their psychological wellbeing by taking up a systematic evaluation of the various aspects related to family environment which affect their psychological wellbeing.

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A STUDY ON TRENDS IN WOMEN ENTREPRENEURSHIP: WITH SPECIAL REFERENCE TO HARYANA

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ABSTRACT

Women play a vital role in development of any society, yet her contributions are often neglected. For economic growth, a labour intensive country like India must realize the potential of its labour force at optimum levels. Women constituting around half of the human resource of the country must not be ignored. The industrial development calls for her active participation in all the economic activities. Indian economy is dominated by the orthodox concepts of the society, gender inequality being the ugliest of all that prevents women to take a flight towards success. This paper presents the various trends in women entrepreneurship at global level and Indian economy as a whole with comparison at state levels. The role of Government in promoting women entrepreneurship has been highlighted and various programs and schemes in support of women entrepreneurship have been discussed. Some conclusions and recommendations have been made at the end of this paper that is based on the primary data collected from around 300 respondents, being women entrepreneurs from the various districts of Haryana.

Introduction

Right from the ancient times gender inequality exists in India and the world as a whole. There are many instances in the history which depicts the fate of women cursed by gender discrimination and patriarchy. Since ages gender inequality has been raising its ugly head through female infanticide, child marriage, sati pratha, undignified treatment, sexual harassment, dowry system etc. In India especially in rural areas boys are brought up to be tough while girls are suppressed and denied the education rights. They are usually barred from attending social, religious, administrative and political platforms. In such a negative scenario there is need for upliftment of women if the status of society has to be improved. Growth in women entrepreneurship calls for various supportive and training programs from the side of Government, both central and state levels. Economic growth of any country depends largely upon its resources with human resource being most important of all the factors of production. As a matter of fact, women constitute roughly half of the human resource capital of the country. India being a labour intensive country must recognize women human resource as a national treasure in mobilizing the overall socio economic and technical growth of the country.

Present Status of Women Entrepreneurship

1. Status of Women at Global level:

According to Global Entrepreneurship Monitor; Women's Entrepreneurship Report 2018/19 the highest participation rates in women entrepreneurs are in the age group of 25-44 years. As far as initiative to start a new business is concerned, it was noted that women have lower confidence levels as compared to men and there is no region in the world in which women rank higher than men. This calls for increased financial and social support in order to uplift the status of women at global level. It would encourage more females to enter into the world of business and entrepreneurship. Table no. 1 based on the study by Buchholz, 2020 reveals the percentage share of female population engaged in entrepreneurial activities in some of the selected countries for the year 2019.

Table no. 1

Sr. no.	Country	Percentage of Female Entrepreneurs
1	Angola	40.7
2	Chile	32.4
3	U.S.	16.6
4	**India**	**12.7**
5	UAE	12.6
6	South Korea	11.4
7	Germany	5.7
8	Egypt	4.1
9	Italy	2.1

(Source: Buchholz, 2020)

The study by Buchholz, 2020 brings out that entrepreneurship among females in Angola, India and Egypt is necessity-driven while, it is innovation driven in Chile, U.S., UAE, South Korea, Germany and Italy. Women entrepreneurship is highest in developing countries like Angola and Chile. It is higher than some of the developed nations like United States. Position of India is not very encouraging with only a meager share of 12.7 percent of female population engaged in entrepreneurial activities. If we compare the results with sixth economic survey estimates (2011) 14 per cent of Indian women owned and ran a business. This indicates that though the conditions are supportive for females to pursue a career in entrepreneurship but there is a long way to go as far as Government policies, social environment, family environment, economic environment etc. are concerned. The business ecosystem is greatly influenced by participation of women in entrepreneurship activities. Hence, steps must be taken to encourage female workforce to take up entrepreneurship as a profession.

2. Rural/Urban distribution of Entrepreneurship in India:

As per Annual report 2019-2020 of The Ministry of MSME (GOI) male ownership which was 79.63% of enterprises as compared to 20.37% owned by female, dominated the proprietary business in MSME sector. The pattern was almost same in urban as well as rural areas. If we look at table no. 2 it shows that in urban areas male owned enterprises (81.58%) was slightly more prominent as compared to rural areas (77.76%). The situation is opposite in case of share of female ownership. It is disheartening to note that though urban literacy rate and awareness levels is more in urban areas than in rural areas still percentage share of female entrepreneurial ownership is less in urban areas (18.42%) than in rural areas (22.24%)

Table no. 2 (Retrieved from MSME; GOI Annual report 2019-2020)

Sector	Male	Female	All
Rural	77.76	22.24	100
Urban	81.58	18.42	100
All	79.63	20.37	100

3. Ownership Distribution as per size of the Enterprise:

If we look at the ownership distribution data as per size of the enterprise, (depicted in Table no. 3) women entrepreneurship is seen more in micro enterprises (20.44%) followed by small and medium enterprises where share of women entrepreneurs is almost negligible. This indicates the fact that women are still not ready to enter into larger ventures where higher degree of risk and higher percentage of financial resources are needed.

Table no. 3 (Retrieved from MSME; GOI Annual report 2019-2020)

Category	Male	Female	All
Micro	79.56	20.44	100
Small	94.74	5.26	100
Medium	97.33	2.67	100
All	79.63	20.37	100

4. State Wise Position of Women entrepreneurship:

As Per the NSS 73rd Round of NSSO: There are a total of estimated 1,23,90,523 women owned proprietary MSMEs in the country. More than 20% proprietary MSMEs are owned by women. Top five states with highest share of women owned business in the country are: West Bengal, Tamil Nadu, Telangana, Karnataka and Uttar Pradesh. An overview of state-wise distribution of proprietary MSME by gender of ownership is depicted in the table no. 4. The data depicts that West Bengal is at the topmost position with respect to percentage share of female ownership in proprietary business with 23.442% female share, followed by Tamil Nadu (10.37%) and Telangana (7.85%). Haryana holds the 16th rank with only 0.79% women ownership. The figures are worrisome for a developing state like Haryana. The various problems, challenges, threats and opportunities needs to be found out to understand the entrepreneurship scenario for female workforce in Haryana. This would aid in devising the various suggestions and strategies to uplift the self employed women.

Table no. 4 Retrieved from MSME; GOI Annual report 2019-2020

Sl. No	State/UT	Male	Female	All	Share of State among All MSMEs with Male Owners(%)	Share of State among All MSMEs with Female Owners (%)
1	West Bengal	5583138	2901324	8484462	11.52	23.42
2	Tamil Nadu	3441489	1285263	4726752	7.10	10.37
3	Telangana	1459622	972424	2432046	3.01	7.85
4	Karnataka	2684469	936905	3621374	5.54	7.56
5	Uttar Pradesh	8010932	862796	8873728	16.53	6.96
6	AndhraPradesh	2160318	838033	2998351	4.46	6.76
7	Gujarat	2375858	826640	3202499	4.90	6.67
8	Maharashtra	3798339	801197	4599536	7.84	6.47
9	Kerala	1647853	495962	2143816	3.40	4.00
10	Rajasthan	2261127	380007	2641134	4.67	3.07
11	Madhya Pradesh	2275251	370427	2645678	4.70	2.99
12	Jharkhand	1250953	310388	1561341	2.58	2.51
13	Odisha	1567395	295460	1862856	3.24	2.38
14	Punjab	1183871	224185	1408056	2.44	1.81
15	Bihar	3239698	168347	3408044	6.69	1.36
16	**Haryana**	**831645**	**98309**	**929953**	**1.72**	**0.79**
17	Delhi	827234	86742	913977	1.71	0.70
18	Manipur	86383	86604	172987	0.18	0.70
19	Jammu & Kashmir	624056	74785	698841	1.29	0.60
20	Chhattisgarh	727203	71201	798403	1.50	0.57
21	Assam	1128411	66665	1195076	2.33	0.54
22	Himachal Pradesh	329595	50368	379963	0.68	0.41
23	Meghalaya	72191	39462	111653	0.15	0.32
24	Tripura	179169	28042	207212	0.37	0.23
25	Puducherry	65350	27072	92422	0.13	0.22
26	Uttarakhand	380000	20964	400964	0.78	0.17
27	Nagaland	65778	20865	86643	0.14	0.17
28	Mizoram	20439	13698	34137	0.04	0.11
29	Goa	57133	10815	67948	0.12	0.09
30	Arunachal Pradesh	16153	6274	22427	0.03	0.05
31	Chandigarh	44321	5560	49881	0.09	0.04
32	Sikkim	20880	5036	25916	0.04	0.04
33	A & N Islands	14302	4026	18328	0.03	0.03
34	Dadra & Nagar Haveli	12900	2629	15529	0.03	0.02
35	Daman & Diu	5880	1560	7441	0.01	0.01
36	Lakshadweep	1384	488	1872	0.00	0.00
37	**ALL**	**48450722**	**12390523**	**60841245**	**100.00**	**100.00**

Role of Government in Promoting Women Entrepreneurship

It is a well established fact that Government of any country plays the most vital role in supporting and upgrading the position of any community, class or sector in the economy. The Government of India (both at Central and State level) as well as the Indian banking industry have undertaken various steps and framed various policies in support of female self employment (Sharma et, al, 2012). The past three decades have seen a tremendous government support for empowering women. Some of the women empowerment initiatives taken up by Indian Government includes: Beti bachao, beti padhao; Mahila E-Haat; working women hostels; Swadhar Greh; STEP; Nari shakti puruskars (Vashistha, (2020). Besides this there are various schemes for providing financial assistance that includes Annapurna scheme, Stree Shakti Package For Women Entrepreneurs, Cent Kalyani Scheme, Mudra

Yojana Scheme, Mahila Udyam Nidhi Scheme, Dena Shakti Scheme, Orient Mahila Vikas Yojana Scheme, Bhartiya Mahila Bank Business Loan, (Ministry of Women and Child Development) still there is a long way to go for turning the dreams into reality. This has resulted in significant development of women entrepreneurs in India. Yet, the road ahead is full of problems and challenges as far as Indian working women are concerned.

Objectives of the study

The present study is based on 300 respondents from various districts of Haryana, selected on the basis of random sampling techniques. A structured questionnaire was prepared to collect the responses. The main objectives of the study are:

1. To study the role of women entrepreneurship in economic development of the country and hence the state of Haryana.
2. To study the awareness levels among women with respect to various training and development schemes run by Government.

Research Methodology

Population of Study

The universe of the study includes all the women entrepreneurs in the state of Haryana.

Sample Size

A structured questionnaire was prepared and responses were collected from approximately 300 respondents based at various districts of Haryana.

Sources of data

Primary Data

Secondary Data

Review of Literature

Women Empowerment and her economic contribution have gained attention of Government and various non government bodies. Various steps have been taken to promote self employment and promoting industrial ventures (Koneru, 2019)

Goel, 2019 studied the various reasons women chose entrepreneurship as a profession and the financial inclusion schemes that government of the country offers so as to encourage women towards entrepreneurship

Vita, et al, 2014 reviews the various studies on women entrepreneurs in and from developing countries and provides a comprehensive overview of the interdisciplinary research on the said topic.

Garg & Aggarwal, 2017 concluded that in order to upgrade the entrepreneurial skills and abilities in women, government must design training programs and workshops.

Garga & Bagga (2009) highlights the potential areas where women entrepreneurship can excel and studied the problematic areas and potential hurdles in the development of women entrepreneurs.

Beqo & Gehrels (2014) concluded that there is a strong relationship between previous experiences and the decision to become self employed. Education and family background exerts great influence on women's career development and motivation levels.

Nziku & Henry (2020) highlights the importance of women entrepreneurship in attaining the target of sustainable development.

Women entrepreneurship and Economic Development

Women Entrepreneurship in Haryana is mostly dominated by tiny, micro and cottage industries dealing in handicrafts, essential items, boutiques, parlours, home bakers etc. that involve very less capital. Growth in women entrepreneurship would directly boost up economic and social growth that includes capital formation, employment generation, improvement in per capita income, balanced regional development and improved living standards (Malyadri, 2014). Investment, human capital, innovation and R & D, economic policies, macroeconomic conditions are some of the main determinants of economic growth (Petrakos et al 2007). Among these factors human capital plays the major role in managing the other factors of production and hence the determinants of economic growth. Women comprising almost half of the overall work force must not be ignored if economy has to be taken to a boost.

1. Optimum Utilization of Human Resource

   As per population census 2021 female ratio in Haryana is 912 females per 1000 males. Hence, women comprise almost half of the total population in Haryana. For achieving the growth targets and higher productivity optimum utilization of human resource

is must. The other factors of production i.e. land, machinery, finance etc remains under-utilized if the labour force of a region is not deployed to the maximum levels.

2. Increase in per capita income and family income
   When women start working the overall income of a family grows. Number of dependant family members falls. Working women can better cater to the financial needs of their family, be it education of the children or improving the overall living standards of the family.
3. Growth in aggregate demand in an economy
   With the increase in family income and per capita income the overall spending capacity of a family increases. This would in turn increase the aggregate demand not only for the essential items but also for the luxury goods. Demand for ready to eat food items, automatic home appliances etc increase.
4. Direct and indirect employment generation
   A boost to women entrepreneurship is directly proportional to economic boost. Besides creating self employment, it creates direct and indirect employment as well. When an industrial unit starts growing, the production grows and hence the need for more labour force and the auxiliary units.
5. Women empowerment
   When women get self-employed they get financially independent and start to earn a status in the society. They get decision making, administrative and political rights.
6. Women and Creativity
   Women by nature are more creative and dedicated than men. Hence, most of the boutiques, parlors, designer studios, interior designing institutes etc are owned and managed by women. These tiny ventures owe a sizeable share in micro and small industry.
   An article titled "Five women entrepreneurs in Gurgaon who started their own ventures" published in The Economic Times in 2012 quoted some of the innovative ventures started by women. In order to remove the barrier of work life imbalance many women have taken the initiative to start a new venture and have succeeded in the same, to quote some: Shalini Singh owner of Cinnamon Stays innovated the idea of breakfast in bed; Rashmi Thakur a software engineer quit her job and started Rendezvous, a lounge for moms and kids; Justmyneighbour.com- an initiative to connect people living in same residential complex has been started by Jessica; Ahoi Haolai Sitlhou a spa business owner in the name of Oriental Senses; Ms Pooja Goel and Shivani Kapoor jointly started "Intellitots Learning" for promoting excellence in early childhood education through innovative programs and products.
7. Balanced Regional development
   Most of the micro small and especially the cottage industries are established in the various nook and corners of the state. Be it a backward area, rural or urban area, handicraft artisans, parlors, boutiques etc that are run by women are found everywhere. In contrast to large scale male dominated industries that are found mostly concentrated in or around developed regions of the state.
   On the basis of primary data collected from 300 respondents covering various districts of Haryana, it may be noted that Micro Industries dominate 44.4% of women entrepreneurial sector followed by Cottage and small scale industries at 13.3% each. Share of large scale industries is almost negligible as compared to smaller scale units.

Various Programs in Support of Women Entrepreneurship

Pradhan Mantri Mudra Yojana:

PMMY scheme was launched on April 8th, 2015 with an aim to assist small business owners to get easy credit facilities of upto 1 million, with women; SC and ST on preferred list. Under PMMY,type of loans are divided into three categories namely: Shishu for loans upto Rs. 50,000 ; Kishore for loans from Rs

50,001to Rs 5,00,000 ; Tarun for loans from Rs 5,00,001 to Rs.10,00,000. As per an article published in The Tribune in May 2020 by Vijay C Roy, women entrepreneurs held majority of beneficiary share i.e almost 70% in PMMY in the state of Haryana in the year 2019.

Table 5 gives an insight into the share of Haryana as compared to total amount of loan disbursed and number of accounts opened under various categories of PMMY scheme.

Table 5

	Number of accounts in Haryana	Total number of accounts	Percentage share of Haryana	Amount disbursed in Haryana (in crores)	Total amount disbursed (in crores)	Percentage share of Haryana
Shishu	9,83,706	5,44,90,617	17.91%	2,964.97	1,62,813.21	1.82%
Kishore	1,39,504	64,71,873	2.15%	2,352.87	91,427.07	2.5%
Tarun	32,707	12,85,116	2.5%	2,305.40	75,474.75	3.05%

(Source: GOI; PMMY Portal)

Table 6 depicts the share of women entrepreneurs under various categories of PMMY Scheme With respect to number of accounts opened and amount disbursed.

	Number of accounts	Total amount disbursed (in crores)
Shishu	3,57,17,217	1,09,222.18
Kishore	29,88,307	25,160.37
Tarun	3,97,825	8,463.68
Total (Women Entrepreneurs)	3,91,03,349	1,42,846.22
Total	18,38,90,080	9,45,805.90
Percent share of Women Entrepreneurs	21.26%	15.10%

(Source: GOI; PMMY Portal)

Analysing the above tables (Table 5 and 6) it may be concluded that under "Shishu" category though the share of Haryana is 17.91% as far as number of accounts are concerned but the share of actual amount disbursed is only 1.82 percent of overall disbursed amount in the country under the said category. Under "Kishore" 2.15% of accounts are in Haryana and 2.5% of total loan disbursal is in these accounts. Percentage share of Haryana as far as "Tarun" category is concerned is more or less same as in case of "Kishore" that is 2.5% and 3.05% for number of accounts and loan disbursal respectively. As far as women entrepreneurs are concerned it is 21.26% in case of total number of accounts opened and 15.10% I case of total amount disbursed under PMMY scheme. Table 2 depicts that out of total number of accounts opened under women entrepreneurs category percentage of "Shishu" is highest i.e. 91%, followed by "Kishore" (10.19%) and "Tarun" (1.01%); the situation is similar in case of total amount disbursed: "Shishu" at 76.65%; 17.61% for "Kishore" and only 5.92% in case of "Tarun". This highlights the fact that as far as women entrepreneurs are concerned the focus is on micro and cottage industries, hence loan application trend is on applying for lower amounts as in "Shishu" upto Rs. 50,000 only. This trend is not only noticed in Haryana but in almost all the states in the country. No doubt women entrepreneurship is more dominant in cottage, micro, tiny and small scale industries only. Negligible number of women is engaged in large scale industries.

Success story of women entrepreneur in Haryana benefitted under PMMY scheme

Pushpa Palwal, initially engaged in an unsuccessful business of running a small tailoring shop, applied for small loan under "Shishu" category through HDFC Bank, Sonepat, Haryana. The total amount of loan that got disbursed to her was Rs. 30,201 with the help of this amount she started running a cosmetic shop and is now supporting family with ease.

Stand Up India Scheme

The said scheme has been launched by Government of India in 2016, for the benefit of SC/ST and women entrepreneurs for providing term loan and working capital loan between rupees ten lakh to rupees 100lakh. This loan is provided against a very nominal rate of interest, for a green field project for setting up a new venture in agri-allied activities, manufacturing, trading or services. There are a number of subsidy schemes under Stand up India Scheme:

- Mahila Coir Yojana that aims at women empowerment especially focusing on rural women in regions producing coir fibre.
- As a step towards women empowerment Government of India and the lending institution share the loan in the ratio of 30:70 of the project cost under Trade Related Entrepreneurship Assistance and Development (TREAD) as a loan to the women applicant. Besides this a grant of upto 1 lakh is provided to the training institutions and the NGOs by the Government for providing training to the women entrepreneurs.

As per States' Startup Ranking 2019, Haryana has been recognized as an "Aspiring Leader".

In a step towards upliftment and support to the women entrepreneurs the Haryana Government has provided a rental subsidy equivalent to 50%. This subsidy has been gramted to those start-ups that are led by women and are at incubation stage. Besides this a United Nation Technology and Innovation Lab (UNTIL) has been proposed under the policy.

Women Entrepreneurship Platform

WEP is an initiative of NITI Aayog that has been set up with an aim to support entrepreneurial aspirations on women from different parts of the country. The three pillars on which WEP stands includes:

ICCHA SHAKTI to motivate women to start their new ventures.

GYAN SHAKTI to upgrade the knowledge level and provide ecosystem to sustain and grow in the world of business and entrepreneurship.

KARMA SHAKTI to provide support to the entrepreneurs so as to broaden their horizons.

Under **WEP** entrepreneurs are provided supportive services such as credit ratings free of cost, women entrepreneurs are provided financial support, mentorship for budding entrepreneurs.

Currently, the Women Entrepreneurship Platform has more than 21,000 registered users and has ongoing programmes with 37 partners (30 existing + 7 newly approved partners whose on boarding are under process).

UdyamSakhi Portal for Women Entrepreneurs

Udyam Sakhi, an initiative of The Ministry of MSME seeks to provide encouragement to women entrepreneurs by assisting them to start, build and grow their venture. The various programs under the said scheme include incubation facility, mentorship, investment guidance, assistance in market survey and preparation of business plans. Besides this it also provides education, technical assistance, training and the required information from time to time.

As per a press release on Udhyam Sakhi Portal dated December 16, 2021 all over India a total of 2952 women beneficiaries are there and Government of India has spent around Rs 43.52 lakhs on the development of the portal.

Udyogini Yojana

In order to provide subsidized loans to aspiring women entrepreneurs from rural and underdeveloped areas Women Development Corporation implemented "Udyogini Yojana" in 2020. An interest free loan upto Rs 3 Lakhs can be availed of under the said scheme. This scheme is open to women from all sections of society aspiring for small businesses like bakeries, tailoring, incense stick manufacturing, groceries, fisheries etc. In order to make repayment easier for women the Government of India extends 30% subsidy. Besides financial support this scheme also extends training for skill up gradation to the beneficiaries. The scheme is available for women with a family income of Rs 1.5 lakh or less but for widows and disabled women it is without any income limit. Offered at very competitive interest rates, without any collateral security with NIL processing fees this scheme aims at overall economic

development of the country. With 7047 women beneficiaries, 5432 children supported under the scheme, 1698 villages covered and 53762 producers engaged (Lendingkart Technologies Pvt. Ltd.2021) Udyogini Yojana is stepping ahead towards the target of overall economic development.

Business Loan Schemes and Government initiatives for women entrepreneurs

The biggest obstacle in the success of any business is finance, in order to deal with this obstacle in the way of women entrepreneurs Central Government of India has launched various loan schemes wherein the beneficiaries can avail of loan facilities upto Rs 25 lakhs without any guarantee. Some of the startup business Government loan schemes for women entrepreneurs are:

Annapurna Scheme Any women willing or has started a catering service unit can avail a loan facility of up to Rs fifty thousand under "Annapurna Scheme" to purchase utensils, raw materials, kitchen essentials etc. (Mansur, 2021)

Dena Shakti Scheme Any Women entrepreneur engaged in micro small or medium enterprise dealing in agricultural, manufacturing or retail activity is eligible to take loan under this scheme. The loan is available through online platform and the beneficiary can avail an easy loan upto Rs 20 lakh (Rai, 2020). This scheme is offered by Dena Bank at a very nominal interest rate of 0.25%.

Cent Kalyani Scheme The scheme is launched by Central Bank of India and is available for women entrepreneurs engaged in MSME units, who are willing to start up a new project or going for expansion and diversification of the existing projects. To meet the working capital requirements and the capital expenditure beneficiaries can borrow upto Rs 100 lakh under this scheme on a very concessional rate of interest without the requirement of any collateral security or third party guarantee.

Bhartiya Mahila Bank Business loan Bhartiya Mahila bank business loan is a government loan that exclusively caters to women entrepreneurs. As a part of PM Modi's banking reforms, in 2017 Bhartiya Mahila Bank merged with SBI with a unique feature that supports women entrepreneurs in India. There are four types of business loans available under this scheme:

BMB Shringar for women between the age group of 20 – 60 years, engaged in the beauty business including beauty parlors, spa and saloons across India. The loan is available upto the tenure of seven years and that too without any collateral security.

Any Women under the age group of 18 – 60 years willing to start a catering business can avail loan under **BMB Annapurna Loan scheme**. The repayment period is three years without any requirement for a collateral security.

A loan amount upto Rs 20 Crore can be availed by a women running a small and medium scale enterprise under **BMB SME Easy scheme**. No collateral is required for loans upto Rs 1 crore and the repayment period is seven years.

For women willing to run a daycare centre for children may avail loan facility under **BMB Parvarish Scheme**. This loan is available for women between the age group of 21 – 55 years. The loan repayment tenure is five years and there is no requirement for any collateral security.

Stree Shakti Yojana With a view to support women empowerment Government of India has launched Stree Shakti Yojana that allows women to set up their own business by offering loans at a very concessional rate. This scheme is being run through the State Bank of India. Any women willing to start a new business in retail, manufacturing, service sector or a self employed woman like chartered accountant, architect, doctor etc are eligible to get benefitted through the said scheme.

TREAD (Trade Related Entrepreneurship Assistance and Development Scheme for Women) Under this scheme women aiming for entrepreneurship are provided training and counseling related to various products and services in addition to the basic credit facilities. These credit facilities are provided indirectly by the Government of India in the form of grant of up to 30 percent of the total project cost which is provided to the Non Government Organizations that in turn utilize the amount of grant for promotion of entrepreneurial activities among target group of women. The balance of the amount i.e. 70 percent of the

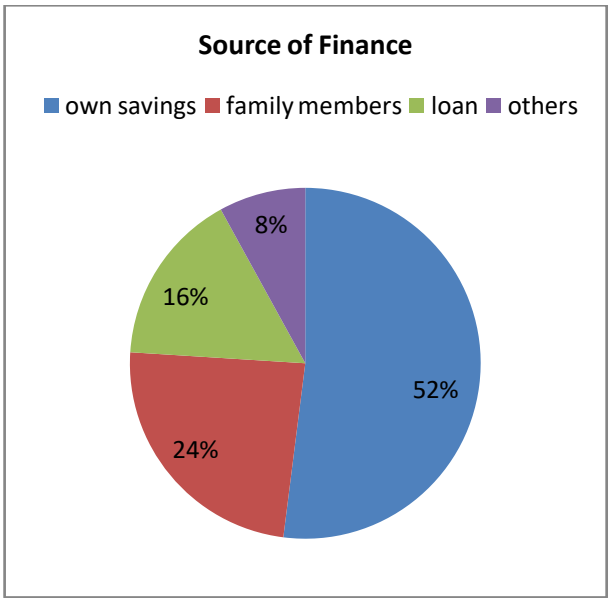
project cost is advanced by the lending agency itself for undertaking the activities as mentioned in the project.

Under TREAD the training institutions and the NGOs engaged in providing training facilities for the women beneficiaries are also eligible for a GOI grant of up to Rs one lakh per program. Besides this National Entrepreneurship Development Institutions are also eligible for a need based GOI grant of up to Rs 5 lakh per project.

Observations and Findings

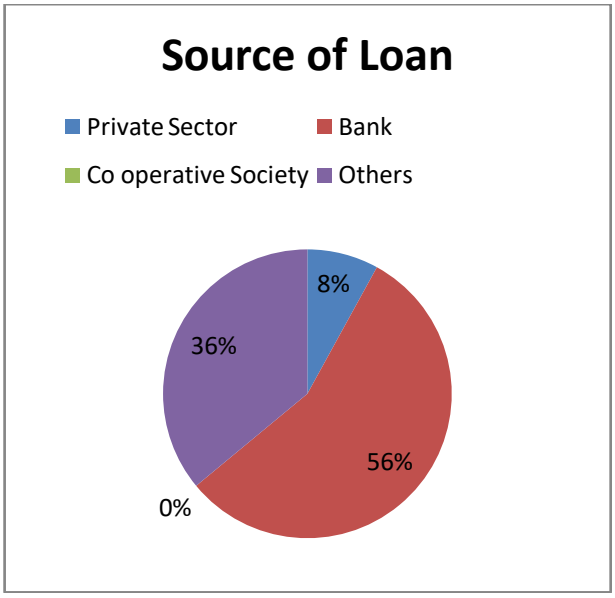
Based on the primary data collected through a structured questionnaire from around 300 respondents it has been observed that the main source of finance among women entrepreneurs in the various districts of Haryana is their own savings. More than half of the respondents voted for the said source followed by various borrowings from the family members. Only 16 percent of the women entrepreneurs have raised funds from the organized sectors in the form of loans. This show that even today in modern times when the world is talking about women empowerment and upliftment, women is not able to raise funds for its venture. Majority of the respondents when asked about the willingness to raise finance through the formal channels showed positive inclination but somehow failed to raise the finance despite having multiple opportunities and loan schemes in the market at their disposal by the Government and other institutions.

Table 7. Source of Finance



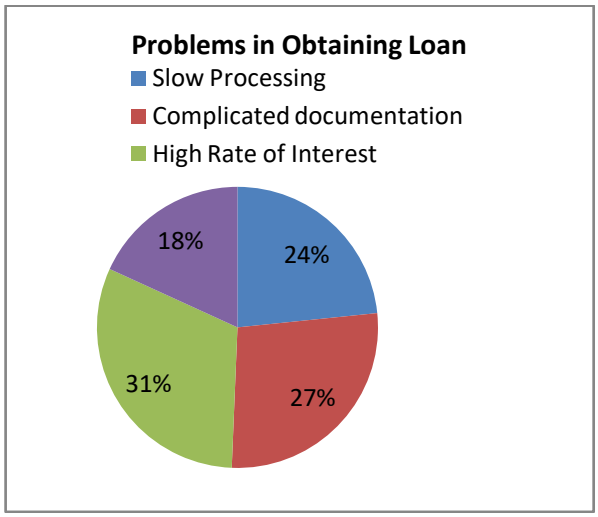
As far as source of loan is concerned majority of loan borrowing is through the various banks and the role of indigenous bankers i.e. mahajans and shahukars is only 12 percent which is a positive sign and an indication of dominance of formal banking sector in the economy.

Table 8. Source of Loan



Though the most dominant source of finance is organized banking sector but there exists several problems while raising the finance. High rate of interest ranging 7.50% to 7.75% seems a problematic area that needs to be addressed. Though there are a number of loan schemes especially designed for the women entrepreneurs but the processing charges and the hidden charges make it expensive for a common person. Complicated documentation is another problem in an economy dominated by non technical and less educated population. This calls for a professional assistance and a government appointed advisor exclusively dedicated to address this problem. As far as slow processing of the loan application is concerned, there is a need for single window clearance scheme for all the loan applications wherein women entrepreneurs are involved.

Table 9. Problems in obtaining Loans



As per Government initiative is concerned there are a number of schemes and training programs to assist the women entrepreneurs in almost all the sectors of the economy. But the irony is that most of the population among the beneficiary list is unaware of the same. As far as Training programs are concerned majority of the targeted population has never attended any. There is a strong need for some awareness drives and seminars/ webinars so that the targeted group drives benefits out of it.

Table 10.

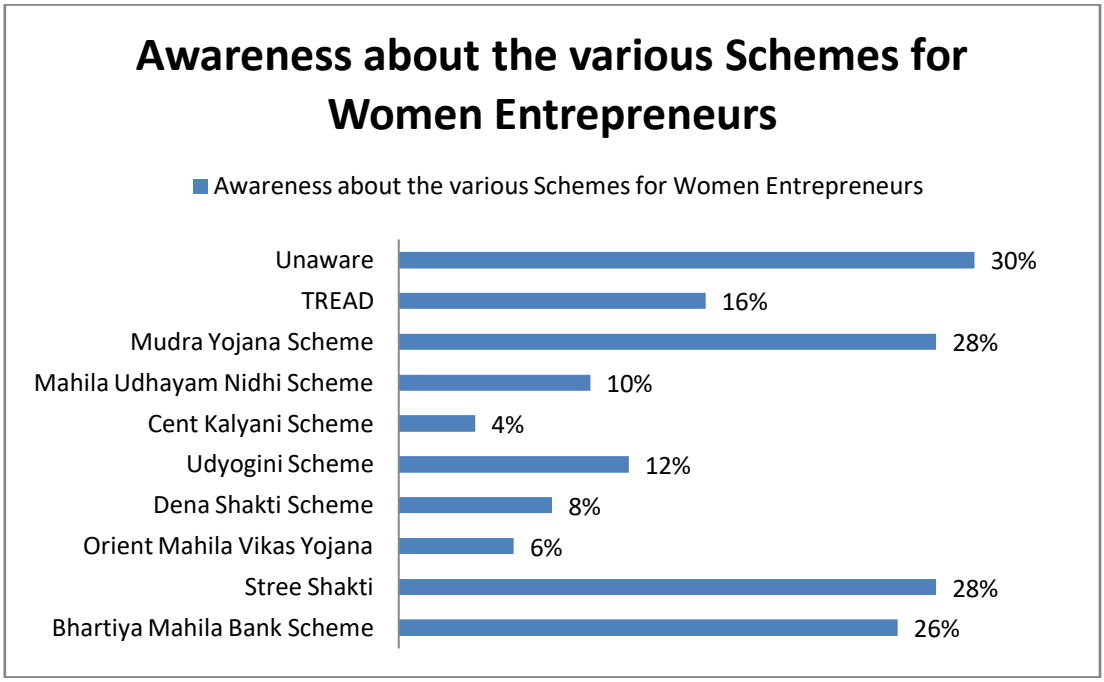
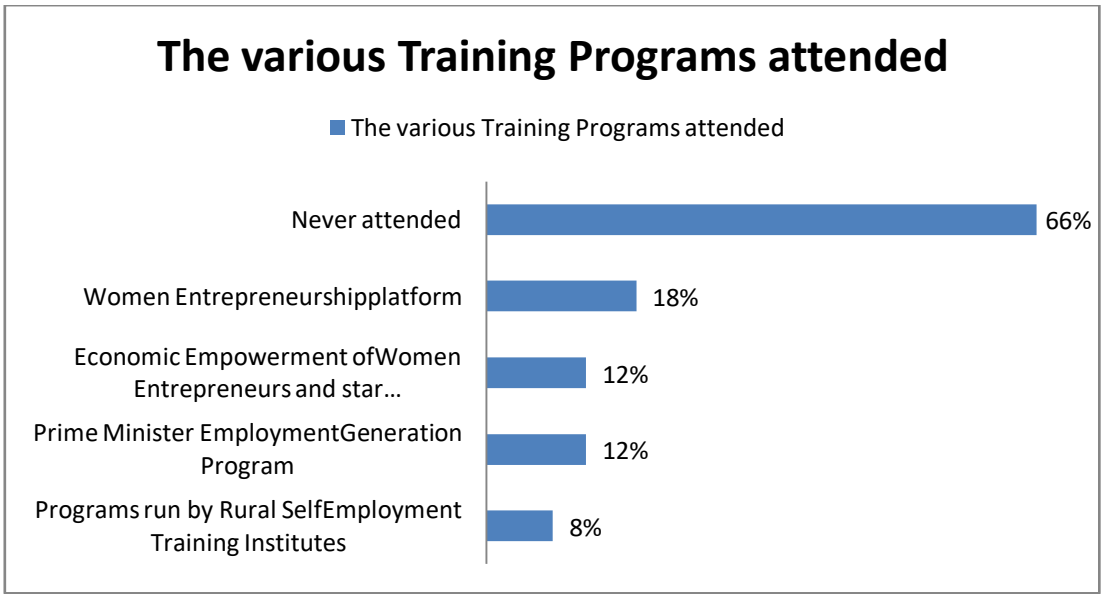


Table 11



Conclusion

Though Indian economy has witnessed a sharp increase in women entrepreneurship but the state of Haryana still lags behind. Backwardness orthodox and gender biased society being the main reasons for it. Economic growth, innovation, progress, employment creation calls for full utilization of human resource and women constituting almost half of the total population cannot be ignored. The entrepreneurial opportunities for women need to be increased with a supportive environment for their chances of success. In order to harness the confidence of new start-ups in women entrepreneurship it is hereby suggested that in parallel to the concept of Industrial theme parks, and special economic zones there must be a specialized and demarcated area for women entrepreneurs with all the incubation facilities and growth oriented activities and assistance.

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HYBRID MODEL FOR EMAIL SPAM PREDICTION USING RANDOM FOREST FOR FEATURE EXTRACTION

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ABSTRACT

The advent of worldwide web has changed the way of communication amongst people, and has driven the expansion of new communication amenities, for example, electronic mail (email). It has now turned out to be an indispensable constituent of the communication framework of multiple businesses and merchants. Nevertheless, this technology has also a weakness that nasty people misuse this "free" mail structure by delivering the redundant mass volume of messages, gain revenues, or steal personal data or IDs, thereby harming users.The proposed model is executed in diverse stages such as to pre-process the data, extract the attributes and classify the data. In this work, the novel framework is proposed to perform the email spam prediction. The proposed model implements the random forest in order to extract the features. Eventually, the spam is predicted using logistic regression model. The proposed model is implemented in python using anaconda.

Keywords: *Email Spam, Random Forest, Logistic Regression, Feature Extraction*

1. Introduction

The advent of Word Wide Web has changed the way of communication amongst people, and has driven the expansion of new communication amenities, for example, electronic mail (email). It has now turned out to be an indispensable constituent of the communication framework of multiple-businesses and merchants [1]. Nevertheless, this technology has also a weakness that nasty people misuse this "free" mail structure by delivering the redundant mass volume of messages, gain revenues, or steal personal data or IDs, thereby harming users. Such people focus on controlling security and reliable identification lapses whose generation is done in the existing E mail communication model in which SMTP (Simple Mail Transfer Protocol) is utilized, which lacks the ability to validate the source of email at the user or mail server end [2]. The existing structure of SMTP is exposed to misuse, as any correspondent can forge their identity and transfer emails comprising any content of their choice to any addressee. Such abuse of E messaging infrastructures to casually deliver redundant emails is known as "spamming".

A surge in the number of spammers and spam emails has been noticed in recent years, as the investment required for the spamming business is minimum [3]. This has led to a system that finds each email suspicious, causing substantial investments in defense mechanisms. The most commonly used mail filtering schemes are KE and ML. The approaches based on KE generate a set of rules so as to classify messages as spam or genuine mail [4]. A general rule like this might be like "If a message has the text 'Buy Now' in its subject, the message is "spam". Such rule set must be built by either of the two, i.e., by the filter's user, or by some other authority. The downside of this approach is that the set of rules needs to be regularly updated, and many users find it inconvenient to preserve them. In the latter case of machine learning, it is not required to explicitly specify any rules[5]. Apart from that, it needs a set of pre-classified documents (training samples). The classification rules are then learned from this data using a specific algorithm. This task is carried out in an efficient manner analyzing the notion of ML in which various techniques are contained.

Nowadays, maximum available data is incomplete that contain collective, noisy and missing values. The model to filter the email spam is planned on the basis of ML that is executed 3 phases. The data is pre-processed, feature engineering is done and the ML algorithm is utilized in these phases. The general structure to filter the email spam is illustrated in Figure 1.

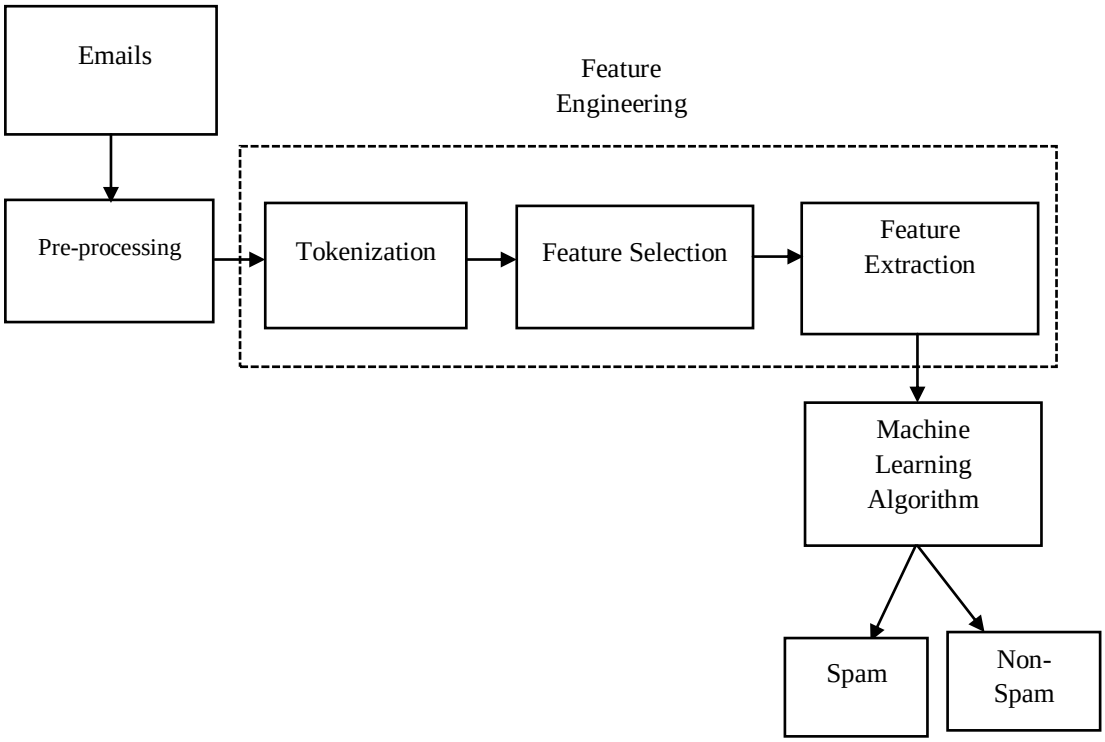

Figure1: Email Spam Filtering Architecture[6]

All the stages of this architecture are explained as:

i. Pre-processing: The major purpose of the initial phase is to pre-process the e-mails in which some words, and articles etc. are included. For eliminating from the email composition as these components are ineffective while classifying the email. This phase is executed when an email is received.

ii. Feature engineering: The second phase is considered as a process to make the decision in which some attributes are deployed for learning from a presented set of training instances. Every attribute is consisted of diverse values. Thus, each training example (a valid or email message) is mapped to a vector in a multidimensional space, which has dimension characteristics [7]. Feature engineering consists of three phases: tokenization, feature selection and feature extraction

iii. Machine Learning Algorithm: One of the most important parts in a document classification system is the learning algorithm. In the last step, machine learning algorithms are applied for e mail spam filtering. There is a wide range of learning algorithms for spam classification, including the probabilistic NB, KNN, DT, LSVM, etc. It compacts the index vectors that create a space with less dimension by uniting the original vectors with the pattern of words appearing together.

2. Literature Survey

Pranjul Garg, et.al (2021) analyzed that email spam was developed as obstruction for email administrations [8]. 70% of business mails found spam. The major focus was on recognizing the Spams and eliminating them as such spam generated offensiveness, deceived to other sites, improper content and those not specific with content through NLP (Natural Language Processing). NLP was an application of AI (Artificial Intelligence). Afterward, various techniques were put forward for managing the undesirable Spams and Spam filtering was one among these techniques. Researchers had investigated diverse mechanisms for detecting spams. Text classification methods such as tokenizing, stemming, Part of Speech-tagging and chunking were deployed for this purpose.

Ersin Enes Eryilmaz, et.al (2020) suggested an approach in which seven diverse ML (machine

learning) techniques were implemented on 800 Turkish e-mail datasets for detecting the spam [9]. The chi-square test was utilized to select the attributes within the suggested approach. The SMO (Sequential Minimal Optimization) had provided optimal results. The promising outcomes were attained from MLP (Multi-Layer Perceptron) after selecting the attributes using the information gain technique. The results exhibited that the SMO yielded the F-measure of 0.985 and MLP offered 0.984.

Tian Xia, et.al (2020) developed an algorithm to detect the complex spam for enhancing the throughout of filtering systems which were based on rules. The analysis of computational complexity of developed algorithm was done [10]. This algorithm had diverse stages in which a term was detected and logical operators of expressions were counted. The overall time complexity to detect the spam was found O(1). The speed of this algorithm utilized in the developed approach was not depending upon the rule size and its term vocabulary. The experimental outcomes depicted that the developed algorithm provided O(1) time complexity as rules for detecting the spam and its terms were maximized. The future work would emphasize on exploiting more methods for working on incremental rules and their vocabulary.

Ghada Al-Rawashdeh, et.al (2019) intended a hybrid WC and SA for optimizing the outcomes so that the accuracy of the task for selecting the attributes was enhanced and this approach to detect Spam was quantified [11]. The intended approach was trained using cross-validation. This approach was tested with the help of 7 datasets. Moreover, an optimization algorithm called WCFS was adopted and three kinds of ensemble with SA were deployed as a technique of selecting attributes. The comparative results demonstrated that the intended approach performed better as compared to others. The accuracy obtained from this approach was computed 96.3% and its F-measure was96.3%.

Huwaida T. Elshoush, et.al (2019) introduced two methods such as Adaboost and SGD with the purpose of filtering the spam emails [12]. The data was pre-processed using R tool. Orange software was utilized to deploy these methods so as the classification models were constructed. The experimental results obtained on Orange tool revealed that the TPR (true positive rate) obtained from first method was 100% and FPR (false positive rate) was 0.1%. The latter algorithm provided TPR of 98.1% and FPR of1.9%. These algorithms provided superior accuracy in contrast to other techniques to filter the email spam.

Patrice Samuel Rompas, et.al (2018) formulated an innovative model so that the email was filtered with the purpose of securing the confidential documents [13]. There were 3 portions of this model: sample architecture, a delivery approval system and an email filtering agent. The major objective of network architecture was to check outgoing emails. The second portion focused on the concept of multilevel security for ensuring that the document was kept confidential and provided the system according to the requirement. The email filtering agent was a modification of a program known as Amavis utilized to classify the document and filter extra attributes. The testing phase was executed for the authentication of the functionality of the agent in this architecture. The results indicated that the formulated solution was capable of securing the confidential documents when normal email delivery was handled.

Shengnan Wang, et.al (2018) recommended a fast content-based algorithm with FSVM and KMC to filter the spam [14]. Different from the classic algorithm, the k-means algorithm assisted in differentiating the mail as spam or normal. This algorithm was useful for compressing the data in accordance with the similarity rules. Thereafter, the classifier was trained using FSVM. This algorithm was efficient for tackling the uncertain factors. The outcomes attained in experiments validated that the recommended algorithm was applicable for enhancing the process to filter the email spam such as it mitigated the time usage and maximized the accuracy rate. In future work, metrics would be enhanced in the recommended algorithm.

M. K. Chae, et.al (2017) projected a hybrid technique in which model of classifying an email is employed as a major algorithm whose respect was given through calculating the IG for the maximization of accuracy during classifying the spam [15]. The projected

approach was executed in three stages such as to pre-process an email, extract the attributes and to classify an email. An analysis indicated in that LingerIG filter was more effectual for splitting the spam emails from the cluster of homogenous work emails.The results obtained in the experimentation revealed that the projected technique yielded precision of 100%while filtering the spam. The analysis indicated that the suggested approach had provided the feasibility. The experiments exhibited that the projected technique was capable of enhancing the process to filter the spam.

3. Research Methodology

E-mail is a considerable mean to communicate with other users. The email provides an efficient way to forward millions of advertisements with no cost to the sender. The unfortunate fact is, nowadays, this scheme is adopted in various organizations. As a result, an enormous amount of redundant emails is known as a spam or junk mail due to which several people are confused with the emails of their e-mailboxes. The spam can be forward without any expenditure. Hence, Internet community faces this issue.

Diverse stages,which assist in predicting the email spam, are defined as:

A. Data Acquisition: The experiments are executed on the data collected from variousclinical organizations.

B. Data preprocessing: The data is preprocessed for ML (machine learning) methods to implement completeness and to analyze the data effectively. This stage focuses on transmitting the clean and de-noised data in the process of selecting attributes. For this, the unnecessary attributes are eliminated from the dataset to boost the effectiveness of the training system.

C. Feature selection: This phase employs a subset, in which extremely unique attributes are contained, to predict the email spam. These selected attributes are related to the existing class of features. The introduced algorithm makes the deployment of RF (Random Forest) to select the attributes. 100 is taken as the estimator value, and this value and tree structure of the most applicable attributes is created using RF. The algorithm selects appropriate attributes to predict the email spam.

D. Classification: The selected attributes are mapped into the training model so that provided features are classified in order to prediction the email spam easily. Every individual class is utilized to denote a category of email spam. The emails are classified using LR (logistic regression) model.This model requires less training data as it provides higher scalability. Predictions and increasing the number of discrete units of information do not create any bottlenecks. This algorithm is effective for tackling the issue related to classification in which two or more classes are contained. The hypothesis of LR is expressed as:

$$h_\theta(x) = g(\theta^T x)$$

Where, the function g is utilized to define the sigmoid function. The extracted attributes are considered as an input in this model. This research work has classified the email data as: spam and no spam.

4. Result and Discussion

This research work is based on the email spam detection. The proposed model is the hybrid model in which RF is integrated with logistic regression. The dataset is collected from the Kaggle. The dataset contains 5172 instances and two classes which are spam and non-spam. Python is executed to implement the presented model and diverse metrics, like accuracy, precision, recall, are utilized to analyze the results.

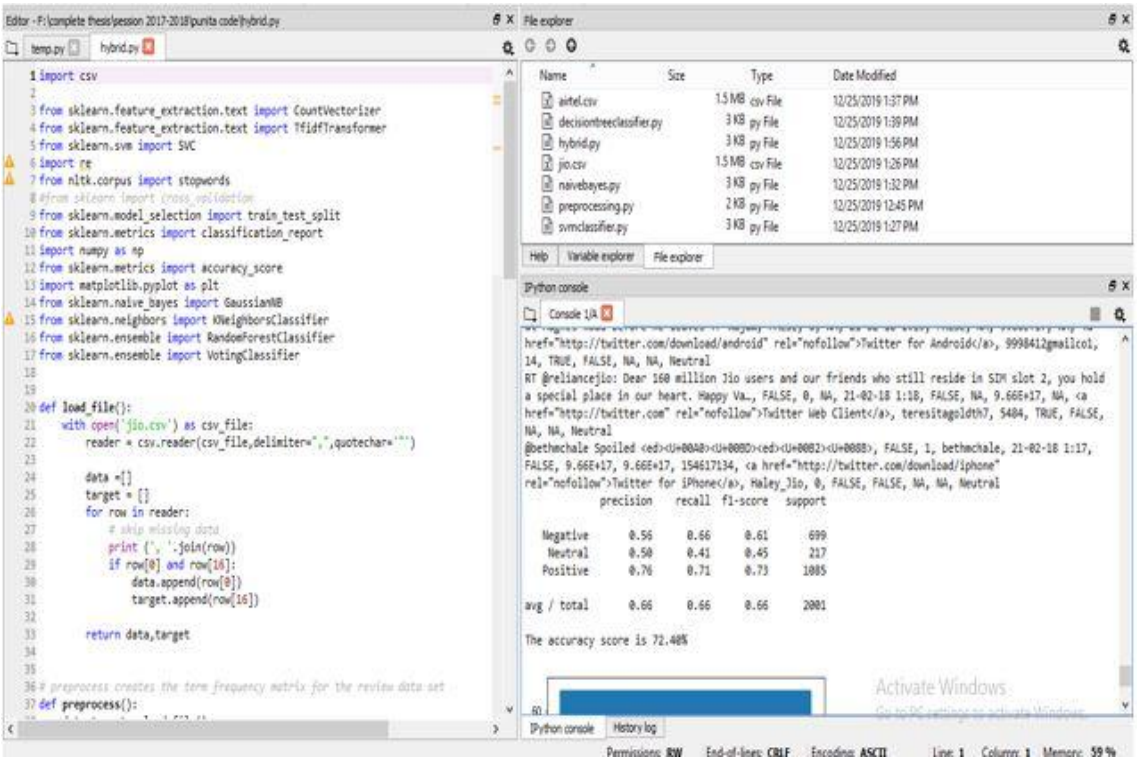

Figure 2: Proposed Model

As shown in figure 2, execution of the proposed model is represented in which RF is put together with logistic regression. The presented model shows high accuracy of 75 percent approximately.

Table 1: Accuracy Analysis

Parameter	Naïve Bayes	SVM	Decision Tree	Proposed Model
Accuracy	47.68 Percent	65.62 Percent	62.12 percent	72.48 percent
Recall	0.48	0.64	0.62	0.66
Precision	0.64	0.65	0.63	0.66

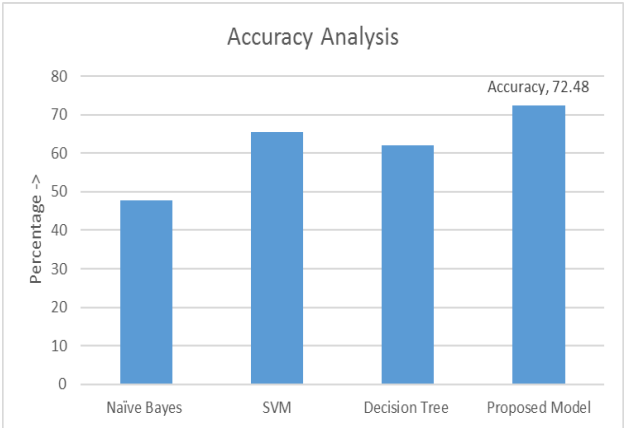

Figure 3: Accuracy Analysis

Figure 3 exhibits the comparison ofseveral models with the proposed model to detect the email spam concerning accuracy. The proposed model achieves accuracy of 72.48 percent.

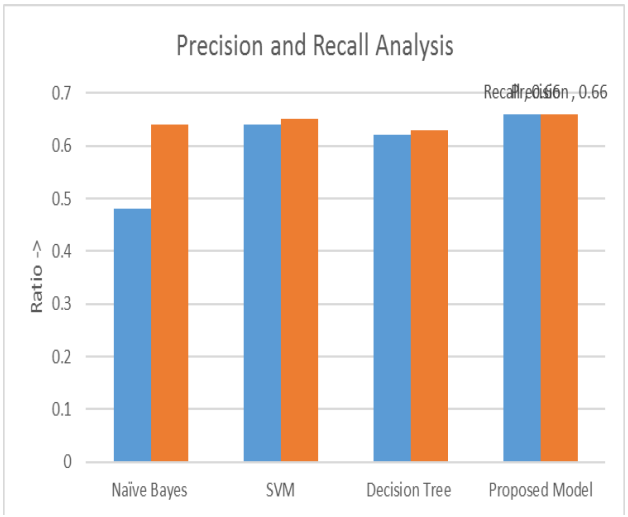

Figure 4: Precision-Recall Analysis

Figure 4 demonstrates the comparison of the proposed models with other models like naïve bayes, SVM, Decision Tree on the basis of precision and recall. The values of precision-recall values are achieved upto 66 percent.

5. Conclusion

In this work, it is concluded that a surge in the number of spammers and spam emails has been noticed in recent years, as the investment required for the spamming business is minimum. This has led to a system that finds

each email suspicious, causing substantial investments in defense mechanisms. This work introduces a model to predict the email spam. The introduced model is based on the random forest and logistic regression. The random forest model is used for the feature extraction and the email is classified using LR. Python is executed to implement the introduced model and the various metrics are considered to analyze the outcomes. The proposed model offers improvement in accuracy upto 5 to 10 percent. In future deep learning models can be applied for the email spam prediction.

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EXAMINETHE PROFESSIONAL COMMITMENT OF TEACHER EDUCATORS AT THE COLLEGES OF EDUCATION IN PUNJAB

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ABSTRACT

The main resolution of this study is to measure the professional commitment of teacher educators at the Colleges of Education in Punjab related to specific categorial variables.Approximately 250 samples are extracted using a systematic random sampling technique and the selected samples are categorized by gender, region and marriage status.In this study, the "Professional Commitment Scale for Teacher Educators (PCSTE) was developed by Dr. Vishal Sood (2011) is used to collect data from teacher educators". The standardized tools were used and the data collected was subject to a mean-difference, study found that married teacher educators teach better and more loyal than unmarried teacher educators at the Colleges of Educationin Punjab**.**

Keywords: *Professional Commitment, Teacher Educators, Mean Differences& Punjab.*

1. Introduction

If a person is dedicated to his profession, he will perform his duties with dedication and effort. According to Arya (2012), a teacher's professional commitment is to dedicate individual time and dedication to his profession. Teaching is such a profession that requires not only relationships with organisations but also with many other players such as parents, students and colleagues. As such, professional commitment is persuasive to both teachers and the education system. Improving the quality of education is the need of today's era.

"Skidmore (2007) well-defined enthusiastic educators are those trainers who are":

a) Commit to developing oneself professionally by pursuing progressive degrees and standards-based specialized development prospects;

b) Engage in critical reflection in repetition by seeking expressive feedback, discussion and participation in accomplishment research;

c) Advance the education profession by creating specialized knowledge groups and faculty contributions to leadership positions.

Professional efforts enhance teachers' ability to consider the needs of their students and provide a variety of teaching methods and skills. They try to schedule meaningful tasks that involve each student. It also helps teachers learn new strategies and engage in professions by learning new technologies and strategies to improve the quality of education. Today is the age of technology. Therefore, to address the era of technology, teachers will learn new skills, enabling students to learn higher levels of skills to think critically, collaborate, communicate and make their own decisions. is needed. All this can be achieved with expert commitment.

1.1 Teacher Educators

A teacher educator is an educator who helps others acquire the knowledge, abilities, and attitudes they need to become effective teachers. There are usually several individual teacher educators in each teacher's initial or in-service training. Teacher educators can be narrowly defined as university professionals whose main task is to train younger teachers in other teacher education institutions, such as universities and teacher training institutes. A broader definition may include professionals who do work that in some way contributes to the initial training or continuing professional development of schools and other teachers. Teacher educators include pre-service teacher educators, trainers providing training and development workshops and programs for teachers, trainers providing in-service training and development for in-service teachers, teacher education and support teachers or trainees, developers and educators, educational researchers, leaders.

1.2 Professional Commitment

The teacher's spirit, combined with his profession, is characterized by consistency, professional loyalty, professional abilities, and compliance with professional standards and ethics. The teaching profession requires a commitment. Effective educators need to focus on their entire educational career, not just their students. This means accepting teaching principles and requirements in accordance with rules and regulations.

Teacher commitments help distinguish between those who are committed to a major and those who are not. An individual who is devoted not only to students and schools, but also to lifelong learners who are devoted to the teaching profession.

1.3 Professional Commitment of Teacher Educators

The professional commitment of teacher'seducators is to act accordance with specific established and recognized rules and norms, primarily including students' teachers, society, profession, pursuit of excellence and basic human values.

2. Literature Reviews

Kohli (2005) conducted "a survey on the professional commitments of Punjab teachers and educators and found that there was a moderate level of professional commitment among Punjab teacher's educators".

Kumar (2012) collected data on 350 teachers from four districts, to study the relationship between teacher thinking style, teacher effectiveness, and professional involvement. "The findings suggest that there is no significant correlation between the professional commitment and job value of teachers working in teacher training institutions". In addition, there is a significant positive correlation between the professional commitment of teacherstraining institutions and their thinking style.

Gupta and Jain (2013) "examine the professional efforts of teachers and educators by region, gender, and educational background". The results showed that the professional commitment of teachers and educators did not differ significantly by region or gender.

Malik and Rani (2013) investigated the relationship between the professional efforts of secondary school teachers and their educational attitudes."Data were collected from 100 secondary school teachers in public and private schools in the Gurgaon district of Haryana. The survey found that there was a significant link between professionalism and educational attitudes across gender, community, government, and independent schools".

Choudhary and Arora (2015) conducted a survey in Punjab entitled "Teacher Commitment and Teacher Effectiveness". Data are from 200 teachers in the Moga and Ludhiana districts. The findings showed that the region, gender, and region did not affect the commitment of junior high school teachers. It was found that the effectiveness of teachers in secondary schools in Punjab does not vary by region, type of institution, or gender.

Sawhney (2015) conducted a survey on the professional efforts of secondary school teachers related to school locations. The results show that there is no significant difference in the professional efforts of middle school teachers in urban and rural areas. However, percentile-based analysis showed that local teachers were more active than urban teachers.

Bala (2017) conducted a survey on the professional efforts of school teachers in Punjab. "The findings suggest that there are significant differences in professional efforts between male and female teachers, with women having an advantage over male teachers".

Alam (2018) investigated differences in professional commitment among secondary school teachers in certain demographic variables. "The study sample consisted of 111 randomly selected teachers teaching in public and private secondary schools in Aligarh (UP)". The results showed that: "There was a significant difference in the professional commitments of secondary school teachers regarding gender and school type, but there was no significant difference in professional commitments between rural and urban secondary school teachers".

Ambrish and Azkiya (2016) conducted "a comparative study of secondary school teachers' professional efforts in gender and discipline". They said the professional efforts

of female secondary school teachers were superior to those of male secondary school teachers. However, there was no significant difference in the case of area.

3. Statement of the Problem

"Examine the Professional Commitment of Teacher Educators at the Colleges of Educationin Punjab"

4. Objectives

1) To find out Gender differences of teacher'seducators in Punjab regarding their professional commitment.
2) To find outrural-urban differences in the importance of professional commitment of teacher's educators in Punjab.
3) Tofind out the differences in importance of professional commitment of teacher'seducators in Punjab by marriage status.

5. Methodology

The subjects of this study are teacher educators teaching in various educational colleges in Punjab.The sample for this study was 250 teacher educators in the teaching population of the Punjab Institute of Education. In this study, "the Professional Commitment for Teacher Educators (PCSTE) byDr. Vishal Sood (2011) was used to collect research data". The primary purpose of this scale is to measure and evaluate the level of commitment of teacher educators to their profession.

6. Research Analysis

Table1.1 Mean difference in professional commitment among Male & Female of Teacher Educators of Punjab

Category	N	Mean	S. D	t-ratio
Males	125	173.17	14.06	
Females	125	170.2		1.68 Not significant at 0.01

Table 1.1 shows the average variance in professional commitment between male and femaleteacher educators in Punjab. The T ratio is showing 1.68, which indicated that gender - wise there is no variance in career commitment. Thus, research hypothesis states, "There is no significant variance in the professional commitment of male and female teacher educators".

Table 1.2 Mean difference in professional commitment among Rural & Urban Teacher Educators of Punjab

Category	N	Mean	S. D	t-ratio
Rural	125	167.14	15.97	
Urban	125	167.74		0.29 Not significant at 0.01

Table 1.2 shows the average difference in professional commitment between urban and rural teacher educators in Punjab. The T ratio is 0.29, which is not significantly different. Therefore, research hypothesis concluded that there is "no significant difference in professional commitment among Punjab teacher educators" which is accepted.

Table 1.3 Mean difference in professional commitment among Married & Unmarried Teacher Educators of Punjab

Category	N	Mean	S. D	t-ratio
Married	125	172.35	15.31	
Unmarried	125	166.66		2.96 significant at 0.01

Table 1.3 shows the average difference in career commitment between married and unmarried teacher educators in Punjab. The T ratio is 2.96, which indicates a significant difference in teacher educators in Punjab. As can be seen from the above table, married teachers'educators are more dedicatedthan unmarried teacher educators in Punjab.

7. Conclusion

The outcomes of the study are:

- Gender-wise, there is no significant difference in career commitment among Punjab teacher educators.
- Area-wise, there is no significant difference in career commitment among Punjab teacher educators.
- There are significant differences in professional commitment between married and unmarried teachers and educators in Punjab. It is empirical that a married teacher's educator is more enthusiastic than an unmarried teacher's Punjab educator.

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STUDY THE FACTORS THAT DETERMINE MIGRATION OF STUDENTS FROM PUNJAB

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ABSTRACT

The main objective of this research paperis to identify recent immigration trends, causes and impact on student life in Punjab. Research shows that the main reasons are the growing desire of young people for better living conditions, the pursuit of a less-struggled path, the attraction to a better system free of corruption, misunderstandings and money-making advisers. Created a wonderful dream of success, distrust of the current Indian education system that offers degrees but no jobs. Social media is often exaggerated to attract people in countries of origin by raising awareness about living conditions in the rich world. Diaspora connections also play an appealing role. Going abroad to find opportunities is not a bad thing, but blindly jumping into the crazy competition to study abroad and settle down without knowing the real situation of the earth brings disaster and fuss to students. Students looking for career opportunities abroad do not invest their parents' hard-earned money into their dreams, but instead seek out, analyze and prepare for the facts, requirements and possible obstacles they may face. However, you need to take a practical approach. Lack of information and preparation can be a nightmare. Applicants should also plan and weigh the pros and cons of immigration rather than being swayed by the success stories of relatives and friends who have settled overseas.

Keywords: *Migration, Punjab, Factors, Students*

1. Introduction

India is the second largest student dispatching country in the world after China, and the number of Indian students abroad has quadrupled in the last 14 years. Student migration of this size is a major source of Indian capital and brain drain, while providing significant benefits to the economies of developed countries. 90% of the student movement from India is concentrated in the five countries where the United States is by far the largest host country, accepting more than half of the expatriates of Indian students, followed by Australia and the United Kingdom.

It seems that several factors are working to drive the large flow of students across the Indian border. These can be broadly divided into two groups.

International Development: Includes elements such as the technological revolution. Globalization of education. Global demographic trends; and most importantly, prioritize already skilled labor migrants for additional income earned in terms of fees that contribute significantly to internal subsidies for the education of domestic students in developed countries. That is. Actively hiring international students is a change in policy.

Domestic situation: Widening output gap in higher education. National regulatory framework; rising income levels; availability of educational loans, India's middle-class desire to move to developed countries. Desperate to gain access to quality education to climb the ladder of society.

"The Indian government is a little late, but is waking up to the problem of student outflows. This is highlighted in the 11th Plan 5 Annual Plan (2007-2012) and the 12th Plan 5 Annual Plan (2012-17), stating: (Government of India, 2012)". Recently, some state governments such as Karnataka, Andhra Pradesh, Maharashtra, Tamil Nadu and Haryana have also been involved in the struggle for the education business. These states are working towards establishing an "educational city" and a "special education zone." The government also greatly encourages private participation in India's education sector.

Currently, the private sector accounts for more than one-third of general registrations and about four-fifths of professional education registrations. For engineering and business schools, the private sector occupies about 90 % of the seats. "In medical education, the proportion of private sector seats increased to about 55% in 2013. Since 2002, private deemed universities have grown by more than 100%, but now the government has stopped giving any institution the status of a deemed university. In addition, private universities

established under state law have grown significantly from zero to 200 in 2014. Over the last decade, the Indian state seems to have allowed an average of about 20 universities to be established annually (see UGC 2015)".

"Indian universities are also encouraged by the government to invite foreign students to enroll. Universities have responded by tailoring courses to international requirements, appointing overseas agents, and publishing offers widely in the media (Kaul, 2006)". As a result, the number of trickles of international students in India is slowly but steadily increasing, accepting only about 7,000 international students in 2002 and reaching about 12,000 in 2008.

High school education is a very important turning point in personal life. This is similar to the General Certificate of Education (GCE), which is the level of school education in countries such as the United Kingdom. At this stage, youth / youth academic performance plays an important role in determining the next higher stage of education, and perhaps also in career (Rosa and Preethi, 2012). At this stage, students and their parents are very worried about their future, especially their careers and settlements. They are susceptible to all such lucrative, whether they choose to crack IIT admission in India non-medically or get an offer from a foreign university (the second option is Easier and less competitive). Students' abilities, aptitudes or grades in the field are in the backseat. The focus is on getting the desired percentage by hooks or scammers to qualify to reach pre-planned destinations. This all brings undue stress to students who are conditioned by their parents, friends and relatives towards goals that they themselves do not have a clear perspective on. The only motivation, though often exaggerated, seems to be recognition of the living conditions of a prosperous world. Various agents claiming guaranteed seats in foreign universities add fuel to the fire. Students with parents who are confused about their plans for the future are even more embarrassed when they are shown the poor job opportunities and plights of futureless educated adolescents in India. They become anxious and can therefore be easily tempted by these scammers to make a large investment to get a seat at a foreign college in a foreign land that their parents are completely unaware. They only know what they were told by the agent. They themselves are not familiar with cross-checking what they are saying. The problem is not that simple. This is because some students can succeed or at least move to a relatively smooth lifestyle that motivates tens of thousands of other students, and thus the transition process continues.

Studies by scholars at the University of Punjabi on the socio-economic profile of people seeking research visas provide new insights. About 70% of volunteers in the Malwaregion claim to come from the agricultural community. It also comes from a marginal category, the impact of a persistent agricultural crisis and poor job prospects. So why not move from the country if the move from agriculture is long-term support for the family? Family resources may be limited, but if migration for education is the answer, why question the odds? At the IELTS Center, there are more female students than males. This is a sign of newly discovered self-confidence, a generation tired of waiting for something to happen. Another important finding is the existence of almost negligible research visas for people from the SC community, due to lack of funding rather than dreams.

2. Objectives of study

1. To study the recent trends of migration of students from Punjab.
2. To find out the major problems faced by the students.

3. Research Methodology

This study is purely descriptive in nature. Only secondary data is used in this research paper. Secondary data was obtained from various journals, research papers, organizational publications, World Bank reports available online, and more. Readers can trust the secondary data because it has already been approved, published, and published and cannot be challenged.

4. Research Findings

4.1 Factors promoting migration

The factors that work together and determine the final decision of the migrating individual are the macro element (mostly independent of

the individual) and the meso- element (more closely related to the individual but under the control of the individual) and can be subdivided into microelements which describes more extensively studied (individual characteristics and attitudes). Despite being home to a world-famous university, India is currently ranked second for students studying abroad.

Admission convenience

Admission to India's top educational institutions is highly competitive, as hundreds of thousands of students do not pass advanced secondary exams each year and seats available are very limited. IIM (Indian Institute of Management), IIT (Indian Institute of Technology) and AIIMS (All Indian Institute of Medical Sciences) are one of India's dream schools. Since the number of seats is very small compared to applicants, it is necessary to deal with the stress of facing entrance exams in specific fields such as the joint entrance exam for the Faculty of Engineering (JEE main story) and national qualifications / entrance exams. (NEET) For medical colleges. One study found that, on average, students are less than 10% likely to secure admission to the reputed IIT. As a result, students who are not guaranteed admission should consider the final option of studying abroad. The increasing number of students from India chooses to study abroad because it is relatively easy to enroll in a higher foreign school.

More research and study options

In India, both parents and governments are more focused on scientific subjects. Much has not been done to popularize liberal arts, and areas such as psychology, art, filmmaking, and animation have not been explored much and are therefore less publicized. Nepotism reigns in these areas, and students are generally unaware of the opportunities available and the ways and places to explore. On the contrary, in countries such as the United States, United Kingdom and Canada, there are various courses available to international students. Schools in these countries offer courses in the most modern and unconventional disciplines such as entertainment, sports and psychology. Not only can you get a degree in your chosen field, but you can also get a job in the same field.

Practical approach of Education

In India, the education system still follows the old McCorley way of doing things, with an emphasis on memorization that is far from the actual work challenges. Some governments sought to introduce project creation and activity-based learning to reduce pressure on students, but eventually grew rapidly to support students, thereby giving them a basic spirit. Became a victim of the small project creation industry that destroys. Teach the learning process. Due to the lack of an appropriate system of practical approaches in the education system, there is a large gap between the actual requirements of college education and work. According to one survey, the majority of Indian graduates are believed to be unemployed due to lack of necessary skills. In contrast, overseas schools encourage students to actively learn through off-campus and on-campus hands-on experiences that make class participation, dialogue exchanges, case studies, and learning fun and meaningful. Engage. In addition, the flexibility to tailor the course to the student's interests and the freedom to work part-time while studying enhances the overall appeal of obtaining a degree abroad. The United States has a strong culture of innovation and technology, whether you're studying healthcare, artificial intelligence, or even finance.

Employment opportunities

After receiving the necessary education, many countries offer good employment opportunities to retain well-trained engineers, doctors and professionals. It can be seen that 90% of international students work abroad to earn money and settle down. This boosts the economy of the host country. In addition, studying abroad paves the way for the immigration of bright students.

Research opportunities

Despite 70 years of independence, Indian universities have been unable to provide students with facilities for research, but they are getting such opportunities as well as employment in overseas research fields.

4.2 Major difficulties faced by students overseas

Students who want to go abroad are sometimes desperate and prey to scammers who promise to enroll in a good university or do the right job, but let the money go and let the students themselves.Students who have no connection to foreign countries face many problems, especially in the early days.

Hardships to make both ends meet

After paying the first installment of the admission fee, the student must work to earn daily expenses. Increasing student pressure has intensified job competition, for example in Canada, which costs significantly more than in the United States. Students are required to work 5-6 hours daily to fit the ends together. On top of that, they need to take advantage of relatively cheap accommodation, which is available far away from work. They need to attend college for 5-6 hours each day, then travel about 100 km, work 5-6 hours, and return to their apartment to prepare for the next day. They forget the time and date of the struggle to survive, and some students have never returned to India when they were 18 to 20 years old. Many young people in Punjab cannot withstand the pressure and cannot return to India. Leave the course on the way

Communication barrier

The Indian accent is very different from the English spoken in foreign countries, which leads to major problems of proper communication, leading to communication errors and troubles.

Mistreatment by employer

Intensifying employment competition between students lowers wages and increases working hours, which in turn increases student hardship. Easy access to a cheaper workforce reduces the quality of working conditions and worsens the student situation.

Second-class citizen

Immigrants are treated as second-class citizens in many countries after obtaining permanent residence in the host country. As a result, many immigrants return to India and quit their well-established businesses and high-paying jobs. Most NRIs do not sell their property home because they are afraid to lose land on foreign land.

Racism

Racism is one such problem faced by most Indians abroad. There is no way out, as the indigenous peoples of the host country cannot change their mindset. In addition, they are considered challenges and competitors by natives because they are more intelligent and competent in their workplace.

Culture differences

In a foreign land, learning everything in life is invalidated and appears to be invalidated, so cultural differences make people feel awkward. For example, the average Indian student grows up according to his parents, calling his neighbours, grocery stores, and merchants his uncle or aunt. People call each other by their first names, and in some cultures, when personal freedom is violated, they are very polite and at the same time not very tolerant and very shocking to Indian students.

Homesickness

Overly dependent and homely Indian students feel homesick after their first dream achieves exposure to foreign lands. This is very annoying and annoying for them.

5. Conclusion

In conclusion, migration flows are now a structural phenomenon that will likely continue for decades to come. India is rapidly modifying its system and will become the centre of economic activity over the next decade. In the modern era of globalization, the migration of students is not seen as a brain drain, but an asset, as bright Indians occupy prominent positions around the world, thereby exacerbating the influence of the Indian diaspora abroad. There may be some issues, but parents making an informed decision in weighing the pros and cons of an immigration decision may help plan a better future for their ward. Careful evaluation of the courses offered by the university, their viability in the job market, the validity of the agent's certificate, the validity of the immigration documents, and the difficulties students may face will help students succeed in the long term.

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THE IMPACT OF TWITTER AND RSS NEWS FEED SENTIMENT ANALYSIS ON STOCK MARKET PREDICTION

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ABSTRACT

Accurate stock market forecasting has been a difficult task in recent years. By merging the Sensex data with Really Simple Syndication (RSS) news sites as well as Tweets, the proposed approach allows obtain optimal precision in national stock exchange (NSE). For a certain time, the link is the focus of the algorithm between RSS feeds, stock price values, and tweet sentiments. For stock market prediction rates, this algorithm uses a trained model. The national NSE, tweets RSS news feeds, as well as RSS news feeds collected for the business stock price exchange from the NSE are the center of the experimental investigation (ASE). There are two types of hypotheses in this work. Null Hypothesis H0: Stock market prediction rate trends at an authorized rate of at least 70% above. Alternative Hypothesis Ha: Using stock market in conjunction with sentiment analysis of tweets as stock and RSS news feeds improves prediction accuracy. Our experimental study established a link between RSS news feeds, tweets and stock exchange, resulting in a 30 percent increase in accuracy.

Keywords*: Stock market intelligence, Stock exchange, Sentiment analysis, RSS feeds, Twitter*

I. Introduction

Stock prices are used as a fundamental metric in stock market forecasting. Clearly specified strategies are applied in order to generate a large profit. The most important the goal of this project is to reduce the number of inaccuracies stock price predicting with the assistance of analysis of how people feel different mathematically there are signs. Their accuracy, however, is questionable. In predictors, it's not very good. One method is to the prediction mechanism can be improved by considering public attitudes and moods as well as current happenings from the time period For Social media is great for recording person's opinions. In our situation, we take into account stock market-related tweets as well as RSS news sources. We do sentiment analysis on RSS news streams in capturing news events. The stock market is notoriously volatile, necessitating the use of a precise forecasting model. Because a stock produces a huge amount of data every day, it is quite difficult for a person to incorporate all historical information while anticipating future trends. The investment's belief is affected by this large volatility. Financial stock market movements are mostly influenced by news, social networking sites such as Twitter and Facebook, current events, and product releases, all of which have a significant impact on a company's stock value. For predicting market conditions, there are two typical methods. Fundamental analysis and technical analysis and are two types of analysis. To anticipate the future trend, technical analysis looks at everyday peaks and troughs, trend indicators, highest and lowest values of the day, indices past price and volume. The efficient market hypothesis, which claims the stock prices are essentially unexpected, reveals the capability of both fundamental and technical analysis. Stock experts can now offer their opinions via news articles and social media platforms such as Twitter and Facebook. The sentiment of these mass media has a significant impact on investment behavior. Twitter has recently been used to detect and forecast trading. The collected text can be as big as you want it to be. If this is the case, the feelings are appropriately classified, and their sources are identified. When polarization is properly assessed, it can be beneficial. In improving a group's profitability and performance. Its investors are pleased. The topic of this research study is the general mood, as reflected in large-scale polls Twitter postings and RSS news aggregated on a daily basis Feeds gathered from stock-related websites can be used in a variety of ways. It can, in fact, that forecast stock price. A new approach is offered for predicting buying and selling signals for stock market investors. By merging stock-related tweets and RSS news feeds using stock price, this paper developed a forecasting approach. Investors buy and sell their products based just on combined outcome

of opinions sentences collected from stock price, tweets, and news feeds of various stock linked indicators.

The following paper's structure: The second section contains a survey of related work. In Section 3, we'll go over how to get content via Twitter and RSS feeds. The architecture of stock market prediction in Section 4. The experimental results are presented in Section 5. Experimentation outcomes, Section 6 conclusion our findings and suggests areas for future research.

II. Related Work

The research investigates NSE prediction system that uses textual texts as input to generate price predictions. Outputs are movements. When it comes to stock price forecasting. A sentence-by-sentence summarizing methodology is used [1]. A daily full-length news piece is published every day. For more information, go here enhancements, higher-level capabilities such in the pre-processing of news, sentiment analysis is used has to be taken into account. The strategy proposed in this research combines public sentiment and technical indicators analysis. The method of support vector machines [2] is used to anticipate the stock price. This effort should concentrate on public opinion influence factor analysis, public sentiment data selection, and enhanced forecasting methodologies in order to achieve greater accuracy. This project mechanically extracts objective words and expressions from unlabeled words also adds the learnt nouns lexicon, which bootstraps from the lexicon to collect objective and subjective sentences from annotated data using rule-based classifiers [3]. Topic-based text filtering and subjectivity studied for improving the performance of extracting information. This study looks at a large number of tweeter feeds that are associated to various metrics throughout time [4]. This article will look at individual's tendency to learn and modify their trade behavior as a result. This article uses various machine learning algorithms to estimate the stock market on day close. Silver prices, Oil prices, and gold interest rates, news, and social media feeds have all been used as inputs to anticipate public opinion [5]. This paper focused solely on the oil characteristic and neglected to consider other factors. This work presents a global dimensional space approach for modeling the complicated investor media environment and capturing the relationships between different sources of information in a tensor. A high-order tensor regression learning issue was also introduced in this study [6]. This research should concentrate on a wide range of applications, such as recognizing moving objects in health-care monitoring ,video data, , and context-aware mobile suggestions. Build domain knowledge sentimental word dictionary from big for that India language news to predict raises Stock Price [7]. Market outlook, international news, and corporate performance all need to be improved further. This study investigates stock market recommender systems by integrating the stock points of a daily average inventory stock indicators with RSS news feeds, which yielded a high degree of accuracy over individual stock calculations [8]. With sentiment classification, this study should concentrate on more than one stock level signal. For feature selection and weight optimization, a unique sigmoid-based mixed separate evolutionary algorithm is created and included the proposed stock picking model, which carefully evaluates the variant's effectiveness in stock price [9]. This work can be developed several goal models to produce various suitable portfolios based on various goals. Topic modeling is focused on an efficient and effective methodology based [10]. It is also necessary to concentrate on the Tweets that have been rejected have been improved presents a new concept. This is the technique that is used to gather web news information was obtained from the RSS website as a result, news collecting and an RSS-based filtering system improves the efficiency (nine). This strategy is identical to ours a sentiment analysis method. This project investigates the precision of by adding natural language in the categorization Semantics and Word processing procedures are examples of processing techniques. Variant spellings of Senses various techniques for classifications are used to categories the data [12] Positive, Negative, and Neutral. The randomized tree classification method should be explored for improved results. A model is created and sentiment score values are assessed for the stock news, whether

it is favorable, negative, or neutral, in order to forecast feelings all around stock news [13]. Negation and valence shifters must also be addressed for improved accuracy. This study looks into experience and understanding historic stock market pricing, and a tree based classifier is utilized to make stock market decisions for trading stocks [14]. Certain elements that influence the behavior of stock market, including such trading volume, news, and financial reports, need to be improved, as they may have an impact on stock price. The relationship between micro blog feeds and the stock market is investigated in this research [15]. Other moods, such as international mood states and political mood states, must be incorporated to improve prediction accuracy. By merging social networking mining technology and stock prices, this research provides an effective and accurate stock market forecast method [16]. This analysis is comparable to our sentiment analysis approach.

III. News Feeds Via Twitter And RSS

A. Twitter's influence stock price forecasting

The Twitter message, sometimes known as a tweet, is limited to 150 characters. On general, allows users to post anything to show their curiosities, how they feel, or just to keep family and friends updated on their whereabouts.[17] Excellent data source for anticipating stock market patterns, with various features obtained from Twitter including sentiment research. Twitter is open to the public; be accessed without any limits on security. Twitter features a simple and very well API that allows programmers to search for a particular set of tweets using specified keywords or depending on a time period[18-20]. The sentiment of stock-related twitter is assessed in this proposed work, as well as a sentiment score ranging from +1 to -1 is computed depends on the polarity of the sentiments. The sentence is positive if the entire emotion score value is between 0.0 and 1.0. If the entire sentiment score falls between -1.0 and 0.0, the sentence is considered negative. If the entire sentiment score is 0.0, the sentence is considered neutral. For a given period, the sentiment score is connected with changes in the currency's stock price.[18]

B. The impact of RSS news feeds on stock prices

RSS (Really Simple Syndication) is a delivery system for frequently randomly Web content. Many news-related websites, blogs, internet communication publishers use RSS Feeds to syndicate their material anyone desires it It's a document in XML format. Syndication of content is made easier. A RSS feed is dependable a method for delivering online content on the web. Because the information is tiny and loads quickly, this can be

Voice is a technology that is utilized in conjunction with products such as cell phones and PDAs e-mail. Unlike email, an RSS feed requires no upkeep, and the message is never blacklisted or censored. Users may sort out what they want from what they don't want via RSS. RSS documents have a self-descriptive and straightforward syntax. In most cases, an RSS news feed includes date, title, and author information, as well as a link and a description. When constructive and positive news about current events is revealed, it has a beneficial effect on stock market values. The RSS news streams are analyzed to catch this.

IV. Proposed Work

The suggested system's architecture is shown in Figure 1. It essentially handles tweets and RSS news collected directly from the Twitter site. The pulls history prices from the relevant stock exchange website. It's http://www.marketstoday.net/markets/jordan/Historical-Prices/10/en/# in our situation. The task is split into two halves that run in parallel. Sentiment analysis on the elements RSS news feeds as well as tweets received from either the Twitter site is one of the concurrent tasks. The RSS person reads the content information from the web sites that is needed for link, description, stock news title, author, and date, so on in the XML article's format. RSS feeds collect the most recent stock feed articles from linked websites. Every one of the collected feeds is stored in the document as short sentences. Similarly, tweets from Twitter include a massive quantity of text entries, which continues to rise every day. Twitter group’s people into communities and connects them, from short conversations to interest graphs. A document is created from a collection of short

tweets. The information gathered from RSS news feeds and Twitter is saved as input text that is not processed into sentences. They're in a document. Those phrases are submitted to the preprocessing procedures, which only clean the documents. Noises are undesirable contents such as comma, semi colons, digits, symbols, dates, and times, which are deleted in this stage. The sentence splitting component divides the text sentences into single sentences and saves them in a folder after the cleaning procedure is completed.

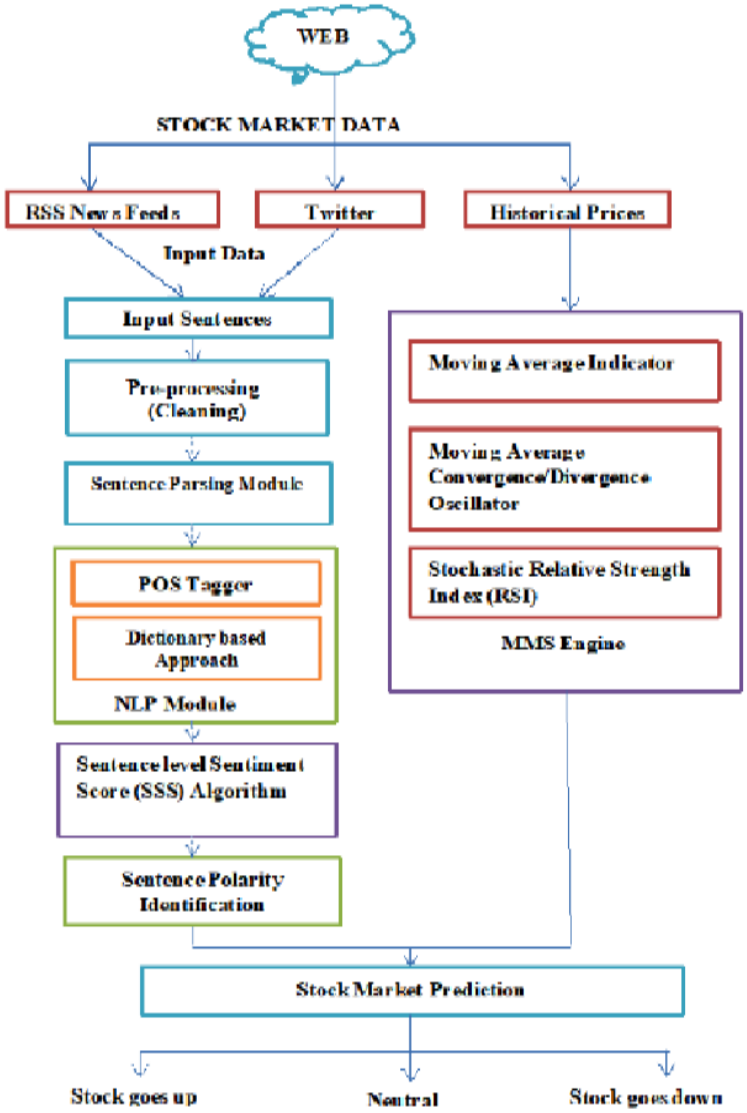

Figure .1: The architecture of stock market forecasting

The Natural language processing (NLP) module receives the individual sentences now. The term "NLP" stands for "natural language processing." also used detect sentiment from words a value that is neutral, positive, , or negative here dictionary-based technique for part-of-speech taggers are employed to determine the paragraph's polarity, as well as determine if the sentence is favorable or negative as well as impartial Each sentence is transferred to a different recipient. NLP Module's POS tagger a point-of-sale system (POS) reads text in a variety of formats. Each phrase is assigned to one of the parts of speech. adjectives, verbs, Nouns , and other words are examples. Following that, you must assign each word in the POS has an adjective, verb, or noun. As an example, they're in a document. Those phrases are submitted to the preprocessing procedures, which only cleanse the documents. Noise sources are undesirable content including such digits, comma, and semi symbols, colons, times, and dates, which are deleted in this stage. The sentence splitting component divides the text phrases into single sentences and saves them in a folder after the cleanup procedure is completed. The score goes from 0.0 to 1.0 and -1.0 to 0.0 in general. The score values of each

sentence are derived by applying a total score to every word in a sentence and adding them together. A sunset is a collection with one or even more equivalents. Unless the score number falls between 0.0 and 1.0 is a statement considered positive. A sentence is considered negative only if the scoring value falls between -1.0 and 0.0. If the value is 0.0, a neutrality value assigned. The following Eq. (1) is being used to determine the word sequence.

Word of sequence (S) = $S_1 + S_2 + \ldots + S_n$ (1)

Where n is number of word.

The MMS engine's other simultaneous task is calculating stock level indications. Moving averaged; Average (convergence/ Divergence, and Stochastic RSI inventory levels signals make up the MMS engine. The very first indication, the Moving Average stock price, is calculated by taking the safety's stock prices over a defined number of periods and dividing by the total number of time periods. Technical indicators are commonly used for 10 days, 15 days, 20 days, 22 days, 60 days, 110 days, and 210 days.The formula of moving average is produced by calculating the average price closing of a stock over the last "n" periods, as shown in Eq. (2).

$$F_t=\frac{B_t-1+B_t-2+B_t-3+\cdots\ldots+B_t-n}{n} \quad (2)$$

F_t= in the next few decades, we've made a forecast.

$B_t - 1$=Actual incidence for up to 'n' periods in the past.

n=the total number of periods that will be averaged.

MACD is the second indicator .

It is used to calculate the distinction between different Exponential Moving Averages (EMAs). If MACD shows a positive signal, the 14-day EMA is higher than the 28-day EMA. Which means that the faster moving average's speed of adjustment is greater than the slower moving average's rate of change? This would be deemed growing because good trend is increasing. The 14-day EMA is below the 28-day EMA if there is a negative signal. If it's negative and falling, the negative gap between the quicker and slower moving averages is widening. When the downward motion of a sine wave accelerates, it is said to be falling.

Whenever the faster exponentially weighted moving crosses the slower moving average, a MACD centerline crossover occurs. The MACD graph, MACD, and accelerates line formulas are as follows. Eqs. (3),(4), and (5) give the formulas for The MACD graph, MACD, and accelerates line , correspondingly.

MACD=(14-day EMA-28-day EMA) (3)

Accelerates line =11-day EMA of MACD (4)

MACD graph=(MACD- Accelerates line) (5)

The Stochastic Relative Strength Index (RSI) is the third indicator. It's a line-plotting it's calculates a value between 0 and 1. This indicator is most commonly used to spot overbought and oversold circumstances. RSI is calculated using the following formula. The RSI computation is described in Eq. (6), whilst average gains and losses are discussed in Eqs. (7) and (8). (8). Eq. (9) is used to generate the SR value, and Eq. (10) is used to obtain the total Stochastic RSI value (10).

$$RSI=110-\frac{110}{1+SR} \quad (6)$$

$$\text{Average Gain}=\frac{Total\ values\ gain}{n} \quad (7)$$

$$\text{Average Loss}=\frac{Total\ values\ loss}{n} \quad (8)$$

n=the total number of RSI periods.

$$SR=\frac{Total\ values\ gain}{Total\ values\ loss} \quad (9)$$

$$RSI(stoch)=\frac{RSI\,(n)-RSI\ low\,(n)}{RSI\ High\,(n)-RSI\ lower\,(n)} \quad (10)$$

RSI=The current level or the RSI indicator.

RSI Low (n)= Over the last n periods, the RSI has achieved its lowest point.

RSI High (n)= Over the last n periods, the RSI has achieved its greatest point.

n=The number of periods that were used in the calculation.

Whenever the Stochastic RSI rises above 0.90, the result indicates that the market is overbought. When something falls below 0.30, it signals that the market is oversold. It is classified as an oversold position as a buy signal if it passes the 0.60 line upwardly and as an overbought scenario as a sell indication if it crosses the 0.60 line downward.

A. Strategy for Prediction

The results of RSS News feeds and sentiment analysis of Twitter as well as the stock point or market, are integrated but also analyzed to

anticipate the stock market. Its end result technology consistently for the stock market is shown in Table 1. The evaluation of orientation for RSS news feeds and twitter data as well as stock points or market, is shown in Table 1. Following the improvements, the numerous number of sentiment result combinations is reduced to ten important combinations.

V. Experimentation Outcomes

By gathering numerous Sentiment data and stock prices, the experimental study was able to anticipate the stock market for the national stock exchange (NSE) from the national stock exchange (NSE). NSE Oracle database (NSE) contains the 340's historical prices. Since the year 2021, companies have been listed on the exchange. The historical prices date back to the year 2014 from 2020 until 2021.

Analysis of Twitter Sentiment	Analysis of RSS News Feed Sentiment	Prediction of FinalResult	Result of stock near indicators
Neutral (ne)	Neutral (ne)	Neutral (ne)	Neutral (ne)
Neutral (Ne)	Neutral(ne)	Neutral (ne)	Neutral(ne)
Negative (n)	Negative (n)	Negative (n)	Negative (n)
Positive (p)	Positive (p)	Positive (p)	Negative (n)
Negative (n)	Positive (p)	Negative (n)	Negative (n)
Positive (p)	Positive (p)	Positive (p)	Neutral (ne)
Negative (n)	Positive (p)	Negative (n)	Neutral (ne)
Neutral (ne)	Positive (p)	Neutral (ne)	Neutral (ne)
Negative (n)	Negative (n)	Negative (n)	Neutral (ne)
Positive(p)	Positive (p)	Positive (p)	Positive (p)

In a prior study, 30 small-cap stocks selected from the NSE, and social media data was gathered from Zoho social, and NSE India, with the goal of reliably predicting stock price [16].The RSS news feeds for NSE were obtained from http://investing.einnews.com/news/NSE-stock, and the tweets for the same firm were obtained from http://twitter.com/NSE. The sentiment value is now calculated using the SSS algorithm for a certain month. http://www.marketstoday.net/markets/jordan/Historical-Prices/10/en/# also has the stock price for NSE market. Three inventory stock indicators are now used, and the stock valuation for a specific month is computed. Finally, combining the findings of RSS news feeds, Twitter, and stock prices for stock level indicators aids stock forecasters in deciding whether to purchase or sell. Figures 2 and 3 depict the polarity calculation of Sentiment for RSS Feeds and Tweets respectively, while Figure 3 depicts the overall negative and positive words of Tweets, indicating that the news result is positive.

Figure .2: Twitter and RSS feed sentiment analysis.

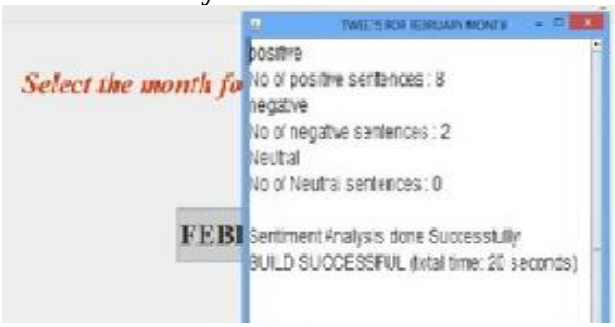

Figure.3: Tweets' polarity score.

Figure.5: Stock value calculations for different stock indicators

Figuren.6: Stock market forecasting's overall result

Figure 4 shows the computation of stock prices for several stock indicators. The total score of the stock market for stock data is calculated using the mixed result of all stock indicators. By integrating the Stock level indicators, Tweets, and results of RSS value, the total traders' decision will be shown in Fig. 6. A statistics hypothesis test is performed in order to obtain data concerning the prediction accuracy. The alternate or research hypothesis and null hypothesis are two sorts of hypotheses. H0 denotes the null hypothesis, while Ha denotes the alternative hypothesis. In general, hypothesis testing is done to determine whether something is true or incorrect based on absolute certainty. There really are two scenarios that could occur. One option is to accept Ha and reject H0 because there is enough material in the dataset to support Ha; the other option is to reject H0 but not accept Ha since there is insufficient evidence to support Ha. Hypothesis testing is undertaken to H0 in this suggested study utilizing one piece -test statistics. H0: Stock level indicators forecast a rise in stock prices at a maximum of 70% above current levels. Ha: Stock indicators, as well as sentiment analysis of RSS news feeds and tweets as stock, improve predictive performance. The equation for one portion R-test statistics is shown in Eqs. (11) and (12), which is as follows:

$$R=\frac{P-P^{*}}{\sqrt{\frac{P(1-P)}{n}}} \quad (11)$$

$$P=\frac{y}{n} \quad (12)$$

Where P= the fraction of the sample.

P*= In the null hypothesis, the population proportion is estimated.

y= A large number of samples were taken.

n= sample size in total.

The following are the two hypotheses for the accuracy of Sentiment and Stock Level Indicators forecast. Tables 2 and 3 illustrate the results. Table 4 is also included demonstrates the H0 Hypothesis Testing Decision. The circumstances under which choices are made about and the following is my hypothesis: if the P-value is high, accept H0, If the P-value is low, reject H0; however. If the p-value is large, therefore H0 is not rejected. If the Z- test is positive, If the value is less than Z, H0 will be rejected, however if the value is more than Z, H0 will be rejected. If the Z- test value is greater than Z, H0 should be rejected. The Z-test curve for is shown in Figures 6, 7, and 8. Z and level of significance.

Researchers have adequate reject the null hypothesis based on the findings of the Z- test and R, as well as P* value of stock price (H0). The probability of seeing a data is collected as severe as the statistical test is given by the P-value is the significant threshold, which is usually set at 0.05. The measured R- test result for the Moving average stock level indicator is 12.04. We reject H0 because it is greater than Z and Z is the rejection within region. We have adequate reject the null hypothesis and accept the alternate hypothesis with a statistic of 12.04 and a P-value of 0.00001, which is less than value, at a 5% level. The measured Z- value of the test statistic for the Moving Average Convergence/Divergence Oscillator (MACD) is 14.78. We reject H0 because it is larger than Z also the rejection within region Z. Researchers possess adequate evidence against the null hypothesis and accept the alternate hypothesis with a statistic of 14.78 and a P -value of 0.00001, which is fewer than value, at a 5% equal of meaning. The Hypothesis Decision for Ha is shown in Table 5.

Table .2: H0: A stock indicator does not provide a reliable forecast.

RSI Stochastic	Average Moving	National Stock Exchange	MACD
64.26	65.23	Percentage of Precision	61.28
695	695	Instances count	695
421	445	Properly classified	435

Table.3: Ha: The accuracy of prediction is determined by stock indicators combined with sentiment analysis using RSS news sources and tweets

Stock price Moving Average + RSS Feeds Sentiment Analysis	Stock price + RSS Feeds and Tweets Sentiment Analysis	National Stock Exchange	RSS Feed Sentiment Analysis + Stock Indicators
80.12%	85.10%	Percentage of Precision	81.10%
695	695	Instances count	695
523	557	Properly classified	543

Table .4: Hypothesis testing reveals the H1 decision.

S.No	Indicators of stock	H0	H1	R-test or Z-test	R or Z	α	P	Decision
1	3 Indicators + SA RSS + Tweets	P=0.82	P>0.82	1.403	1.645	0.05	0.80308	Hα.Accept
2	Moving Average + RSS SA	P=0.82	P>0.82	1.362	1.645	0.05	0.0865	Hα:Accept
3	3 Indicators + RSS SA	P=0.82	P>0.82	1.28	1.645	0.05	0.10027	Hα:Accept

Table.5: Hypothesis testing reveals the H0 decision.

S.No	Indicators of stock	H0	H1	R-test or Z-test	R or Z	α	P	Decision
1	RSI Stochastic	P=0.82	P>0.82	12.84	1.645	0.05	0.00001	Hα.Reject
2	Average Moving	P=0.82	P>0.82	12.04	1.645	0.05	0.00001	Hα: Reject
3	MACD	P=0.82	P>0.82	14.78	1.645	0.05	0.00001	Hα: Reject

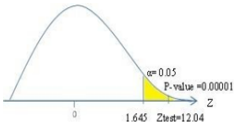

Figure .6: Moving average Z- test curve

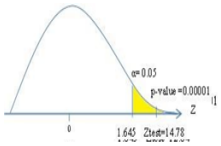

Figure.7: MACD's Z- test curve

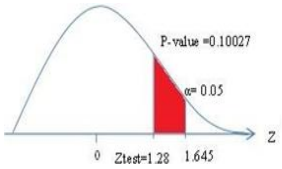

Figure.10: Sentiment analysis (RSS) Z test curve + 3 Stock Indicators

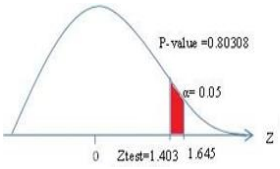

Figure.11: Sentiment analysis (RSS, tweets) + 3 Stock level + Z test curve

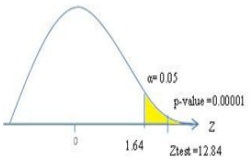

Figure.8: For stochastic RSI, the Z test curve is used

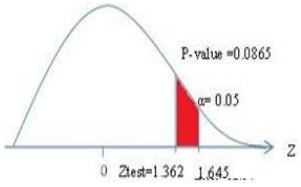

Figure.9: Sentiment analysis Z test curve + Moving Average stock indication

The oNSErved Z- test result for the Stochastic RSI stock indicator is 12.84. Designers reject H0 because it is greater than Z and Z is within the rejection region. Researchers have to reject the null hypothesis and accept the hypothesis alternate such a statistical data 12.84 as well as a p-value of 0.00001, that less than value, at a 5% significance level. The Z test curves for the meaningful scale and Z for the Ha are shown in Figures 9, 10 and 11.Researchers has information to accept alternate hypothesis after results of Z test and Z, as well as the p-value of stock market (Ha).

The measured Z test result for sentiment classification and the stock price moving

average 1.362. Researchers accept Ha because less than Z and Z-test do not fall into the rejection range. Researchers have really against the null hypothesis the alternate hypothesis and accept it a statistic of 1.362 and a p-value of 0.8065, that really is higher than value, at a 5% significant level.

The measured Z test value sentiment analysis (RSS) as well as three stock indications 1.28. Researchers accept Ha less than Z and Z-test do not reduction the rejection within range. Researchers have really to reject the alternate hypothesis and accept it with a statistical of 1.28 and a p-value of 0.10027, which again is higher than value, at a 5% significant level. The measured Z test result for sentiment analysis of RSS, and three inventory stock market is 1.403. Researchers accept Ha because it is less than Z and Z-test does not fall into the rejection range. Researchers to reject the alternate hypothesis and accept it a statistic of 1.403 as well as a p-value of 0.80308, which is higher than value, at a 5% level of significance.

VI. Conclusions

Stock price pointers such as Moving average, MACD, and Stochastic RSI are used in traditional stock market analysis. For the stock price, NSE are utilized prediction. In prior research, we discovered that sentiment mining of RSS feed sections aids in stock price forecast and stock level indicators. The effect of attitudes from tweets and RSS news feeds as investigated in this paper. It has been discovered that combining social media attitudes with stock level indicators improves forecast quality.The experimental evaluation is done for hypothesis testing H0, Ha because our approach is a hybrid approach. As compared to H0 and Ha has showed a considerable enhancement in correctness and precision. There's really sufficient evidence to reject the alternative hypothesis and the null hypothesis. By adding sentiment analysis from other social site sources such as Facebook material ,Tweets, RSS news feeds, and LinkedIn, this study can be expanded to anticipate client purchase patterns.

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INVESTIGATION OF THE CHANGE IN RESTING HEART RATE IN RESPONSE TO AEROBIC TRAINING WITH AND WITHOUT PRANAYAMA PRACTICES AMONG ACTIVE AND SEDENTARY COLLEGE MEN

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ABSTRACT

The purpose of the present study was to analyze the changes on resting heart rate in responses to aerobic training with and without pranayama practices among active and sedentary college men. The study was confined to sixty college men from Veterinary College, Hassan, Karnataka state, India as subject and their age ranged from 18 to 23 years. Of the chosen sixty college men, thirty subjects were active and remaining thirty subjects were sedentary. Of the thirty active subjects 15 were performed aerobic training with pranayama practices the remaining 15 subjects were performed aerobic training only. Similarly, of the thirty chosen sedentary subjects 15 were performed aerobic training with pranayama practices the remaining 15 sedentary subjects were performed aerobic training only. The training regimen for the experimental groups lasted for twelve weeks for six days per week. The data collected from the training groups on resting heart rate was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post test. Further, percentage of changes was calculated. To find out the chances in selected dependent variables due to the impact of experimental treatment. Further, three-way analysis of variance (2 × 2 × 2) was used to find out the influence of each factor independently and also their combined influence. Subsequent to 12 weeks of aerobic training with pranayama (ATP) and aerobic training (AT) 5.09% and 3.68% of changes in resting heart rate was observed among active men subjects. Similarly, after 12 weeks of aerobic training with pranayama (ATP) and aerobic training (AT) 2.67% and 2.39% of changes in resting heart rate was observed among sedentary men subjects.

Keywords: *Aerobic training, Pranayama practices, Resting heart rate, Active and Sedentary college men.*

Introduction

Training induces physiological changes in almost every system of the body, particularly within the skeletal muscles and the cardio respiratory system. The changes resulting from training are influenced by the frequency, duration, intensity of the training program and by heredity. The effects of training are specific to the type of exercise performed, the muscle groups involved, and to the type of training program used. The specificity of training and exercise has two broad physiological bases, metabolic and neuromuscular. The effects of training are lost after several weeks of detraining. Training effects can be maintained with maintenance programs consisting of one or two days of exercise per week. Previous training does not significantly influence the magnitude or rate of gain of training effects induced by subsequent training program**.**

Aerobic exercises are powerful, and aerobic exercise needs to be a part of our fitness program. Aerobic exercise (also known as aerobics, cardiovascular exercise or cardio) is any sustained rhythmic activity that primarily uses of larger muscles, such as quadriceps and hamstrings, and challenges heart and lungs. Aerobic means "with oxygen," so when the exercise aerobically body uses oxygen to help produce energy during the exercise. Heart and lungs have to work harder to continuously deliver oxygen to body during aerobic exercise, and this strengthens the heart and lungs.

Yoga helps to tone up the entire body to regularize blood compositions and improve blood circulations, tones up glands and visceral muscles. Regular practice of yoga helps to keep our body fit, controls cholesterol level, reduces weight, normalizes blood pressure and improves heart performances. Further, preliminary studies in the United States and India suggest that yoga may be helpful for specific conditions, such as asthma, epilepsy, anxiety, stress and others.

The sound knowledge of the various training methods are most required for the coaches, trainers and players to achieve the goal. Through the study of science and various sports training, researchers have developed a greater understanding on how the human body reacts to exercise, training and many other stimuli. The effects of aerobic training with

and without pranayama practices on resting heart rate is useful research objectives and it has drawn the attention of the investigator. The present scientific study is one of the efforts to explore and suggest a best scientific method for the development of physiological parameter.

Subjects and Variables

The study was confined to sixty college men from Veterinary College, Hassan, Karnataka state, India as subject for the study and their age ranged from 18 to 23 years. Of the chosen sixty college men, thirty subjects were active and remaining thirty subjects were sedentary. Of the thirty active subjects 15 were performed aerobic training with pranayama practices and the remaining 15 active subjects were performed aerobic training only. Similarly, of the thirty chosen sedentary subjects 15 were performed aerobic training with pranayama practices the remaining 15 sedentary subjects were performed aerobic training only. The resting heart rate was the chosen dependent variable and was measured by using Digital Blood Pressure Monitor.

Training Program

The training regimen for the experimental groups lasted for twelve weeks for six days per week. Of the thirty active subjects 15 were performed aerobic training with pranayama practices the remaining 15 subjects were performed aerobic training only. Similarly, of the thirty chosen sedentary subjects 15 were performed aerobic training with pranayama practices the remaining 15 sedentary subjects were performed aerobic training only. Aerobic training with pranayama practices group (active & sedentary group) performed pranayama practices after completion of their aerobic training workout. However, aerobic training without pranayama practices group (active & sedentary group) performed aerobic workout only. The subjects of the experimental groups performed the specific training package during the morning session.

The experimental groups performed aerobic exercise alternatively six days in a week for twelve weeks. In this present investigation continuous running was given as aerobic exercise. To fix the training load for the aerobic exercise group the subjects were examined for their exercise heart rate in response to different work bouts, by performing continuous running of two minutes duration for proposed repetitions and sets, alternating with active recovery based on work-rest ratio. The subject's training zone was computed using Karvonen formula and it was fixed at 65%HRmax to 90%HRmax. The work rest ratio of 1:1 between exercises and 1:3 between sets was given.

During the training period, the experimental groups underwent pranayama practices six days a week for twelve weeks. The pranayama practices included in this training programme were Anuloma Viloma, Nadi Suddhi, Ujjai, Suryadedana, Bhastrika and Kapalabhati respectively. The training programme was conducted in the morning sessions from 6 `O`clock onwards. The training load was progressively increased once in three weeks.

Statistical Technique

The experimental design used was the $2 \times 2 \times 2$ factorial design. The first factor consists of groups (active & sedentary) and the second factor consists of training (aerobic with pranayama & aerobic) and the third factor consists of tests (pre & post test). The data on resting heart rate was collected from the active and sedentary men performed aerobic training with pranayama practices as well as aerobic training alone groups once at the beginning (pre-test) and finally at the end of the experimental period of 12weeks (post –test). The data collected from the training groups on resting heart rate was statistically analyzed by paired 't' test to find out the significant differences if any between the pre and post test. Further, percentage of changes was calculated to find out the chances in resting heart rate due to the impact of experimental treatment. Further, three-way analysis of variance ($2 \times 2 \times 2$) was used to find out the influence of each factor independently and also their combined influence. In all the cases the level of confidence was fixed at 0.05 level for significance.

Results

The pre and post test mean and standard deviation values on resting heart rate of active and sedentary men performed aerobic training with pranayama practices as well as aerobic training alone are given in table-I.

Table-I: Mean and Standard Deviation Values on Resting Heart Rate of Different Training Groups among Active and Sedentary Men subjects

Groups		Aerobic & Pranayama		Aerobic	
		Pre Test	Post Test	Pre Test	Post Test
Active	Mean	70.70	67.10	70.60	68.00
	SD	0.94	1.19	1.07	1.24
Sedentary	Mean	70.90	69.00	71.00	69.30
	SD	0.99	1.05	0.81	0.94

The pre and post test mean and standard deviation values on resting heart rate of aerobic training with prenayama groups (70.70± 0.94 & 67.10±1.19) as well as aerobic training alone group (70.60±1.07 & 68.00±1.24) of active men subjects and the pre and post test mean and standard deviation values on resting heart rate of aerobic training with prenayama groups (70.90±0.99 & 69.00±1.05) and aerobic training alone group (71.00±0.81 & 69.30±0.94) of sedentary men subjects are presented in this table (Table-I).

Table-II: Paired 'T' Test Result on Resting Heart Rate

Groups	Training	Mean Difference	'T'-Test	Percentage (%)
Active	Aerobic & Pranayama (ATP)	3.60	6.19*	5.09
	Aerobic Training (AT)	2.60	4.08*	3.68
Sedentary	Aerobic & Pranayama (ATP)	1.90	8.14*	2.67
	Aerobic Training (AT)	1.70	7.96*	2.39

** Table value: [df 9=2.26 (0.05 level)]*

The pre and post test mean difference on resting heart rate of aerobic training with prenayama groups (MD=) as well as aerobic training alone group (MD=) of active men subjects varies considerably because the dependent't' test results of ATP (6.19) and AT (4.08) groups were better than the needed table value *[df 9=2.26 (0.05 level)]*.

Similarly, the pre and post test mean difference on resting heart rate of aerobic training with prenayama groups (MD=) as well as aerobic training alone group (MD=) of sedentary men subjects varies considerably because the dependent't' test results of ATP (8.14) and AT (7.96) groups were better than the needed table value *[df 9=2.26 (0.05 level)]*.

Subsequent to 12 weeks of aerobic training with pranayama (ATP) and aerobic training (AT) 5.09% and 3.68% of changes in resting heart rate was observed among active men subjects. Similarly, after 12 weeks of aerobic training with pranayama (ATP) and aerobic training (AT) 2.67% and 2.39% of changes in resting heart rate was observed among sedentary men subjects.

The resting heart rate data obtained from the different training groups of active and sedentary men have been analyzed by three way factorial ANOVA (2x2x2) as in table -III.

Table –III: Three Way Factorial ANOVA Results on RHR Data (Pre&Post) of Different Training Groups among Active and Sedentary Men Subjects

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" ratio
Groups	18.05	1	18.05	16.57*
Training	1.80	1	1.80	1.65
Test	120.05	1	120.05	110.25*
Groups and Training	0.20	1	0.20	0.18
Groups and Tests	8.45	1	8.45	7.76*
Training and Tests	1.80	1	1.80	1.65
Groups, Training and Tests	0.80	1	0.80	0.73
Error	78.40	72	1.08	

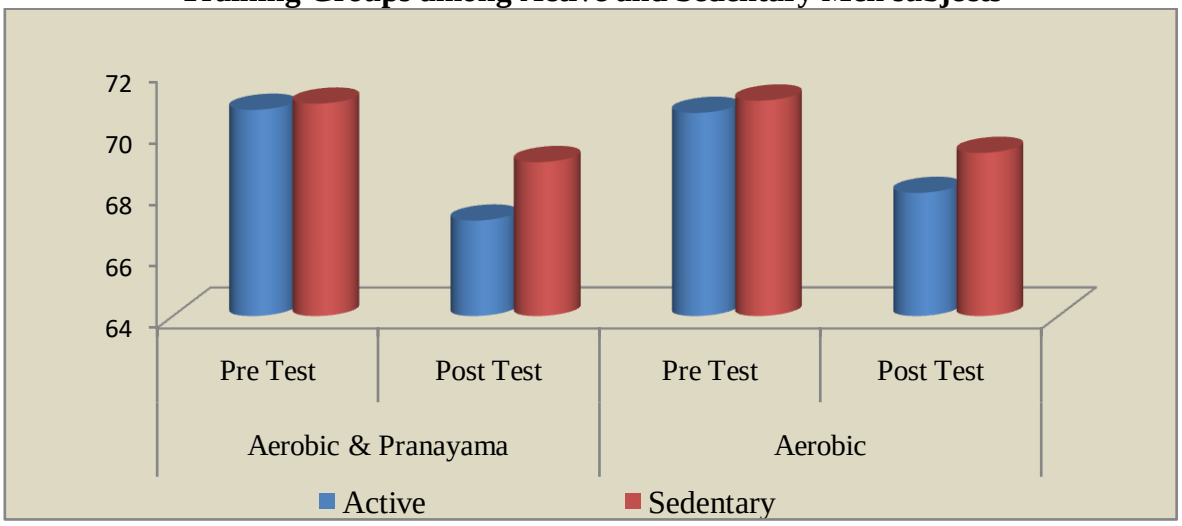
**Significant(.05 level) (Table values for df 1 & 72 is 3.96)*

The obtained 'F' ratio value on resting heart rate for groups (active & sedentary=16.57), and test (pre & post =110.25), groups and test=7.76, are greater than the table value [df 1&72=3.96 (0.05 level)]. It proved that active and sedentary men differ from one another irrespective of training and testing conditions and also the aerobic training with pranayama (ATP) and aerobic training (AT) groups differ from one another irrespective of groups and tests. Similarly pre test value differ from the post test value irrespective of groups and training.

The obtained 'F' ratio value for interaction of training (ATP & AT =1.65), groups and tests (F=0.18) , training and test (F=1.65) is lower than the table value [df 1&72=3.96 (0.05 level)]. However, the interaction of groups and training (0.73), the interaction of groups, training and test (0.73) are lesser than the table value [df 1&72=3.96 (0.05 level)].

The pre and post test mean values on resting heart rate of active and sedentary men performed aerobic training with pranayama practices as well as aerobic training alone groups are graphically represented in figure-I.

Figure- I: Graph Showing the Mean Values (Pre&Post) on Resting Heart Rate of Different Training Groups among Active and Sedentary Men subjects



Discussion

The previous researches proved that aerobic and pranayama had significant influence on resting heart rate and the present result, is in conformity with the previous researches. There have been many studies to describe the effect of aerobic and pranayama over cardiovascular system. Gillett and Elsenman (1987) in their study determined the effect of 16 weeks aerobic dance programme and was concluded significant improvement in the physiological variables such as breath holding time and heart rate. Wool May et al., (1998) conclude that 18 week walking programme appeared to improve aerobic fitness. Sayed (1996) concluded that high, but not low, intensity physical conditioning significantly enhances the cardio respiratory fitness and reduces the resting level of plasminogen activator inhibitor activity which may be linked with the favourable effects of exercise conditioning.

Pramanik et al., (2009) found that both the SBP and DBP decreased significantly with a slight fall in heart rate after slow bhastrika pranayamic breathing for 5 minutes. Khanam et al., (1996) showed decreased heart rate and sympathetic reactivity following a brief period of yogic exercise practice in asthmatic patients. Statistically significant reduction in pulse rate were found in several other studies after regular practice of yoga which were attributed to increased vagal tone and decreased sympathetic activity (Wenger & Bagchi ,1961; Vempati & Telles, 2002). The results of the studies of Telles, Reddy and Nagendra (2000) concluded that the breath volume and heart rate were significantly decreased before and after sessions of cyclic meditation (CM) and Shavasana (SH). Bowman et al., (1997)

performed a study comparing the effect of yoga and aerobic exercise on the baroreflex over healthy elderly persons. It revealed that heart rate decreased significantly following yoga.

Conclusion

Subsequent to 12 weeks of aerobic training with pranayama (ATP) and aerobic training (AT) 5.09% and 3.68% of changes in resting heart rate was observed among active men subjects. Similarly, after 12 weeks of aerobic training with pranayama (ATP) and aerobic training (AT) 2.67% and 2.39% of changes in resting heart rate was observed among sedentary men subjects. Further, active and sedentary men differ from one another irrespective of training and testing conditions and also the aerobic training with pranayama (ATP) and aerobic training (AT) groups differ from one another irrespective of groups and tests. Similarly pre test value differ from the post test value irrespective of groups and training. It is inferred from the above literatures and from the results of the present study that systematically designed aerobic and pranayama exercises develops the physiological factors of active and sedentary men.

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ISOLATED AND THE COMBINED EFFECT OF PLYOMETRIC AND GAME SPECIFIC CIRCUIT TRAINING ON EXPLOSIVE POWER OF VOLLEYBALL PLAYERS

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ABSTRACT

The purpose of the present study was to evaluate the isolated and the combined effect of plyometric and game specific circuit training on explosive power of volleyball players. To achieve the purpose of the study, 80 male volleyball players from various colleges affiliated to Mahatma Gandhi University, Kottyam, Kerala state, who had represented inter collegiate level volleyball competition were chosen as subjects. The age of the subjects ranged from 18 to 23 years and all the subjects were healthy and normal. The selected subjects (N=80) were classified into four groups of twenty subjects each (n = 20) at random. Group-I underwent plyometric training, group-II underwent game specific circuit training, group-III underwent combined plyometric and game specific circuit training and group-IV acted as control. The initial testing took place before the beginning of the training while the final testing was performed after 12 weeks of intervention on explosive power. To find out the pre and post test mean differences paired 't' test was applied. Percentage of improvement was also calculated. Further, the data collected from the four groups prior to and post experimentation on explosive power were statistically analyzed by applying the analysis of covariance (ANCOVA). The Scheffe's test was also applied as post hoc test. The volleyball player's explosive strength performance improved 10.72% due to plyometrics (PT), 1.45% due to game specific circuit (GSCT) and 5.53% due to combined plyometrics and game specific circuit (CT) training.

***Keywords**: Plyometric training, Game specific circuit training, explosive power and volleyball players*

Introduction

Volleyball is one of the popular sports, in the world with participation of all ages. Volleyball performers must be athletic, they have to be quicker and need an excellent athleticism. A lot of training has been done for volleyball players but various important aspects were overlooked. If athletes are to attain a high level of performance, information from the continuous assessment of training and competition must be made available to aid in the evaluation of how players are performing and progressing.

The ability to jump plays an effective and important role in volleyball, it has to be said that its development leads to showing its effectiveness when the competitors are on equal level. Because jump skills are greatly complicated that it is nearly the outcome of vertical force and horizontal speed besides harmony and synchronization of the work of arms and feet. There is also total harmony related to the skill and plan achievement during attack and block. Volleyball places high requirements on a player's speed, agility, upper-body and lower-body muscular power, and maximal aerobic power. Therefore, coaches and professionals involved in volleyball are interested in the potential effectiveness of different training regimes and improvements of those conditioning capacities are known to be important determinants of success.

Though many types of trainings prevail to develop physical fitness, physiological and skill performance variables the role of polymeric and game specific circuit training is an undisputed one. Lot of researches had been carried out on the effects of plyometric and game specific circuit training, but still the bone of contention is about the duration to get the maximum benefit. Experts differ in their views based on their studies, most of the experimental studies has been carried out in many countries using the suitable equipments and devices available there. Hardly few explorations have been made in India, the area of effective plyometric and game specific circuit training on explosive power of volleyball players. Hence, the purpose of the present study was to evaluate the isolated and

the combined effect of plyometric and game specific circuit training on explosive power of volleyball players.

Methodology

Subject and Variable

To achieve the purpose of the study, 80 male volleyball players from various colleges affiliated to Mahatma Gandhi University, Kottyam, Kerala state, who had represented inter collegiate level volleyball competition were chosen as subjects. The age of the subjects ranged from 18 to 23 years and all the subjects were healthy and normal. The selected subjects (N=80) were classified into four groups of twenty subjects each (n = 20) at random. Group-I underwent plyometric training, group-II underwent game specific circuit training, group-III underwent combined plyometric and game specific circuit training and group-IV acted as control. the chosen dependent variable explosive power was assessed by conducting sarjent jump test.

Training Programme

The experimental group-I performed plyometric training and group-II performed game specific circuit training three days per week for twelve weeks. During the training period, various exercises were administered per session throughout the training duration of twelve weeks. Every day the work out lasted for about 60- 90 minutes including warming up and cool down exercises.

Twelve weeks of plyometric training program was developed using three training sessions per week. Training volume ranged from 90 foot contacts to 140 foot contacts per session. The intensity of training was tapered so that fatigue would not be a factor during post-testing. Rest interval of 1:1 between each exercise repetitions, 1:3 between sets and one day between plyometrics sessions was given in order to allow the neromuscular system to recover. Less intensive plyometric exercises was incorporated during the early stages of training to gradually condition the subjects and more demanding exercises was included when training progress.

The subjects of the experimental group-II performed game specific circuit training, three alternative days in a week for twelve weeks during the morning session. The following were the exercises performed at different stations such as Clock Drill, Cup Drill, W Drill, Sandwich Drill, Movement Patterns, Box Drill, Box Touches, Medicine Ball Wrist Sets, Depth Jump, Medicine Ball Overhead Pushes, Rolls, Velocity Builder Block Jumps, Block and Slides respectively. The duration of each exercise was thirty seconds. The training intensity was gradually increased as training progressed throughout the training period. The subject's training zone was computed using Karvonen formula and it was fixed at 80%HRmax to 95%HRmax. The rest - work ratio of 1:1 in-between repetitions and 1:3 between sets was given.

Statistical Technique

To find out the pre and post test mean differences paired't' test was applied. Percentage of improvement was also calculated. Further, the data collected from the four groups prior to and post experimentation on explosive power was statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). Since four groups were involved, whenever an obtained 'F' ratio value was found to be significant for adjusted post test means, the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases the level of confidence was fixed at 0.05 level for significance.

Result

The chosen volleyball player's explosive strength data collected from PTG, GSCTG, CTG and CG group's are analyzed statistically by dependent''t' test, and the discovered results are exhibited in table-I.

Table-I: Percentage(%) of Changes and 't' Test Results of Chosen Four Group's Volleyball Players on Explosive Strength

Chosen Groups	Tests	No.	Mean Scores	S.D	D.M	Improvement in%	't' – test result
Plyometrics	Pre	20	68.05	3.17	7.30	10.72	7.73*
	Final		75.35	3.75			
Game Specific Circuit Training	Pre	20	67.92	3.25	2.03	1.45	3.56*
	Final		69.95	3.26			
Combined Training	Pre	20	68.70	2.49	3.80	5.53	4.38*
	Final		72.50	2.94			
Control	Pre	20	67.45	2.60	1.35	0.36	0.85
	Final		68.70	2.15			

*df 19=2.09(Table value)(*significant)*

The volleyball player's explosive strength performance data (pre & post) collected from the PTG (68.05&75.35), GSCTG(67.92&69.95), CTG(68.70&72.50) group's differ noticeably since the 't' test results of PTG (7.73), GSCTG (3.56) as well as CTG (4.38) are higher (t value>2.09) than 2.09 (table value).

The volleyball player's explosive strength performance improved 10.72% due to plyometrics (PT), 1.45% due to game specific circuit (GSCT) and 5.53% due to combined plyometrics and game specific circuit (CT) training.

The chosen volleyball player's explosive strength data (pre&post) collected from PTG, GSCTG, CTG and CG group's are analyzed by ANCOVA and the discovered results are exhibited in table-II.

Table – II: Derived ANCOVA Results on Explosive Strength of Chosen Four Group's Volleyball Players

Mean	PTG	GSCTG	CTG	Control Group	SoV	SS	df	MS	'F' ratio
Adjusted Post-test	75.56	69.77	72.43	67.13	B	554.90	3	184.96	22.99*
					W	603.23	75	8.04	

*(Table value for df 3 & 75= 2.74)*Significant (.05 level)*

The derived adjusted post test means (75.56, 69.77, 72.43 & 67.13) obtained through ANCOVA statistical technique resulted in 'F' value of 22.99 which is better (F>2.74) *to* 2.74 (*Table value for df 3&75*). It established that the chosen four groups (PTG, GSCTG, CTG & CG) differ from one another.

As the adjusted means (posttest) of preferred four (PTG, GSCTG, CTG & CG) group's of players (volleyball) differ from one another, the Scheffe's **(post hoc)** statistics was utilized(table-III).

Table – III: Post Hoc (Scheffe's) Analysis on Explosive Strength Performance of Chosen Four Group's Volleyball Players

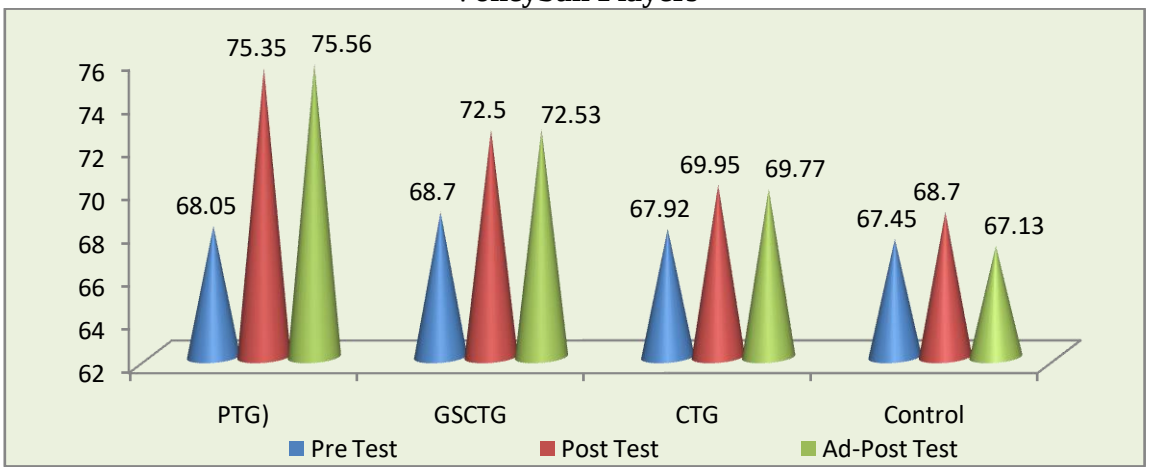
Plyometrics (PTG)	Game Specific Circuit Training	Combined Training	Control Group(CG)	M.D	C.I
75.56	69.77			5.79*	2.57
75.56		72.43		3.13*	2.57
75.56			67.13	8.43*	2.57
	69.77	72.43		2.66*	2.57
	69.77		67.13	2.64*	2.57
		72.43	67.13	5.30*	2.57

**Significant (.05)*

It established that due to plyometric (PT) (MD=8.43) game specific circuit (GSCT) (MD=2.64) and combined training (CT) (MD=5.30) the volleyball player's explosive strength performance improved considerably. Although, plyometric (PT) and combined training (CT) are superior to game specific circuit training (GSCT) (5.79&2.66>2.57). While, plyometric (PT) was better than combined training (CT) (2.66>2.57) in enhancing explosive strength.

The graphically represented volleyball player's explosive strength performance data (pre, post &adjusted) of the chosen four group's are in figure-I.

Figure – I: Figure Showing the Explosive Strength Performance of Chosen Four Group's Volleyball Players



Discussion

The present study result reveals that isolated and combined effect of plyometric and game specific circuit training have significantly enhanced the explosive power of volleyball players. The purpose of plyometric training is to improve the power of subsequent movements using both the natural elastic components of the muscles and tendons as well as stretch reflex (Trajkovic, Kristicevic & Baic, 2016). Considering that jump performance ability is highly influenced by the individual's ability to take advantage of the elastic and neural benefits of the SSC, well-developed strength and the rate of excursion of the activated musculature during the contraction. It is expected that plyometric training may benefit volleyball players' jumping performance.

Circuit training alone induced strength and power improvements that were significantly greater than when resistance and endurance training were combined, irrespective of the intra session sequencing (Chtara *et al.*, 2008). Shafeeq *et al.*, (2012) observed that interval circuit training significantly helped to improve the explosive power, cardio respiratory endurance and muscular strength. Circuit weight training resulted in improved muscular strength (Harber *et al.*, 2004), leg explosive power (Vadivel and Maniazhagu, 2013). Upper extremity cardiorespiratory endurance and muscle strength improve when undergoing a short-term circuit resistance training program (Jacobs, Nash & Rusinowski, 2001). It is observed that the limited amount of studies performed on volleyball shows that plyometric and game specific circuit exercises have a greater effect.

Conclusion

The volleyball player's explosive strength performance improved 10.72% due to plyometrics (PT), 1.45% due to game specific circuit (GSCT) and 5.53% due to combined plyometrics and game specific circuit (CT) training. Although, plyometric (PT) and combined training (CT) are superior to game specific circuit training (GSCT). While, plyometric (PT) was better than combined training (CT) in enhancing explosive strength. Hence, Volleyball players can use plyometric and game specific circuit training to condition them for quick volleyball maneuvers through bursts of intense exercises and drills.

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EFFECTS OF AEROBIC TRAINING, RESISTANCE TRAINING AND CONCURRENT TRAINING PROGRAMMES ON EXPLOSIVE POWER AND STRENGTH ENDURANCE AMONG UNIVERSITY LEVEL FEMALE BASKETBALL PLAYERS

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ABSTRACT

Aerobic exercising is true exercising that enhances the effectiveness of capacity of the cardiovascular mechanism in absorbing and delivering oxygen. High-impact of the word "aerobics" signifies "the presence of oxygen" and describe the use of oxygen in the body's metabolism or energy creating system. If to go by definition the numerous varieties of exercises when performed at reasonable and different paces, for lengthy time frames that receive the increased coronary heart siphoning and enhanced respiration are the direct elements of aerobics. These activities enhance the capabilities of circulatory system and greater productivity in conveying oxygen.

***Keywords**: sports training, explosive mass, basketball.*

Introduction

An aerobic work is a work in which the amount of oxygen that the body can supply is less than the amount necessary to perform the task. An aerobic work can be performed only for a short period of time, since an oxygen debt is incurred, and there is build-up of lactic acid in the blood stream

The American College of Sports Medicine (ACSM) defines cardio exercising as " the movements or activities of synchronised and rhythmic in nature and maintained consistently or repeated for a longer time and definitely performed by the large muscle nodes are the part of aerobics exercises. The impact of cardio exercises are diminishing of the pulse rate, reducing the pressure of blood against the walls of arteries and veins (blood pressure) in the physical state of rest and the potential to use the oxygen at any level while performing the exercises."

Aerobic exercising is true exercising that enhances the effectiveness of capacity of the cardiovascular mechanism in absorbing and delivering oxygen. High-impact of the word "aerobics" signifies "the presence of oxygen" and describe the use of oxygen in the body's metabolism or energy creating system. If to go by definition the numerous varieties of exercises when performed at reasonable & different paces, for lengthy time frames that receive the increased coronary heart siphoning and enhanced respiration are the direct elements of aerobics. These activities enhance the capabilities of circulatory system and greater productivity in conveying oxygen.

The mechanics of a specific aerobic workout necessitate that oxygen is received via the lungs and moved to the veins. Oxygen prosperous blood is then siphoned with the aid of the coronary heart to the muscles. The muscle tissues use oxygen for muscle contractions. Through pursuits of high-impact training, the body turns out to be greater productive of oxygen. The high-impact games which directly correlated with aerobic factor and the vital capacity like basketball, football, marathon running, rowing, trekking, cycling thus need to improve oxygen utilization by the body. One such advantage of high-impact preparing is an expanded cardio-respiratory perseverance, which thus lessens the general danger of death related with absence of maximal high-impact limit (VO2 max).

The Aerobic training improves the heart stroke volume and escalates and improve the cardio respiratory and cardiovascular framework output. Its changes in hormones that break down the fat for use as a fuel and Increase the number of mitochondria (Powerhouse of cell) that produce energy from oxygen. The aerobic workout results in lowers the resting pulse and brings down blood LDL cholesterol degree. Its Increase in lean body mass resulting in increase in the muscle mass tone leading to Strengthen body balance, stance and posture

Any exercise that contracts the muscles against an external resistance, with the expectation of escalation in strength, mass, tone, and/or endurance, is called resistance training. In the

other words strength training would more accurately be described as resistance exercise that builds strength? Any object like dumbbells, bricks, bottles of water, rubber exercise tubing, your own body weight or any other object that contracts the muscle, acts as the external resistance.

Resistance Training must be a fundamental piece of a grown-up workout agenda and of ample energy to improve strength, muscular perseverance, and fat free mass (FFM). It must be based on principles of specificity, progressiveness, individualised and uniformity and differentiation. The formulation of the resistance training must be on the basis of prognostic performance and its structure. The training must have the effect to establish an mprove to all the widespread muscle groups. "Adding strength training to an exercises programme of normal and routine exercises will help to diminishing the threat of 'constant infections diseases' enhancing the quality of fitness and enabling the people in the society to enhance and hold up their health and self-reliant way of life." (Pollock and Vincent, 1996)

Strength and endurance can be improved with that branch of Weight training or resistance training, which involves the performance of physical exercises. The uses of weights are connected with this. A variety of training techniques such as calisthenics, isometrics, and plyometric can also be a part of this. Strength training can provide important functional benefits and improvement in overall health and well-being, including increased, muscle, tendon, bone and ligament resistance and toughness, better joint function, escalated bone density, less potential for injury, risen metabolism, increased fitness and improved cardiac function, only when it is properly performed.

The mechanism in which the couple of training are adjusted in a frame work of training schedule specifically in a single day training sessions like endurance and resistance training, speed and strength training and aerobics and resistance training etc. is commonly referred as concurrent training. This mechanics enable the unification of couple of trainings within a specific planned and systematic training program. For example cross fit training. The major objective of a concurrent training program is to enhance the variables of adaptation of the concern trainings parallel in a systematic planned conditioning programme to achieve the specific training goals. Concurrent training include the training of multiple qualities simultaneously in the same training programme.

It characterized as a mixture of resistance and cardio workouts in a periodic application programme to enlarge all components of the genuine performance. The long term adaptation of physical capacity to training is affected by the accumulation of specific physiological responses. These physiological changes occur in the body only after the optimal maximum stress given on the body during the training session by in the shape of exercises over an extended period of time (weeks, months, years). Aerobic training is utilized to enhance cardiovascular endurance and cardiorespiratory quality and to increase metabolic mechanism liable for intensify the energy substance (secretion of enzyme) usage during regular and periodically endurance exercises.

In conclusion to achieve the multiple training objectives at a particular point of time (span of time) the specific concurrent training programme is the best source of training. Concurrent training in the iron game was once made mainstream with the aid of the Westside Barbell Club and Louie Simmons, who incorrectly referred to as it "conjugate form' (which is a specific term authored through Yuri Verkhoshanski to depict an approach that makes use of a deferred/delayed training impact, training residuals, and different adaptation terms) alternatively than concurrent.

Dynamic strength is ability of muscles to carry out work against a resistance when the body is in motion. Basketball is a high speed, highly technical and intense co-coordinative abilities dominated sport which requires dynamic strength/isotonic strength in the shape of strength endurance, explosive power, cardiovascular endurance and stability for maintaining control over the rigorous movements. The variables taken in this study are explosive power and strength endurance which are part of the dynamic strength.

The explosive power is the ability to overcome resistance with high speed. It produce a

maximum amount of force in a minimal amount of time. This mechanism involved muscle lengthening followed by rapid acceleration through the shortening phase. Explosive strength is the use of your powerful anaerobic muscle fibres which do not use oxygen and thus wear out quickly. These anaerobic muscle fibres work in short powerful bursts. In explosive power the focus is on the speed of movement through a range of motion.

Explosive strength is based on the ability of the contractile elements to rapidly generate tension while power announce the ability of elastic tissues to minimise the transitions time from lengthening to shortening during the strength shorten cycle. It improve the speed of motor unit recruitment and enhance intramuscular coordination. It activate type II muscle fibres.

The explosive power is used for rebounding, shooting, tapping and leaping forward for dunking in Basketball. The ability to jump both vertically and horizontally a player need explosive power. When specifically talks about the basketball this physical fitness component is focal point to be developed among the forward and centre players because the key responsibilities of these players are to rebound, to defend the paint area shots, to use it for the power dunking and for aggressive and brush up defence. Explosive power in Basketball is manifested through various variants of jump, starting acceleration, sudden change in direction also. In conclusion explosive power development in training programs show the positive relation with determined factors like short sprints, jumping and throwing.

Strength endurance is the capacity of an individual to complete strength activity in a given time relevant to a given acyclic or cyclic course of movements with the high resistance to fatigue . It is the combination of endurance and strength ability. As a rule therefore strength endurance is related to speed endurance and too short, medium or long term endurance ability.

Strength endurance training is an important step in an integrated training program. It involves using higher amount of weight, lower repetitions, more sets and little rest. The main aim of this training is to sustain the ability to maintain force generation during fatigue. Basketball demand quickness, lateral movements, explosive power for rebounding, tapping and brush up defence. Strength endurance improves explosive power and acceleration/speed around the court and reduce the risk of joint and tendon injuries. It improve resilience of muscle and connective tissues to reduce the risk of common injuries in Basketball such as a sprain or muscle pull. Therefore this is the core component for any training programme of a basket baller.

Strength endurance is an integral part of all forms of specific endurance therefore always be viewed differently:

- The selected exercises having cyclic or acyclic sequence of movements.
- The duration of loading.
- The intensity of loading.
- The density of loading.

After high application of strength within the range of 80 to 90% of maximal performance ability involving 06 to 10 repetitions per set of exercises with three sets performed at brisk tempo, an incomplete break off 60 to 180 seconds leads to the development of strength endurance with a high strength effect

After medium application of strength within a range of 70 to 80% of maximal performance ability with and 10 to 14 repetitions each of 10 to 12 different exercises per set (three sets) more static strength endurance can be achieved. A relatively short incomplete break of 30 to 120 seconds is sufficient to recover

After only moderate of slight application of strength within a range of 40 to 60% off maximal performance ability with 10 to 12 different exercises with 12 to 15 repetitions each in three sets over a duration of 45 to 60 minutes general strength endurance may be achieved.

Objectives of the Study

1) To examine the effects of Aerobic Training, Resistance Training and Concurrent training on explosive power among female Basket Ball Players.
2) To examine the effects of Aerobic Training, Resistance Training and Concurrent training on strength endurance among female Basket Ball Players.

Hypotheses

1) Aerobic training, Resistance training and Concurrent training will effect significantly to explosive power among the University level female Basket Ball Players.
2) Aerobic training, Resistance training and Concurrent training will significantly effect to strength endurance among the University level female Basket Ball Players.

Sample

The sample for the study was consisted of sixty (60) women basketball players studying in different affiliated Colleges of Kurukshetra University, Kurukshetra. The age range of the participants was between 18 to 25 years. The participants included in the sample were regularly participating in the games and sports. Only those participant were included who have given their consent to participate in the study and having the good mental and physical health. They were experimented for 12 weeks programme consisting of aerobic training, resistance training and concurrent training load.

Design

All the 60 players which were selected for specific training programme were very well acquainted with the basketball sport and were playing the specific positions of the point guards, shooting guards, forwards, power forwards and centre. The total sample was randomly divided into 4 batches which consists of (Experimental Group-1 =15 for Aerobic training) N-1, (Experimental Group-2 = 15 for Resistance training) N-2, (Experimental Group-3 =15 for Concurrent training) N-3 and (Experimental Group-4 =15 with the routine training work out) N-4. The specific work out as per the aerobic, resistance and concurrent training/conditioning programmes were given to experimental teams for 12 weeks. The N4 group was given with the routine training workout as per their college schedule. All the participants were inform about the goal and protocol of the study.

Statistical Techniques

In the present study random group design was used. All the four groups were randomly selected from various colleges' basketball players of Kurukshetra University. Analysis of covariance (ANCOVA) statistical technique was used to find out the adjusted mean difference among the variables. Scheffe's post hoc test was used to find out the paired adjusted mean difference when the study was significant.

Results

The obtained data were processed for ANACOVA and Scheffe"s test to meet the objectives of the study. Analysis of covariance was used to find out the adjusted mean difference among the variables. Scheffe"s post hoc test was used to find out the paired adjusted mean difference on the dependant variables. The result of ANACOVA analysis are presented in table no. 1.

The pre and post test data collected from the experimental and control groups on explosive power and strength endurance are statistically analyzed by ANCOVA and the results are presented in table- I

Table-I: Analysis of Covariance on Explosive Power and Strength Endurance of Experimental and Control Groups

	Aerobic Training Group	Resistance Training Group	Concurrent Training Group	Control Group Group	S o V	SS	Df	MS	'F' ratio
Explosive Power	2.60	2.65	2.66	2.44	B	0.096	3	0.032	7.11*
					W	0.248	55	0.004	
Strength Endurance	48.47	50.36	52.42	43.62	B	1.26	3	0.42	32.31*
					W	0.715	55	0.013	

(The required table value for significant at .05 level of confidence are of 3 and 56 and 3 and 55 are 2.70 and 2.72)

** Significant at .05 level of confidence*

The adjusted post-test means on explosive power of aerobic, resistance, concurrent training and control groups are 2.60, 2.65, 2.66 and 2.44 respectively. The obtained 'F' ratio value of 7.11 on explosive power are greater than the required table value of 2.72 for the degrees of freedom 3 and 55 at 0.05 level of confidence. It is observed from this finding that significant differences exist among the adjusted post-test means of experimental and control groups on explosive power.

The adjusted post-test means on strength endurance of aerobic, resistance, concurrent training and control groups are 48.47, 50.36, 52.42 and 43.62 respectively. The obtained 'F' ratio value of 32.31 on strength endurance are greater than the required table value of 2.72 for the degrees of freedom 3 and 55 at 0.05 level of confidence. It is observed from this finding that significant differences exist among the adjusted post-test means of experimental and control groups on strength endurance.

Further to determine which of the paired means has a significant improvement, Scheffĕ *S* test was applied as post-hoc test. The result of the follow-up test is presented in Table – II

Table – II : *Scheffĕ S Test for the Difference Between the Adjusted Post-Test Mean of explosive power and strength endurance on aerobic, resistance, concurrent training and control groups*

Adjusted Post-test Mean of Explosive Power					
Aerobic Training	**Resistance Training**	**Concurrent Training**	**Control Group**	**Mean Difference**	**CI at .05 level**
2.60	2.65	-	-	0.05	0.08
2.60	-	2.66	-	0.06	
2.60	-	-	2.44	0.16*	
-	2.65	2.66	-	0.01	
-	2.65	-	2.44	0.21*	
-	-	2.66	2.44	0.22*	
Adjusted Post-test Mean of Strength Endurance					
48.47	50.36	-	-	1.89	4.23
48.47	-	52.42	-	3.95	
48.47	-	-	43.62	4.85*	
-	50.36	52.42	-	2.06	
-	50.36	-	43.62	6.74*	
-	-	52.42	43.62	8.8*	

* Significant at 0.05 level of confidence.

The result of the study shows that aerobic, resistance training and concurrent training increases explosive power and strength endurance when compare with control. concurrent training may have better effect to increases explosive power and strength endurance of university basketball players.

Discussion

The results of the study showed that there is a significant difference between the control group and aerobic training, strength training and parallel training groups. Thus, 12 weeks of experimental treatment increased the explosive power of the basketball players compared to the control group. However, there is no significant difference between the experimental groups in terms of explosive power. The above results are consistent with the studies of Sosen (2012), Martha et al (2013) and Mary Varghese and Mutuelekkuvan (2018).

The results of the analysis of the covariance of strength endurance show that there is a significant difference between the control group and the groups of aerobic training, resistance training and simultaneous training. Thus, 12 weeks of experimental treatment improved endurance performance among female basketball players compared to the control group. However there was no significant difference between experimental groups on strength endurance. The above results are consistent with the study of Jyoti, Vinu and Mutu Elekuvan (2010) and Sirino et al (2019).

Conclusion

From the analysis of the data, the following conclusions were drawn.

1. The result of the study shows that aerobic, resistance training and concurrent training increases explosive power and strength endurance when compare with control group.
2. Concurrent training may have better effect to increases explosive power and strength endurance of university level female basketball players.

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नई शिक्षा नीति 20–20 के परिपेक्ष्य में विद्यार्थियों के कठिन विषय: एक अध्ययन (विशिष्ट बालकों के सन्दर्भ में)

अंतिमबाला पाण्डेय
प्रशान्ति शिक्षा महाविद्यालय, उज्जैन

सारांश

किसी भी राष्ट्र की प्रगति समृद्धि, संस्कृति का मूलाधार शिक्षा ही होती है। शिक्षा को राष्ट्रोत्थान का मूल तत्व माना गया है। वर्तमान समय में विद्यार्थियों का जीवन संधर्षभरा होता जा रहा है विगत दो वर्षो में कोरोना के कारण हमारी दिनचर्या के साथ–साथ हमारी शिक्षा व्यवस्था भी प्रभावित हो रही है। जिसके कारण भविष्य को लेकर अभिभावक तथा विद्यार्थी दोनो ही चिन्तित हो रहे है, क्योंकि ऑनलाईन शिक्षा कोरोना की परिस्थिति को देखते हुए आवश्यक थी परंतु इस तरह की शिक्षा से भविष्य में होने वाले बदलाव व मानसिक स्थिति में कुछ विकृतियां होने लगी। हायर सेकेन्डरी में रूचिकर विषय का चुनाव करते समय तथा अपने भविष्य का निर्माण करने हेतु उसे चुनते है। आज की स्थिति में बच्चों को, जिन्हें हम कठिन विषय कहते है जैसे कि अंग्रेजी, गणित, विज्ञान, आदि ऐसे विषय है जो हमें बिना अभ्यास के आना संभव नहीं है। विगत दो वर्षो में महामारी कोरोना काल के कारण निरंतर अभ्यास की कमी से विषय को अपनाने से भयभीत हो रहे है तथा कठिनाईयों का सामना कर रहे है। अतः शोध करने से आने वाली युवा पीढ़ी व उनके रूचिकर विषय का अध्ययन कर किस प्रकार से अपनी समस्या का समाधान कर सकेंगे। शोध से सुझाव व निष्कर्ष आदि का वर्णन कर विद्यार्थी इस समस्या से उत्पन्न होने वाली कठिनाईयों को सुलझा सकते हैं तथा विद्यार्थियों में सकारात्मक व उत्साहवर्धक प्रभाव डाला जा सकेगा।

प्रस्तावना

आधुनिक एवं उन्नत भारत के लिये प्रथम सीढ़ी है शिक्षा। भारतवर्ष के भविष्य को बनाने में गांव –गांव व शहर–शहर में उच्च शिक्षा के लिये कई योजनाएं बनाई गई है परंतु उन योजनाओं पर कितना प्रतिशत कार्य सफलतापूर्वक होता है इसका निष्कर्ष हम अपने शोध द्वारा प्रस्तुत करेंगे। सरकार द्वारा मिलने वाली सुविधाएं बच्चों तक पहुँच पाती है या नहीं इसका उत्तर हमारे पास कोई विश्वसनीय सूत्र या रिसर्च के द्वारा देखने पर ज्ञात किया जा सकता है। नई शिक्षा नीति 2020 को बनाने में अत्याधिक चुनौतियों का सामना हमें कुछ वर्षो तक करना पडेगा तथा इसका लाभ भी हमें अधिक लंबे अंतराल के बाद ही मिल पायेगा। परंतु एक अच्छी सोच एवं अच्छा विचार अगर सम्पूर्ण भारत वर्ष में लागू हुआ तो कहीं न कहीं हमारे राष्ट्र की उन्नति निश्चित रूप से हमारे सामने उभरकर आयेगी। विद्यार्थी विगत 2 वर्षो से कोरोना के चलते कोई विशेष अध्ययन नहीं कर पाये जिसकी वजह से उच्च शिक्षा में आगे बढ़ने के अवसर नहीं के बराबर प्रतीत हो रहे है ऐसे में उनकी व्यवसायिक उन्नति भी अवरूद्ध हो रही है। इस उन्नति हेतु हम अगर विद्यार्थियों से उनकी अभिव्यक्तियों पर सर्वेक्षण कर उनकी समस्याओं को समझने में तथा सुझाव देने में सहायक हो सकते है तो शिक्षा में ऐसी अनेक सहायक प्रणालियां है जिनके माध्यम से सुधार की संभावना निश्चित होती है।

शोध की आवश्यकता

नई शिक्षा नीति 20–20 के अंतर्गत जो भी परिवर्तन समय अनुसार किये गये है वे पूर्ण रूप से हमें लाभांन्वित करेंगे परंतु वर्तमान समय में विद्यार्थियों को विषय से संबंधित डर मन में हमेशा बना रहता है इस डर या भय को बच्चों के मस्तिष्क से निकालने के लिये शोध नितांत आवश्यक है।

शोध के उद्देश्य

1–बच्चों के डर को अभिव्यक्ति द्वारा समझना,
2–विषय चयन हेतु उनकी क्षमताओं को जानना,
3–बच्चों की रूचियों का अध्ययन करना,
4–विषय कठिन होगा इस भय को दूर करना।

परिकल्पना

परिकल्पना अध्ययन अनुसार बनाना आवश्यक नहीं है। क्योंकि यह अध्ययन एक समीक्षात्मक अध्ययन है।

शोध विधि

शोधकर्ता द्वारा स्वयं निर्मित प्रश्नावली का निर्माण किया गयातथा यह शोध सर्वेक्षण विधि द्वारा किया गया है।

निष्कर्ष

1–कक्षा 11 वीं के विद्यर्थियों को क्रमशः मेथ्स, (52 प्रतिशत) अंग्रेजी, (79 प्रतिशत) संस्कृत एवंसामाजिक विज्ञान (6 प्रतिशत), आदि कठिन लगते हैं।
2–इन विषयों के कठिनाई के कारणों में सर्वाधिक पढ़ने में एवं फार्मूलों (20 प्रतिशत) में हैं। 3–कक्षा 11

के छात्रों को मेथ्स 84 प्रतिशत एवं अंग्रेजी 9 प्रतिशत कठिन लगते हैं।

4–इन विषयों में कठिनाईयों का कारण नियमित अभ्यास की कमी 25 प्रतिशत है।

5–सामान्य विषय का कठिन होना दर्शाता है कि छात्र की चयनित विषय पर नियमित
अभ्यास की कमीहै ।

कक्षा 11 वी के विद्यार्थियों के कठिन विषय निम्नलिखित है –

विद्यार्थियों का चयन भोपाल, होशंगाबाद, रायसेन, सागर, शाजापुर, विदिशा से डाटा एकत्र हुआहै।

सर्वेक्षण सारिणी नीचे दर्शाये अनुसार है –

S.No	Tough Subject	Count	Percentage
1	Maths	1572	52.82%
2	English	590	19.83%
3	Sanskrit	242	8.13%
4	Social Science	197	6.62%
5	Science	139	4.67
	Overall	2976	100.00%

S.No	Reason	Total	Percentage
1	Reading	1469	49.36%
2	Sums & Formula	618	20.77%
3	Under standing	220	7.39%
4	Difficult	47	1.58%
5	Others	28	0.94%
6	Not Answered	594	19.96%
	Overall	2976	100.00

सुझाव

- स्कूल को कठिन विषयों के लिये अलग समिति बनानी चाहिये।
- भाषा संबंधी समस्या को अल्प प्रयासो के माध्यम से दूर किया जा सकता है।
- संस्कृत और सामान्य विज्ञान जैसे विषयों को उचित समय अनुसार चिन्हित कर ठीक किया जा सकता हैं।
- गणित और अंग्रेजी जैसे विषयों के लिये पूरे साल प्रयास करना होंगे। इन्हे छोटे समूह बना कर भी अभ्यास किया जा सकता है।
- परीक्षा के पूर्व प्रोत्साहन से सबंधित व्याख्यान का आयोजन किया जाना चाहिये।
- विभिन्न प्रकार के कौशलों द्वारा विषय को विस्तार से समझने की रूचि उत्पन्न करना चाहिये।
- अध्ययन के समय शैक्षिक उपलब्धि हेतु सकारात्मक एवं उत्साहवर्धक प्रभाव बच्चों में लाने का प्रयास करना चाहिये।
- आत्म विश्वास की कमी हेतु कुछ रोचक शैक्षिक सामग्री का समावेश किया जाना चाहिये।

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EFFECT OF LADDER AND PLYOMETRIC TRAINING ON AGILITY AMONG FOOTBALL PLAYERS

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ABSTRACT

The purpose of the study was to investigate the effect of ladder and plyometric training on agility among football players. To assist the study, forty-five (45) football players from Government Degree College, Kulgam, Jammu and Kashmir, India were selected as subjects at random and their age ranged from 18 to 22 years. The subjects were separated into three equal groups. Group-I performed ladder training, group-II performed plyometric training and group-III did not do any training and acted as control group. Agility was assessed by Shuttle run test. The subjects were involved with their respective training for a period of six weeks. At the end of the six weeks of the training post-tests were taken. The significant differences between the means of experimental group and control group for the pre-test and post-test scores were determined by Analysis of Covariance (ANCOVA). The Scheffe's post hoc test was used to find the paired mean difference if any. The level of significance was fixed at 0.05 level of confidence for the degree of freedom 14. The ladder training and plyometric group produced significant improvement in agility. The 'f' values of the selected variables have reached significant level. In the control group the obtained 'f' value on agility failed to reach significant level.

Keywords: *Agility, Ladder, Plyometric & football players.*

Introduction

A ladder is an outstanding piece of training equipment and is useful to enhance body control and agility and increase the foot speed. For this training there is no need to go out and purchase an own Ladder, it is just as easy to use throw-down lines and as far as juniors are concerned, they may modify and there is no chance of their getting tangled up in the Ladder. The added advantage of lines is that the distance between them can be changed to suit various exercise patterns. Using a building block system of skill development is very important to achieve success in training with a Ladder. The training starts with general expansion up to advanced skill development, from a full range of motion to smaller, quicker movements. Keeping in mind the principle of working from slow and controlled movements and moving onto fast, explosive movements as a teaching and learning progression will have a greater amount of success. Plyometric training consists of quick, explosive movements designed to increase speed and power. This can be achieved through performing multiple exercises that focus on training our bodies and brains to activate more muscle fibers, more quickly, in order to increase the efficiency and speed of our muscle contractions. Plyometric drills usually involve stopping, starting, and changing directions in an explosive manner. These movements are components that can assist in developing agility (Craig, 2004; Miller et al., 2001). Plyometrics is the term given to exercises designed to increase the power of an athlete. It is an upgradation of explosive strength and referred to by others as "speed-strength". In layman's terms, the aim of plyometrics is to increase the explosiveness of the muscle allowing an athlete to run faster, jump further, or generate force at a greater rate. Plyometric training is a form of training that is used to help develop and enhance explosive power, which is a vital component in most of the athletic performances. This training method is meant to be used with other power development methods as a complete training program to improve the relationship between maximum strength and explosive power. The modern history of Plyometrics is somewhat brief but not relatively new. This technique had originated in Russia and Eastern Europe in the middle of60's. The Soviets were very successful in the use of Plyometrics in their training programmes, especially in track and field. This technique was originally known as the "Shock Method of Training". Yuri Verhoshansky, a Russian coach whose success

with jumpers is legendary, could very well be called the "Father of Plyometrics". He had tried and succeeded in increasing his athletes reactive abilities by experimenting with exercises like the depth jump. He has been the leading researcher and coach responsible for the development of Plyometrics. He also has been credited with most varied types of plyometric training that are still in use today (Coetzee, 2007). Plyometric refers to exercises that allow the muscle to contract eccentrically before explosive contraction which enable the muscle to reach maximum explosive strength in a shortest period of time. The training aims at linking strength with speed to produce power. In this training the body weight of an athlete is used as resistance. All the forms of jumping exercises, wall bar exercises, pull-ups, skipping, rope climbing, sit-ups, etc. are considered as part of plyometric exercises. Since plyometrics put great stress on the muscular-skeletal system, it is better to practice after developing the basic strength through weight training. (Dr. Chu 1998). Agility is the ability to change the direction and also to change the position of the body quickly, effectively, and consciously, and requires the integrity of motion skills by using a combination of balance, coordination, speed, reflex, strength, endurance, and stamina (Hsiu-Ching et.al, (2012). Agility is not a single physical ability, but is composed of components of balance, coordination, speed, reflex, strength, endurance, and stamina. These components interact each other. Agility can be defined as the ability to explosively begin, reduce speed, change direction, and accelerate again quickly while maintaining body control and minimize speed reductions (Sethu, 2014, p.59).

Methodology

The purpose of the study was to investigate the effect of ladder and plyometric training on agility among football players. To assist the study, forty-five(45)football players from Government Degree College Kulgam, Jammu and Kashmir, India were selected as subjects at random and their age ranged from 18 to 22 years. The subjects were separated into three equal groups. Group-I performed ladder training, group-II underwent plyometric training and group-III acted as control group. Agility was assessed by Shuttle run test. The subjects were involved with their respective training for a period of six weeks. At the end of the six weeks of the training post-tests were taken. The significant differences between the means of experimental group and control group for the pre-test and post-test scores were determined by analysis of covariance (ANCOVA). The Scheffe's post hoc test was used to find the paired mean difference if any. The level of significance was fixed at 0.05 level of confidence for the degrees of freedom.

Statistical Analysis

Analysis of Covariance (ANCOVA) was applied. When the f-ratio of adjusted post-test mean was found to be significant, Scheffe's post hoc test was employed to find out paired mean differences. The level of confidence was fixed, at 0.05 level of significance.

Analysis of Agility

The data collected from three groups on agility were statistically analyzed by ANCOVA and the results are presented in Table 1.

Table 1 : Analysis of Covariance on Agility of Experimental and Control groups

Test	Ladder Training Group	Plyometric Training Group	Control Group	SOV	SOS	df	M.S	F-ratio
Pre-test Means	13.62	13.76	13.81	**BG**	0.28	2	0.14	1.88
S.D(±)	0.28	0.13	0.35	**WG**	3.20	42	0.07	
Post-test Means	12.58	13.04	13.79	**BG**	11.26	2	5.63	69.97*
S.D(±)	0.26	0.15	0.38	**WG**	3.38	42	0.08	
Adjusted Post-Test Means	12.66	13.02	13.73	**BG**	8.22	2	4.11	122.4*
				WG	1.37	41	0.03	

***Significant, table value,2 to 42&2 to 41 is 3.22 &3.23*

Table 1, shows that pre-test mean values on agility of ladder training group, plyometric training group, and control group are 13.62, 13.76 and 13.81 respectively. The obtained 'F' ratio of 1.88 pre-test score was lesser than the required table value of 3.22 for df 2 and 42 for significance at 0.05 level of confidence on agility. The post-test mean values on agility of ladder training group, plyometric training group, and control group are 12.58, 13.04, and 13.79 respectively. The obtained 'F' ratio value of 69.97 for the post-test score was greater than the required table value of 3.22 for the df of 2 and 42 for significance at 0.05 level of confidence on agility.

The adjusted post-test mean on agility of ladder training group, plyometric training group, and control group are 12.66, 13.02, and 13.73 respectively. The obtained 'F' ratio of 122.4 for the adjusted post-test score was greater than the required table value of 3.23 for df 2 and 41 for the significance at 0.05 level of confidence on agility. It was concluded that the differences exist among the adjusted post-test means of ladder training group, plyometric training group, and control group on agility. The 'F' value in the adjusted post-test means was found significant, hence Scheffe's test was applied to assess the paired mean difference and the results are presented in Table 2.

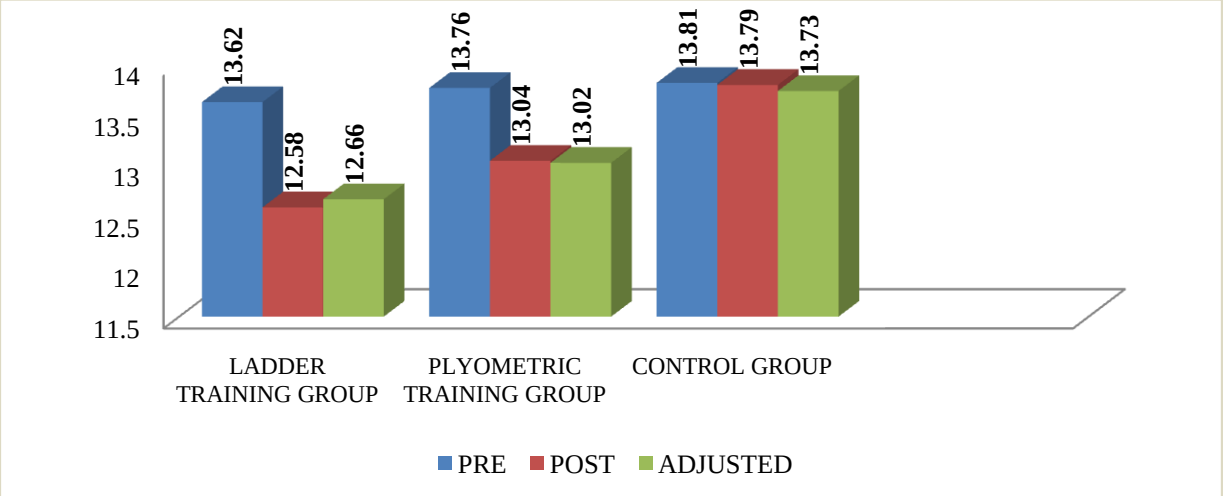
Table 2 : Scheffe's test for the Differences between Adjusted Post-test Paired Means on Agility

Ladder Training Group	Plyometric Training Group	Control Group	Mean Difference	C.I
12.66	13.02	-	0.36*	0.16
12.66	-	13.73	1.07*	
-	13.02	13.73	0.71*	

**Significant at 0.05 level of confidence.*

From the Table 2, it was imperative that both the experimental groups differed significantly from the control group on agility. Significant differences were found between ladder training group and plyometric training group in improving agility of football players. Therefore, six weeks of ladder training showed greater improvement than plyometric training among football players. The findings of the study imply that both the groups improved but ladder training had significantly improved agility than the other two groups in this study. The changes in agility are presented in Figure 1.

Figure 1: The Pre, Post and Adjusted Post test Means of Experimental and Control Groups on Agility



Discussion on findings

The result of the study indicates that the experimental group namely ladder training group and plyometric training group had shown significant enhancement in agility among the football players. The control group football players has not shown significant changes in agility. The analysis of the study

indicates that the ladder and plyometric groups had shown significant level differences in agility among football players. It is evident from the literature and from the outcome of the present study that systematically designed training develops agility and is one of the important quilts for better performance in almost all sports and games. Hence it is concluded that meticulous training will bring positive changes in football players which will better their overall performance. These findings are in accordance with the findings of Senthil Kumaran (2021), Abdul Halik (2021), Jenith (2021), Senthil Kumaran (2018), Ooraniyan (2018) and Chidambara Raja (2014).

Conclusion

- The ladder training group produced significant improvement in agility. The 'f' values of the selected variables have reached the significant level.
- The plyometric training group produced significant improvement in agility. The 'f' values of the selected variables have reached the significant level.
- In the control group the obtained 'f' value on agility failed to reach the significant level.

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IMPACT OF LADDER AND SAQ TRAINING ON PHYSICAL FITNESS PARAMETERS AMONG KHO-KHO PLAYERS LIVING AT MODERATE ALTITUDE IN KASHMIR

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ABSTRACT

The purpose of this study was to determine the effect of ladder and SAQ trainings on physical fitness parameters among Kho-Kho players. ThirtyKho-Kho players were purposely selected from Army Goodwill School Behibagh and Army Goodwill School Aahgam, Jammu and Kashmir, India.Withmean: (14.16 ± 0.2 years, height of 152.10 ± 1.15 centimetres, 47.70 ± 3.30 kg were chosen). All the subjects were tested to assess speed and agility before (pre-test) and after 8-weeks training period (post-test).Agility was assessed by Illinois test. Speed was assessed by 50 meter run. *The subjects were randomly segregated into three groups; ladder training, (12 exercises for two sessions per week) (ladder G-I=15). Speed, agility and quickness (SAQ) training (12 exercises for three sessions per week) (SAQ G- II=15), and control group (CG=15) didn't take part in any special training*. Speed and agility was improved significantly in both training groups (P< 0.05). SAQ group was much better than ladder group in speed and also SAQ training was much better in agility than ladder training group. This may be due to the nature of trainings and type of exercises given. It was concluded that Kho-Kho game requires fast changes in direction, vertical jumps, forward lunges around the court. Kho-Kho coaches should take place ladder and SAQ training exercises in training programme.

Keywords: *speed, agility, ladder training, quickness, SAQ training and kho-kho players.*

1.1 Introduction

Kho-Kho is a game played in two innings by 12 nominated players out of 15, on each side. Initially 9 players start the game and 3 are kept reserve. One team becomes the chaser and the other defenders or runners. In the game, the chaser pursues the runner; tags and touches them and makes them out. Each team has to chase and defend for 9 minutes twice in a match.The Kho-Kho match requires fast changes in direction, vertical jumps, forward lunges, and different postural positions (VermaKavita 2015). To our knowledge, the agility and speed are important motor skills to chase and defend at different positions around the court. Ladder training drills aid in the improvement of many aspects of movement. These exercise use hip strength to control foot movement and to strengthen the body and its balance. The person using the agility ladder vigorously practices forward, backward, and sideways movement. Consistent practice of these drills aids in increasing the stamina and reaction timeof the Kho-Kho player. Ladder training is multi-directional because it incorporates elements of strength, power, balance, agility, core and joint stability, foot speed, eye hand coordination and reaction time. Each component should be incorporated into each training session on daily basis.(Chu DA 2012)Speed, agility and quickness (SAQ) training is fast becoming the most popular exercise in the world today. Even in the sports world, many players and coaches did not emphasize the importance of speed, agility and quickness (SAQ) training if their particular sport did not require them to have high levels of muscular power in order to be competitive. However, in recent years the amount of information and research on speed, agility and quickness (SAQ) training has exploded. Players of all types, from the professional to the weekend enthusiast now understand the potential benefits of partaking inspeed, agility and quickness(SAQ) training program.The main purpose of physical preparation in training is to improve the functional potential of athletes and develop the bio motoric ability to the highest standards. Speed is one of the basic components necessary bio motor in some sports. Every sports activities both games, competitions, and games always require speed bio motor components. Speed is the ability of the complex, because in general, speed is an ability that allows a basketball player to move as quickly as possible at the level of specific resistance. Agility is an important quality in a lot of sports that are played on the field. In

Kho-Kho, agility demonstrated the ability to move with quick footwork and precise (Mathiv and Prasad 2018).

2. Materials & Methods

Thirty adolescent Kho-Kho players (30 boys; age = 14.05 ± 0.2 years) participated in this study. All the recruited participants were local residents, since intra AGS/PGPS Kho-Kho competition was going to be held and the players of these schools were practicing regularly. As the investigator is the physical training instructor of Army Goodwill school Behibaghon contract basis and he takes these students as subjects of this study. During this recruitment, subjects signed participant information and consent form. All the details of the study such as purpose, testing procedure, period of involvement, risks, benefits and discomforts throughout the study and the freedom of participant to withdraw were include in the consent form. All the participants had prior kho-kho experience of at least 1 year. None of the subjects had lower-extremity injuries and surgery within 6 months prior to the pre-tests, any cardiovascular and metabolic disease. This study was approved by the School Review Committee for the ethical use of human subjects. All participants were tested to evaluate agility and speed before (pre-test) and after 8-weeks (post-test). Participants were randomly divided into two groups of ladder training group (G-I), SAQ training group (G-II) and control (CG). The descriptive characteristics of the subjects are in table. I

Table 1. Descriptive Characteristics of the Groups.

variable	G - I (*n* = 10)	G - II (*n* = 10)	CG (*n* = 10)
	Mean	Mean	Mean
Age (yrs)	13.9	14.2	14.4
Height (cm)	151.4	150.8	152.1
Weight (kg)	45.2	47.8	46.5

2.1. Testing Procedure

The Illinois Agility Test was used to evaluate agility (Raya MA*et al.,* 2013). On the basketball court, four cones were used to create a test area with a length of 10 metres and a width of 5 metres. Four more cones were set in the centre, spaced 3.3 metres apart. The photocells were placed at the beginning and end of the race. The individuals were told to run as fast as they could around the course. With a five-minute break between trials, the best result of the two trials was recorded.The speed was assessed by taking subject to the starting position, which was located behind the starting line. The test administrator indicating the set position by raising both arms sideways. The go signal was given quickly, with the arms lowered to the side. The administrator started the stopwatch when the arms reached the side of the body. The subject dashed across the finish line as quickly as he could. When the subject's torso crossed the finish line, the watch stopped.

2.2. Training Protocol

During the training period, two experimental groups, G- I underwent ladder training for three days per week for a total duration of 8 weeks. Similarly G-II underwent SAQ training for three days per week of duration of 8weeks. All workouts began with a general warm-up and ended with a 5-10 minute cool-down time (low-intensity cardio vascular exercise, stretching, etc.). The ladder G-I performed upper and lower-body exercises in two training sessions per week (Monday, Wednesday and Friday) for 8 weeks. Ladder training programme included side to side ankle hoops, standing jump and reach, front cone hoops, double leg hoops, lateral jump warrior and diagonal cone hoops was given on three alternative days. The intensity was set to be 55% calculated on the basis of heart rate, gradually increase of intensity up to 85%of MHR at the end of training programme. The SAQ G-II performed lower-body and upper-body exercises in three training sessions per week (Tuesday, Thursday, and Saturday) for 8 weeks. The training programme included; 6×6 hurdles, walk run, bunny hoops, fast foot ladder, step ups, break way belts, zig zags, single leg and lateral runs.The intensity was set to be 55% calculated on the basis of heart rate, gradually increase of intensity up to 85%of MHR at the end of training programme.

2.3. Statistical Analysis

All data are presented as mean ± SD. Paired *t*-tests were used to identify any significant differences between the groups at the pre and post tests for the dependent variables. Effect sizes were determined using the method and interpreted based on the recommendations of Rhea [14] who defines < 0.50, 0.50–1.25, 1.25–1.90, and > 2.0 as trivial, small, moderate, and large, respectively. A criterion α level of P ≤ 0.05 was used to determine statistical significance. Statistics were analysed using SPSS ver. 25.

3. Results

3.1 Analysis of Speed

The descriptive analysis showing mean pre, post, percentage and effect size of improvement and 't' ratio of the collected data on speed among experimental and control group are presented in table II.

Table. II. Paired T-test for the Pre-and Post-test of the Speed.

Variable Name	Groups	Pre test SD	Posttest SD	M.D	% Change	ES	T.Ratio	Sig.
Speed	Ladder G-I	7.48 0.109	7.29 0.125	0.19	2.54	1.74	13.13*	0.00
	SAQ G-II	7.50 0.103	7.26 0.111	0.24	3.20	2.33	12.02*	0.00
	CG	7.51 0.124	7.53 0.154	0.02	0.02	0.16	0.87	0.78

**Significant at 0.05 level (Required Table value 2.14 with df 14) E.S=Effect Size*

It is clear from the table II, that there were significant difference (P< 0.05) in both experimental groups and significant changes between pre-test and post-test data on speed, of laddertraining G-I and SAQ training G-II because the obtained 't' ratio is 13.13 and 12.02 which is greater than the required table value of 2.14 at 0.05 level of significance for the df 14. The results of the study shows 2.54, 3,20 and 0.02% change from pre to post training with 1.74, 2.33 and 0.16 effect size within the group for speed. The percentage of changes on speed of ladder training G-I, SAQ training G-II and control group are given in the figure 1.

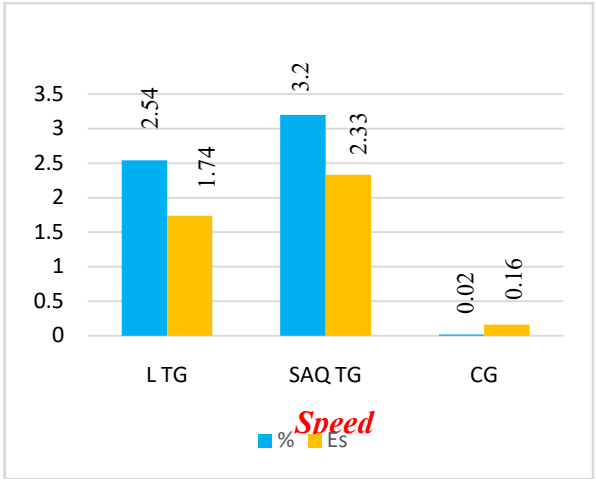

Fig. 1. *% change and effect size in three groups of Speed.*

3.1 Analysis of Agility

The descriptive analysis showing mean pre, post, percentage and effect size of improvement and 't' ratio of the collected data on agility among experimental and control group are presented in table III.

Table. III Paired T-test for the Pre-and Post-test of the Agility.

Variable Name	Groups	Pre Test SD	Post Test SD	M.D	% Change	ES	T.Ratio	Sig.
Agility	Ladder G-I	20.00 1.46	17.26 1.48	2.73	13.70	1.87	6.04*	0.00
	SAQ G-II	20.13 1.35	16.93 1.38	3.20	15.89	2.37	6.95*	0.00
	CG	20.26 1.43	20.06 1.48	0.20	0.98	0.13	0.56	0.58

**Significant at 005 level (Required Table Value 2.14 with df 14) E.S= Effect Size.*

It is clear from the table III, that there were significant difference (P< 0.05) in both experimental groups and significant changes between pre-test and post-test data on agility, of laddertraining G-I and SAQ training G-II because the obtained 't' ratio is 6.04 and 6.95 which is greater than the required table value of 2.14 at 0.05 level of significance for the df 14. The results of the study shows 13.70, 15.89 and 0.98 % change from pre to post training with 1.87, 2.37 and 0.13 effect size within the group for agility. The percentage of changes on agility of ladder training G-I, SAQ training G-II and control group are given in the figure 2.

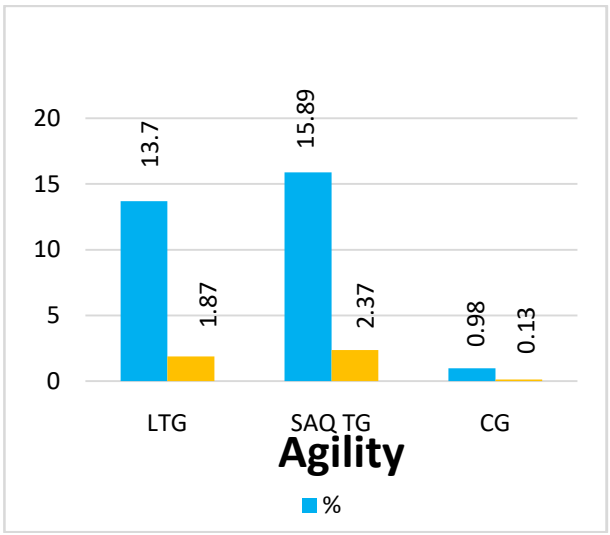

Fig. 2. *% change and effect size in three groups of Agility.*

4. Discussion and Conclusion

The purpose of the present study was to compare the effects of ladder and speed, agility and quickness (SAQ) training on bio-motor parameters among kho-kho players. There was significant improvement on speed and agility of kho-kho players due to ladder training and speed agility and quickness (SAQ) training. The improvement of speed was much better by speed, agility and quickness (SAQ) than ladder training and also the improvement of agility was better by SAQ training than ladder. The improvement may be due to the nature of the trainings and the type of exercises given in the training regime. The findings of the study are in conformity with the findings of **Raja and Mahendran.,** determined the effects of six-week ladder training followed by speed training on selected physical variables among inter- college kho-kho players. Significant improvements were found in favour of ladder training.**Remirez- Campillo*et al.*,** showed that speed increased by 7 weeks of ladder training in non-trained adolescent males. **Pratama*et al.*,**reported that there is significant influence of ladder drills and rope jump exercises towards increasing speed and agility.**Heang*et al.*,** observed that a six week plyometric training significantly improved agility performance in both groups. Furthermore, this study finds that, as a whole that the training methods, speed, agility and quickness (SAQ) significantly improve the performance of footfall players. In addition, research conducted by **Rahul Kumar and Dhapoha** suggests that SAQ training has significant influence on agility and speed. The results of this study are also in agreement with **Jovanovich and Sporis.** The increase of speed and agility with ladder and speed, agility and quickness SAQ training is supposed to be due nature of the training and the exercises given in the training schedule.The results of this study demonstrated that eight-week ladder training and speed, agility and quickness (SAQ) increased adolescent kho-kho players' agility and vertical leap. In many nations, kho-kho is one of the most popular sports among adolescent boys. A kho-kho match necessitates quick direction changes, hops, forward motion, lunges around the court. Consequently, the agility and vertical jump are important motor skills to win competition in badminton game. Coaches should incorporate in kho-kho training program with ladder and SAQ exercises.

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EFFECT OF TWELVE WEEKS CONDITIONING TRAINING PROGRAMME ON SELECTED MOTOR SKILLS AMONG BASKETBALL PLAYERS

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ABSTRACT

The present study was deliberated to know the impact of twelve weeks conditioning training program on selected Motor Skills of college level Basketball players. To attain the purpose of the present study, total thirty (N=30) of college level Male Basketball players of Krishna Institute of Education & Technology Bilaspur, Yamuna Nagar (Haryana) were selected as subjects. The age of the subjects was ranged from 20 to 28 years. Co-ordination ability, Balance ability and Agility level were selected as dependent parameters and Twelve – weeks conditioning training Program was chosen as independent parameters for present research. After the collection of relevant data, to know the impact of twelve weeks conditioning training program on selected Motor Skills of college level Basketball players, t-test was employed on mean values of pre and post-tests with the help of Statistical Package for the Social Sciences (SPSS) 16.0. The level of significance was set at 0.05 percent. The results validate that, during twelve – weeks conditioning training program the agility level improved significantly in College level Basketball players. The result strongly confirm that, after the application of twelve – week conditioning training protocol the balance ability increased significantly in College level Basketball players. The results validate that, significant change was found in co-ordination ability in College level Basketball players due to application of twelve - week conditioning training program.

Introduction

The actual improvement of a sportsperson at the pinnacle of his exhibition has additionally turned into a superb interest to anybody required .in the development of youthful athletes. In the new past, in India likewise, there have been endeavors to look for ability and to decide different variables, which could be answerable for extreme achievement. The games researchers working with the top mentors in the games concerned are attempting to discover the essential physical and the physiological qualities that may be execution restricting variables.

Basketball is a group activity wherein two groups, most ordinarily of five players each, contradicting each other on a rectangular court, contend with the essential goal of shooting a b-ball (roughly 9.4 inches (24 cm) in distance across) through the protector's loop (a crate 18 inches (46 cm) in breadth mounted 10 feet (3.048 m) high to a backboard at each finish of the court) while keeping the rival group from shooting through their own band. A field objective is worth two focuses, except if produced using behind the three-point line, when it is worth three. After a foul, coordinated play stops and the player fouled or assigned to shoot a specialized foul is given at least one-point free tosses. The group with the most focuses toward the finish of the match dominates, however on the off chance that guideline play lapses with the score tied, an extra time of play (additional time) is commanded." The term engine wellness, while frequently utilized interchangeably with actual wellness, was instituted to incorporate components which include a greater number of capacities than those essential actual wellness parts yet was not to envelop the different neuromuscular coordination abilities which make up broad engine capacity. Engine wellness considers productivity of fundamental developments and consequently would include such components as force, spryness, speed and equilibrium. Coordinative capacities have significant and the solid connections with the engine abilities as engine coordination frames the premise of both. Coordinative capacities become viable in developments just through the engine capacities. Coordinative capacities ought not be compared with engine abilities, however both are interrelated and reliant. Both are controlled by engine co-appointment measure. In an engine expertise, measure is to a great extent automatized for the execution of a specific development. In coordinative capacities this cycles are recently balanced out and consummated for execution of a wide number of developments like one another (Wikibooks, 2010).

Methodology and Procedure

The present study was designed to know the impact of twelve weeks conditioning training

program on selected Motor Skills of college level Basketball players. To attain the purpose of the present investigation, total thirty (N=30) of college level Male Basketball players of Krishna Institute of Education & Technology Bilaspur,Yamuna Nagar (Haryana) were recruited as subjects. The age of the samples was ranged from 20 to 28 years. Subsequent variables were selected as independent variables and dependent variables for present study:

Dependent Variables: Co-ordination ability, Balance ability and Agility level.

Independent variables: Twelve – weeks conditioning training Program.

The data for planned study was collected from total thirty (N=30) of college level Male Basketball players with the help of different following tools and methods.

S. no	Variable	Tests
1.	Agility	Shuttle Run (AAHPER-YFT)
2.	Balance	Beam Walk (The New York State Physical Fitness Test)
3.	Co-ordination	Obstacle Race Test (Scot)

After the compilation of related data, to know the impact of twelve weeks conditioning training program on selected Motor Skills of college level Basketball players, t-test was employed on mean values of pre and post-tests with the help of Statistical Package for the Social Sciences (SPSS) 16.0. The level of significance was set at 0.05 percent.

Results of the Study

Table No. 1 : Mean and SD values of Pretest and Posttest of Agility Level in college level Basketball players

Variable	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post-Test SD	t-Values
Agility Level	12.45	0.48	11.83	0.58	4.01*

$t_{.05}(29) = 2.09$

Table no. 1 divulged that the Pre - test and Post - test Mean & SD for Agility level in college level Basketball players is 12.45 & 0.48 and 11.83 & 0.58 correspondingly. Furthermore the table statistically shows that the calculated t value 4.01 for agility level of college level Basketball players is greater than the table value that is 2.09. Therefore, the values of table no. 1 shows that, after twelve – weeks conditioning training protocol the agility level increased significantly in college level Basketball players. The results of table no. 1 are also depicted in figure no. 1.

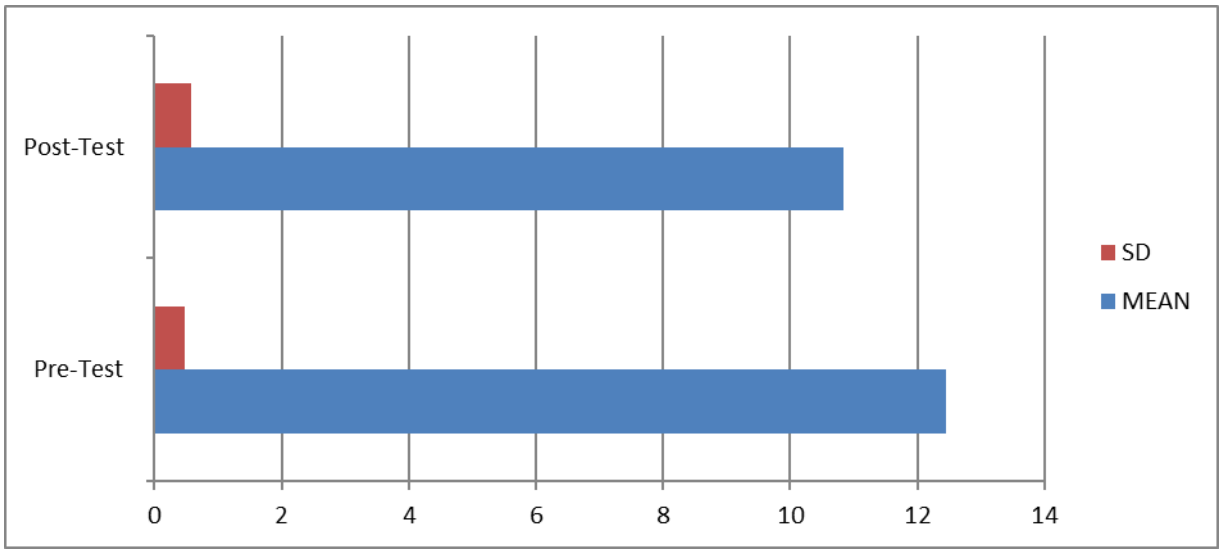

Figure no. 1 : Mean and SD values of Pretest and Posttest of Agility Level in college level Basketball players

Table No. 2
Mean and SD values of Pretest and Posttest of Balance Ability in college level Basketball players

Variable	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post-Test SD	t-Values
Balance Ability	16.53	0.62	18.54	0.53	2.81*

$t_{.05}(29) = 2.09$

Table no. 2 confirms that the Pre - test and Post - test Mean & SD for Balance Ability in college level Basketball players is 16.53 & 0.62 and 18.54 & 0.53 respectively. Furthermore the table confirms that the calculated t-value 2.81 for Balance ability of college level Basketball players is higher than the table value that is 2.81. Therefore, the data of table no. 2 reveals that, after practicing twelve – weeks conditioning training protocol the Balance ability increased significantly in college level Basketball players. The results of table no 2 are also illustrated in figure no. 2.

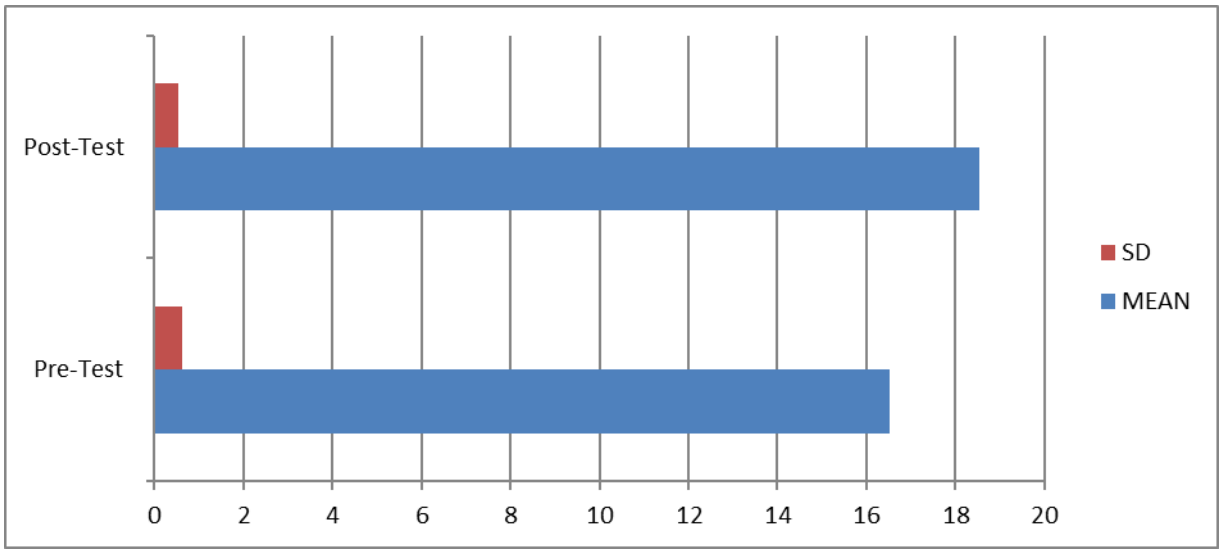

Figure no. 2: Mean and SD values of Pretest and Posttest of Balance Ability in college level Basketball players

Table No. 3: Mean and SD values of Pretest and Posttest of Co-ordination Ability in college level Basketball players

Variable	Pre-Test Mean	Pre-Test SD	Post-Test Mean	Post-Test SD	t-Values
Co-ordination Ability	29.41	2.71	27.85	0.97	3.64*

$t_{.05}(29) = 2.09$

Table no. 3 confirmed that the Pre - test and Post - test Mean & SD for Co-ordination Ability in college level Basketball players is 29.41 & 2.71 and 27.85 & 0.97 respectively. Further the table confirmed that the calculated t-value 3.64 for Co-ordination ability in college level Basketball players is higher than the table value that is 3.64. Therefore, the values of table no. 3 depicted that, after going through twelve – weeks conditioning training protocol the Co-ordination ability increased significantly in college level Basketball players. The results of table no 3 are also illustrated in figure no. 3.

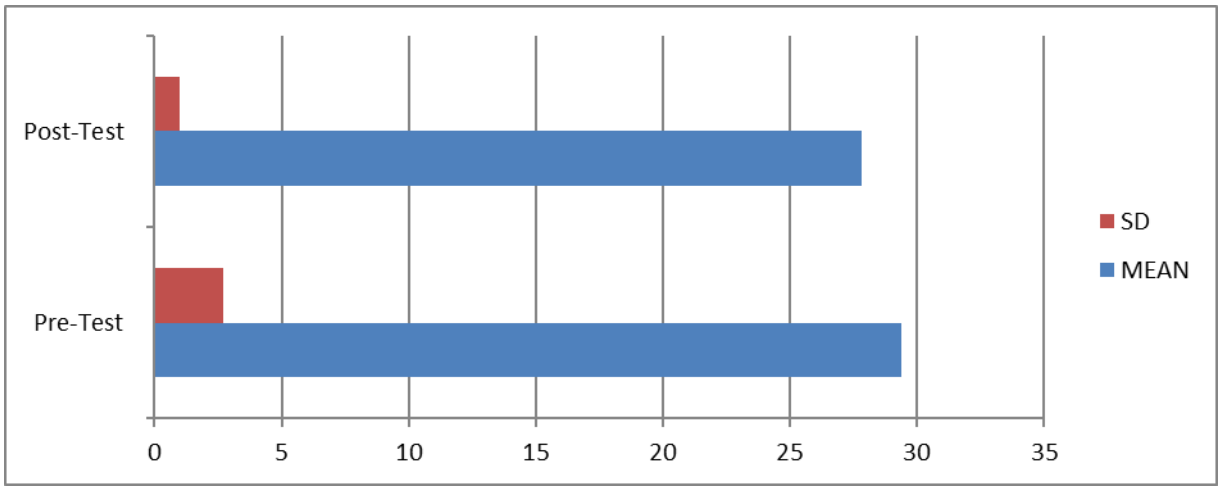

Figure no. 3 : Mean and SD values of Pretest and Posttest of Co-ordination ability in college level Basketball players

Conclusions

The findings of the present research confirmed that agility level increased significantly in college level Basketball players after underwent through of twelve – weeks conditioning training protocol. This may be due to varied agile conditioning exercises which were practiced by college level Basketball players throughout twelve weeks conditioning training protocol.

The result of present study confirmed that balance ability increase significantly in college level Basketball players due to the application of twelve - week conditioning training protocol. These changes can be due to balancing conditioning exercises, which were practiced by college level Basketball players during twelve weeks conditioning training protocol.

The result of the study established that co-ordination ability increase significantly in college level Basketball players due to the application of twelve weeks conditioning training protocol. alteration in co-ordination ability can be also due to specific conditioning workout, which were practiced by college level Basketball players during twelve weeks conditioning training protocol.

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DESIGNING OF SDD TEMPLATE MAKING USING MACHINE LEARNING

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ABSTRACT

Preparing Software design document from the customer requirement is very intricate task. According to projects requirements of the projects are different. In this paper requirements are divided into various projects types or categories. Using project types the design templates are designed for the new software. Preprocessing, Analysis, Clustering, template making are the steps that are performed for designing the templates. In this proposed model the keywords of requirements are matched with the project types 1, 2, 3 and 4. The best matched design document provides the template which is suited according to project requirements.

Keywords: *SRS, SDD, clusters, ML, HLD, LLD etc.*

I. Introduction

1.1 Design

It's a method for converting user needs in the form of SRS into a format that programmers can use for coding and implementation. The design is roughly divided into two parts. Preliminary design includes functions such as developing architecture, determining technological solutions, planning data collecting, and using a functional decomposition technique. Technical specifications, system modules, process details, data structure, and numerous design tools are all part of detailed design.

Design activities connect requirements analysis to requirements implementation. There are a variety of well-known methodologies that can help in the system design process. The most widely acknowledged methodologies are functional decomposition and object-oriented design. Regardless of the method employed, the architecture of the system should be described, as well as how it is deconstructed, organized, and any interactions between components.

- *Function-oriented Design* – Uses a top-down technique to decompose requirements, first identifying major system functions, then elaborating and refining them to a level suitable for design.
- *Object-oriented Design* - Decomposes important system functions into objects rather than procedures using a component-based design technique.
- *Data-structure Centered Design* - Design a system by starting with the data it will manipulate rather than the function it will accomplish. The input and output data structures are first determined, and then the system's control structure is constructed based on that data.
- *Integrated Definition (IDEF)* - A modeling technique that uses sixteen methods to capture the processes and structure of information in an organization using modeling procedures. Each method is meant to capture a specific sort of information.

Design patterns are used in software engineering to provide standard, repeatable answers to typical software design problems. It provides a problem-solving template that may be applied to a variety of circumstances. The earliest set of design decisions made by the development team is reflected in design patterns. These patterns help restructure systems by improving software documentation, speeding up the development process, allowing large-scale reuse of software architectures, capturing expert knowledge, and capturing design trade-offs.

The instances of design patterns are extracted using a design pattern detection technique. However, input, extraction methods, case studies, recovered patterns, system representation, accuracy, and validation method varies between detecting approaches. Methodologies, database query approaches, metrics-based approaches, UML structure and graph approaches are among the approaches used to uncover design patterns.

Any good design strategy must include established principles that support at least three key elements:

1. Classification and object identification
2. Relationships between classes and objects are described and diagrammed (logical blueprints)
3. By specifying the functionality of each class, you may define and depict object actions.

1.2 Design Document

A system design document (sometimes called a system design specification or technical specification document) is a written report that describes the overall architecture of a system product. These design documents are often created by system designers or project managers and distributed to the system development team to provide an overview of what needs to be built and how it should be done. Design Documents are divided into 2 parts: Low level Design and High Level Design.

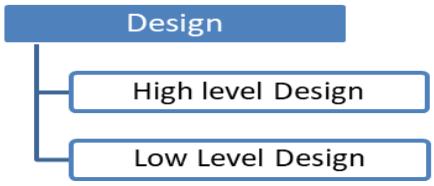

Figure 1 Design types

High Level Design: High Level Design (HLD) stands for "generic system design," which refers to the entire system design. It describes the application's overall description and architecture. It comprises a description of the system architecture, database design, and a summary of the systems, services, platforms, and module relationships. It's also known as system/macro level design. Solution architect is the person who creates it. It transforms a client's or company's need into a high-level solution. It is made first, which means it comes before Low Level Design.The overall description of a system architecture, as well as the design of its database and a brief explanation of its services, systems, platforms used, and module relationships, are all included in a high level design. It essentially transforms a client's or companies entire requirements into a high-level solution. It is used prior to the low-level design.

Low Level Design: LLD (Low Level Design) is a term that refers to the process of detailing. The acronym HLD stands for "component-level design." It provides a full description of each module, including actual logic for each system component and a thorough examination of each module's specifications. Micro level/detailed design is another name for it. Designers and developers work together to make it. It transforms a high-level answer into a detailed one. After High Level Design, it is generated in the second step. The low-level design is essentially a detailed description of each module. To put it another way, the LLD specifies every module in great detail, including the actual logic of every system component. It is characterized as detailed/micro-level design because it delves extensively into every system specification.

The designers and developers are primarily responsible for creating and implementing the low-level design. It has the ability to translate a high-level answer into a more comprehensive one. As a result, the LLD is only activated when the HLD has been designed and implemented.

II. Literature Review

Yarahmadi, H., & Hasheminejad, S. M. H. (2020) evaluated the existing literature on design pattern detection and looked at a number of different aspects of it, including data representation, kind of design pattern, advantages and disadvantages of various methodologies, quantitative results, and so on. Design patterns aided the software design phase in resolving the majority of engineering challenges and facilitated the manufacturing process and software development. The majority of the time, implementations does not match the design. Despite the fact that many design patterns have been developed and that design patterns are extremely important in software engineering, the articles solely focused on design patterns (GoF). They looked at research projects from 2008 to 2019 and compiled a list of datasets that were used in the evaluations.

Tummalapalli S. et al. (2019) highlighted the fact that multiple integrating Web Services given by various parties can be used to design and construct a distributed software system. Bad or poor design, such as bad design selection, anti-pattern, poor planning, and so on, plagued the Web Services-based system.

Anti-patterns could be predicted early on, which could aid developers and testers in resolving design issues and making better use of resources. To handle imbalance data in forecasting 5 various forms of anti-patterns, the author empirically researched and assessed six classification strategies, eight feature selection techniques, and one data sampling technique. The AUC value was used to assess the performance of the created models utilizing these strategies. They analyzed that the best feature selection technique was OneR, data sample was better that without sampling and Random Forest was best classification algorithm for anti-pattern predictions.

Silva-Rodríguez V et. al. (2019) designed a model that incorporates both requirements and design patterns A model called IDpatternM uses artificial intelligence algorithms to assess text needs and design decisions in order to assist designers in saving time during development. The accuracy and potential source for the evaluation of the IDPatternM model were determined using metrics.

III. Methodology

Different requirement and design documents are categorize into various application types like 3D games, restaurant software, Web messaging system, Virtual classroom tools etc. Templates are made according to requirements groups of different projects. All templates contains the basic things of design documents like Description, ER-Diagram, DFD etc. which is according to requirements of the software projects. Figure 2 tell about the proposed model in which the first step is the preprocessing of Software Requirement specification document (SRS) and Software Design document (SDD).Keywords are collected from these documents and then clustering technique are applied. According to this template are designed and matched. Datasets were collected which contains the requirement and design documents of various projects according to the application types. Various applications are 3d based animation games, Web messaging system, virtual classroom tool etc was taken as datasets. Then a template was made according to the application type. That template contains the DFD diagram, ER diagram, Classes Used, User case etc according to the requirements. After that the verification is done by using another requirement documents preprocessed that documents and mapping of requirements clusters was done with design clusters and suitable template was predicted by the system.

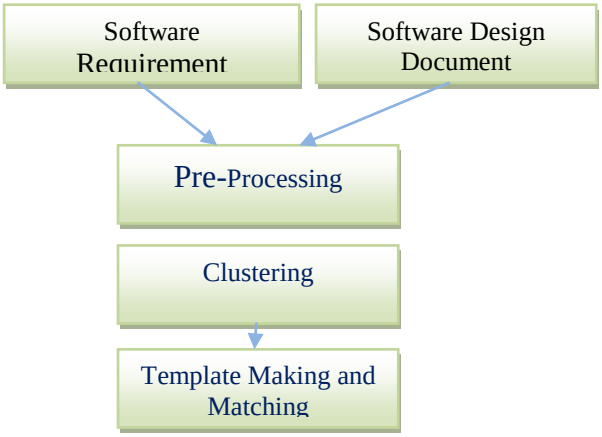

Figure 2 Proposed Model

IV. Results And Discussions

Dataset for different projects types is collected which contains the requirement keywords and design keywords. Before and after implement the preprocessing techniques the words are collected in requirement documents and design document according to projects. Along with this the information like No of modules, Entities, No of Use-Cases, Database Tables, Application type etc are also described. Table 1, shows the four project types with Type 1,Type 2,Type 3,Type 4.Project type 1 based on Mobile and web applications whereas Project Type 2 and 3 is for only web applications and Project type 4 software works on Window platform .Before processing the keywords in the requirement documents of projects range varies from 4215-7751 whereas after pre processing the range changes from 2243-3069.In design document before preprocessing keyword range is 3469-8796 and after pre-processing range is 2318-4402.The maximum number of modules are used by project no. 2 i.e. 20.Project type 4 contains maximum number of user cases i.e. 31 and no of classes is 26.Mostly java language is used to develop the project. Figure 3 tells about the keywords counts according to project types. Requirement document before preprocessing and after preprocessing difference according to type 1, 2, 3, 4 is 2966, 4682, 3644 and

1972.However design document keyword difference is 4394, 3921, 3544 and 1151 of four different projects respectively that can be shown in the given figure 3.

Project Type	**Number of Words In Requirement document Before preprocessing**	**Number of Words In Requirement document After preprocessing**	**Number of Words In Designing document Before preprocessing**	**Number of Words In Designing document After preprocessing**	**No of Modules**	**Entities**	**No of Use Case**	**Database Tables**	**Application Type**	**No of classes**	**Technology**
Project Type 1	5694	2727	8796	4402	8	3	22	-	Mobile and Web based	22	Microsoft's .NET and C#
Project Type 2	7751	3069	7774	3853	20	4	12	-	Web based	22	Java
Project Type 3	6707	3063	6835	3291	9	5	4	24	Web based	7	Java +Browser +SQL +Netbeans +Ellipse
Project Type 4	4215	2243	3469	2318	4	9	31	13	Window platform	26	Java

Table 1 Information of Project Types

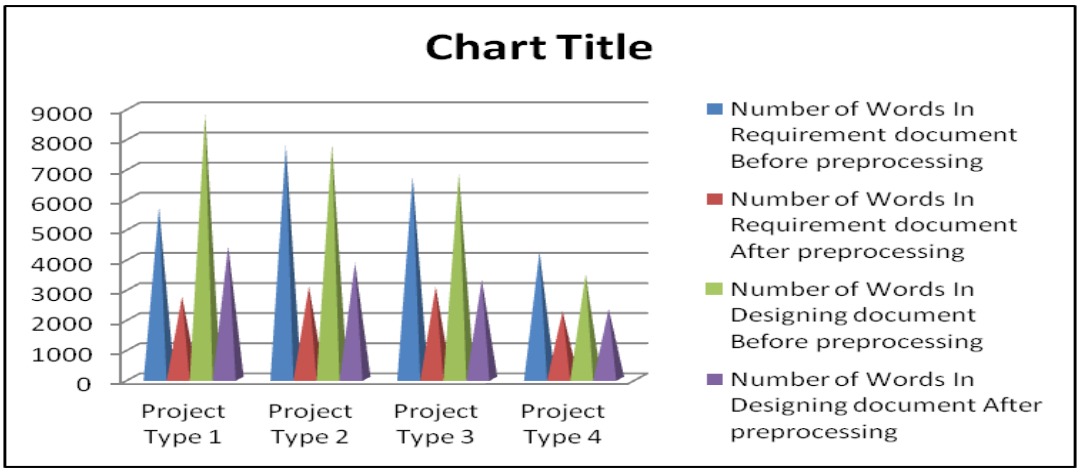

Figure 3 Number of keywords according to Project Types

By evaluating Figure 4 maximum number of modules is in 2nd project, highest entities and User cases in project 4 and greatest database in project 3.

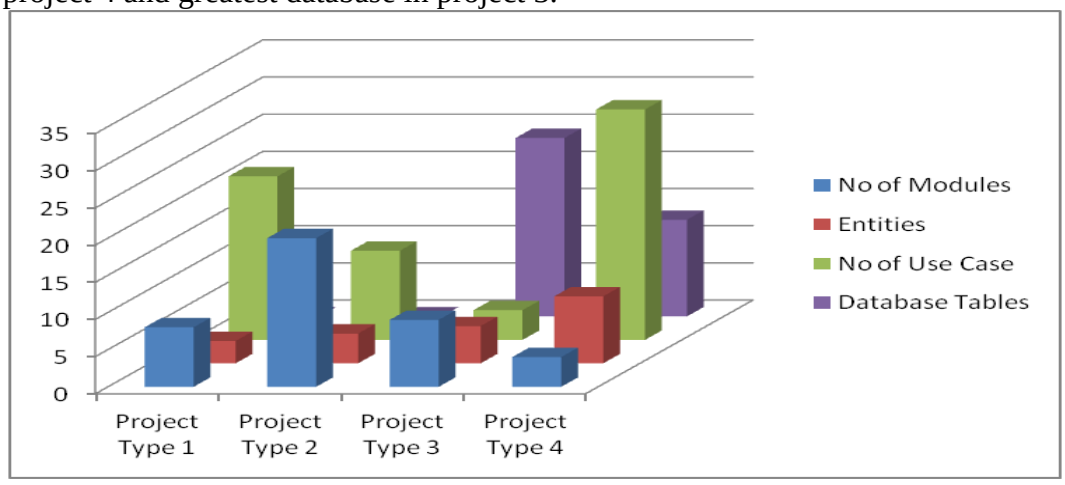

Figure 4 Design fields according to projects

Projects	Project Type 1	Project Type 2	Project Type 3	Project Type 4	Maximum Matching
Death match	347	315	307	255	Project Type 1
Wexpect	484	478	495	520	Project Type 4
Possession	841	782	887	560	Project Type 3
Innovation Tech	1002	1025	983	772	Project Type 2

Table 2 Analysis of various projects used

Table 2 tells about the matching of requirement keywords of new project design documents keywords of existing project types. Deathmatch project keywords is matched with all project types and the greatest match has occur with 347 keywords so the Project type 1 design template is best suited to deathmatch project. Similarly Wexpect project matches with project type 4 with 520 keywords, Possession with project type 3 with 887 and Innovation Tech with project type 2 with 1025 words.

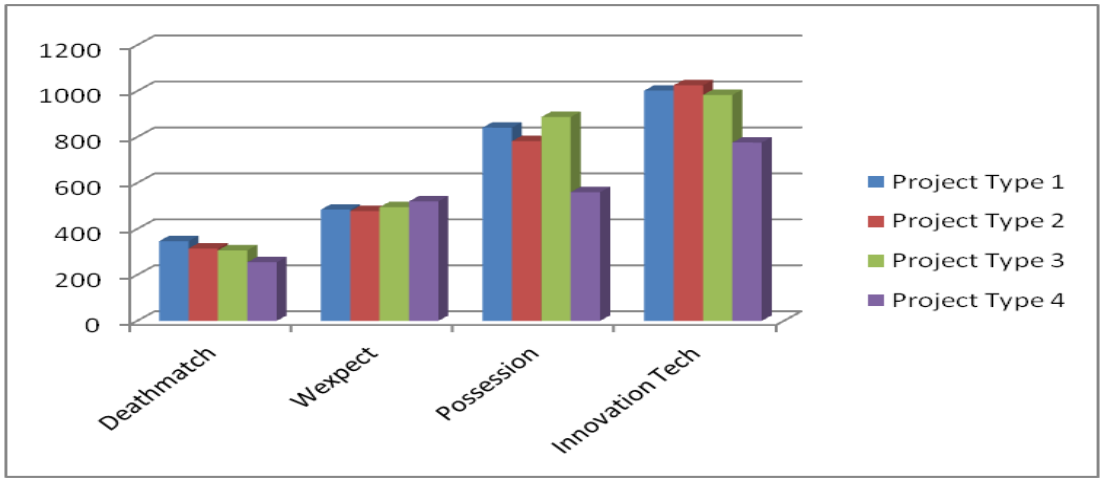

Figure 5 Analysis of matched keywords of various projects

Figure 5 describe about the verification of the projects according to project types. Keywords are compared with each design keywords and the numbers tells about which design template is best suited according to maximum matching.

V. Conclusion

Software Engineering with ML is the field which solves various problems related to development of software. In this paper design documents template are discussed which contains the software's different tools for designing like ER diagram, DFD etc. Projects requirement and design documents are preprocessed and cluster were made for finding the similar clusters. Then according to new project requirements design keywords are compared and find the best template that suits to those requirements. From the graph it is observed that Deathmatch project requirements are matched with project type 1, Wexpect matched with Project type 4 etc.

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LANGUAGE CREATIVITY AMONG ADOLESCENTS IN RELATION TO COGNITIVE ABILITY

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ABSTRACT

This study examines language creativity of adolescents in relation to cognitive ability. The sample of the study comprised of 1006 adolescents of class9th and 10th, studying in Government and private schools of different districts of Punjab. Descriptive survey method was employed to collect the data. Language creativity Test by S.P. Malhotra and Sucheta Kumari and Cognitive Ability Test by Vishal SOOD and Pooja Sharma was used to collect the data. The major findings of the study revealed significant relationship between language creativity and cognitive ability.

***Keywords**: Language creativity, Adolescents and Cognitive ability.*

Introduction

Mind makes the most significant contribution while discussing about creativity especially in language. In simple words, language creativity is directly related to the usage of normal words more effectively and accurately at the right time and at the right place, according to the situation. We, all have various skills within us but the mind makes us aware to use them more creatively. The use of language is perhaps, the most common creative act that all human possesses and exhibit as a regular part of their daily lives. Our skill for developing language is likely the result of a genetic disposition for such creative behavior. Evolution of human thought is attributed to evolution of language amongst the species. Indeed, language has been intricately connected with the process of thinking as well as expressing it in oral and written form. As society evolved, language was used as a means of developing cooperative behavior. Communication through language made it possible for man to unite efforts and share others' abilities of mind and body.

Language offers a means for generating an essentially infinite variety of novel representations, and an unprecedented inferential engine for predicting events, organizing memories, and planning behaviors. It entirely shapes our thinking and the ways we know the physical world (Deacan, 1997). The use of language is perhaps the most common creative act that all humans possess and exhibit as a regular part of their daily lives. Our skill for developing language is likely the result of a genetic disposition for such creative behavior. Language has crucial importance in the life of every individual. It plays an important role in students' life also. It is the vehicle of our thoughts and medium of expression of feelings and experiences. Students exchange their ideas through language which may be oral or written. It contributes to the mental development of the students.

Second variable that is involved in the study is: cognitive ability. Cognition is an act or process of knowing and a collection of mental processes that includes awareness, perception, reasoning and judgement. The study of cognitive process has its roots in the Gestalt Psychology of Wertheimer, Kohler and Koffka and in the studies of cognitive development in children by Piaget during the 19th century. Cognition is a scientific term used for "the process of thought. ´" usage of the term varies in different disciplines, such as in psychology, it usually refers to as an information processing view of an individual's psychological functions. Other interpretations of the meaning of *cognition* Link it to the development of concepts; individual minds, groups and organizations. Cognitive abilities are brain-based skills, we need to carry out ant task from the most complex. They have more to do with the mechanisms of how we learn, remember, problem-solve, and pay attention, rather than with any actual knowledge. For instance, answering the telephone involves perception (hearing the ring tone), decision taking (answering or not), motor skill (lifting the receiver), language skills (talking and understanding language), social skills (interpreting tone of voice and interacting properly with another human being).

Language Creativity

The notion of linguistic creativity is propounded by Chomsky in 1966. It is the ability of ideal speaker in a homogenous speech community to combine a finite known stock of elements on the basis of a finite known stock of computational patterns. Language creativity, or the artful use of language, is central to children's emotional, cognitive and social development and education, as well as to communicate in general. Linguists and psychologists have shown that children naturally play and experiment with language sounds, structures and meanings and it has been argued that this kind of spontaneous often playful, creativity in language contains the seeds of more prestigious poetic, literary and dramatic cultural forms (Cook 2000; Tannen 2007). Children also pursue creative activity through language, using it for practicing social roles, speculative thinking, intellectual exploration and the creation of alternative world.

Language creativity may be understood to be the creativity exhibited by an individual in the usage of language in its various forms. It consists of characteristics similar to those which are considered in the concept of general creativity. Beyond the early childhood, when a child imitates the language utterances, the use of language is a highly automated ability. The nature of language is such that vast majority of utterances are produced for the first time. The learning of language consists largely of learning the sounds, word patterns, rules for creating words and stringing them together. Having learnt these, the speaker develops highly automated skills and language use becomes largely subconscious and almost entirely creative.

In simple words, language creativity may be defined as "multi-dimensional attribute that is differently distributed among the people and includes mainly the factors of fluency, flexibility, originality and elaboration."

Adolescence

Adolescence is typically conceptualized as the transition phase from childhood to (emerging) adulthood, which covers the period of 10-19 years of age. This is often seen as a critical period for creative identity development (Barbot & Heuser, 2017; Beghetto & Dilley, 2016). One reason is because adolescents are undergoing rapid neuro developmental changes, including the development of more advanced levels of objective, rational, hypothetical, abstract, and metacognitive thinking (Kleibeuker, De Dreu, & Crone, 2016). If the comparison is done with the previous generations, adolescents of this century are facing new societal and developmental changes. Adolescence has long been recognized as a period of heightened risk-taking and accordingly, a stage that requires special oversight from adults. "Adolescence" is a dynamically evolving theoretical construct informed through physiologic, psychosocial, temporal and cultural lenses. (Fletcher, 2016). World Health Organization (WHO) defines adolescence as a phase of life between 10-19 years of age characterized by physical growth, emotional, psychosocial and behavioral changes, thus, bringing about transformation from childhood to adulthood. These changes occur a year or two earlier in girls than boys. Some of the changes are externally visible and some are internal. According to Stehlik, (2018), Adolescence can be defined biologically, as the physical transition marked by the onset of puberty and the termination of physical growth; cognitively, as changes in the ability to think abstractly and multi-dimensionally; or socially, as a period of preparation for adult roles. It is the stage of multiple changes and rough struggle. Language creativity can be better understood and developed in this stage of human development because things are learnt and inculcated rapidly and enthusiastically by the learners.

Stages of Adolescent Development

Stages of Adolescence	*Physical Development*	*Cognitive Development*	*Social-Emotional Development*
Approximately 11-13 years of age	Puberty: grow body hair, increase perspiration, and oil production in hair and skin, Girls- breast and hip development, onset of menstruation Boys- growth in testicles and penis, wet dreams, deepening of voice Tremendous physical growth: gain height and weight Greater sexual interest	Growing capacity for abstract thought Mostly interested in present with limited thought to the future Intellectual interests expand and become more important Deeper moral thinking	Struggle with sense of identity Feel awkward about one's self and one's body; worry about being normal Realize that parents are not perfect; increased conflict with parents Increased influence of peer group Desire for independence Tendency to return to ''childish'' behavior, particularly when stressed Moodiness . Rule-and limit-testing. Greater interest in privacy
Middle Adolescence Approximately 14-18 years of age	Puberty is completed Physical growth slows for girls, continues for boys	Continued growth of capacity for abstract thought Greater capacity for setting goals. Interest in moral reasoning Thinking about the meaning of life	Intense self-involvement, changing between high expectations and poor self-concept Continued adjustment to changing body, worries about being normal Tendency to distance selves from parents, continued drive for independence Driven to make friends and greater reliance on them, popularity can be an important issue Feelings of love and passion
Late Adolescence Approximately 19-21 years of age	Young women, typically, are fully developed Young men continue to gain height, weight, muscle mass, and body hair	Ability to think ideas through Ability to delay gratification Examination of inner experiences. Increased concern for future Continued interest in moral reasoning	Firmer sense of identity Increased emotional stability Increased concern for others. Increased independence and self-reliance Peer relationships remain important Development of more serious relationships Social and cultural traditions regain some of their importance

Cognitive ability is one of the most extensively studied topics within the field of behavioral genetics (McGue & Bouchard, 1998). Cognitive ability, sometimes referred to as general intelligence (g), is essential for human adaption and survival. It includes the capacity to "reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience "(plomin, 1999). Cognition is an act or process of knowing and a collection of mental processes that includes awareness, perception, reasoning and judgement. The study of cognitive processes has its roots in Gestalt psychology of Wertheimer, Kohler and Koffka and in the studies of cognitive development in children by Piaget during the 19th century. Gottfredson (1997) defined cognitive ability as a general mental capability involving reasoning, problem solving, planning, abstract thinking, complex idea comprehension and learning from experience. Cognitive abilities are brain-based skills, one need to carry out any task from the simplest to the most complex. They have more to do with the mechanisms of how one learns, remembers, solve the problem and pay attention rather than any actual knowledge. Cognitive abilities or skills are supported by specific neuronal networks. For example, memory skills depend chiefly on parts of the temporal lobes and parts of the frontal lobes (behind the forehead). People, having brain injuries, can experience lower cognitive ability. In psychology, cognitive ability is meant for an aptitude that carries out mental processes, such as problem solving, adaptation, comprehension, reasoning, knowledge acquisition, abstract thought and making

connections (Flavell 1999). In education, it is considered a foundation for learning (Reif 2008).

Language development During adolescence

Language development of students during the high school years has not received a great deal of attention from researchers. More has been learned about developments in this period through studies carried out by educators. Further, these studies are largely concerned with analyses of written language rather than spoken language. There are some exceptions and these are studies of pragmatic knowledge during this age period. The results of the written language analyses indicate that, in general, with age there is increasing use of sentence-combining structures. Sentences become lengthier and more complex. It is not surprising that there is no large body of research on structural language development in this period because, presumably, there are no longer remarkable changes in what students know.

In these years, students are usually aged 12 or 13 years to 17 or 18 years. Much of the language-acquisition task has been completed long before this. Language skills in school-aged children and adolescents display for others their level of cognitive development and social development.

Developing Language in Adolescence

Increasing awareness of the terminology used in various academic disciplines.

Ability to understand complex, multiclause sentences.

Emerging ability to carry on lengthy conversations about abstract topics.

Mastery of a wide variety of connectives

Ability to understand figurative language

Literature Review

Scott and Huntington (2002) found an increase in cultural awareness and cognitive flexibility amongst group of university students studying a French poem. Mac. Eoin et al. (2006) conducted a study and concluded that linguistic and cognitive creativity is enhanced by bilingual language proficiency. Kharkhurin (2008) explored U.S. Russian-English bilingual immigrants' superiority in fluency aspect of divergent thinking. Sadaghat (2011) strongly supported the result of study that perceived ability, perceived instrumentality and achievement goals predicted cognitive engagement and academic achievement. Research studies by Poulin-Dubois, Blaye, Cutya, and abaialystok (2011), Lauchlan, Parisi, and Fadda (2012), Greenberg, Belana, and Bialystok (2013), Kalashnikova and Mattock (2014), Adi-Japha, Berberich-Artzi, and Libnawi (2010), Kempert, Hardy, and Saalbach (2011), Steby, Sindhupriya, Rupali, and Swapna (2010), and Yang, Yang, and Lust (2011) suggested that positive relationships existed between bilingualism and executive functions among bilingual children. Sehic (2016) revealed through his research that college level learners who completed a second language course achieved higher mean scores in all four domains of creative thinking skills, but there was a statistically significant difference in the domain of flexibility alone. Singh (2017) explored the effect of learning style and cognitive style on learning and achievement of learners and found learners differ in their cognitive style. Liang et al., (2020) conducted research and found that memory ability can effectively help students to improve memory, recitation and other supporting content.

Objectives

1. To study level of language creativity and cognitive ability among adolescents.
2. To find out the relationship between language creativity and cognitive ability among adolescents.
3. To study level of language creativity and cognitive ability with reference to Type of Institution, Parental attitude and Gender

Hypothesis

There is no significant relationship between language creativity and cognitive ability among adolescents.

Methodology

Descriptive survey method was employed for the study.

Sample Of The Study

The sample of the study confined to 1006 students of class 9^{th} and 10^{th}, covering different districts of Punjab. (Nabha, Patiala, Ludhiana, Rajpura and Sangrur).

Tools Used

Language Creativity Test by S. P. Malhotra and Sucheta Kumari was used. It was developed with the sole purpose of measuring language creativity of school and college going students. It has five sub-tests, namely: (i) Plot building, (ii) Dialogue writing, (iii) Poetic diction, (iv) Descriptive style, and (v) Vocabulary test and each sub-test is to be scored for four factors, viz, Fluency, Flexibility, Originality and Elaboration. All these sub-tests are verbal in nature and collectively form a language creativity test. So, these sub-tests can be collectively administered individually or to a group of students ranging from 30 to 40 at a time. There are 27 items in the test. It generally takes two hours and thirty minutes depending upon the grade level of students.

Cognitive Ability Test by Vishal Sood and Pooja Sharma was used. The test is comprised of multiple-choice questions having four options, out of which one option is correct and remaining three options are incorrect. There is 1 mark for every correct response. The total cognitive abilities score of a student on test is computed by adding the score on all individual items in the test. CAT is a multiple-choice test. The total cognitive abilities score of a student on this test was computed by adding the score on all individual items in the test. The score on the test can range from 0 to 76. The higher total score on the test will reflect high cognitive abilities level and vice-versa. Moreover, the score on each type of cognitive ability can be computed separately by adding the scores obtained on respective number of test items. There is no limit for giving responses to all questions/items of the test.

Results And Discussions

In order to study the level of language creativity and cognitive ability among adolescents, the data was analyzed and computed values of sample are given in tables.

Table 1: Showing language creativity among adolescents

Variable	N	Mean	Standard Deviation
Language Creativity	1006	470.01	72.248

Table 1 shows that the mean for the measure of language creativity has been found to be 470.01 in total sample of 1006 adolescents and their S.D. is 72.248. The value shows moderate level of language creativity in the sample.

Table 1.1 Distribution of the scores of language creativity of adolescents

Class Interval	Frequency	Percentage	Cumulative Frequency
241-280	5	0.50	5
281-320	14	1.40	19
321-360	48	4.80	67
361-400	108	10.20	169
401-440	181	18.10	350
441-480	203	20.30	553
481-520	202	20.20	755
521-560	128	12.80	883
561-600	85	8.50	968
601-640	30	3	998
641-680	2	0.20	1000
Total	N= 1006	100	

Table 1.1 shows that central tendency 553 is found to have the mean of the scores of language creativity of adolescents.

Variable	N	Mean	Standard deviation
Cognitive ability	1006	31.26	9.471

Table.2: Distribution of the scores of cognitive abilities of adolescents

Class Interval	Frequency	Percentage	Cumulative Frequency
11-15	18	1.80	18
16-20	103	10.30	121
21-25	205	19.90	320
26-30	220	22.00	540
31-35	144	14.40	684
36-40	118	11.80	802
41-45	94	9.40	896
46-50	79	7.90	975
51-55	23	2.30	998
56-60	2	.20	100
Total	N=1006	100	

The Table 2 shows that central tendency is found to have the mean of the scores of cognitive abilities of adolescents.

Table 2.1 showing the coefficient of correlation between language creativity and cognitive ability for the different groups of Adolescents

Group	N	Df	Table value at 0.05 and 0.01 levels	Correlation Value	Level of significance
TOTAL	1000	998	0.0619 0.0520	0.093**	Significant
MALE	439	437	0.0875 0.0735	0.109*	Significant
FEMALE	561	559	0.0875 0.0735	0.086*	Significant
RURAL	475	473	0.0875 0.0735.	0.073	Not Significant
URBAN	525	523	0.0875 0.0735	0.113**	Significant
GOVERNMENT	269	267	0.0875 0.0735	0.000310	Not Significant
Aided	196	194	0.0875 0.0735	0.135	Not Significant
Private	535	533	0.0875 0.0735	0.122**	Significant

Table 2.1 shows that language creativity and cognitive ability are positively corelated. The value of correlation in males is more than the females and it is significant on 0.05 level as mentioned above. There is correlation between urban and rural but not significant in rural yet significant in urban on 0.01 level. Next, in aided schools, correlation is not significant but significant in private schools.

Conclusion

In this vast competitive world, students need to be sound and sharp in cognition to grasp and understand the complexities of the academic as well as creative world. It is not an easy job to secure prominent place and prove oneself in the personal and professional world. As mentioned above, this is clear that cognitive ability must be enhanced if we want to increase the language creativity of adolescents. So, sincere efforts must be done by the educators to increase the cognitive ability of adolescents. Now-a-days, there are numerous ways and means to meet this desired goal and make adolescents creative, confident and competent enough to meet the future challenges and prove their worth in all the spheres of life.

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INDIA'S FIVE-YEAR PLANS AND THE WELFARE OF WOMEN

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ABSTRACT

India has been using five-year plans since its independence to develop its economy. Since that, more than six decades of planning had taken place. Twelve Five-Year Plans have been completed by India throughout this time. Analysis of government measures for the welfare of women in various time periods is the primary goal of the particular study. In order to improve the status of women in the development process, several programmes, policies, and initiatives have been implemented. The Indian government views women's welfare as a component of national development because women make up approximately half of the population in our nation. From the First Five-Year Plan to the Fifth Five-Year Plan, Indian planners focused on assisting women in carrying out their household duties more effectively. Women's welfare was a subheading of social welfare from the second plan to the sixth plan. Various programmes will launch in India to improve the social and economic status of women.

Keyword: Development, Welfare, Women empowerment, Economic plan, Social welfare

Introduction

Development cannot bring about peace and prosperity on its own without providing social justice and gender equality. According to the 2011 Census Report, women make up approximately half of the population of the country. Women make up one-third of the labour force in the nation and are primarily responsible for supporting families, making them a vital part of the economy. It is also widely known that rural women make money through a range of economic activities, such as working in factories or running small, side business, in addition to caring for their family and bearing children. In all dimensions of human development, they have furthermore demonstrated their capacity to excel as growth managers and entrepreneurs. We understand that a family's reliance on the women's income would rise along with its degree of poverty. As a result, they are considered to be the better developed socially speaking. Even in rural regions, women still do not have equal standing in our culture, and this is true both within and beyond the four walls of the home. The rural women make up the largest portion of India's economic success. The emphasis on women's empowerment and active participation in the main stream of the development process is rising as a result in the majority of developing countries today.

Objectives

The primary goal of the study is to analyze the steps taken up by the government for the Welfare of Women in various Plans period.

Research Methodology

The study mostly uses secondary data and is a descriptive form of analysis. Information was gathered from the Planning Commission Report.

Five Year Plans and Welfare of Women in India

Since 1951, the Indian government has been implementing five-year plans to promote economic growth. More than six decades of planning have already passed. A total of twelve plans have been adopted throughout this time. The key component of economic planning is setting up clear objectives or aims and choosing the best course of action to reach those targets. A specific component of each Five-Year Plan is devoted to the programmes and initiatives created expressly for women. The Indian government has implemented programmes and projects for the advancement of women in each of its five-year plans. The following discussion examines several plans for programmes and schemes created to welfare of women.

Women are still discriminated against and are not given the same right as men. Women are still paid less, expected to cook, clean etc. Women are still strict by their society and family. Women can’t go outside at night or with the guys. Some families still not allowed women to

work or study far away from their home. Because they believed that women are weaker than men. Women's empowerment is actually needed in society. It is very important for women's self-esteem and also for the development of society. Empowering women is to grant women the right equal to men. Women have equal right to take part in education, society, economy and politically. Women can be involved in any activity of the society. Women should be allowed higher education as men. They can go with higher education whatever they want. The initiative for women's development started with the independence of India and the implementation of the Constitution. The Indian Constitution gives assurance of equality of opportunity and status for women as men. Women play an important role in the development of India from the view point of economy, social and political equivalent to men. Half of the Indian population is women. They represent a key segment of human resources with the purpose of national development. After independence, the Government of India planned to form a democratic set-up and prosperous society through constitutional laws and legal provisions to achieve such goals. Indian government supports welfare activities. The Government of India provides free and compulsory education for all children up to the age of fourteen along with the right to an adequate means of livelihood, equal pay for equal work and maternity relief. The planned economic development in India started with the launching of the First Five Year Plan in 1951 A.D. The Five Year Plans was introduced by Pandit Jawahar Lal Nehru, the first Prime Minister of India. It was a detailed programmes of development in each sphere like agriculture, industry, transport, trade and social services.

First five-year plan (1951-1956)

The first five years of this plan's programmes for women's development were primarily concerned with welfare. The National Family Planning Program first became available in 1951. The National Family Welfare Program became its new name afterwards. Beginning in 1952, the Community Development Program. The Central Social Welfare Board (CSWB), a poster child for the welfare-based approach to women's concerns, was established in 1953. In collaboration with the state governments, the board set up state social welfare boards around the nation in 1954. Community development workers and the rural aristocracy collaborated closely to satisfy the demand for forming women into Mahila Mandals (women's clubs).

Second five-year plan (1956-61)

These programmes put a lot of focus on agricultural expansion. At the local level, the Mahila Mandal system, which split women into groups, served as a focal point for the advancement of women. The plan claimed that women should be safeguarded from dangerous employment, get maternity benefits, and have access to child care facilities. It also highlighted the importance of organising women as employees. Additionally, it advocates for training opportunities to enable women compete for employment at higher levels and equal compensation for equal effort.

Third five-year plan (1961-66)

The main welfare strategy of the plan focuses on giving women access to health and educational facilities. Consolidating educational programmes and bolstering rural welfare initiatives took up the majority of the cash allotted for social welfare. The health program's main objectives included helping with family planning, educating people about nutrition and health, and ensuring the welfare of mothers and their young children.

Fourth five-year plan (1969-74)

The Plan's main objective was to make women's domestic wellness the foundation of its policies and guidelines. Priority was given to pre-school immunizations and extra nourishment for children, expectant women, and nursing mothers. During this time, the Central Social Welfare Board carried out the following programmes for the welfare of women.

1. Considered courses of education for adult women.
2. Socio-economic programmes

Fifth five-year plan (1974-1978)

Women who need safety and financial stability are the main focus of this plan. Family planning, vulnerable group nutrition, children's nutrition,

and nutrition for expectant and nursing mothers were the key objectives of the health programmes. It also recommended a functional literacy programme to provide women the knowledge and skills they need to change how housewives are seen. The Women's Welfare and Development Bureau was established under the Ministry of Social Welfare as part of the plan, which coincided with the International Women's Decade and the submission of the Report of the Committee on the Status of Women in India (CSWI) towards equality in 1996. It serves as the nodal point within the Indian government.

Sixth five-year plan (1980-1985)

This effort was revolutionary in terms of women's growth. The plan used a multidisciplinary approach with a three-pronged emphasis on three key sectors, namely education, employment, and health, and contained for the first time a chapter titled "Women and Development." The family was embraced by the chapter as a developmental unit as well. It makes the claim that obtaining economic independence will speed the growth of women's status and suggests setting up district-level cells targeted at encouraging female participation through self-employment. In addition, it required the government to assess the efficacy of the institutions in place to implement the various particular laws designed to protect women's rights.

Seventh five-year plan (1985-1990)

The Department of Women and Child Development was created in 1985 as a section of the Ministry of Human Resource Development in order to give the holistic development of women and children the much-needed push. All societal groups were the focus of attempts to supply welfare measures, particularly the underprivileged women. A significant accomplishment of the seventh plan was the promotion of the 27 Beneficiary Oriented Schemes (BOS) in 1986, which provided women in numerous areas with immediate benefits. A number of new art and craft facilities were opened, which enhanced the employment opportunities for women. With the intention of enhancing participant skills and expanding opportunities for women to obtain jobs, the Support to Training-cum-Jobs for Women (STEP) programme was launched in 1987. The National Perspective Plan of Women (NPPW) was published by the Indian government in 1988.

Eight five-year plan (1992-1997)

When the eight five-year plans' concept was unveiled in 1992, it marked a shift away from development to measures that emancipated women. It pledges to ensure that women get equal chance to engage in development and that they do not miss out on the benefits of growth from all industries. In 1992, the National Commission for Women (NCW) was created to defend the rights and interests of women. Rashtriya Mahila Kosh (RMK) was established in 1993 to help disadvantaged women who needed microcredit. As required by the constitution, the National Nutrition Policy (NNP) was enacted in 1993 with the goal of improving the nutritional status of the general public, particularly that of children, adolescent girls, and nursing mothers. To encourage women to practise economy, the Mahila Samridhi Yojana (MSY) was established in 1993. The National Crèche Fund (NCF) was started in 1994 to provide childcare services for kids of working women. The Indira Mahila Yojana (IMY) launched a thorough plan for empowering women through women SHGs in 1995.

Ninth five-year plan (1997-2002)

The plan places a strong emphasis on the advancement of women and went into force on April 1st, 1997. In an effort to raise the status of females, the government approved the Bhagya Shree Bal Kalyan Policy and the Rajrajeswari Mahila Kalyan Yojana on October 19, 1998. This plan includes a number of initiatives, such as the Women Component Plan (WCP), which intends to guarantee that women get at least 30% of money from other development sectors. The Special Action Plan of 1998 ensures that women and girls have easy and equal access to education. Other initiatives include giving reproductive child health care a high priority, implementing supplemental feeding programmes like the Special Nutrition Program (SNP) and Mid-Day Meals (MDM), and eliminating gender bias in all educational initiatives. 2001 was designated as the Year of Women's Empowerment by the Indian government

(Swashakti). The National Policy for Women's Empowerment was passed into law in 2001.

Tenth five-year plan (2002-2007)

The plan specifically states that it wants to empower women to be a force for development and social change. They are called Swayamsidha, Swashakti, Support for Training and Employment (STEP), and Rashtriya Mahali Kosh (RMK), and they will put a sector-specific, three-pronged approach for empowering women into action based on the suggestions of the national policy for women's empowerment. The ultimate purpose of economic empowerment, which strives to make all potential women economically independent and self-sufficient, is to ensure that training, employment, and income-generating opportunities are accessible and have both forward and backward linkages.

Eleventh five-year plan (2007-2012)

Women were acknowledged under the plan as agents of social and economic advancement in addition to being equal citizens. The essence of the eleventh five-year plan strategy for Women Agency and Child Rights are: Recognition of the right of every woman and child to develop to her/his full potential, the differential needs of different groups of women and children, need for intersectional convergence as well as focused women and child specific measures through Ministry of Women and Child Development (MOWCD), partnership with civil society to create permanent institutional mechanisms that incorporate the experiences, capacities and knowledge of Voluntary Organizations (VOs) and women's groups in the process of development planning. The eleventh Plan acknowledged that a country cannot be healthy unless its women are healthy. The Plan will look at how globalization affects women, particularly impoverished women, including salary disparities between men and women, the exploitation of women in the unorganised sector, a lack of skill development, technology, and marketing support.

Twelfth five-year plan (2012-17)

The main areas of focus in this Plan are government, urbanisation, health, and education. The ministry of family and child development was established as a section of the ministry of human resource development in 1985 in an effort to improve the situation of women and children. In 2006, the department received the status of a ministry, which gave it the power to design plans, policies, and programmes as well as to oversee and coordinate the efforts of governmental and non-governmental organisations working to develop services for women and children, including services like supplemental nutrition, health screenings, and immunisation.

Conclusion

In a summary, it may be concluded that the government's many welfare programmes are designed to emancipate women from societal ills and violence. In India, the Five Year Plans emphasized the welfare of women in particular. The government has created several programmes and policies for the welfare and empowerment of women. However, there are still a lot of issues where governments need to focus on promoting women.

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IMPACT OF SWISS BALL AND THERABAND EXERCISE WITH PRANAYAMA PRACTICES ON UPPER ARM AND SHOULDER JOINT FLEXIBILITY AMONG MIDDLE AGED WOMEN

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ABSTRACT

The purpose of the study was to find out the impact of swissball and theraband exercise with pranayama practices on upper arm and shoulder joint flexibility among the middle-aged women such as by using the zipper test. To achieve this purpose of the study, forty-five middle aged women from Kakching, Manipur were selected as subjects at random. The subjects aged ranged from 40 to 55 years. The selected subjects were divided into three groups of fifteen subjects each, such as swissball with pranayama (group I), theraband exercise with pranayama (group II) and group III acted as control. Training for selected subjectsfive days per week of twelve weeks.Control group was not exposed to any specific training but they were participated in regular activities. Pre and post - tests data on selected criterion variables were gathered prior to and immediately after the training program. The pre and post-test scores were statistically examined by the dependent 't' test and analysis of co-variance (ANCOVA). The level of significant was fixed at 0.05 level. It was concluded that theraband exercise with pranayama group had shown significantly improved inupper arm and shoulder joint flexibility. However, the control group had not shown any significant improvement onupper arm and shoulder joint flexibility.

Keywords: *Swiss ball, Theraband exercise, Pranayama, upper arm and shoulder joint flexibility.*

Introduction

Swiss ball strengthens abdominal muscles while also stabilizing the lower back and improving posture. There are many different names for the swiss ball namely, exercise ball, gym ball, fitness ball, stability ball, gymnastic ball, yoga ball, body ball, physio ball.

Theraband are basically latex tubes or bands that are used for low impact strength training exercises and physical treatment. It is a resistance band that can be an excellent tool for people who want to train at home, travel, stretch, rehabilitate or for those just want to add variety to their exercise program. It comes in different resistance levels that are determined by the color and thickness of the band. They provide resistance during strength exercises, assistance during flexibility exercises and in some cases can assist in stability.

Pranayama is the practise of controlling one's breath through various techniques and exercises. It is the control and regulation of one's breath. "Prana" is a Sanskrit word, which means "Vital Force". It also signifies "life" of breath. Äyana, means the control of the pran so pranayama means the control of the vital force (Prana) by concentration and regulated breathing.

Upper arm and shoulder joint flexibility which is assessed by zipper test. It is the test that are measured by how mobile and flexible upper arms and shoulder joint. The shoulder stretches to determine if the hands can be brought together behind the back. Flexibility refers to the muscle's ability to lengthen. Mobility refers to a joint's ability to move over its whole range of motion.

Methodology

The purpose of the study was to find out the impact of swiss ball and theraband exercise with pranayama practices on selected upper arm and shoulder joint flexibility among the middle-aged women such as by using the zipper test. To achieve this purpose of the study, forty-five middle aged women from Kakching, Manipur were selected as subjects at random. The subjects aged ranged from 40 to 55 years. The selected subjects were divided into three groups of fifteen subjects of each groups, such as swiss ball with pranayama (group I), theraband exercise with pranayama (group II) and control group (group III). Group I and Group II underwent training for five days per week of twelve weeks. Group III acted as a control in which they did not undergo any special training program. All the subjects of three groups were tested on selected upper arm and shoulder joint flexibility at prior to and

immediately after the training programmed by using zipper test. The analysis of covariance (ANCOVA) was used to analysis the significant difference, if any in between the groups. The level of significant to test the "F" ratio obtained by the analysis of covariance was tested at 0.05 level of confidence, which was considered as an appropriate.

Training Program

During the period of training, the experimental groups underwent five days per week of twelve weeks. The duration of training was planned for 60 minutes that is 6:00a.m to 7:00 a.m. in the morning session. The experimental groups trained at the same time of the day in the morning session, five days a week throughout the study. Experimental group-I performed swiss ball with pranayama practice, experimental group-II performed theraband exercise with pranayama practice and group-III acted as control. To determine the training load, the subjects were assessed for their exercise heart rate in response to various work bouts, proposed repetition and set. After completion of twelve weeks of training, the participants were retested.

Swiss ball with pranayama

Experimental group-I performed as swiss ball with pranayama practice five days per week for twelve weeks. The swiss ball training practice consisting of inclined plank, crossover crunch, triceps dip, hip extension and pelvic tilt.

Theraband exercise with pranayama

Experimental group-II performed as theraband exercise with pranayama practice five days per week for twelve weeks. The theraband exercise training practice consisting of front squat, chest press, kneeling crunch, overhead shoulder press and abdominal crunch.

Experimental design and Statistical technique

Pre and post- test random group design was used as experimental design. A paired "T" test was used to determine differences within the group from pre- test to post- test. The collected data were analyzed statistically through analyze of covariance (ANCOVA) to find the significance difference. However, the Scheffe's post hoc test used to determine paired mean differences, if any, whenever the obtained 'F' ratio value was found to be significant for adjusted post- test means. In all cases, the level of confidence was fixed at 0.05 for significance.

Analysis Of The Data

Analysis Of Upper Arm And Shoulder Joint Flexibility

The descriptive analysis of the data showing mean and standard deviation, mean difference, "t" ratio and percentage of change onupper arm and shoulder joint flexibility of swissball with pranayama, theraband exercise with pranayama and control group are presented in table –A.I.

Table – A.1 : Descriptive Analysis of the Data on Upper Arm and Shoulder Joint Flexibility of Experimental and Control Groups.

Training Group	Test	Mean	Standard Deviation	Mean Difference	Percentage of change	"t" ratio
Swissball with Pranayama	Pre	4.23	0.54	0.85	20.09	12.02
	Post	5.08	0.50			
Theraband with Pranayama	Pre	4.18	0.56	1.44	34.44	23.93
	Post	5.62	0.49			
Control Group	Pre	4.14	0.52	0.04	0.96	2.09
	Post	4.18	0.54			

Table t-ratio at 0.05 level of confidence for 14 (df) = 2.15.

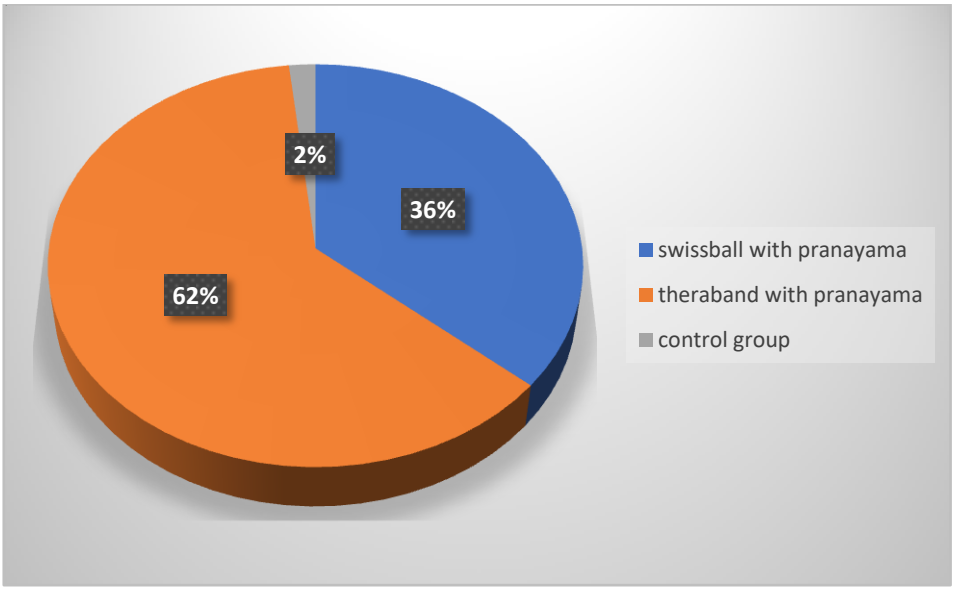
Table- A.1 shows that the mean, standard deviation, and mean difference values of the pre and post test data collected from the experimental and control groups on upper arm and shoulder joint flexibility. Further, the collected data was statistically analyzed by paired "t" test to find out the significant differences if any between the pre and post data. The obtained "t" values of swissball with pranayama, theraband exercise with pranayama

are 12.02 and 23.93 respectively which are greater than the required table value of 2.15 for significance at 0.05 level for 14 degrees of freedom. It revealed that significant differences exist between the pre and post-test means of experimental groups on upper arm and shoulder joint flexibility.

The result of the study also produced 20.09% of changes in upper arm and shoulder joint flexibility due to swissball with pranayama, 34.44% of changes in upper arm and shoulder joint flexibility due to theraband exercise with pranayama and 0.96% of changes in control group.

The percentage of changes on upper arm and shoulder joint flexibility of experimental and control groups is graphically represented in figure (I).

Figure (I) : Pie Diagram Showing the Percentage of Changes on Upper Arm and Shoulder Joint Flexibility of Experimental and Control Groups.



The pre and post test data collected from the experimental and control groups on upper arm and shoulder joint flexibility was statistically analysed by using analysis of covariance and the results are presented in table A.2.

Table – A.2 : Analysis of Covariance of the Data on Upper Arm and Shoulder Joint Flexibility of Adjusted Post Mean Test Scores of Experimental and Control Groups.

	Swissball With Pranayama	Theraband Exercise with Pranayama	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" ratio
Adjusted Post Mean	5.04	5.62	4.21	BG	14.95	2	7.47	187.02*
				WG	1.65	41	0.04	

*Significant at .05 level of confidence.

(The table value required for significance with degrees of freedom 2&41 is 3.23)

The adjusted post-test means on upper arm and shoulder joint flexibility of swissball with pranayama, theraband exercise with pranayama and control groups are 5.04, 5.62 and 4.21 respectively. The obtained "F" value of 187.02 on upper arm and shoulder joint flexibility was greater than the required table value of 3.23 of 2, 41 df at 0.05 level of confidence. It reveals that significant differences exist between the adjusted post -test means of experimental and control groups onupper arm and shoulder joint flexibility.

Since, the obtained "F" value in the adjusted post- test means is found to be significant, the Scheffe's test is applied as in table- A.3.

Table-A.3 : Scheffe's Post Hoc Test for the differences among Paired Means of Experimental and Control Groups on Upper Arm and Shoulder Joint Flexibility.

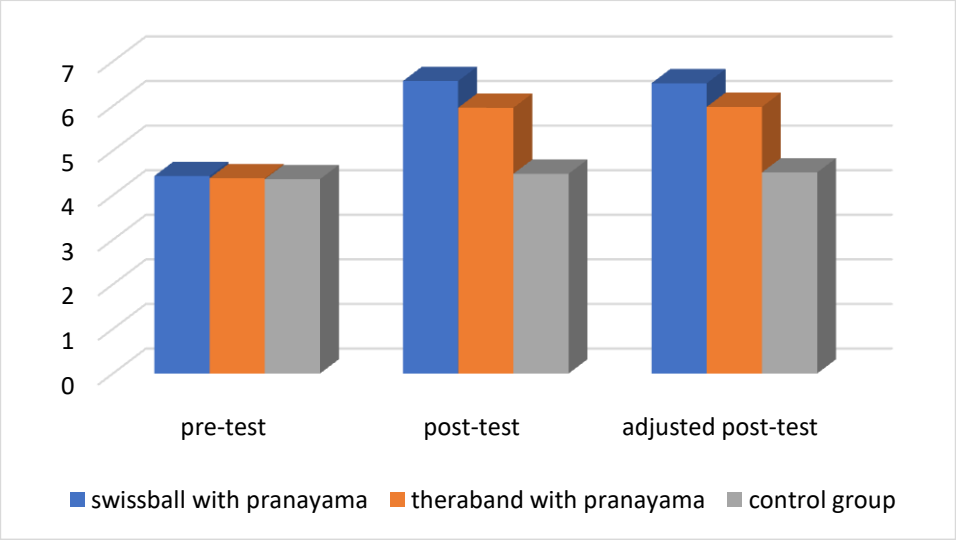
Swissball exercise with Pranayama	Theraband exercise with Pranayama	Control Group	Mean Difference	Confidence Interval
5.04	5.62	---	0.58*	0.24
5.04	---	4.21	0.83*	
---	5.62	4.21	1.41*	

*Significant at 0.05 level

As shown in table -A.3 the Scheffe's post hoc analysis proved that significant mean differences existed between swissball with pranayama and theraband exercise with pranayama groups, swissball with pranayama and control groups and theraband exercise with pranayama and control groups onupper arm and shoulder joint flexibility. Since, the mean differences 0.58, 0.83 and 1.41 are higher than the confidence interval value (0.24).

Hence, it was concluded that due to the impact of swissball with pranayama and theraband exercise with pranayama practice on upper arm and shoulder joint flexibility of the subjects was significant improved. However, theraband exercise with pranayama practice were better than swissball with pranayama practices.

Figure (II) : Bar diagram Showing the Mean Values on Upper Arm and Shoulder Joint Flexibility of Experimental and Control Groups.



Discussion

The finding of the present study was that there was significance improvement on upper arm and shoulder join flexibility due to the impact of swissball with pranayama and theraband exercises with pranayama practices among middle aged women. Theraband exercise with pranayama had better improvement than swissball with pranayama practices on upper arm and shoulder joint flexibility after twelve weeks of training. The study was well supported by the previous research.

Eltanahi Nagla (2011) conducted the effect of Swiss ball exercises on the abdominal, back and leg muscles strength, hip and spine flexibility, static and dynamic balance and Vital Capacity in addition to their relationship of Gankaku Kata performance level. Results showed significant differences between the two measures of physical and physiological variables with improvement of Gankaku Kata performance.

Kim and Nam (2011) examined the effects of theraband exercise on muscle flexibility, balance ability, muscle strength and self-rated health in elderly women. The quasi-experimental research design (one-group pre-test-post- test) was employed. Participants were recruited in S-city

and a total of 14 elderly women completed 15-week theraband exercise. Findings of this study indicated that the 15-week theraband exercise program had a favourable effect on muscle flexibility, balance ability and muscle strength of elderly women. Future research needs to develop combined exercise programs with other types of exercise for the health of elderly women.

Sekendiz et al., (2010) investigated the effects of Swiss ball core strength training on trunk extensor (abdominal)/flexor (lower back) and lower limb extensor (quadriceps)/flexor (hamstring) muscular strength, abdominal, lower back and leg endurance, flexibility and dynamic balance in sedentary women (n = 21; age = 34 ± 8.09; height = 1.63 ± 6.91 cm; weight = 64 ± 8.69 kg) trained for 45 minutes, 3 d·wk-1 for 12 weeks. The results support the fact that Swiss ball core strength training exercises can be used to provide improvement in the aforementioned measures in sedentary women. In conclusion, this study provides practical implications for sedentary individuals, physiotherapists, strength and conditioning specialists who can benefit from core strength training with Swiss balls.

Stevenson and Mark Warpeha (2010) assessed the following measures during the free-weight back squat exercise with and without elastic bands: peak and mean velocity in the eccentric and concentric phases (PV-E, PV-C, MV-E, MV-C), peak force (PF), peak power in the concentric phase, and RFD immediately before and after the zero-velocity point and in the concentric phase (RFDC). Twenty trained male volunteers (age = 26.0 ± 4.4 years) performed 3 sets of 3 repetitions of squats (at 55% one repetition maximum [1RM]) on 2 separate days: 1 day without bands and the other with bands in a randomized order. It was concluded that there may be benefits to performing squats with elastic bands in terms of RFD. Practitioners concerned with improving RFD may want to consider incorporating this easily implemented training variation.

Conclusion

1. It was concluded that due to the impact of swiss ball and theraband exercise with pranayama practice on upper arm and shoulder joint flexibility of the subjects was significant improved.
2. Theraband exercise with pranayama practice were better than swiss ball with pranayama practices on upper arm and shoulder joint flexibility.

We can conclude that by giving the swiss ball with pranayama practice and theraband exercise with pranayama practices, the upper arm and shoulder joint flexibility of middle age women can be improved. So, it is recommended to use such kind of training.

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EFFECT OF FINANCIAL INCLUSION AND SELF-HELP GROUPS ON WOMEN EMPOWERMENT IN PUNJAB

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ABSTRACT

Women empowerment is one of the serious issues in present times. Financial inclusion means having access to practical and reasonably priced economic services and goods which fulfil one's requirements, including transactions, payments, savings, credit, and insurance, and therefore are provided in a sustainable and responsible manner. It is one of the epic contributing factors in women empowerment. Self-help groups also help in women empowerment. The aim of the study is to study the effect of financial inclusion and self-help groups on women empowerment. Data was collected using survey questionnaire framed considering the conceptual framework of financial inclusion, self-help groups and women empowerment. To study the effect Multivariate analysis of covariance (MANCOVA) has been applied. Self-help group have been used as fixed factor and financial inclusion as covariate. Results revealed that financial inclusion and self-help groups significantly affect women empowerment and its dimensions.

Keywords: *Financial Inclusion, Self-help groups, women empowerment, MANCOVA.*

Introduction

Women empowerment is very important issue as they play a very significant role in every sphere of life and society. The topic of empowerment of women has become important among university researchers and on global and national forums during the latter part of the 20th century. Scholars, bureaucrats, and governments have started to pay a lot of consideration to empower females because of their low socioeconomic status. The tempo of development of females is still slow due to hierarchical society of India (Mandal, 2013, May). Supporting a woman's feeling of self-worth, her freedom to make her own decisions, and her ability to influence social change for both herself and others are all ways to empower women (World Vision, n. d.). For women, having access to money can reshape their lives. Women who successfully involve in the monetary sector are quite able to control threat, level out expenditure in the face of risk, or pay for family expenses such as schooling of their children (Dupas and Robinson 2013).

Giving women the tools they need to maximise returns, manage money, take funds, and pay their debts is essential for both empowering women and alleviating poverty because women with low income suffer poverty more frequently than men do (Holloway, Niazi, and Rouse 2017). Financial utilities can increase domestic women's power in decision-making and influence over resource distribution (Karlan et al., 2016). According to research, offering women access to personal savings accounts enhances their investments while also increasing their financial independence and giving them more power in the family. This includes being able to make more sustainable choices and have more financial flexibility (Dupas and Robinson 2013).

The most recent World Bank Global Findex statistics showed that, despite an overall rise in account ownership, gender inequalities haven't yet shrunk since the previous six years. Women are far less likely than men to have an account, despite significant advances in this area. The gender gap in emerging countries is 9 % on mean (67 per cent of males and 59 per cent of females), and has hardly altered from 2011. Although the actual amount of funded females has decreased, this doesn't really imply that females are not progressing.

As an illustration, women are now more likely than men to have accounts in a few emerging markets, including Indonesia, the Philippines, and Argentina. Nevertheless, in certain nations, including Pakistan, Bangladesh, and Nigeria, the gender difference in account ownership has widened over the previous 3 years. Despite Pakistan having over 1.3 million freshly financed women, the gender gap in account ownership widened from 16 to 28 percentage points. Similar to Bangladesh, where over 6.7 million newly banked women had positive advancements, yet the gender gap widened to 29 % from 2014's 9 % point difference. Even if they had not achieved as much development as

males during this time, women had (Hendriks, 2019).

The "better half" of society and equal to men are how women are viewed. However, in reality, men still rule our society, and women are not treated equally with men either within or outside the four walls of the home. They are actually viewed as weak and dependant on males. Indian women consequently have a poor reputation in society. Even though women shoulder a lot of responsibility and carry out a variety of tasks related to managing the family, including childrearing, feeding, attending to agricultural work, caring for domesticated animals, and the like, they nonetheless struggle with being both socially and economically invisible (Sahu, 2015).

Principles for Empowerment of Women

The Principles of Women's Empowerment are employed to empower women in the market, profession, and communities. They were developed in collaboration between the UN Global Compact and UN Women (World Vision, n. d.)

The following are seven principles:

Principle 1: Establish high-level corporate leadership for gender equality

Principle 2: Treat everyone fairly at work, upholding non-discrimination and human rights **Principle 3:** Ensure the health, happiness, and safety of all employees, regardless of gender

Principle 4: Promote the education, training, and career development of women

Principle 5: Implement supply chain, marketing, and business development strategies that support the advancement of women.

Principle 6: Promote equality through community projects and campaigning

Principle 7: Track and report progress toward achieving gender equality in the public sphere

Types of Women's Empowerment

- **Social Empowerment** - The potential of females to take personal and group action to alter dynamics of society as well as the organizations and ideologies that exclude them and keep them in poverty is referred to as social empowerment (Simavi, n. d.). The course of gaining the independence, authority, self-assurance, and other resources required to effect transformation and lay the foundation for a brighter future is known as social empowerment. This occurs on both personal and a group level (United Way NCA, May 24, 2022).
- **Economic Empowerment** – It can be defined as a method by which the poor, landless, deprived, and disadvantaged minorities of all communities can be liberated from all sorts of exclusion and subjugation; can benefit directly from marketplaces as well as family; can efficiently handle a square nutritious food and accomplish basic needs such as a residence, garment, healthcare, and drinkable water, etc. The financial emancipation of women has been promoted by SEWA (Self Employed Women's Association). According to this argument, increased awareness and visibility are impossible without "access to the possession of available capital by the impoverished women" (Mandal, 2013, May).
- **Political Empowerment** - The greatest need of the hour is to politically empower women because it is decided by politics what to give, whom to give and how much to be given? The decentralisation of authority and power in the underprivileged, downtrodden, and helpless people who haven't been able to take part in the formulation and execution of government organisations' programs and policies, as well as family and social issues, is implied by the political empowerment of women (Mandal, 2013, May).
- **Psychological Empowerment** - Psychological empowerment of females may function as a miracle nut that unlocks n options, and so, this is what we should concentrate on, since females could only reflect, make decisions, and earn for them if their brains and minds were completely enlightened (Bhasin, June 11, 2021). It is the ability to control one's own existence as a human rather than as a created feminine status of obedient, as well as independence, ability to making decisions, and healthy self. Competence, meaning, self-determination, and influence are the four cognitive processes that reflect a subjective

perspective in psychological empowerment, which also reveals cognitive orientations regarding their employment function (Spreitzer, 1995).

- **Decision-Making Empowerment** – Giving females' legal authority or responsibility to execute duties is known as empowerment of females. Females who are strengthened can partake in strategy making and process of making decisions and personally assisting in growth activities and programs. Starting at residence is where empowerment should begin. The independence of women in the family is determined by their status in the home. It's indeed important to consider if she is able to make decisions regarding domestic issues such as purchasing jewellery and other items for your home, having access to funds, the freedom to visit home of relatives, or obtaining medical services (Yogendrarajah, 2013).

Even today, compared to their siblings and spouses, women and girls have far lower incomes, levels of education, levels of ownership, and economic influence. As a result, health of women, their education, employment opportunities, and even the degree of authority they have over their own lives and decisions are negatively impacted (Hendriks, 2019). There were just 15.1 per cent of Indian women who had their own bank or savings account in the years 2005–2006. 78.6 per cent of Indian women have a bank or saving account that they are completely responsible for maintaining, according to the National Family Health Survey (NFHS-5) - 2019-21. In 2016–17, 53 per cent of women managed their bank accounts independently. These accounts are not accessible to male family members (Jadhav, 19 May, 2022).

FI and its advantages have gained huge consideration. Consequently, the way to promote FI has placed a strong emphasis on creativity and the uptake of new technologies. Merchandise and economic utilities, particularly smartphones, are possible to decrease information asymmetry in economic utilities and develop cheaper ways to reaching poor customers, reported by the World Economic Forum in 2018 (Abor, Amidu, & Issahaku, 2018).

The World Bank defines financial inclusion (FI) as having access to practical and reasonably priced economic services and goods which fulfil one's requirements, including transactions, payments, savings, credit, and insurance, and therefore are provided in a sustainable and responsible manner (Jadhav, 19 May, 2022). The ability to utilise different financial utilities efficiently depends on having full gain and being financially included. FI starts with the possession of funds or operations in banks and finance companies which can be utilised as a mechanism to process payments and handling finances in the early phase (Setyari, Widanta, & Purbadharmaja, 2018). In addition, FI makes it simple for users to get credit from reputable banking firms, which they may use to pay for their children's education and pursue entrepreneurial endeavours which will make them improve manage business risks (Demirguc-Kunt et al., 2018). Reducing economic disparity, boosting GDP, and raising living standards are all aspects of promoting FI (Kim, 2016).

The main tactic for FI in India in recent years consists of the following components: (i) inspiring agents and middlemen like non-governmental organisations (NGOs), microfinance institutions (MFIs), and business correspondents (BCs) to penetrate financially excluded and backward zones; (ii) concentrating on a decentralised strategy by leveraging existing provisions like the state level bankers' committee (SLBC) and district consultative committee (DCC) and bolstering regional development banks (RRBs) and cooperatives locally; (iii) using technology to promote financial inclusion; (iv) urging banks to open simple, no-frills accounts; (v) placing a focus on financial literacy and credit counselling; and (vi) fostering complementarities between the formal and informal sectors (Swamy, 2010).

In order to offer basic financial services to each and every financially excluded family, the government launched the National Mission for Financial Inclusion (NMFI), also known as the Pradhan Mantri Jan Dhan Yojana (PMJDY), in August 2014 (Jadhav, 19 May, 2022). According to the National Strategy for Financial Inclusion (NSFI) of the RBI, females

who have more influence over their economic situations to help themselves and their family escape poverty.

A key factor in establishing FI in India has been the SHG-bank linkage programme. With a significant increase in the total number of SHG funds connected to banks, which reached 74.62 lakhs by March 2011, there has been consistent success under this initiative. There were 60.98 lakhs exclusively for women SHGs overall, and 12.94 lakhs of those were credit-linked. A total of 47.87 lakh SHGs had loans pending as of March 31, 2011, of which 39.83 lakh were exclusively for females and encompassed 97 million people. As of March 31, 2011, SHGs had saved a total of Rs. 7016 crores with banks, of which Rs. 5298.64 crores came from only female's SHGs. As of March 31, 2011, there were 31,221 crores worth of pending loans towards SHGs, of which 26,123 crores were loans towards females' SHGs (Swamy, 2014).

"Women's organisations work for empowerment by encouraging greater independence in its members. Their right to make their own life decisions applies to them. Additionally, they try to have power and access to resources (Sahu, 2015). Increasing understanding, making a stand, and striving to exert power are all parts of the empowerment task, which aids individuals in having charge of their life. The sensation of empowerment is what ignites one's inner motivation to achieve their objectives (Indiresan, 1999).

One of the main tactics for empowering women is the formation of self-help groups, and numerous government programmes in India have demonstrated how powerful women's organisations can significantly advance the growth and fusion of different services and endeavours (Sahu, 2015). A self-help group (SHG) is an unaffiliated, democratically established voluntary association of people with shared interests (Ramesh, 1996). The advantages of forming women's groups for boosting trust and concentrating on capacity building have been underlined by experience with various programmes and projects. Various organizations in different states around the nation have concentrated on boosting professional growth and sensitization, encouraging wealth creation via earnings enterprises, and teaching savings and credit monitoring to disadvantaged women. Because agriculture was their primary source of income, the ladies were so destitute that they frequently required debts to purchase seeds for agriculture. The overarching self-help programme for India's rural poor is called Swaranjayanti GramSwarozgar Yojana (SGSY). A thorough self-employment project called Swamsjayanti Gram Swarozghar Yojona (SGSY) was introduced by the Indian government on April 1st, 1999, to replace the previous IRDP, DWCRA, TRYSEM, SITRA, and MWS & GKY.

Research Methodology

Objectives of the Study

I. To study the effect of Financial Inclusion on women empowerment in Punjab.
II. To study the effect of Self-Help groups on women empowerment in Punjab.

Hypotheses

I. Financial Inclusion will significantly affect women empowerment in Punjab.
II. Self-Help groups will significantly affect women empowerment in Punjab.

Sample

The aim of the study was to see the effect of Self-help groups and financial inclusion on women empowerment. To achieve this goal a sample of 550 female participants was selected. The literacy level varied from 0 to 16 (means from illiteracy to post graduation and/plus diploma). Sample also included married, unmarried, and widow and divorcee females.

Tools Used to Assess Knowledge Management Practices

A survey questionnaire was framed keeping in mind the concept of Self-help groups, financial inclusion and women empowerment. The same questionnaire was administered to female subjects.

Tools Used For Statistical Analysis

The aim of the research was to study Role of Financial Inclusion and Self-Help Groups in Women Empowerment in Punjab. To reach the

goal and were applied on the data collected from various banks in Punjab.

Results and Discussion

The aim of the present research work was to study the effect of self-help groups and financial inclusion on women empowerment. For this purpose data was collected using questionnaire discussed above. The data collected was subjected to statistical analysis i.e. MANCOVA. In Table 1 Between-Subjects Factors have been presented.

Table 1 Showing Between-Subjects Factors

		N
Self-Help Group	**No**	436
	Yes	113

Pillai's trace (Table 2) is significant for Self-Help Group (SHG) and Financial Inclusion (FI) which indicates that SHG significantly contributes to the explained variance in the model when effect of FI is controlled. Further, it also indicates that FI also contributes to the explained variance in the model.

Table 2. Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.361	51.026[b]	6.00	541.00	.000	.361
	Wilks' Lambda	.639	51.026[b]	6.00	541.00	.000	.361
SHG	Pillai's Trace	.111	11.278[b]	6.00	541.00	.000	.111
	Wilks' Lambda	.889	11.278[b]	6.00	541.00	.000	.111
FI	Pillai's Trace	.161	17.242[b]	6.00	541.00	.000	.161
	Wilks' Lambda	.839	17.242[b]	6.00	541.00	.000	.161
a. Design: Intercept + Self-Help Group (SHG) + Financial Inclusion (FI)							
b. Exact statistic							

The results of MANCOVA have been presented in the Table 3. There was a significant effect of self-help group (SHG) on Economic Empowerment *F(1, 546) = 63.45, p<0.01*, Social Empowerment *F(1, 546) = 12.86, p<0.01*, Personality Development *F(1, 546) = 24.86, p<0.01*, Political Empowerment *F(1, 546) = 4.83 p<0.05*, Decision Making (DM) Empowerment *F(1, 546) = 17.07, p<0.01*, and Empowerment Total Score *F(1, 546) = 5.53, p<0.05*, (Hence, partial proves *Hypothesis II*). SHG have no significant effect on Intellectual Development *F(1, 546) = 3.18, p>0.05*,

The covariate financial inclusion was significantly related to Economic Empowerment *F(1, 546) = 53.11, p<0.01*, Social Empowerment *F(1, 546) = 76.28, p<0.01*, Personality Development *F(1, 546) = 50.84, p<0.01*, Intellectual Development *F(1, 546) = 10.24, p<0.01*. Further, the covariate, FI has been found to be significantly related to Political Empowerment *F(1, 546) = 40.86, p<0.01*, Decision Making (DM) Empowerment *F(1, 546) = 79.83, p<0.01* and Empowerment Total Score *F(1, 546) = 3.377, p<0.05* (Hence, proves *Hypothesis I*).

Table 3 Showing Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Partial Eta Squared (η^2)
Corrected Model	Economic Empowerment	1546.926[a]	2	773.46	63.97	.190
	Social Empowerment	170.020[b]	2	85.010	47.75	.149
	Personality Development	116.516[c]	2	58.258	41.35	.132
	Intellectual Development	9.812[d]	2	4.906	7.28	.026
	Political Empowerment	6.216[e]	2	3.108	24.29	.082
	D M Empowerment	4756.789[f]	2	2378.4	52.16	.160
	Empowerment Total Score	241.106[g]	2	120.55	4.10	.015

Intercept	Economic Empowerment	1551.171	1	1551.2	128.29	.190
	Social Empowerment	218.519	1	218.52	122.74	.184
	Personality Development	147.493	1	147.49	104.69	.161
	Intellectual Development	31.263	1	31.26	46.38	.078
	Political Empowerment	17.923	1	17.92	140.10	.204
	D M Empowerment	347.212	1	347.21	7.62	.014
	Empowerment Total Score	3306.620	1	3306.6	112.51	.171
SHG	Economic Empowerment	767.223	1	767.22	63.45**	.104
	Social Empowerment	22.897	1	22.897	12.86**	.023
	Personality Development	35.023	1	35.023	24.86**	.044
	Intellectual Development	2.148	1	2.148	3.18	.006
	Political Empowerment	.618	1	.618	4.83**	.009
	D M Empowerment	778.479	1	778.479	17.07**	.030
	Empowerment Total Score	162.616	1	162.616	5.533*	.010
FI	Economic Empowerment	642.126	1	642.126	53.11**	.089
	Social Empowerment	135.817	1	135.82	76.28**	.123
	Personality Development	71.626	1	71.63	50.84**	.085
	Intellectual Development	6.899	1	6.89	10.24**	.018
	Political Empowerment	5.228	1	5.23	40.86**	.070
	D M Empowerment	3640.022	1	3640.02	79.83**	.128
	Empowerment Total Score	99.241	1	99.24	3.377*	.006
Error	Economic Empowerment	6601.657	546	12.09		
	Social Empowerment	972.092	546	1.780		
	Personality Development	769.222	546	1.409		
	Intellectual Development	367.995	546	.674		
	Political Empowerment	69.850	546	.128		
	D M Empowerment	24895.762	546	45.597		
	Empowerment Total Score	16046.701	546	29.390		
Total	Economic Empowerment	38129.000	549			
	Social Empowerment	2704.000	549			
	Personality Development	3034.000	549			
	Intellectual Development	1960.000	549			
	Political Empowerment	765.000	549			
	D M Empowerment	384679.00	549			
	Empowerment Total Score	864315.00	549			
Corrected Total	Economic Empowerment	8148.583	548			
	Social Empowerment	1142.113	548			
	Personality Development	885.738	548			
	Intellectual Development	377.807	548			
	Political Empowerment	76.066	548			
	D M Empowerment	29652.550	548			
	Empowerment Total Score	16287.807	548			

In Table 4 R Squared, Adjusted R Squared and % of Variance for variables under study have been presented. It is quite clear from the table 4 that 19% variance in Economic Empowerment, 14.9% variance in Social Empowerment, 13.2% variance in Personality Development, 2.6% variance in Intellectual Development, 8.2% variance in Political Empowerment, 1.6% variance in D M Empowerment and 1.5% variance in Empowerment Total Score has been explained by the fixed factor (SHG) and covariate (FI) or the model.

Table 4 Showing R Squared, Adjusted R Squared and % of Variance for variables under study

Variable	R Squared	Adjusted R Squared	% of Variance
Economic Empowerment	.190	.187	19.0
Social Empowerment	.149	.146	14.9
Personality Development	.132	128	13.2
Intellectual Development	.026	.022	2.6
Political Empowerment	.082	.078	8.2
D M Empowerment	.160	.157	1.6
Empowerment Total Score	.015	.011	1.5

Further, Table 5 and 6 present estimated marginal means and pairwise comparisons respectively. It is quite clear from the table 5 and 6 that for Economic Empowerment females who are not part of self-help group have lower mean (M=6.786) than those who are part of a self-help group (M=9.721), for Social Empowerment females who are not part of self-help group have lower mean (M=1.582) than those who are part of a self-help group (M=2.089), Personality Development females who are not part of self-help group have lower mean (M=1.849) than those who are part of a self-help group (M=2.476), Political Empowerment females who are not part of self-help group have lower mean (M=1.103) than those who are part of a self-help group (M=1.186), D M Empowerment females who are not part of self-help group have higher mean (M=26.039) than those who are part of a self-help group (M=23.08), and Empowerment Total Score females who are not part of self-help group have lower mean (M=39.024) than those who are part of a self-help group (M=40.376). Further, pairwise comparison shows that the differences between the pairs of the means are significant at 0.05 level of significance except for Intellectual Development, for which means for those who are part of group and those who are not are almost similar and pairwise comparison shows that the difference between the two means are not significant at 0.05 level of significance (Table 6).

Table 5 Showing *Std. Deviation* and Estimated Marginal *Means* considering SHG as fixed factor

Dependent Variable	SHG	Mean	Std. Error	Std. Deviation
Economic Empowerment	No	6.786[a]	.167	3.73633
	Yes	9.721[a]	.328	3.23363
Social Empowerment	No	1.582[a]	.064	3.85612
	Yes	2.089[a]	.126	1.50360
Personality Development	No	1.849[a]	.057	1.05416
	Yes	2.476[a]	.112	1.44366
Intellectual Development	No	1.666[a]	.039	1.27467
	Yes	1.821[a]	.077	1.09410
Political Empowerment	No	1.103[a]	.017	1.27134
	Yes	1.186[a]	.034	.82735
D M Empowerment	**No**	**26.039[a]**	.324	.82987
	Yes	23.081[a]	.637	.83032
Empowerment Total Score	No	39.024[a]	.260	.36122
	Yes	40.376[a]	.512	.40442
a. Covariates appearing in the model are evaluated at the following values: FI = 96.6667.				

Table 6 Showing Pairwise Comparisons

Dependent Variable	(I) SHG	(J) SHG	(I-J)Mean Difference	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
Economic Empowerment	No	Yes	**-2.936***	.369	.000	-3.660	-2.212
	Yes	No	**2.936***	.369	.000	2.212	3.660
Social Empowerment	No	Yes	**-.507***	.141	.000	-.785	-.229
	Yes	No	**.507***	.141	.000	.229	.785
Personality Development	No	Yes	**-.627***	.126	.000	-.874	-.380
	Yes	No	**.627***	.126	.000	.380	.874
Intellectual Development	No	Yes	-.155	.087	.075	-.326	.016
	Yes	No	.155	.087	.075	-.016	.326
Political Empowerment	No	Yes	**-.083***	.038	.028	-.158	-.009
	Yes	No	**.083***	.038	.028	.009	.158
D M Empowerment	No	Yes	**2.957***	.716	.000	1.551	4.363
	Yes	No	**-2.957***	.716	.000	-4.363	-1.551
Empowerment Total Score	No	Yes	**-1.352***	.575	.019	-2.480	-.223
	Yes	No	**1.352***	.575	.019	.223	2.480
Based on estimated marginal means							
*. The mean difference is significant at the .05 level.							
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).							

Discussion

Giving anyone authority or power is what empowerment is all about. In a community, women are vital as mothers and to the household. While women provide care for their families unpaid, their high positions at job allow them to earn more (Rathiranee, 2013). There was a significant effect of self-help group (SHG) on Economic Empowerment, Social Empowerment, Personality Development, Political Empowerment, Decision Making (DM) Empowerment and Empowerment Total Score. SHG have no significant effect on Intellectual Development. Further, it is quite clear from estimated marginal means and pairwise comparisons that those women who are part of a self-help group are economically, socially, and psychologically (personality development) and politically more empowered than females who are not part of self-help. As demonstrated fundamental self-evaluations and self-esteem (Seibert et al., 2011) in earlier findings, personality was thought to play a significant impact in psychological empowerment (Wang et al., 2013). In comparison to those who are part of a group those women who are not part of a self-help group more empowered with decision making authority. According to the research conducted by Rathiranee (2013) it has been found that decision-making and women's empowerment power are strongly correlated. In spite of this, norms of culture and other individual factors prevent women from making decisions at the home level. The present result is inconsistent with the previous research. For women, who are not part of self-help group are low on Empowerment Total Score than those who are part of a self-help group. A SHG essentially works jointly to routinely accumulate little sums, agreeing to both to put money into shared money, fill their urgent requirements, make decisions collectively, Disputes should be settled using group decision-making and dialogue. Lend money without recourse at market prices and according to the negotiated parameters of the group (Sahu, 2015).

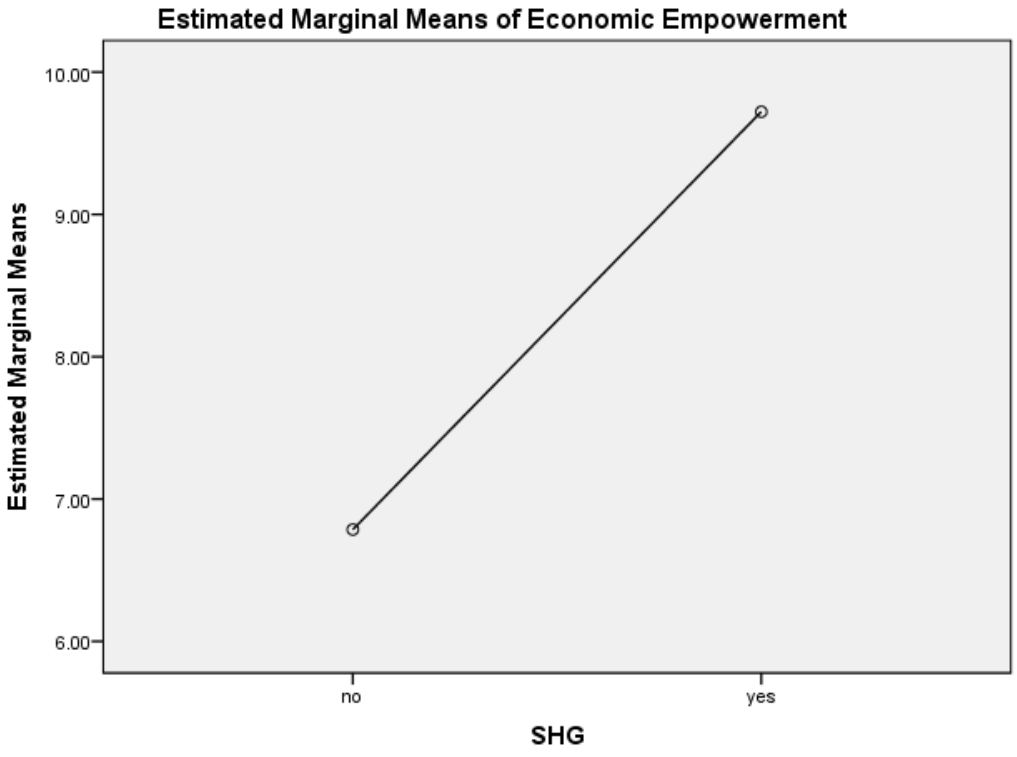
According to a research, giving away free ATM cards led to higher account access and availability and lower withdrawal fees, but it also caused people in bigger and more powerful positions in the household (mostly men) to substantially improve usage of account, whereas people in weaker positions in the family (mostly women) decreased usage of account (Schaner, 2017). The present research found that covariate financial inclusion was significantly related to Economic Empowerment, Social Empowerment, Personality Development, and Intellectual Development. Further, the covariate, FI has

been found to be significantly related to Political Empowerment, Decision Making (DM) Empowerment and Empowerment Total Score. Scores of financial inclusion were obtained adding services and schemes availed by the participant. In in score means increase in financial inclusion. Same is true for empowerment scores. So, it can be inferred from the results that as financial inclusion score increases there is increase in economic, social, psychological (personality and intellectual development), political, decision making empowerment of women. Further, there is also increase in total score of women empowerment and financial inclusion.

Conclusion

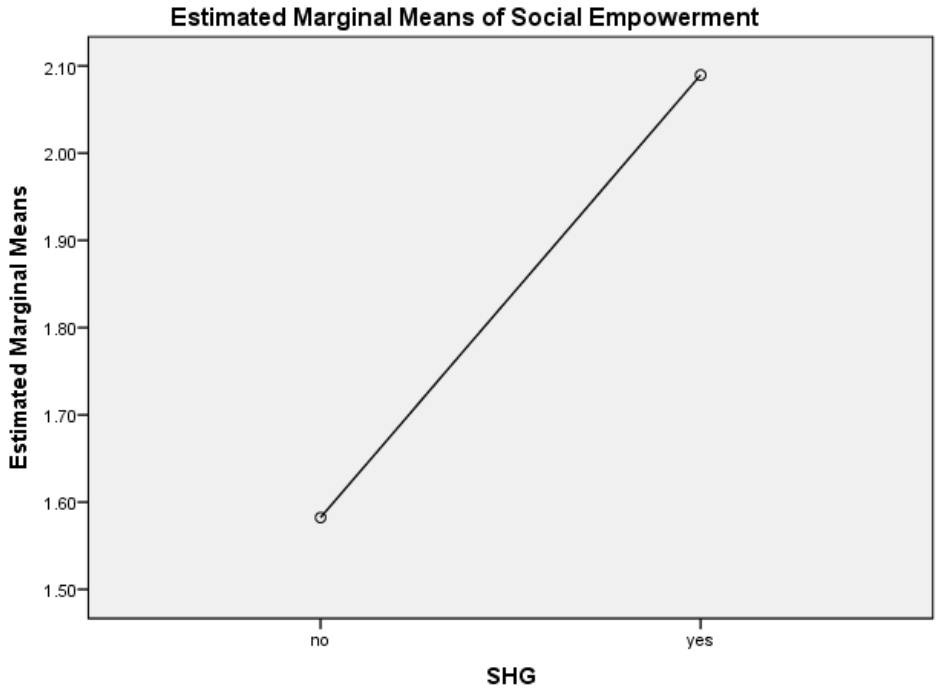
From the results and discussion it can be concluded that self-help groups and financial inclusion plays significant role in women empowerment. The procedure of enabling women to make their own decisions for their own advantages is known as "women empowerment." An important factor influencing a woman's decision is her financial stability and awareness finances (Maurya, 2016). Further, despite the fact that there are countless options to develop women's capabilities as clear financial players; the northern region nevertheless deserves greater consideration (Manta, 2014).

Profile Plots
Economic Empowerment



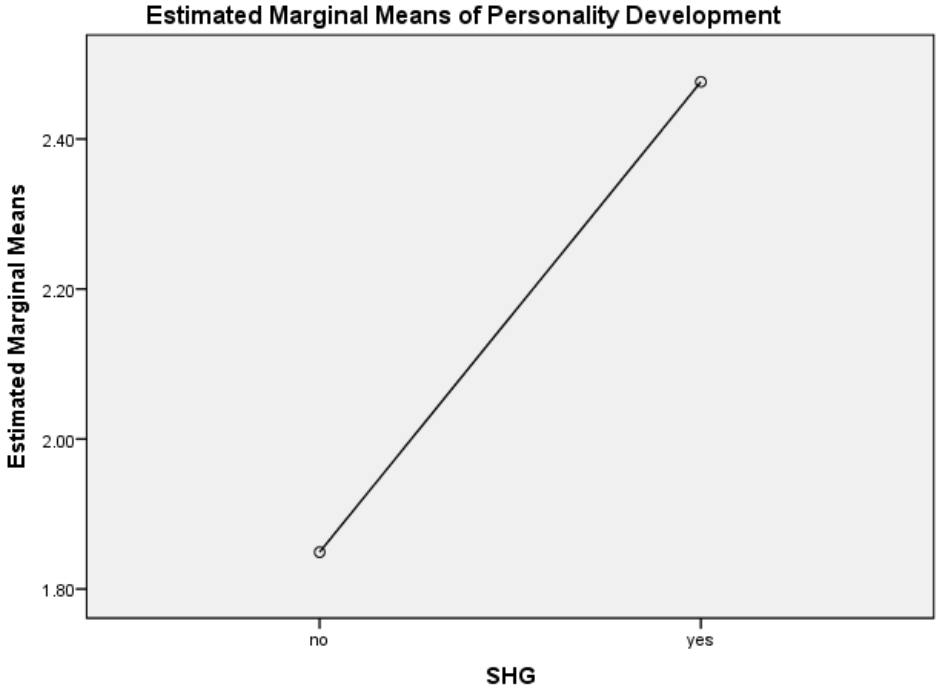
Covariates appearing in the model are evaluated at the following values: FI = 96.6667

Social Empowerment



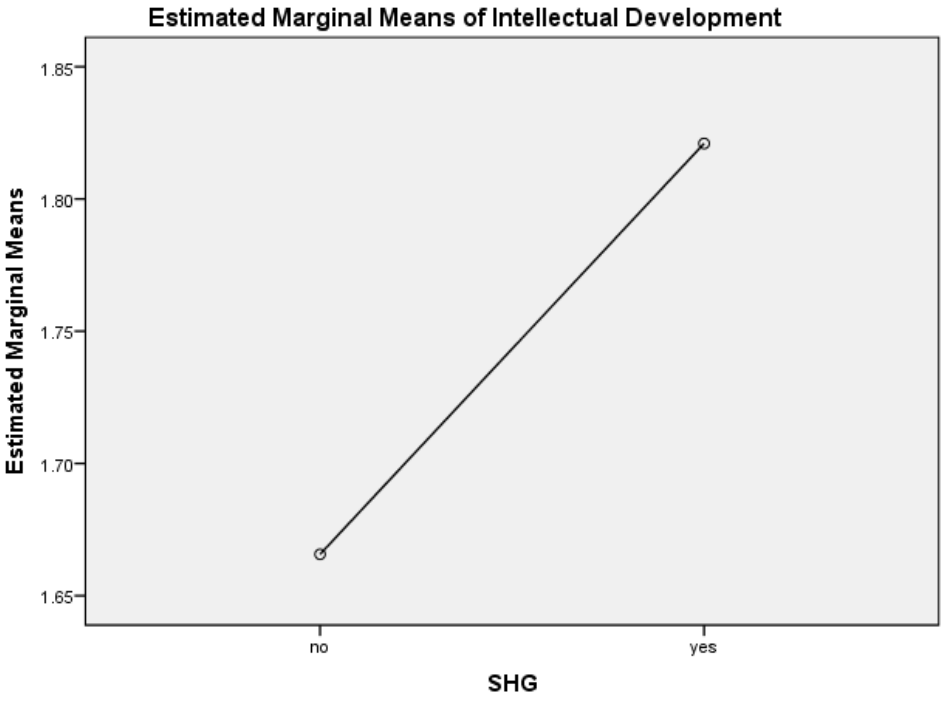
Covariates appearing in the model are evaluated at the following values: FI = 96.6667

Personality Development



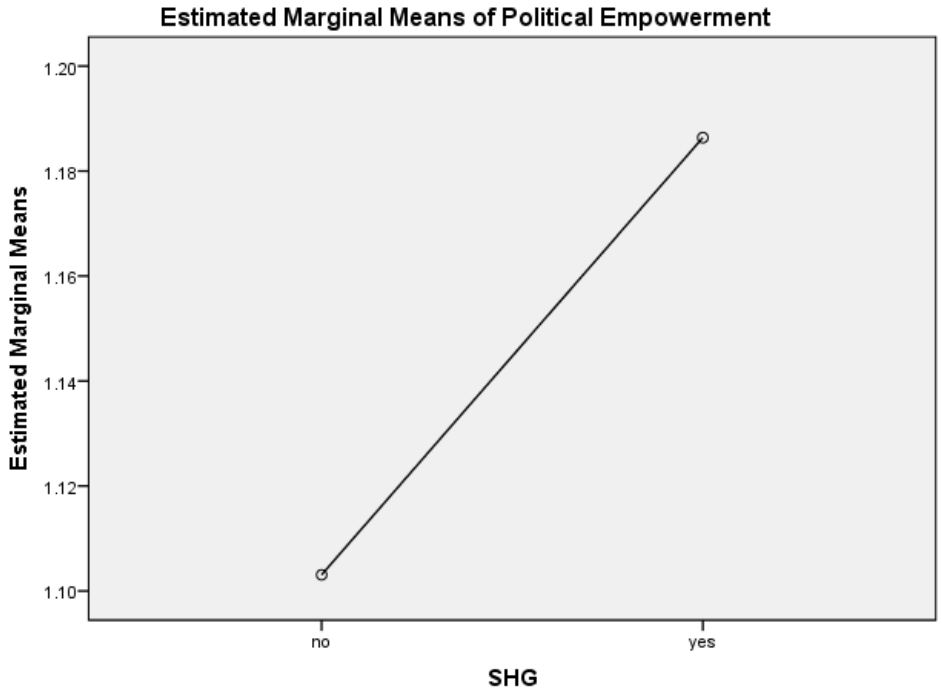
Covariates appearing in the model are evaluated at the following values: FI = 96.6667

Intellectual Development



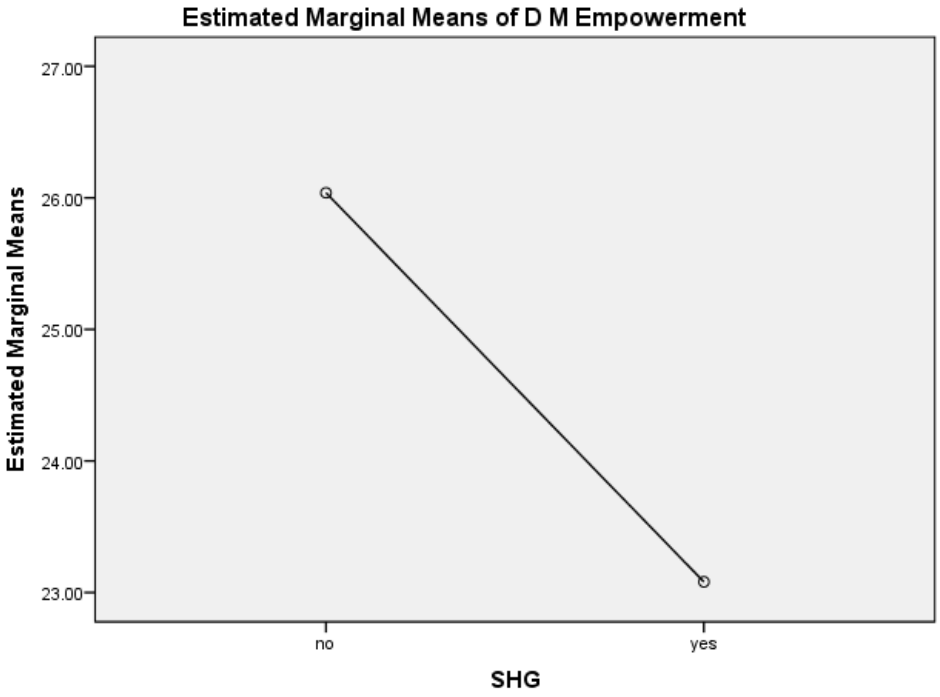
Covariates appearing in the model are evaluated at the following values: FI = 96.6667

Political Empowerment



Covariates appearing in the model are evaluated at the following values: FI = 96.6667

D M Empowerment



Covariates appearing in the model are evaluated at the following values: FI = 96.6667

Empowerment Total Score

Covariates appearing in the model are evaluated at the following values: FI = 96.6667

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PRACTICE OF PRIVACY-PRESERVING TECHNIQUE IN THE FRAMEWORK OF DIGITAL FORENSICS

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ABSTRACT

With over 93 percent of the world's data created by computers, digital forensics offers significant challenges as well as opportunities. This paper presents an in-depth knowledge of privacy protection as well as There are numerous forensics tools related to the various stages of such models. Our study aims to describe various privacy-preserving personal data mining technologies and analyse their advantages and shortcomings. The investigation emphasises present research requirements and future research possibilities.

Keywords: *Digital forensics, personal data, process model, forensic tool*

Introduction

Digitalization is becoming the new way of our lifestyle in recent years as the internet has become more prevalent now-a-days. With the increased use of internet connections in companies and households, there has been an increase in cybercrime. Cybercrime is a type of threat and illegal activity that affects individuals, businesses, and countries all around the world. The proliferation of illegal acts including digital media has altered the traditional concept of a crime. Meanwhile, due to the diversified character of offences linked with different crime categories, the methods but also criminal activity targets were modified in the more general sense, influencing a way investigations are conducted as well. To cope with the challenges posed by crime complexity, forensic investigative structures have been existence fine- adapted to match a crime nature as well as seriousness existence devoted. Digital forensics can be defined as the digital analysis and investigative procedures that aid in the capture of digital or cybercrime in layman's terms. Despite digital forensics' research initial focus has been solely as of offence committed utilizing computers, a branch was now expanded on include various additional digital tools such as cameras, cellphones, and so forth. Such a digital data stored on these devices could be examined or recognised of a villain purposes variety [1].

Almost every existing cross-data analysis application now includes privacy protection features. The privacy-preserving technology allows individuals to provide sensitive personal data while maintaining their privacy. This new trend has an impact on data collection results by boosting analytical accuracy, expanding the number of participants, and better understanding the settings of the participants. To prove to the court that a given activity is criminal in nature and not acceptable as a simple activity, a combination of data gathering, identification, preservation, analysis, and presentation processes are used. In this case, gathering these personal data is critical for a variety of beneficial uses, such as health monitoring. Nonetheless, these applications face significant privacy risks and issues about how personal data is handled.

Importance of the research

In the topic of Practice of Efficient Privacy-Preserving Investigation in Digital Forensics, there are only a few research studies. The study offers to understand the limit of private data sharing and its protection technique approaches aiming to prevent third-party privacy intrusions. The importance of digital evidence is expanding in both civil and criminal litigation, according to an assessment of the literature. As a result, the volume of digital evidence is growing, posing a dilemma for preservation.

Statement of the Problem

The following questions will be the focus of the planned research:

- To what extent should the acquired evidence be limited to the date in order to address the data privacy concern?

Objectives

The objectives have been envisioned as follows:

- To improve the standard of living as well as the welfare of the community with personal data protection.
- To explore the techniques for preserving the private information.
- Stating the framework of cyber forensic tools in order to preserve privacy.

Research Method

We start with the strategy of descriptive research which allow us to data collecting and management. Following the collection of data, we would investigate and conduct an analysis of the whole sampling. These can be done in two ways; one is primary data collection whereas another is secondary data collection. The paper used secondary data gathered from various reports, policy briefs and news media.

Concept of Privacy Protection

Giving people a sense of security and confidence is what privacy is all about. People want control over what personal information is shared with others, as well as the amount of information shared and under what circumstances it is shared. These debates led to the definition of privacy, which said that privacy is the power to choose when and to what extent personal information is released to third parties.

Database systems are designed to be built in a specific way. But these systems don't always delete data safely after deletion, and that required data and actions can be found in allotted storage. Data items that can be found in data files were replicated in database systems. Such information poses a serious threat to privacy because it may expose not just investigators to inaccurate data, but also cybercriminals who may gain access to all of them for nefarious purposes. To avoid this, the researchers formulated a series of transparency guidelines to ensure secure information deletion, as well as altered database language (MySQL) internals for securing the deletion log with minimal performance impact caused by overwriting-encryption store and process information in general.

Privacy-Preserving Techniques

Computer forensics and data confidentiality are two techniques to data protection that are diametrically opposed [2]. To put it another way, digital forensics technologies seek to locate and retrieve electronic data relevant to a specific incident, whereas privacy rights methods seek to preserve the data holder's privacy. As a result, striking a balance between these two areas is challenging. Current privacy-preserving digital forensics approaches capture and encrypt the entire data set, treating all data users' information as private [3].

In refs. [4-8], some of the most recent privacy-preserving strategies each for a specific and sensitive attribute have been discussed. There are a number of systems in place to protect privacy before, during, and after data gathering [9]. The privacy-preserving strategies work on many aspects of data collection. These mechanisms can be characterised based on data distributions, the intensity of the mining process, and the approach to data modifications [9,10].

As a result, there are three types of existing approaches:

- Randomization: This involves introducing (or responding to) noise to the data in order to mask attribute values, which is usually accomplished by manipulating probability distributions.
- Anonymization: Anonymization techniques enable the removal or modification of personally identifying data. However, removing unique identifiers from datasets does not ensure data privacy.
- Cryptography: Cryptographic techniques ensure that only the authorized parties have the access to the information. Modern cryptographic approaches enable operation over encryption datasets, ensuring complete privacy protection. The purpose is to jointly calculate an operation on their inputs while maintaining the confidentiality of those inputs.

Table 1 precises the main advantages and weaknesses of privacy-preserving techniques. Randomization-Based techniques can show efficient performances, allowing operational scalability with good usuability. Although anonymization-based solutions are effective at

hiding identifying records, they do not allow us to use or share them in analytics operations. The main topology for ensuring and preserving privacy is cryptography. However, as compared to other techniques, most cryptography algorithms have a high computational cost and a long execution time.

Technique	Advantage	Weakness
Randomization-Based techniques	Efficient, Scalable	May discover some identifiers if linked to public records
Anonymization-Based techniques	Hide identifier records	Lose information in the original database
Cryptography-Based techniques	Secure & Robust	High computational complexity

Table 1: Advantages and weakness of privacy-preserving techniques

Framework of Digital Forensics

The earliest instance of cybercrime was in 1834 in France, when two robbers hacked the French Telegraph System and stole information on the country's stock and financial markets. And, during the last fifteen years, cybercrime has become considerably more common around the world, since most organisations, such as financial institutions, have become increasingly reliant on digital frameworks to collect and maintain their customers' data. During the inaugural Digital Forensic Research Workshop produced a set of guidelines [11], generally known as the Roadmap Document) establishing the topic of "Digital Forensics" in a formal manner [11].

A computer forensics research adheres to a series of scientifically validated procedures for collecting, preserving, searching, and analysing evidence in terms of determining the commission of a crime, while a computer forensics structures aids forensics professional in investigating Without jeopardising processes, information, or even other situations, commit a crime. A framework for conducting an effective forensic analysis might be defined as such a framework.

Digital Forensics used to refer to the process of acquiring, preserving, examining, analysing and presenting digital evidence. a key goals of computer forensics are to keep such proof as close to their unique state as possible. Computer forensics aims to do analytic inquiry through locating, gathering, as well as defending the use of digital data in order to reconstruct past occurrences. In a larger sense, digital forensics combines computer science with legal practises in the course of a criminal investigation. Researchers should obey a judicial process through the start to end of a research in order for the investigators' digital forensics to be lawfully accepted in a law court. As recommended by subject matter experts, process-specific technologies must be employed at various stages of a computer forensics research process. The instruments must be chosen based on their performance as well as the importance of the digital evidence in solving a particular case [12]. Disk imaging, carving, and data recovery file analysis, memory imaging, extraction of document information, memory analysis, analysis of log files, forensic examination of mobile devices and network forensics, are just a few of the techniques accessible. Forensics tools are classified as Macintosh-based applications, Linux-based applications, Windows-based applications, as well as Android-based applications, among others, depending as of an underlying operating system and supporting environment. Table 2 includes most of the forensic tools along with their tasks, provider, reference model etc.

S. No.	Tool/ Application name	Major tasks	Supported platform	Software license type	Provider/ Developer	Reference forensics model
1	EnCase	Data identification, Acquisition, Analysis, Documentation, Reporting	Linux, Mac, Windows, Solaris	Commercial	Guidance Software	PM5, PM8, PM14
2	Forensics Toolkit (FTK)	Identification, Imaging, Analysis, Reporting	Windows	Commercial	AccessData	PM5, PM14
3	X-Ways	Imaging, File carving, Data recovery, Analysis	Windows	Personal, Commercial	X-Ways Software Technology AG	NA
4	WinHex	Imaging, Analysis, Privacy-protection, Wipe/ Erase confidential files	Windows	Personal, Commercial	X-Ways Software Technology AG	NA
5	The SleuthKit and Autopsy	Data acquisition, Analysis, Data carving	Windows, Linux, Unix	Freeware	Brian Carrier [50, 51]	PM5
6	Passware Recovery Kit Forensic	Password recovery, Memory acquisition, Live memory analysis, Data decryption, Evidence discovery, Encryption analysis	Windows	Commercial	Passware	NA

Table 2: A summarized view of the well-known digital forensics tools

Conclusion and Future Scope

The paper demonstrates the concept of privacy, current advances in personal data protection strategies, including several underscored cutting-edge techniques for preserving privacy as well as a critical performance measures for evaluating them. In this paper, the benefits and drawbacks of several privacy-preserving techniques are described, which can help in selecting the best method for a digital investigation work. This will be helpful for consumers with cyber protection and would assist them in protecting their data and information through the use of various protection models.

However, due to the huge exponential growth in the digital data volume, the find out process has become tiresome and irritating. Evidence extraction as well as cure through massive but also diversified digital information are still free subject to be resolved in the not-too-distant future, according to an existing literatures. Furthermore, most forensics devises has been designed for evaluate digital information inside a steadfast manner. Even if the underlying policy has changed little, the adjustments must be reviewed again from the beginning when re-inspecting an inquiry process. As a result, a real-time investigation process analysis must be established in order to effectively handle the dynamic of data and investigation policies.

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THE NATURE AND IMPACT OF IMPLEMENTATION OF PERFORMANCE APPRAISAL SYSTEM IN PUBLIC ORGANISATION. A CASE OF ZANZIBAR ELECTRICITY COOPERATION

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ABSTRACT

Performance appraisal system was introduced in Zanzibar public institutions since July 2004 and was active within three years later. However, the nature of the performance appraisal which introduces in the public sectors was complex because of too many procedures which challenged its implementation. It is from this perspective research on the nature and impact implementation of the performance appraisal was essential to address the critical gaps that could affect performance of service delivered in the selected institution. The study was conducted at Zanzibar Electricity Corporation (ZECO) and applied descriptive design approaches. Sample size of 140 staff of the ZECO were involved. Data were collected using interviews and questionnaires Secondary data were collected from books, journals/articles and dissertations. Quantitative data were analyzed using SPSS software version 16.0 where outputs from descriptive statistics and frequencies were used. Qualitative data were analyzed through description and explanations. Findings revealed that ZECO was still using Closed Annual Confidential Report System (CACRS) instead of Open Performance Review and Appraisal System (OPRAS). Despite the use of CACRS still the performance still is not improved.

Keywords: *Performance Appraisal, Organization Performance*

1. Introduction

For some years now the public sector in most countries (developed and developing) has been undergoing implementation and restructuring of performance appraisal system with the aim of bringing effectiveness and efficiency in public services and activities. However, some countries have not been doing well on these performance appraisals. For this case the study aims at examine the nature and impact of implementation performance appraisal system in public organizations in Tanzania. This first part of a research paper provides the background, statement of the research problem, objectives of the study, research questions, its scope and ends by highlighting the significance of the study.

1.1 Background Information

The desired performance of the employees is critical building of the future perspective of the organization. The brilliance of the organization relies on the management efforts to supervise and control the existing local staff to perform their appointed responsibilities in the best manners (Emojong, 2004). The local staffs should be enhanced by well communication, trainings, and other subsistence to facilitate their efficiency. The role of senior staff and organization managers is to ensure effective system is applied to enhance effectiveness on the services delivery (Palmer, 1993).

Performance appraisal (PA) is an important approach for any organization development whether large or small. It is a formal tools to evaluate performance of individual or group or team within institution. It has initial focus of enhancing employees to achieve organization objective which is a central mission of the strategic plan which is the most factor of the effective implementation of PA. Roos, 2009 clarifies that the objective of the performance appraisal is to recompense employee hardworking, behavior of working and obedience. It helps the workers to retain in their position even if they are doing poorly (Boninelli & Meyer 2004). The effective implementation of the PA depend up on acceptance of the organization managers and their associated subordinates toward performance objectives, performance targets, performance criteria and required resources in order to achieve the set targets and objectives (Makura, 2009) which is rarely formed in majority of organizations (Russell and Russell, 2010).

The Open Performance Appraisal system (OPRAS) was adopted in Tanzania by 2004 with only one target of replacing the Annual

Confidential Report System (ACRS), which resulted with poor feedback and poor identification of training needs (Nigera, 2004). It has also a problem of lacking poor guidance to promote performance and accountability to the public servants. However, the implementation of OPRAS just like ACRS was proof failure and could not be institutionalized (Beitenhader et al, 2010).

2. Research gap

For years now the public sector in Tanzania has been administering performance appraisal to enhance performance. Firstly, the secretive appraisal and now the open performance appraisal system. The current appraisal system procedures were designed to assist both managers and subordinates in planning, managing and executing organizational goals, which will lead to effective service delivery to the public (URT, 2005). The Revolutionary Government of Zanzibar attempted various strategies to ensure performance appraisal system is producing the targeted outcomes. Training, seminars, workshops and symposiums have been opened to all managers, their associated seniors and subordinates to run, manage and interpret PA procedures and results. Beside those efforts still there is a problem in administering PA in the organization. There is no consistency and regular follow up which resulted which can materialize an effective outcome of not PA and managements still observe no change in the servants' performance. As a result, both managers and local staff dislike the system and therefore effectiveness was not proceeded. It is because of these diverse experience and events that the study would examine the nature and impact implementation of performance appraisal in public organization specifically at Zanzibar Electricity Corporation.

3. Statement of the Problem

For years now the public sector in Tanzania has been administering performance appraisal to enhance performance. Firstly, the secretive appraisal and now the open performance appraisal system. The current appraisal system procedures were designed to assist both managers and subordinates in planning, managing and executing organizational goals, which will lead to effective service delivery to the public (URT, 2005). The Revolutionary Government of Zanzibar attempted various strategies to ensure performance appraisal system is producing the targeted outcomes. Training, seminars, workshops and symposiums have been opened to all managers, their associated seniors and subordinates to run, manage and interpret PA procedures and results. The Performance Appraisal lacks consistency and regular follow up which resulted not changes observed. Both managers and local staff dislike the system and therefore effectiveness was not proceeded. The situation in the public sector is almost still the same, too many procedures, ineffective services and poor customer care as opposed to the intent of the implementing performance appraisal system reforms (World Bank, 2008). It is because of these diverse experience and events that the study was the nature and the impact of performance appraisal in public organization specifically at Zanzibar Electricity Corporation.

3.1 Purpose of the study

To examine nature and impact of implementation of performance appraisal to workers in the public organizations.

3.2 Specific Objectives

i. To identify the type of appraisal system implemented by ZECO in the course of undertaking workers performance appraisal.
ii. To examine the extent of scaling up performance appraisal and its influence within ZECO.

3.3 Research Methodology

The study employed descriptive and cross – sectional research design that allows data to be collected at one point at a time, because it is the most common design used in survey research (De Vaus, 1993). Cross-sectional design was used to cover a selected sample of the population. The design managed and described the distribution of variables in a study population within a given time, variables like physical characteristics of people, socio-economic characteristics of people like age, sex, marital status, education and the event that occur in the population like factors hindering implementation of performance appraisal in

public organization. In this design questionnaires were managed to all respondents that have been selected. The population constituted some employees of Zanzibar Electricity Cooperation (ZECO) who were selected in different units like Human Resource Departments, Training Department and reception.

Purposive and simple random sampling was used to obtain the sample. The purposive sampling was employed because of its advantage in getting rich information from Managers, Human resource officers and Administrative officer. Simple random sampling was employed so as to avoid bias and gives every item of the universe an equal chance of being selected (Kothari, 2004). Therefore simple random sampling was used to select ordinary workers and secretaries who provided required information for the study. A sample of 140 respondents was randomly selected from those identified purposively. The formula developed by Areola (2007) was used to determine sample size for this study:

$$n = 1 + NE^2$$

Where: n = sample size

N = population size

Literature Review

"Performance appraisal is a systematic evaluation of the individual with regard to his or her performance on the job and his potential for development." Worldwide, performance appraisals are used in nearly all organizations. There are different tools and number of goals that performance appraisals focus to examine individual‟s performance and potential of development. So at its core, the performance appraisal process allows an organization to measure and evaluate individually the employee‟s behaviour and accomplishments over a specific period of time (De Vries et al. 1981). By using a formal system performance appraisals have many advantages if they are designed and implemented properly. Not only in reward allocation, promotion/demotions, layoffs/recalls, transfers and selecting training and development program for employees but it may also assist individual employee‟s decisions regarding career choices and the subsequent direction of individual time and effort. Additionally, performance appraisals may increase employee‟s commitment and satisfaction (Wiese and Buckley, 1998).

Definitions According to Newstrom, "It is the process of evaluating the performance of employees, sharing that information with them and searching for ways to improve their performance''. Meaning Performance appraisal is the step where the management finds out how effective it has been at hiring and placing employees . A "Performance appraisal" is a process of evaluating an employee's performance of a job in terms of its requirements.

E = level of confidence desired (5 – 10%)

$= 1+ 557(5 - 10\%)^2$

$= 1+557 \times 25/100$

$= 1+557 \times 0.25$

Sample size = 140

Questionnaires were administered to the all selected samples specifically to the local staff. The interview guide was applied to gather necessary information from Human resources personnel.

Before entering data in a computer program for in depth analysis, questionnaires were organized by coding for analysis. Responses were screened and checked to ensure clarity of the responses on the questionnaires. Data were analyzed using Statistical Package for Social Science (SPSS Version 16) and Microsoft excel using descriptive statistics such as Tables, Figures, frequencies and percentages that were generated.

4. Results and Discussions

Distribution of Respondents by Education Level

The education profile of respondents was also one of the areas examined to find out the factors influencing people to get involved in implementation of performance appraisal system in public organizations. The data is presented in Table 1. Out of 140 respondents, 78 (55.7%) had secondary school education/ Ordinary education, 5(3.6%) had A-level Education, 32 (22.9%) had diploma, 17 (12.1%) had a degree level of education, 6(4.3) had attained post graduate studies and only

2(1.4%) had a CPA. The results imply that the public institutions in Zanzibar involve majority workers with of low level education. Therefore, few who high level of education have willing to participate in implementation of performance appraisal because respondents at decision making positions have high level of education such as degree and postgraduate levels.

Table 1. Education Level of Respondents

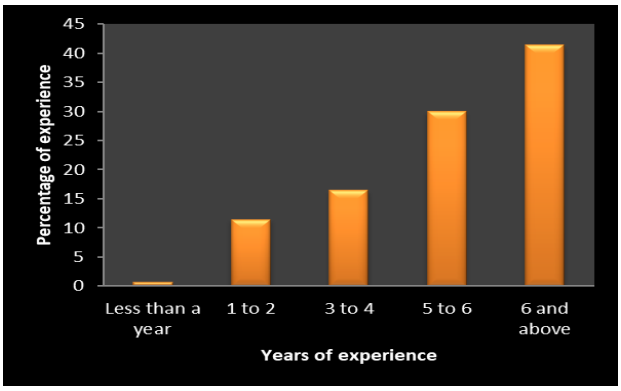
Education level	Frequency	Percent (%)
Ordinary level	78	55.7
Advanced level	5	3.6
Diploma	32	22.9
Degree	17	12.1
Postgraduate	6	4.3
CPA	2	1.4
Total	**140**	**100.0**

Source: paper, 2019

Distribution of Respondents Based on Working Experience

Respondents were asked to indicate their working experience. This question was intended to examine the how the experience might have affected the implementation of performance appraisal. Data presented in Figure 1.show that out of 140 respondents, 1(1%) had less than a year at work, 16(11.4%) had one year to two years' experience at work, 23(16.4%) had three to four years of experience, 42(30%) had five to six years of experience while 58(41.4%) had six and above years of experience at work. The presence of workers with six and above years of experience at work dominating the study which reflects the workers with experience at work about the problem of implementing performance appraisal. However, the people with this experience are expected to have high contribution and impacts on implementation of performance appraisal.

Figure 1: Distribution of Respondents Based on Working Experience (N=140)



Source: paper, 2019

Understanding of the performance Appraisal by the ZECO Staff

Understanding of the performance appraisal was examined in order to assess the knowledge capacity of staff on performance appraisal. This was necessary question which also able to understand the type of appraisal which is experienced by the workers. Majority of the staff 88 (63%) have knowledge on Closed Annual Confidential Report System. Only 15 (10.7%) knew the Open Performance Review and Appraisal system while 37 (26.4%) stated that they did not know anything about Performance Appraisal system.

Table2: The Appraisal that is Mostly Known to Workers

Type of appraisal	Frequency	Percent
Open	15	10.7
Confidential	88	62.9
None	37	26.4
Total	**140**	**100.0**

Source: paper, 2019

The inference drawn from the responses above indicates that Closed Annual confidential Report System is mostly known by the staff rather than Open Performance Review and Appraisal system. The understanding of the (CACRS) by the majority has been influenced by the number of factors. The first factor is the establishment of the system in the organization. CACRS was introduced in some of public sectors since 2004. It is this system which is mostly used to assess employees' performance in the organizations. The second factor is training. Some of the public workers were

invited to the training when Performance appraisal was introduced in the public sectors. This factor influenced understanding of other systems. Other factors are knowledge and experiences. Some public servants have basic knowledge on performance appraisal from their educational background.

Why CACRS was effective then OPRAS

The CACRS is believed to perform more effectively in the organization than other types of appraisal systems. The reason behind is that CACRS has different influence within Zanzibar Electricity Cooperation. It receives much feedback from the employees themselves at ZECO. OPRAS is more politics. According to Erick (2008) the system was applied in Tanzania but it produced poor feedback and definitely it was not working.

The level of CACRS performance

Based on the table3 the result from respondents showed various levels of performance of the CACRS system. These levels were determined from the responses of the workers. Majority of workers 45 (32.0%) measured fairly, good 21 (15%) and very good 22 (16.0%). However, the inference drawn from the responses indicates that the system used is almost perform the best. David, (2012), pointed out that majority of the organization management fail to implement performance appraisal because of the challenges of work plan, budget and individual willing to be assessed. In ZECO, majority of workers have less knowledge on how to use and benefit of using appraisal system. Although, managers are willing to implement performance appraisal.

Table 3: The Extent Performance Appraisal Perform Properly

Performance	Frequency	Percent
Very Good	22	15.7
Good	21	15.0
Fair	45	32.0
Poor	18	12.9
Very poor	34	24.3
Total	**140**	**100.0**

Source: paper, 2019

The impact of CACRS Appraisal system on organization development change

Data indicates that 48 (34.3%) of respondents revealed that the changes brought by this type of appraisal was fair but not perfect, 43 (30.7%) said that changes were not perfect. However, 19 (13.6%) of respondents reported that the performance appraisal had brought very satisfied changes to organization performance. 43 (30.7%) satisfied, 48 (34.3%) fairly satisfied, 14 (10%) unsatisfied and 16 (11.4%) reported very unsatisfied. The result of the study was against the notion that developing countries have problem in their institutional management (Waal, 2007). Majority of workers however, observed changes in organization performance due to employment of the appraisal system.

Table 4: If Performance Appraisal has been able to Change Performance

Changes	Frequency	Percent
Very satisfied	19	13.6
Satisfied	43	30.7
Fairly	48	34.3
Un satisfied	14	10.0
No change	16	11.4
Total	**140**	**100.0**

Source: paper, 2019

Management capacity on implementation of Performance appraisal

The performance appraisal was examined weather was successfully implemented in the organization. This was done so as to understand if the management has enough capacity to implement Performance appraisal. About 94 (67.1%) agree that performance appraisal was successfully implemented in the organization. It was 21(15%) of respondents who disagreed on this while 16 (11.4%) of respondents strongly disagreed. Only 9 (6.4%) strongly agreed that the performance appraisal was successfully implemented in the organization.

Table 6: If Performance Appraisal was Successfully Implemented in the Organization

Response	Frequency	Percent
Strongly agree	9	6.4
Agree	94	67.1
Strongly disagree	16	11.4
Disagree	21	15.0
Total	**140**	**100.0**

Source: paper, 2019

The Positive Impacts of Performance Appraisal at ZECO

There were different impacts from using performance appraisal as observed by respondents, 46 (33%) indicated that there was an improvement of service delivery, 33 (24%) indicated improvement in public service delivery, 27(19.3%) increase employee performance. The employees changed their behavior at the work place as reveled by 24(17.1%) of respondents. Only 10 (7%) reported that there was an increasing working in team among the employees.

The reflection drawn from the responses above indicates that the services were delivered effectively with efficiency and the clients were satisfied with the work done by the employees. Smita (2011) pointed out other positives impact of the performance appraisal including motivation, complement those who gets motivated for being recognised, setting, the right goals and expectations motivates, identifying Training Needs/ Areas for Improvement, identifying areas of strength encourages to working harder and documented History of Employee Performance. However, result from interview revealed that performance appraisal enabled the organization to have close contact between staff and community. "*After the implementation of performance appraisal at ZECO the public service delivery to clients /citizens was improved when compared to the time when the system was not yet being implemented to an organization*"(Human Resource Manager)

Table 5: The Positive Impacts of Performance Appraisal at ZECO

Positive impacts	Frequency	Percent
Improvement of public service delivery	33	23.6
Organization to assess the individual employee	27	19.3
Improvement of effectiveness and efficiency of service delivery	46	32.9
Behavior change of employees at work place	24	17.1
Increase of team work	10	7.1
Total	**140**	**100.0**

Source: paper, 2019

5. Conclusion

After careful analysis, interpretation and discussion the data then the study came up with conclusion. Firstly, the closed performance appraisal is well known in the institution however, its performance is still doubtful. Secondly, CARCS receives much feedback from the employees themselves at ZECO. Thirdly, the impact of the system to the organization is the employees' improvement performance although to average satisfaction.

Implication of the study

The study will be used as a blueprint for. Through this study ZECO will be able to adopt effective performance appraisal system which services improvement as it will be a guidance toward performance appraising through CARCS will produce an effective outcome for the employees' performance. It will also be used as a reference to other institutions toward performance appraising of their staff.

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CHARACTER RECOGNITION SYSTEM USING RADIAL FEATURES TRANSFORM

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ABSTRACT

Character recognition in any of the textual language is one of the most desired activities while digital processing of documents. This is also very much in demand while translating a document from one language to other. Character recognition is the heart of any digital processing of document while translation. The presented approach employs radial transform in order to transform a character image into feature transform. The feature transform consists of radial feature set consisting of minimum and maximum radii in each quadrant, intercepts on axes, statistical variances of radii in each quadrant along with perimeter and area. This way, a character is fully transformed from its shape-based entity to radial transform that in turn can be used to recognize the character from that particular language.

Keywords: *Centre of Mass, SVM, Radial Vector, Otsu Algorithm, Standard Deviation, Character Recognition*

1. Introduction

Text extraction from images finds application in most of the documents related entries in offices. And the most popular application is in libraries where no. of books are entered daily by typing the book title along with its author name and other attributes. This can be made easier by using a suitable algorithm or software application that can extract the text from the book cover and present in a text file thereby reducing the typing job of the user. Now he needs only to arrange the book title and authors name and etc. by formatting the material.

In image processing, a pattern is transformed from its shape to feature vector. Feature vector may include its perimeter, color profile, radii, area, edge features, moments and key points on pattern etc. As an example of input pattern and its features vector is shown in below figure 1.1

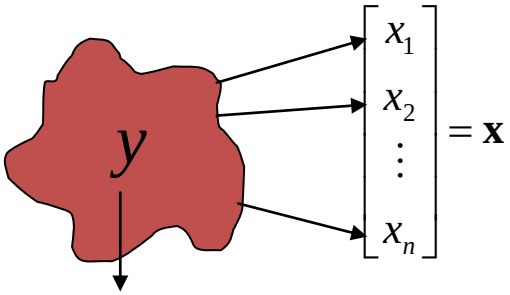

Figure 1.1: Pattern and Feature Vector X

Features vector is a set of features ($\mathbf{x} \in X$) extracted from the pattern. With the help of feature vector, a pattern may be defined as a point in feature space. While working or extracting features of a pattern, it is very much required that the features are invariant with respect to its size, orientation and location. Size invariance can be achieved via centre of mass of the pattern. Orientation invariance is obtained by using orthogonal transformation of features. And size invariency is achieved using the mean radius of the pattern under test. Using the weighted score of unknown input pattern with trained set of parameters, the decision is deduced.

$$Q : X \rightarrow Y$$

In ideal conditions, a feature vector should have the property of transform i.e. when **V** is the feature vector set for a given pattern **P** and say f_1, f_2, f_3 … f_n represents the features, then,

$$V = P\{f_1, f_2, f_3 \ \dots \ f_n\}, \qquad and$$
$$P = V^{-1}\{f_1, f_2, f_3 \ \dots \ f_n\}$$

Therefore, in above equation, the pattern should be reconstructed completely or faithfully from respective features vector set and taking inverse of the feature vector transform.

2. Review of Related Literature

Techniques for page segmentation and layout analysis are broadly divided in to three main categories: top-down, bottom-up and hybrid techniques [1]. Many bottom-up Approaches are used for page segmentation and block identification [5], [11].Yuan, Tan [2] designed method that makes use of edge information to extract textual blocks from gray scale document images. It aims at detecting only textual regions on heavy noise infected newspaper images and separate them from non-textual regions.

The sequence of separating the text from the image is basically fall into two categories: statically methods and syntactic methods. First category include techniques like template matching, measurement of density of point in a region, moments ,characteristic loci, and mathematical transformation .In the second category the process aims at collecting the effective shape of the numeral generally from counters or counters.

The White Tiles Approach [3] described new approaches to page segmentation and classification. In this method, once the white tiles of each region have been gathered together and their total area is estimated, and regions are classified as text or images. George Nagy, Mukkai Krishnamurthy [4] have proposed two complementary methods for characterizing the spatial structure of digitized technical documents and labelling various logical components without using optical character recognition. Projection profile method [6], [13] is used for separating the text and images, which is only suitable for Devanagari Documents (Hindi document).

The main disadvantage of this method is that the irregular shaped images with non-rectangular shaped text blocks may result in loss of some text. They can be dealt with by adapting algorithms available for Roman script. Kuo-Chin Fan, Chi-Hwa Liu, Yuan-Kai Wang [15] have implemented a feature based document analysis system which utilizes domain knowledge to segment and classify mixed text/graphics/image documents. This method is only suitable for pure text or image document, i.e. a document which has only text region or image region. This method is good for text-image identification not for extraction.

The Constrained Run-Length Algorithm (CRLA) [14] is a well-known technique for page segmentation. The algorithm is very efficient for partitioning documents with Manhattan layouts but not suited to deal with complex layout pages, e.g. irregular graphics embedded in a text paragraph. Its main drawback is the use of only local information during the smearing stage, which may lead to erroneous linkage of text and graphics. Kuo-Chin Fan, Liang-Sheen Wang, Yuan-Kai Wang [17] proposed an intelligent document analysis system to achieve the document segmentation and identification goal. The proposed system consists of two modules: block segmentation and block identification. Two kinds of features, connectivity histogram and multi resolution features are extracted.

3. Text Preparation

Image acquisition is the very first step while conversion of text from scene to a textual information. The image of the text matter is either scanned or clicked using the digital camera. The acquired image is in jpeg format i.e. 24-bit color format. The same is converted to 8-bit color format i.e. gray color format using the rgb2gray command in matlab. The gray image is now binarized using the Otsu algorithm. This gives an binary image consisting of black color text material on white back ground.

4. Features Extraction

Very firstly, all the text characters are exposed to features extraction algorithm. Each character image is used as input image. The features are extracted using the algorithm discussed in below:

Following statistical features are computed from the analysis of the pattern with respect to centre of gravity for categorization:

[a] Normalised Maximum Radii in each Quadrant represented by R_1, R_2, R_3, and R_4. See fig. (2)

[b] Intercepts on each axis represented by X_1, X_2, Y_1 and Y_2 with respect to centre of gravity of object. See fig. (2).

[c] Mean Radius (R_M)

[d] Figure Aspect i.e. length to width ratio (FA) $FA = (X_1 + X_2) / (Y_1 + Y_2)$

[e] Normalised Perimeter (Np) N_p = Total no. of pixels at the contour of object / R_M

[f] Normalised Standard deviation of radii taken from centre of gravity of object (NSD).

$SD = \sqrt{[(Ri - R_M)2 / N_p]}$ $NSD = SD / R_M$

Where R_M, and R_i are the mean radius and i_{th} radius i.e. distance of i_{th} pixel on contour of the pattern from its centre of gravity.

[g] Normalised area (NA) of the pattern. = Total pixels on objects / R_M^2

All features are normalized with respect to mean radius of the pattern [6]. It makes all the statistical features independent of size of the

pattern. The set of described statistical features may be termed as figures of merit to classify an object.

5. Results

The SVM classifier fairly classifies the character patterns to their respective class as shown in table-1.0. However, in few cases, the accuracy is limited to 80-90% and can be attributed to complex character shape or nature of sample images.

	Sample Images	**No. of sample images**	**Correct No. of Images**	**Incorrect Images**	**% Accuracy**
1	A	10	9	1	90
2	B	10	8	2	80
3	C	10	9	1	90
4	D	10	8	2	80
5	E	10	9	1	90
6	F	10	9	1	90
7	G	10	9	1	90
8	H	10	10	0	100
9	I	10	10	0	100
10	J	10	9	1	90
11	K	10	9	1	80
12	L	10	10	0	100
13	M	10	9	1	90
14	N	10	9	1	90
15	O	10	10	0	100
16	P	10	10	0	100
17	Q	10	10	0	100
18	R	10	9	1	80
19	S	10	10	0	100
20	T	10	10	0	100
21	U	10	10	0	100
22	V	10	10	0	100
23	W	10	10	0	100
24	X	10	10	0	100
25	Y	10	10	0	100
26	Z	10	10	0	100
Over all Accuracy					93.8%

Table 1: Character wise Accuracy using SVM Classifier

Character	MaxR1	MaxR2	MaxR3	MaxR4	Mmax	MinR1	MinR2	MinR3	MinR4	Mmin	MR	X1	X2	Y1	Y2	SD	Area	NP	FA	Euler
A	1.34	1.35	1.56	1.55	1.45	0.66	0.67	0.49	0.5	0.58	1	0.71	0.72	1.32	0.49	0.3	2.5	8.14	0.78	0
B	1.12	1.27	1.26	1.14	1.2	0.56	0.76	0.76	0.73	0.7	1	0.69	0.76	1.02	1.01	0.15	2.42	6.85	0.72	-1
C	1.33	1.23	1.22	1.31	1.27	0.79	0.46	0.46	0.76	0.62	1	0	0.95	0.83	1.22	0.24	2.47	10.29	0.46	1
D	1.05	1.26	1.26	1.05	1.15	0.91	0.76	0.76	0.91	0.84	1	0.92	0.76	1	1.01	0.11	2.07	6.46	0.83	0
E	1.64	1.44	1.45	1.67	1.55	0.24	0.24	0.13	0.13	0.19	1	0.96	0.76	0.24	1.24	0.38	2.97	13.83	1.17	1
F	1.69	1.31	1.78	1.15	1.48	0.72	0.1	0.03	0.05	0.22	1	0	0.66	0.71	0.45	0.41	2.88	11.62	0.57	1
G	1.35	1.32	1.24	1.41	1.33	0.1	0.68	0.68	0.1	0.39	1	1.12	1.17	0.89	1.23	0.31	3.21	13.31	1.08	1
H	1.55	1.55	1.57	1.57	1.56	0.24	0.24	0.14	0.14	0.19	1	0.97	0.97	0.24	0.13	0.38	3	12.79	5.33	1
I	1.63	1.63	1.63	1.63	1.63	0.3	0.3	0.3	0.3	0.3	1	0.29	0.29	1.61	1.61	0.46	2.1	7.66	0.18	1
J	1.83	0	1.37	1.14	1.08	0.07	47.82	0.56	0.08	12.13	1	0.6	0	0	1.14	0.42	2.38	9.13	0.53	1
K	1.7	1.45	1.46	1.74	1.59	0.44	0.34	0.08	0.09	0.24	1	0.51	0.84	0.51	0.08	0.39	2.85	11.22	2.27	1
L	0	1.75	1.13	1.67	1.14	44.47	0.05	0.04	0.6	11.29	1	0	0.53	0	1	0.43	2.06	9.07	0.53	1
M	1.65	1.64	1.66	1.66	1.65	0.16	0.16	0.12	0.13	0.14	1	0.52	1.15	0	1.2	0.4	4.05	17.99	1.39	1
N	1.6	1.59	1.58	1.59	1.59	0.23	0.26	0.19	0.28	0.24	1	0.99	0.97	0.47	0.37	0.39	3.41	13.5	2.35	1
O	1.04	1.04	1.04	1.04	1.04	0.94	0.94	0.94	0.94	0.94	1	0.96	0.94	1.02	1.01	0.03	2.03	5.79	0.94	0
P	1.19	1.19	1.58	1.05	1.25	0.95	0.72	0.51	0.51	0.67	1	1.09	0.72	0.95	0.51	0.26	2.47	7.54	1.24	0
Q	1.07	1.09	0.98	1.34	1.12	0.84	0.96	0.9	0.85	0.89	1	0.84	0.96	1.06	0.9	0.1	2.11	6.38	0.92	0
R	1.18	1.32	1.44	1.62	1.39	0.82	0.83	0.27	0.33	0.56	1	0.82	0.83	1.03	0.33	0.29	2.67	9.22	1.22	0
S	1.4	1.43	1.39	1.39	1.4	0.29	0.33	0.16	0.21	0.24	1	0.79	0.62	0.33	1.35	0.35	3.43	13	0.84	1
T	1.47	1.47	1.78	1.78	1.62	0.25	0.25	0.25	0.25	0.25	1	0.25	0.25	0.99	1.76	0.43	2.3	9.79	0.18	1
U	1.56	1.57	1.18	1.18	1.37	0.49	0.5	0.5	0.49	0.49	1	0.92	0.93	0	1.13	0.28	2.49	11.25	1.63	1
V	1.76	1.75	1.44	1.45	1.6	0.32	0.26	0.23	0.27	0.27	1	0.81	0.79	0	1.42	0.41	2.85	10.92	1.12	1
W	1.8	1.81	1.47	1.49	1.64	0.15	0.13	0.15	0.15	0.14	1	0.15	1.2	0.51	0	0.41	3.53	16.22	2.64	1
X	1.57	1.57	1.61	1.58	1.58	0.28	0.28	0.31	0.32	0.3	1	0.28	0.31	0.49	0.38	0.38	2.5	9.93	0.68	1
Y	1.65	1.66	1.66	1.66	1.66	0.08	0.05	0.47	0.02	0.15	1	0.56	0.57	0	1.64	0.44	2.45	9.4	0.69	1
Z	1.5	1.44	1.47	1.49	1.48	0.23	0.28	0.27	0.16	0.23	1	0.19	0.36	1.21	1.13	0.35	2.39	10.68	0.23	1
0	1.23	1.22	1.23	1.23	1.23	0.77	0.76	0.76	0.77	0.77	1	0.77	0.76	1.21	1.21	0.16	2.4	6.12	0.63	0
1	1.54	1.47	1.77	1.82	1.65	0.45	0.13	0.13	0.45	0.29	1	0.45	0.99	1.47	1.76	0.45	2.71	9.13	0.44	1
2	1.42	1.42	1.53	1.46	1.46	0.13	0.06	0.19	0.36	0.19	1	0.52	0.12	1.4	1.22	0.36	2.72	10.52	0.24	1
3	1.49	1.53	1.48	1.45	1.49	0.34	0.33	0.05	0.07	0.2	1	0.57	0.33	1.04	0.05	0.39	3	11.33	0.82	1
4	1.51	1.23	1.29	1.35	1.34	0.53	0.71	0.7	0.54	0.62	1	0.53	0.85	1.23	0.7	0.25	2.79	7.94	0.72	0
5	1.59	1.52	1.47	1.47	1.51	0.44	0.42	0.02	0.05	0.23	1	0.8	0.89	0.43	1.45	0.37	3.35	12.67	0.9	1
6	1.4	1.38	1.32	1.34	1.36	0.39	0.32	0.83	0.81	0.59	1	0.81	0.83	0.38	1.31	0.29	3.08	9.11	0.97	0
7	1.4	1.39	1.9	1.18	1.47	0.07	0.51	0.08	0.04	0.18	1	0.04	0	0.51	0.08	0.45	2.4	9.28	0.07	1
8	1.27	1.28	1.25	1.27	1.27	0.43	0.41	0.62	0.64	0.52	1	0.58	0.56	1.25	1.24	0.25	2.61	6.73	0.46	-1
9	1.32	1.34	1.41	1.37	1.36	0.83	0.8	0.38	0.32	0.58	1	0.83	0.8	1.32	0.38	0.29	3.09	9.11	0.97	0

Table 2: Feature Extraction

6. Conclusion

The feature vector set comprising of features from radial, morphological, statistical and ratio profile domains possess enough resolution while classifying a character pattern to its respective class (94.8%). The accuracy of the receptiveness can be observed in comparison analysis. In case of complex shape pattern or pattern that are very unsymmetric about their com, the accuracy falls. This is attributed to noise present on boundary or symmetricity of the same. The boundary is not uniform due to shape profile of the character leaf image. For ore validation of the algorithm and feature vector, more character patterns were tested and recognition accuracy was to the satisfactory mark. Many researchers have used the features using Zernike moments and histogram of gradients and got the accuracy in the tune of 85-90%. Further, there is huge variety of character's diversity in nature and all cannot be covered up in the in single slot.

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THREE STAGE IMPLEMENTATION PROCEDURE OF ZED A RATING SYSTEM IN MSMES: A CASE STUDY

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ABSTRACT

MSME is the backbone of the associate degree economy in generating employment opportunities. The aim of this study is to explore the reimbursement accomplished by the MSME industry by implementing three stage procedure of the Zero Defect Zero Effect (ZED). In Industrial Policy of Punjab launched in November 2017, Incentives to Industries have been linked to ZED Certification & for availing benefits a unit has to get itself certified to ZED within 3 years of the start of Production, failing which further incentives for next 4 years are held back. The results revealed that the implementation of ZED helps in enhancing the ecological balances and certifies them as a responsible manufacturer. ZED mark stamped on the products, leverages the trust and profit for organizational business. The idea here is that with a philosophy of zero effect zero defects, organizations can increase their profits by eliminating the cost of failure and increasing revenues.

Keywords: *MSMEs, Three stage ZED Implementation, Systematic review*

1. Introduction

Indian industries were challenged to enhance their organizational performance to guarantee their endurance and development in the violently aggressive global market. Indian organizations are facing a stiff challenge from the competitive manufacturing industries in China and Taiwan due to cost-effectiveness, level of quality, and new technology adoption. International organizations were focused on their competitive strengths such as technology, lean manufacturing, cost management, and new products. In today's era of industrialization, industrial growth has started to affect the environment with severe downside problems and as a result, the impact on the environment needs to be analyzed with more intensity (Webnote 2017). There is a need to enhance understanding of the effectiveness of safety and health in order to improve the efficiency of any organization. Intending to make India a worldwide manufacturing hub, the Indian government gave an open call to manufacturers globally to start manufacturing in India. The new thing is followed by industries is Industry 4.0, a totally new way of manufacturing based on Artificial Intelligence and Total Automation. For up-gradation of Industry, many management systems have been designed and implemented by International Organization for Standardization "ISO". The most Common out of them are ISO 9001, ISO14001, IATF 16949 & OHSAS 18001.

Micro, Small & Medium Enterprises (MSME) Department, Govt. of India has developed a rating model called "Zero Defect Zero Effect" (ZED). MSME Department has given the responsibility of implementation of this ZED Rating Model to the Govt. Agency "Quality Council of India" (QCI) and has developed an Online System for the same. The objective of the ZED certification scheme is to enhance the productivity and competitiveness of MSMEs through the adoption of ZED production processes that have a low/no impact on the environment. There are a total of 50 parameters and evaluation of MSME is done on 30 parameters out of 50. Out of these 50 Parameters, 20 parameters are mandatory to be audited and the rest 10 can be selected by the MSME, from 30 optional parameters. These parameters have been derived from requirements of ISO 9001, (a Quality Management System), ISO 14001 (An Environment Management System), OHSAS 18001 (Health & Safety Management System), IATF 16949 (An Advanced Quality Management System for Auto Sector), some Energy Efficiency Improvement Systems and Intellectual Property Rights (IPR) requirements. By implementing these management systems the organizations gained some benefits viz. reduction in non-conformance (rejection & rework) and

customer complaints, reduction in the cost of manufacturing, increase in productivity level, better environmental condition and first time ok in new product design/ development.

It is with the changing nature of manufacturing organizations that this paper is primarily concerned. It begins by considering, in the next section, how a number of industry experts/authors have defined ZDM and ZED. In view of the profusion of a range of ZED rating systems, the next and the final section concludes with the stages of ZED.

2. Literature

To create proper awareness in MSMEs about ZED manufacturing and motivate them for assessment of their enterprise for ZED rating a systematic review has been conducted using multiple databases. Different case studies related to the implementation procedure of Zero Defect Zero Effect (ZED) have been studied. Published case reports from 2012 to 2022 have been included. Wang (2013) elaborates that the quality of a product is dependent on both facilities/equipment and manufacturing processes. Any error or disorder in facilities and processes can cause a catastrophic failure. To avoid such failures, a zero-defect manufacturing system is necessary in order to increase the reliability and safety of manufacturing systems and reach zero-defect quality of products. One of the major challenges for ZDM is the analysis of massive raw datasets. This type of analysis needs an automated and self-organized decision-making system. Jaff and Ivanov (2014) presented a conceptual framework of the causes of excessive lead-time and also describe the relationship between setup time, operation time, and non-operation time in order to find potential methodologies that can reduce lead-time in manufacturing process. It will also further identify simple strategies for reducing lead-time that can help towards achieving zero-defect manufacturing. The manufacturing Survey Questionnaire developed is one of the key tools for this purpose.

Eger et al. (2018) stated that current practices of ZDM are implemented on single-stage production only. The adoption of this type of strategy restricts the organization from adapting the changes arising from production operations towards production targets, thus reducing their competitiveness in the global market. The main goal is to develop ZDM strategies that reduce the generation of scrap parts and prevent defect propagation in multi-stage production systems. Parashar and Parashar (2015) give an insight into various models/ standards available for industries on which they can work to ensure that all products manufactured are defect-free & at the same time they don't make any negative impact on the environment, through any of their processes.

Thangaiah et al. (2015) has deliberated on a model Zero Defect Operational Material (ZDOM) which ensures that every operational process defined by the industrial Strategies is linked to a set of performance measures in the relevant value chain, which may eventually influence future results. The customer requirement & market complaints vary based upon the Industry's nature. The application of the Analytical Hierarchy Process (AHP) to beverages can be quite different than to a mechanical or an assembled product. Bose (2017) highlights the details of ratings and guidelines of the ZED rating model to support the "Make in India" model.ZED is a 360 coverage of an Enterprise from concept to customer satisfaction and it covers all the major interventions like ISO 9001 (QMS), ISO 14001 (EMS), Lean Manufacturing, 5S, Kaizen, Clean Development Mechanism, Supply Chain Management, Energy Conservation, Intellectual Property Rights, etc. Karunakaran et al. (2018) emphasized the use of Traditional Powerful tools and modern measures of quality Improvement to achieve Zero defects status in manufacturing which helps reduce the cost of manufacturing as there will be no rework or rejections. Sinha and Chowdhary (2020) proposed a framework to ensure zero defects in Indian port operations and a port-sustainability-index to address the issue of undesirable and right outputs simultaneously in an Indian port system. Data envelopment analysis has been used to check the performance of all private port terminals. To identify the dimensions and factors that affect ports' performance a systematic literature review and a real life case study of a major port in India and expert group discussion

was done to ascertain the views of stakeholders. Thus a framework including four KPIs, namely, port-sustainability-index (PSI), load factor (lx and ly), draft ratio (dr), and turnaround-time ratio (TATR) has been suggested by the authors to ensure zero-defects and sustainability in port operations. Psarommatis et al., (2021) provided a clear definition about Zero-Defect Manufacturing (ZDM) with a goal to present the ZDM approach to align everyone in one common understanding of ZDM. In this study numerous literatures have been presented to know the reason of migration of manufacturing organizations from traditional quality improvement methods to ZDM. The authors also stated that ZDM represents the natural evolutionary step for quality approaches in manufacturing, with the emergence of advanced data-driven technologies, below once more the definition of ZDM.

The literature survey highlights only few studies related to zero defect manufacturing (ZDM). Studies on the impact of environmental aspects during manufacturing were also reported very less. In Indian scenario, the studies on the implementation of ZED rating system introduced by MSME Deptt, Govt. by India has not been reported by the researchers. A very little exploration was there on the implementation of initiatives to achieve the target of ZDM along with its impact on environment. Despite so much importance and emphasis given by MSME Department, Quality Council of India (QCI) and the Department of Industries and Commerce, Govt. of Punjab; this research work focus on the implementation procedure of ZED.

3. Three stage Implementation procedure of ZED

Any MSME, if it wants to be certified under ZED rating model has to take following steps:

1. Self-Assessment (Online) – The MSME has to do Self-Assessment on total 30 Parameters (20 Mandatory and 10 optional). Based on assessment, numbers 0 to 5 have to be given on each parameter. If the self - assessment rating average of 30 parameters comes above 2.2 (on scale of 5), they can go for desktop Assessment.
2. Desktop Assessment (Online) – During Desktop Assessment again evaluation is to be done on 30 parameters (20 Mandatory & 10 optional) & documents related to each parameter have to be uploaded. Assessment will be done by QCI & if the rating comes out to be above 2.2 (on a scale of 5), MSME can go for Onsite Assessment.
3. Onsite Assessment– After desktop Assessment, a request is sent to QCI to carry Onsite Assessment Audit. Selection of Auditor(s) chosen for carrying out the Onsite Assessment audit is done through online & totally transparent selection method. The auditor(s) visits the site & conducts audit to evaluate the MSME on 30 Parameters (20 Mandatory & 10 Optional). As per audit findings,

a. If the overall rating is less than 2.20 (on Scale of 5) no rating is given to the MSME
b. If the overall rating is between 2.20 (on Scale of 5) to 2.50 then Bronze rating is given to MSME.
c. If the overall rating is between 2.50 (on Scale of 5) to 3 then Silver rating is given to MSME.
d. If the overall rating is between 3.0 (on Scale of 5) to 3.5 then Gold rating is given to MSME.
e. If the overall rating is between 3.5 (on Scale of 5) to 4 then Diamond rating is given to MSME.
f. If the overall rating is between 4 (on Scale of 5) to 5 then Platinum rating is given to MSME.

These ratings are valid for 3 years. After 3 years, revalidation has to be got done. Depending upon the category of MSME i.e. for Micro, Small & Medium Enterprises, subsidy on ZED Assessment cost is passed on to the MSME @ 80 %, 60 % & 50 % respectively. Large Industry cannot be assessed in ZED Rating Model.

3. Conclusion

ZED is to bring the number of defects occurring during production to zero. However, zero defects involve zero failures turnout during manufacturing operation, but not

necessarily zero imperfections, blemishes, or non-conformities. The model of zero defect manufacturing are practiced in organizations to improve product quality and reduce time and cost. In this study a systematic three stage implementation procedure of ZED has been studied using multiple databases. MSMEs also understood the importance of this ZED Rating Model and has given it a due weight age in the new Industrial Policy launched in year 2018. Many Incentives like subsidy in State GST and electricity duty waiver etc. have been offered for seven years to new or existing MSMEs doing more than 50% expansion in fixed capital investment. But these incentives are offered to MSMEs up to three years only, if they do not get themselves rated in any Category of ZED rating model within 3 Years of starting Production.

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DEVELOPMENT OF BEVACIZUMAB NANOPARTICLE LOADED IN-SITU GEL FOR ATTEUNATION OF DIABETIC RETINOPATHY

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ABSTRACT

Diabetic retinopathy is a circumstance which arises because of expanded blood glucose degree main to blindness if now no longer handled eventually. The goal of the prevailing examine is to layout preservative loose managed launch ocular drug shipping gadget for progressed drug availability on the goal web page with better affected person compliance. The Bevacizumab loaded In-situ gel had been organized. Optimized technique grow to be determined on based totally absolutely on the very last consequences of inclusive In-vitro characterization, scanning electron microscope, Fourier transform infrared spectroscopy (FTIR), X-ray diffraction spectroscopy, In-vitro launch, Isotonicity, Sterility, Biodegradibility. The relative efficacy of optimized technique grow to be investigated in rabbits in the direction of its marketed counterpart. The organized In-situ gels had been sterile, smooth and suggests prolonged drug launch behavior. Ocular and plasma kinetics suggests full-size better drug availability on the goal web page with minimal systemic distribution. Preclinical consequences installed that In-situ gel function a promising drug service for posterior eye segment.

***Keywords**: In-situ gel, Diabetic retinopathy, Pharmacokinetic, Characterization etc.*

Introduction

Diabetic Retinopathy is the primary reason of blindness or vision improvement among humans with diabetes[1]. DR is as a consequence of modifications in microvascular trouble of the retina occurring every in Type I and Type II diabetes mellitus[2]. The prevalence of DR has extended autonomic first-rate buddy with the developing prevalence of Diabetic worldwide. Further the prevalence of DR in non diabetic person make the situation getting worse. DR is not curable but early manipulate reduce the risk of vision loss. Continuous manage of blood sugar, diet, workout lower the chance of developing it. Laser treatment, medicine like steroids anti-VEGF are frequently employed withinside the treatment of DR[3]. However the laser treatment associated with certain limitations like slight vision loss, reduce vision subject and impair color vision. Further the effectiveness of laser treatment require massive optimization near loss intensity, expressive time application node and exposure time. Moreover luxurious surgical intervention require expert, proper information of path medical doctor and long term complications, limits their excessive pleasant outcomes. Topical application or direct injection of anti-angiogenesis and anti inflammatory pills with proper weight loss program manipulate is usually used to reduce the improvement of trouble associated with DR[4]. The invasive nature associated with intra vitral injection with anti-VEGF medication now now not fine required expert professions but moreover outcomes horrible affected individual compliance. On the opportunity hand topical application moreover suffers from horrible drug bioavailability at the purpose site. Moreover long term exposure of preservative reason toxicity to the ocular surface. Recently preservative loose, controlled drug delivery method for anti glaucoma and medication gaining popularity as glaucoma treat[5]. Accordingly US affected individual being application amount US9161938132 disclosure controlled released biocompatible implants of alpha 2 adrenergic agonist. Results indicated that the encapsulated drug release over a instead longer period, suitable for the delivery of anti-glaucoma medication. Similarly Frezzotti et al, 2001 examine the preservative unfastened timolol gel. Results showed a great bargain in intra ocular stress and lachrymal film decrease returned up time withinside the employer handled with gel as examine to conventional drug. Biodegradable polymer are entensively investigated for controlled drug delivery utility.PCL due to its biocompatibility, mechanical behavior and slow degradation is substantially investigated for ophthalmic drug

delivery utility, mainly for posterior section ocular disease[6]. Accordingly Prata et al, 2009 investigated the cappotential biodegradable ophthalmic implant for the delivery of dexamethasone. Results inferred PCL occurring to their slow degradation offer ideal platform for better utilization of drug for ophthalmic utility. Elecrospinning gaining recognition for their specific cappotential to deliver ultrafine In-situ gel film outperformed the conventional bulk In-situ gel. Further electrospinning allow clean intervention to tailored mechanical and structured houses to obtain preferred pharmaceutical and biopharmaceutical endpoints[7]. Looking to the aforementioned benefits. The motive of the contemporary have a have a take a observe is to investigate the restoration cappotential of preservative free In-situ gel of Bevacizumab. Further the restoration cappotential of the prepared device changed into accessed through numerous pharmacokinetic and toxicological analyses. In addition a relative efficacy of the product changed into accessed in competition to its marketed product.

Angiogenesis has prolonged been associated with aggressive tumor growth , fundamental to the idea that blocking this device may be a likely for the treatment of maximum cancers(8). The discovery of vascular endothelial growth factor (VEGF) as a superb regulator of endothelial mobileular growth and survival paved the way for translating the ones thoughts into clinical practice, and validation of this approach came in 2004 with the approval of the anti-VEGF monoclonal antibody (mAb) bevacizumab for the treatment of metastatic colorectal maximum cancers in mixture with sizeable chemotherapy[8]. Bevacizumab has now been accredited through manner of way of the Food and Drug Administration for use in mixture with chemotherapy/immunotherapy in colon, breast, lung, and renal mobileular cancers and as a single agent in glioblastoma[9]. Additional antiangiogenic sellers, collectively with sunitinib, sorafenib, and pazopanib, have moreover been accredited as single sellers in particular indications, similarly substantiating this approach to maximum cancers therapy.

Krishnan, P., et al. and Janga, Karthik Yadav, et al. explained the low solubility and permeability of insitu gel that's why there is need of preparation of nanoparticulate insitu-gel to increase and linearized the release of medication to target site.

Bevacizumab ($C_{6538}H_{10034}N_{1716}O_{2033}S_{44}$) is a monoclonal anti-vascular endothelial growth factor antibody used in combination with antineoplastic agents for the treatment of many types of cancer[10]. There is a great deal of evidence indicating that vascular endothelial growth factor (VEGF) is important for the survival and proliferation of cancer cells. VEGF plays an important role in angiogenesis, lymphangiogenesis, and tumor growth, which are all factors that contribute to its attractiveness as a therapeutic target for anti-cancer therapies. Cancer cells promote tumor angiogenesis by releasing VEGF, resulting in the creation of an immature and disorganized vascular network[11]. The hypoxic microenvironment promoted by cancer cells favors the survival of more aggressive tumor cells, and gives rise to a challenging environment for immune cells to respond appropriately. As a result, VEGF has become a well-known target for anti-cancer drugs like bevacizumab[12]. Bevacizumab is a mAb that exerts its effects by binding and inactivating serum VEGF. When bound to the mAb, VEGF is unable to interact with its cell surface receptors, and proangiogenic signalling is inhibited. This prevents formation of new blood vessels, decreases tumor vasculature, and reduces tumor blood supply. In 2004, bevacizumab gained FDA approval for specific types of cancer, and became the first antiangiogenic agent introduced to the market. Bevacizumab is generally indicated for use in combination with different chemotherapy regimens which are specific to the type, severity, and stage of cancer. The aim of the present study is improve the ocular absorption of bevacizumab and minimize the frequency of administration.

Materials and Methods

Bevacizumab was used, obtained from Sigma, India. Carbopol and Hydroxypropylmethyalcellulose have been issued from SD fine chemical substances limited,India. Acetonitrile taken from CDH chemical substances Pvt. Ltd.,India. Other

material and chemicals used withinside the take a look at are of analytical grade.

Preparation of bevacizumab loaded chitosan nanoparticles

The drug loaded chitosan nanoparticles formulated by using inotropic gelation method (Aktaş et al., 2005; Elnaggar et al., 2015; Fazil et al., 2012). Firstly the chitosan solution were prepared by dissolving accurately weighed required amount of chitosan in 1% (v/v) solution of glacial acetic acid followed by 16hrs of continuous stirring on magnetic stirring having 250-350 rpm at room temperature[13]. After stirring sonicate it for 20 min then filter the solution with the help of filter paper[14]. The next step is to prepare STPP (sodium tripolyphosphate) solution by weighing it accurately and dissolve it in double distilled water followed by the sonication of 5 min and then filter it[15]. Now the drug conc is dissolved in the 1% glacial acetic acid solution then this solution is poured into chitosan solution. After this the STPP solution is added to chitosan solution dropwise with the help of syringe followed by continuous stirring under the magnetic stirrer for 1 hour. Then, pH of the solution become adjusted to 4.5 with the help of 2M NaOH solution and that become prepared with the useful resource of the usage of dissolving 8g of NaOH in double distilled water and fill it upto 1000 ml[16]. Then allow it to stir for 30 min followed with the useful resource of the usage of centrifugation at 23940g followed with the useful resource of the usage of 4 °C temperature for 45 mins. Then the drug pay load is determined with the useful resource of the usage of casting off the supernatant.

Preparation of bevacizumab/nanoparticles loaded In-situ gel

In order to prepare Bevacizumab/CSNP containing polymer dispersion, Bevacizumab (25 mg/ml)/NPs same to (Bevacizumab 25mg/ml) had been added into pre-form polymer dispersion at a cognizance of (1-5%) w/w, Bevacizumab to the complete polymer amount respectively[17]. The Bevacizumab/CSNP containing dispersions had been stirred in a day at ambient conditions to get easy homogenized dispersions.

Formulation code	Drug concentration (%w/v)	Speed (rpm)
BCVZ-1	1	5000
BCVZ-2	1.5	9000
BCVZ-3	2	12000
BCVZ-4	5	15000
BCVZ-5	5.5	15000

Table1

Various concentration of drug was experimented to active high drug loading efficiency, 5%
w/v of drug was found to develop (table1) a saturated system in the selected solvent system.

Characterization of chitosan nanoparticles loaded in-situ gel

Size and Zetapotential

The average particle size of nanoparticles measured. Particle size distribution and zeta potential of chitosan nanoparticles were measured through Zetasizer Nano S (Malvern, UK). The analysis was carried out at a scattering angle of 90° at a temperature of 25°C using nanoparticles dispersed in deionized distilled water (2 mg of sample was dissolved in 5 ml of deionized water and then sonication is done in sonics vibra cell sonicator). Particle size distribution of the nanoparticles is reported as a polydispersity index (PDI).

Process yield

It was calculated by weighing the dried nanoparticles (Y1) and the totality of initially dried bulk of initial ingredients (Y2) [18]
Process yield = Y1 / Y2 * 100

Optical microscopy

The optical microscopy of the In-situ gels were completed to ensure the outer form of the In-situ gels and to determine the ground morphology of the prepared In-situ gels. A thin layer of In-situ gel became positioned on a glass slide and one drop of immersion oil became introduced to the specimen using spreader. The pictures of In-situ gel became positioned beneathneath motic microscope ready with an eyepiece having 40X to 100X resolution[19].

Entrapment efficiency

Entrapment overall performance (ee) was determined thru manner of method of

measuring the attention offree drug (unentrapped). The entrapment overall performance of prepared drug loaded In-situ gel was calculated using formula (eqn-1). A nonoIn-situ gel of seemed area (1×1cm) was removed and dissolved in ethanol observed in a check tube.The tubes was subjected to ultrasonication for 5 minutes to facilitate drug dispersion.The tubes were then spun at 10000 rpm for 10mins(14). The amount of free drug present was determined thru manner of method of using U.V. Spectrophotometer[20].

Drug entrapment (%) =

$$\frac{\text{total drug} - \text{entrapped drug}}{\text{total drug}} \times 100 \text{ -----(eqn-1)}$$

Sterility test

The sterility check of In-situ gel become executed via way of means of evaluating turbidity of the check inoculation with check of Mc farland requirements. The subculture media become organized via way of means of usng nutrient broth and it become autoclaved to sterilize the subculture media[21]. The In-situ gel had been transferred into the subculture media and incubated for 48hrs. After the stibulate term the samples had been taken and analyzed below uv spectroscopy.Solution such as 1% $Bacl_2$ and 1 %H_2SO_4 become used to provide a chain of Mc farland requirements with appreciate to their composition and equivalence.

Isotonicity

Isotonicity of the developed device modified into decided for swelling,bursting and shredding of RBC, the RBC were taken and diluted with the hayem's solution, which modified into observd beneathneath the motic microscope and the a few different part of test RBC modified into incubated with device[22]. After incubation the diameter of purple blood cells modified into measured. The endorse diameter of RBC modified into determined through manner of method of manual picture assessment of approximately hundred to 500 RBC. Change in diameter of RBC modified into in assessment with manage corporation to interpret toxicity.

Biodegredibility of In-situ gel

Biodegredibility of prepared In-situ gel modified into completed using gravimetric method[23]. In-situ gel of $2cm^2$ area were suspended in a simulated lacrimal fluid. After predefined time period, sample of electrospun In-situ gelwas dried in vaccum at room temperature, and the burden of In-situ gels modified into determined[24] . Percent degradation modified into determined using following formula.

$$\text{Biodegredibility} = \frac{\text{IW-FW}}{\text{IW}} \times 100$$

IW- Initial weight

FW- Final weight[25]

In-vitro release

The in-vitro release take a look at modified into performed the use of franz diffusion cell to evaluate the drug release profile of the optimized formulations[26].The pre-handled cellophane membrane modified into used and installation on the franz diffusion cells[27].The receptor compartment contained PBS (100 ml) of pH-7.4[28]. The temperature of diffusion media modified into thermostatically controlled at 37±0.5ºc with the useful resource of the use of surrounding water withinside the outer jacket and the medium modified into stirred with the useful resource of the use of magnetic stirrer at 100 rpm. About 1 cm^2 place of In-situ gel membrane modified into lessen and carried out onthe cellulose nitrate membrane, which modified into steady in amongst donor and receptor compartment. The donor compartment modified into then capped to prevent evaporation[29]. Samples of 1ml were taken after 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,14, 15, and 16 hours and modified with the useful resource of the use of an equal volumes of smooth PBS to maintain the sink conditions. After suitable dillutions with PBS, samples were analyzed with the useful resource of the use of uv spectrophotometer at 237 nm in the direction of the smooth and atomic absorption spectrophotometer for In-situ gel. The release experiments of each sample were performed in triplicate and not unusualplace fee are reported.

XRD (x-ray diffraction)

X-ray crystallography(dop S2, thru malvern panalytical) is a manner used for identifying the atomic and molecular form of a crystal, in which the crystalline atoms reason a beam of incident Xs-rays to diffract into many particular directions[30]. By measuring the angles and intensities of these diffracted beams, a crystallographer can produce a three-dimensional image of the density of electrons withinside the crystal[31]. From this electron density, the suggest positions of the atoms withinside the crystal can be determined, similarly to their chemical bonds, their crystallographic disorder, and various special information.

Statistical analysis

Each check in in vitro studies modified into carried out in triplicate, and the statistics had been analyzed with the useful resource of the usage of one-way assessment of variance usingthe Graph Pad Prism software (Version 3.0, Graph Pad Prism Inc., La Jolla, CA). p Values a lot much less than 0.05 had been considered statistically significant.

Ex-vivo permeability test

Drug permeability was determined using Franz diffusion cell. Freshly prepared tissue was fixed between donor and the receptor compartments, so that its epithelium surface oriented toward donor compartment. Permeability study was performed in simulated lachrymal fluid at pH7.4 and at temp. 37ºC. After a predefined period samples were withdrawn from receptor compartment. Fresh buffer is replaced to maintain the in-situ conditions. The amount of drug was determined by U.V. Spectrophotometer[32]

Zetasizer

The average particle size of nanoparticles measured. Particle size distribution and zeta potential of chitosan nanoparticles were measured through Zetasizer Nano S (Malvern, UK). The analysis was carried out at a scattering angle of 90° at a temperature of 25°C using nanoparticles dispersed in deionized distilled water (2 mg of sample was dissolved in 5 ml of deionized water and then sonication is done in sonics vibra cell sonicator). Particle size distribution of the nanoparticles is reported as a polydispersity index (PDI).

Scanning Electron Microscopy (SEM):

The size and the morphology of dried chitosan nanoparticles were examined in Quanta 400 ESEM/EDAX (FEI). Vacuum dried small amount of prepared chitosan nanoparticles samples were kept on an SEM stub using double-sided adhesive tape at 50 mA for 6 min through a sputter. Afterwards, the stub containing the sample was placed in the scanning electron microscopy (SEM) Chamber. The photomicrograph was taken at an acceleration voltage of 20 KV.

Results and Discussion

Size and Zeta potential

The effective zeta potential of synthesised NPs was determined to be + 15.3 mV, showing that they are cationic.The size of chitosan nanoparticles was deetrminded by using zetasizer and it was 212± 29 nm. The zeta potential for CSNPs was 50.3 mV i.e. formed nanoparticles was fairly stable. Zeta sizer also measures zeta potential. Zeta potential is the surface charge which greatly influences particle stability in suspension through the electronic repulsion between particles. It can also determine nanoparticle interaction in vivo condition with the cell membrane of bacteria, which is usually negatively charged. The result showed the zeta potential of CSNPs was 50.3 mV. The higher zeta potential indicates that CSNPs was fairly stable.

In-vitro drug release

The fee of drug diffusion from the gadget via the artificial dialysis membrane modified into measured and compared to drug solution in drug release tests. After 24 hours, 90.80 0.76 percent of the general medicine modified into diffused from the NPs in an in-vitro diffusion investigation. The NPs had a brief initial release withinside the primary 60 minutes (39.68 0.87 percent), observed thru manner of method of gradual and continual diffusion, whilst the drug solution had an initial release of 80.27 1.2 percent in 60 minutes. The initial fast release might be due to drug release from the NPs surface, but the continual diffusion seen at

subsequent time elements might be due to drug release from the nanoparticle middle matrix due to hydration and exclusive elements[33].

In-vitro evaluation of drug loaded in-situ gel

The in-vitro launch research had been performed for natural drug and the formulations. The research had been performed with the aid of using the usage of changed USP XXIII Dissolution equipment pH 7.four simulated synthetic tear fluid as a medium, for a length of 6 hours at rpm 50 and 370 C ± 20 C[34]. Samples had been withdrawn on time span of 30 min.

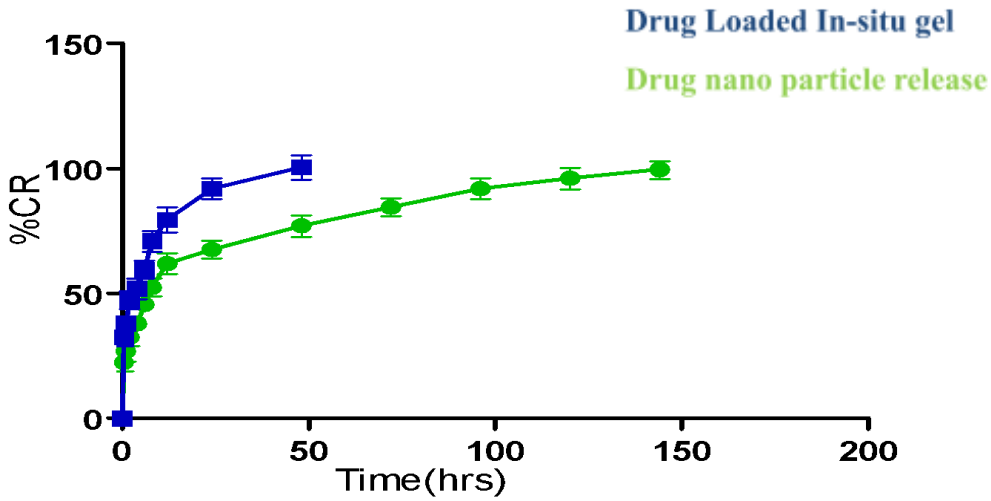


Fig.1

Optical microscopy

Microscopic snap shots had been taken from optical microscope, performed a essential function withinside the optimization process. The essential issues encountered in In-situ gel fabrications had been droplet formation, abnormal In-situ gel formation, thick In-situ gel, Low In-situ gel density, beaded In-situ gels, etc[35].

Entrapment Efficiency

The drug entrapment overall performance as calculated thru UV-assessment modified into located to be almost 95.5%. of drug loaded insitu gel and 98% of Nanoparticle loaded drug insitu gel. The amount of drug entrapped withinside the In-situ gels modified into located to be almost same to the amount of drug that modified into introduced at some stage in the machine of loading. But the small decrease in entrapment overall performance is probably due to the shortage of some nano-In-situ gels on the edges of apparatus.

X-ray Diffraction

X-ray diffraction is a very crucial experimental method that has been used to cope with all issues related to crystal form of solids. X-Ray Diffraction suggests the peak at 2θ (22°), complies with the equal antique literature[36]. The diffractogram suggests no extrade in physical country of drug in In-situ gel. Further XRD diffractogram affirm the presence of Bevacizumab withinside the prepared In-situ gel. Results of XRD look at indicated a characstristic crystallogram at 2Θ (22º) this is concordant to our observation.

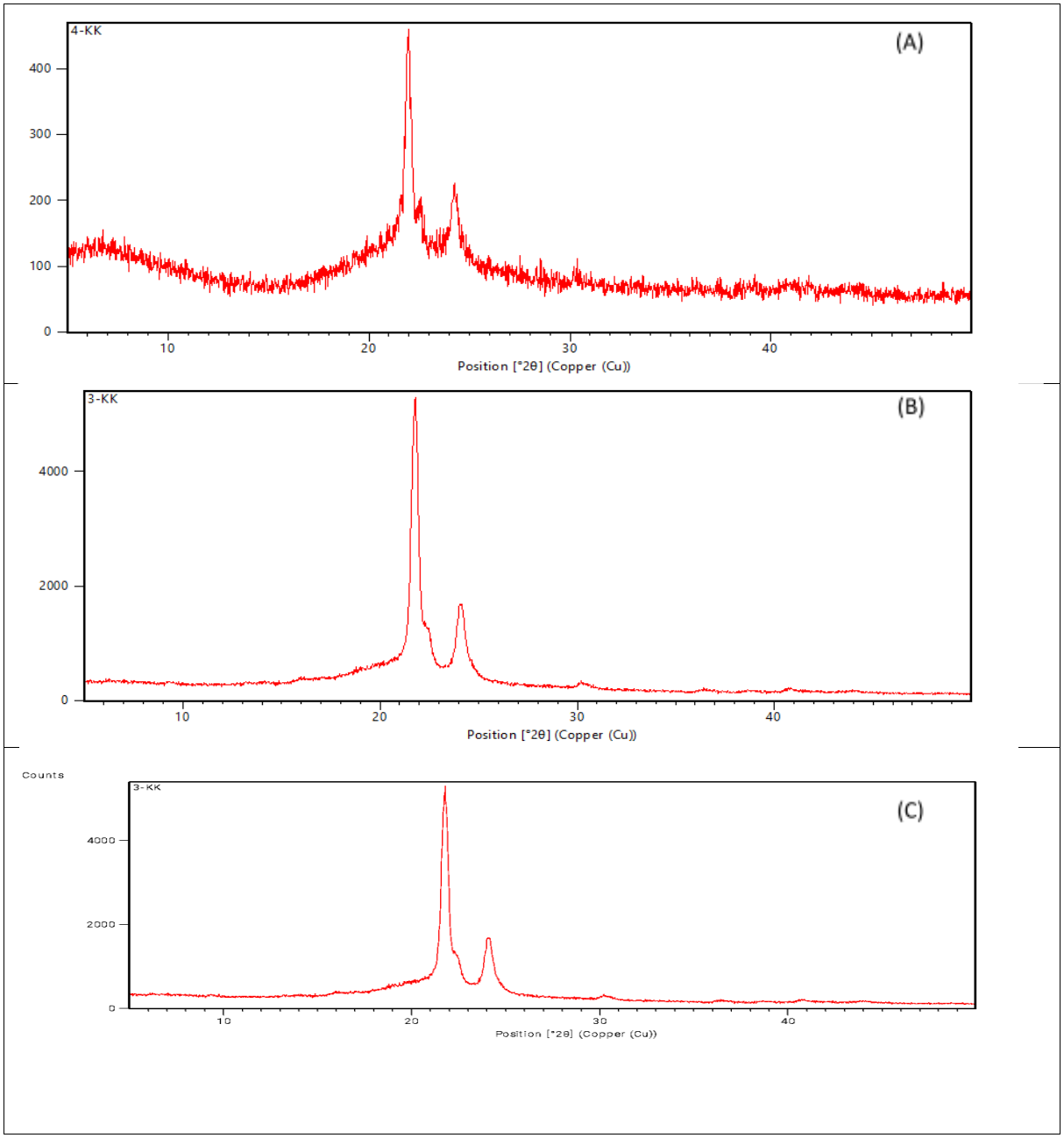


Fig.2

X-Ray Diffraction (A)-Drug, (B)- Drug loaded insitu gel**, (C)-** Nanoparticle loaded drug insitu gel.

Infrared Spectrum

The IR of drug loaded In-situ gel is exhibited withinside the decide below. The IR spectra were obtained and studied for any kind of interaction amongst their realistic groups. All the most peaks of drug were found to intact and no tendencies changes decided in primary peaks of the drug indicated no interaction amongst drug and determined on polymers.Fig(C) suggests FTIR spectra of Nanoparticle loaded drug insitu gel. Bevacizumab exhibited O-C-O stretch at 1187-1298 cm-1, 1600-1660 cm-1represent to C=C bonds, at 1598-1674cm-1corresponds to C=O stretching,C=H bending at 2995-2950cm-1.The FTIR spectra of Drug loaded insitu gel reveals characterstic top at 2950-2970cm-1corresponds to assymetric CH2 strecthing, at 1730cm-1representing thr carbonyl stretching and 1185cm-1corresponds to assymetric C-O-C stretching[37]. All the Characteristic peaks indicated that presence of drug in herbal and active withinside the prepared In-situ gel.

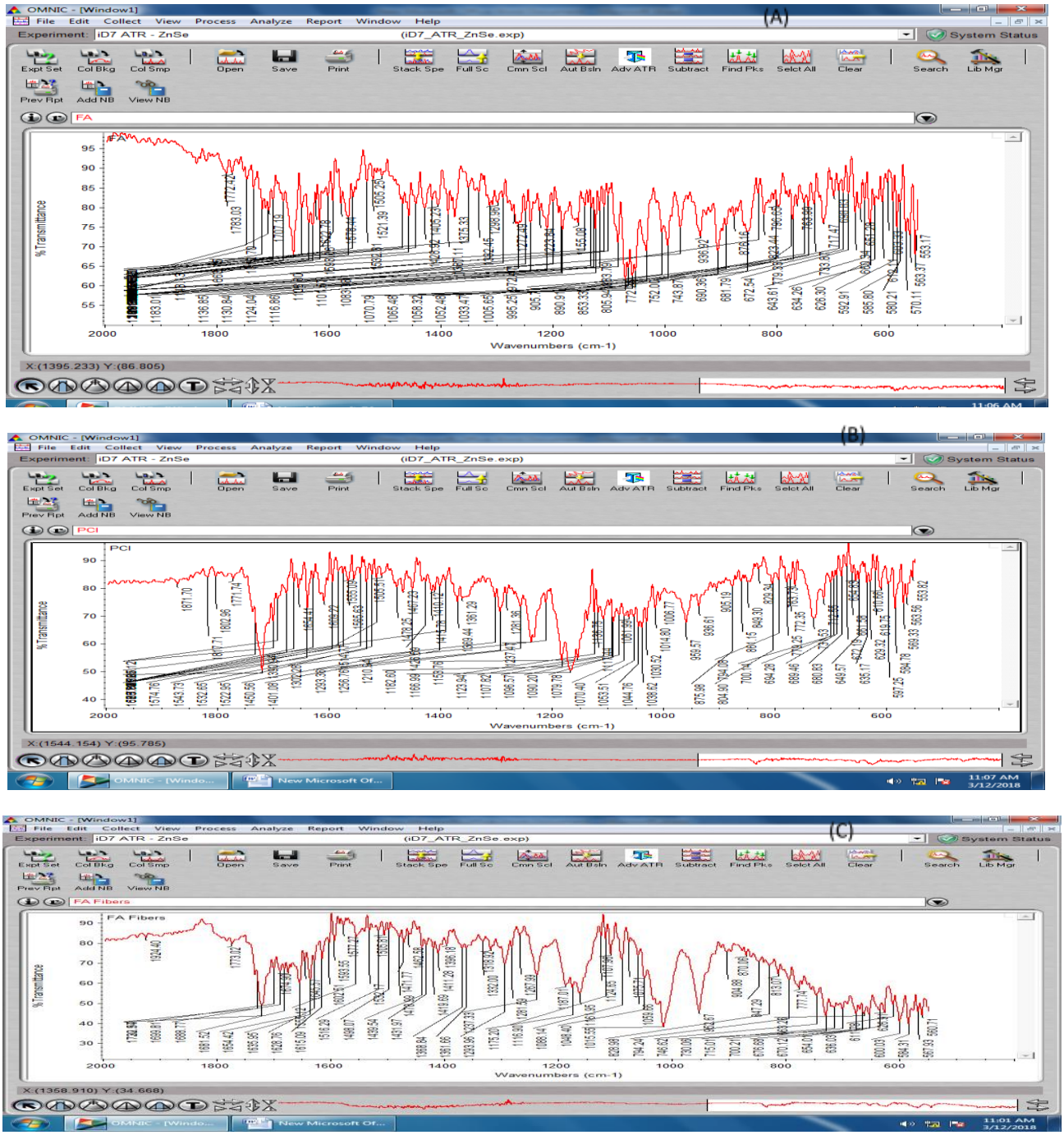


Fig.3

IR Spectra (A)- drug, (B)- Drug loaded insitu gel **, (C)-** Nanoparticle loaded drug insitu gel

Sterility testing

The sterility check of In-situ gel became carried out via way of means of evaluating the turbidity of the check formula with that of Mc farland trendy. It became observed that the absorbance(620nm) of each the same old and the check samples became observed to be withinside the nearly equal variety, which suggests that there has been no microbial increase in Nanoparticle loaded drug insitu gel. The discovered absorbance of trendy and the check samples are in variety from 0.78-0.seventy nine which suggests that there may be no signal of microbial infection in drug loaded In-situ gel. Formulation of In-situ gel beneathneath non-stop UV mild and managed environmental situations produce sterile product. Further the excessive floor to volumne ratio guarantees excessive UV exposure, this may be important indication to supply sterile

check of In-situ gel,appropriate for ophthalmic application.

Zetasizer analysis

The size of CSNPs (selected concentration) was 216 nm. The zeta potential for CSNPs was 50.3 i.e. formed nanoparticles was fairly stable. Zeta sizer also measures zeta potential. Zeta potential is the surface charge which greatly influences particle stability in suspension through the electronic repulsion between particles. It can also determine nanoparticle interaction in vivo condition with the cell membrane of bacteria, which is usually negatively charged. The result showed the zeta potential of CSNPs was 50.3 mV. The higher zeta potential indicates that CSNPs was fairly stable.

SEM Analysis

The morphology of CSNPs was observed and the results are shown in below Fig. CSNPs revealed a very homogenous morphology and they are spherical in shape.

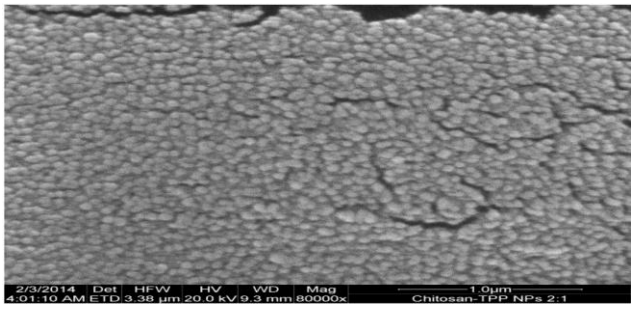
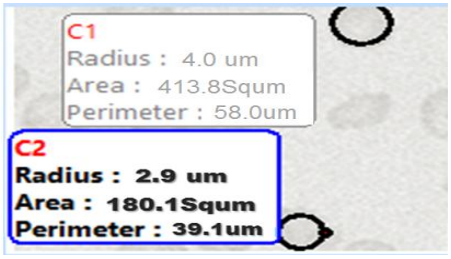


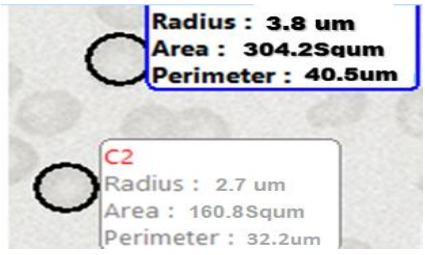
Fig.4

Isotonicity

Isotonicity of the Nanoparticle loaded drug insitu gel and Drug loaded insitu gel changed into examinedusing RBC dilution method, 500 RBC had been counted and their imply had been stated. Results indicated that there's no extrade in imply diameter changed into located withinside the dealt with group (Nanoparticle loaded drug insitu gel) evaluate to untreated group, showed the isotonicity of the advanced formulation. High molecular weight of hydrophobic polymer and insoluble nature of drug rendering fewer ionized debris to persuade tonicity . Tonicity outcomes additionally verify that the advanced product keep away from pain and irritation,for this reason make a contribution an beneficial platform for ophthalmic drug delivery[34].The imply price of 500 RBC had been tested and stated in under Figure.



Standard (RBC with Hayems sol.)



Test (RBC, Hayems sol. , formulation)

Fig.5

Pharmacokinetics Study

Plasma kinetic look at became achieved to decide the systemic absorption and toxicity profile of the organized formula. Results validated a better drug availability from the organized formula evaluate to the obvious drug and the advertised formula, attributed to prolonged drug launch conduct and better retention of the drug provider on the absorption site. However the Cmax, that's a important indication of drug toxicity is located to be 1.2µg/ml evaluate to standard drug i.e. 1.5µg/ml. However the t½ and AUC of organized formula is considerable better than the advertised and the obvious formula, attributed to managed drug launch conduct of the formula.

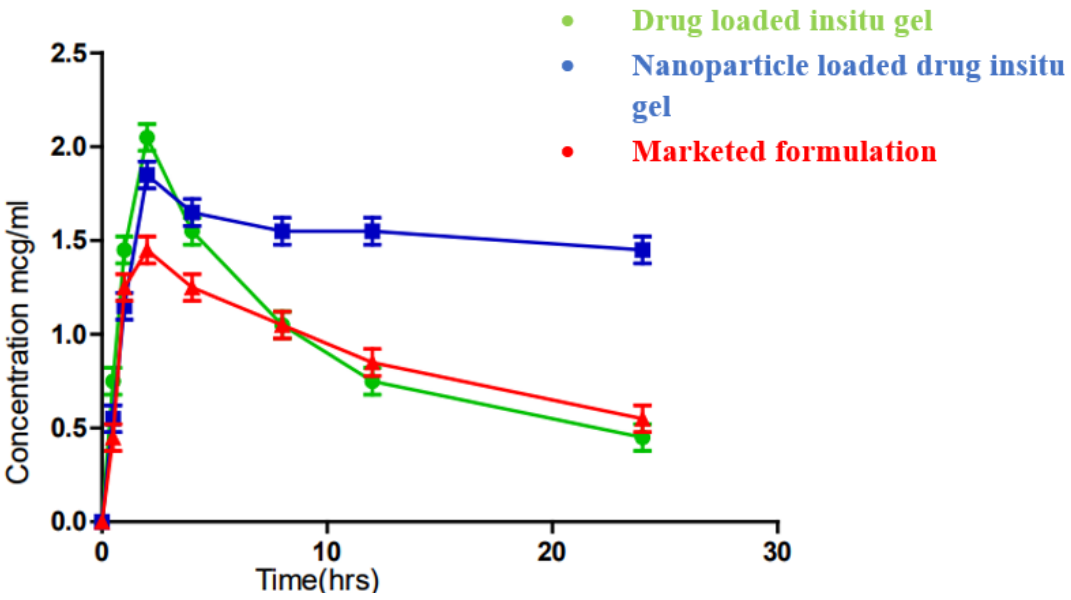


Fig.6

Parameters	Drug loaded insitu gel	Nanoparticle loaded drug insitu gel	Marketed formulation
C_{max}(µg/ml)	1.5	1.21	1.23
T_{max} (hrs.)	1.00	3.00	1.5
$T_{1/2}$ (hrs.)	6.65	27	18
AUC_{total}(µg/µl/h)	0.1748	0.63	0.18
MRT (hrs.)	6.2	12.1	8

Abbreviations: AUC= Area under the curve, $\mathbf{C_{max}}$ = Maximum concentration of drug, $\mathbf{T_{max}}$= peak time when drug achieves C_{max}, **MRT**= Mean residence time.

Table2

Pharmacokinetics of lacrimal fluid

Optical kinetics changed into done to decide the healing capability of the service system. Further the kinetic parameters of the method are as compared with undeniable drug and the advertised method to decide the relative performance of the organized method.

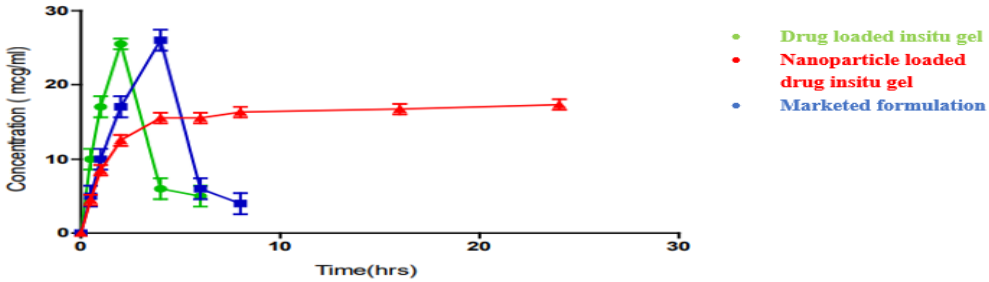


Fig.7

Parameters	Drug loaded insitu gel	Nanoparticle loaded drug insitu gel	Marketed formulation
C_{max}(µg/ml)	13.6	10.2	10.2
T_{max} (hrs.)	0.5	2.56	0.81
$T_{1/2}$ (hrs.)	4.6	8.96	2.31
AUC_{total}(µg/µl/h)	0.91	0.12	0.89

Table3

Ex-vivo permeability test

Results of permeability study indicated a significantly higher drug permeation in In-situ gel group compared to the plain drug suspension. Higher drug permeation in In-situ gel attributed high surface drug.

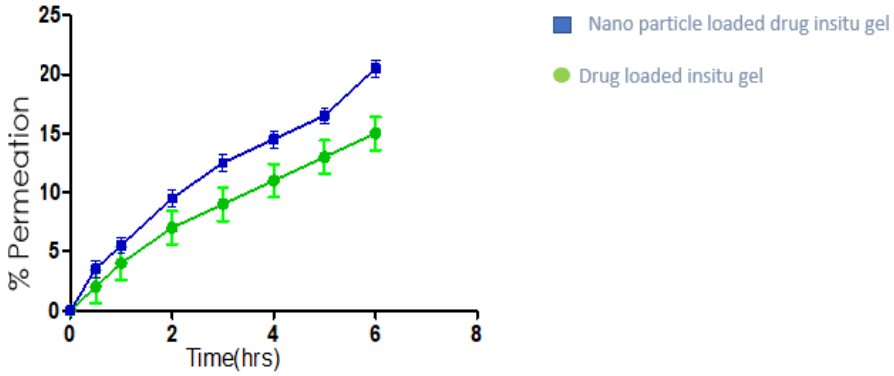


Fig. 8

Conclusion

Nanoparticle In-situ gel may be taken into consideration as a Controlled drug launch pattern, excessive retention and gradual degradation are vital attributes to gain the recuperation goal. Both plasma and ocular kinetics help the recuperation software program application of the Bevacizumab. Single software program application preserve the recuperation window for the longer duration which guarantees that the consolation and the compliance of affected individual maximum crucial to higher recuperation techniques in persistent ocular infection management.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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WHAT ROLE DOES SOCIAL MEDIA PLAY IN SMART WATCH CONSUMERS' BUYING BEHAVIOUR?

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ABSTRACT

The purpose of this study is to evaluate how social media influences the purchasing decisions of consumers. The primary objective of this research is to determine the impact that social media has on the purchasing decisions made by consumers. Because of the proliferation of social media, consumers now have several options to adapt to various facets of life. Facebook, Twitter, and Instagram have all played important parts in increasing the number of consumers who make purchases online. The purpose of this study is to determine which types of customers in Ludhiana are most influenced by the online purchase of mobile devices through social media, as well as which types of social media are most frequently utilised by consumers there. In this study, primary research methodologies and a questionnaire were used to evaluate the influence of social media websites on the shifting behaviours of users who intend to shop online. The purpose of this study is to shed light on the how, when, and why of social media's influence on the consumer decision-making process. The research that has been done in the past on social media marketing, as well as consumer decision-making processes and social media, provides the foundation for the theoretical framework. This particular research endeavour will be conducted using the quantitative research method. A questionnaire was prepared and distributed to various people in order to collect the empirical data, and 314 responses were observed. The study demonstrates how individuals are attending, analysing, and selecting knowledge before making a purchase via social media. The data suggests that individuals take an active role in the hunt for information while using social media in comparison to when using mass media. Nevertheless, during the process of knowledge search, information exposure is selective and subjective. The findings indicate that the use of social media platforms has an effect on customer satisfaction during the stages of data search and alternative appraisal, with pleasure increasing as a result. The customer works through the steps of the method to make a final decision about what to buy and then does an evaluation after making the purchase.

Keywords: *Smartwatch, social media, Consumer, Buying behaviour, Marketing, Online opportunities, Decision, Perception*

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Introduction

Social Media

The influence of social media on customer behaviour and the purchase of smartwatches is the topic of this paper. The term "social media" refers to any kind of online communication that focuses on the participation, interaction, and sharing of content within communities. The user of social media is not only a spectator but also acts as a dynamic participant because he contributes input, feedback, and opinions on the open platform, which is why social media marketing characteristics have brought about a significant change in marketing tools. The use of social media makes it easier to locate one-of-a-kind sales and deals pertaining to smartwatches. To learn more about something using social networking. New smartwatches, as well as stores that specialise in selling smartwatches. According to a statistic that was published recently, there were 4.62 billion people using social media all over the world in January of 2022. As an increasing number of people sign up for various forms of social networking, The most important function of social media is that it has altered the method in which businesses engage with their customers. In addition to this, social media platforms can play a significant influence in influencing the decision-making process of consumers on their purchases of smartwatches.

The use of social media has an effect on the level of satisfaction a consumer feels throughout the stages of data search. Customers can also influence the opinions of other customers by using social media. buyers through evaluations of previously owned wristwatches. The purpose of this study is to investigate the effect that social media has on children. regarding the purchasing patterns of smartwatches by consumers. This study focused on the three most important parameters in a social media impact on consumer buying behaviour of watch purchases, which are reviews from a variety of purchasers, price, and availability. presentation of the firm or brand on social networks and the challenges associated with searching for information on

watches on social networks A quantitative survey It was common practise to organise activities in retrospect to investigate various aspects of the decision-making process' phases. The study had a total of 314 participants, and the replies from those participants were used to assess the participants' decision-making process.

Consumer Buying Behaviour

The selection, acquisition, and consumption of products and services by consumers for the purpose of gratifying their desires is referred to as consumer buying behaviour. The consumer's behaviour is the result of multiple processes working together. The individual in what he is and the customer in his decision-making process, shopping habits, purchasing behaviour, the brands he buys or the retailers he goes all have their origins in a variety of circumstances, particularities, and traits. A choice to purchase something is the culmination of each and every one of these considerations. First, the consumer considers what kinds of goods he would like to consume, and then he chooses only those kinds of goods that will provide him with a higher level of utility.

After deciding what goods to purchase, the customer will then calculate an estimate of the amount of money he has available to spend. The final step in the process is for the consumer to conduct an assessment of the market prices of various goods and determine which of those commodities he will buy. In the meanwhile, there are a variety of other elements that influence the purchases that consumers make, including social, cultural, economic, personal, and psychological aspects. The behaviour of consumers, also known as buyer behaviour, can be impacted by a number of different causes or forces.

Factors Influencing Consumer Buying Behaviour

The consumer behaviour or buyer behaviour is influenced by several factors or forces. They are:

1. Internal or Psychological factors
2. Social factors
3. Cultural factors
4. Economic factors
5. Personal factors

Review of literature

McKinsey Company (2010): In his study, social media has a significant impact on consumers, particularly those who are making their first purchases of a particular product. It is a more substantial influence on high priced products since customers want to perform further research and to urge opinions before making a purchase decision for the product. This indicates that customers are influenced by social media platforms during the stage of shopping for a product in which they are searching for info. As a direct consequence of this, clients will turn to social media in order to make inquiries about the product and the services.

Kumar et.al. (2017): A study conducted under the title "Consumer Perception and Purchase Intention towards Smart watch" investigated the fact that because smart watches may be synchronised with smartphones, users are able to access their email and messages from social networking sites through the device. The internet, more so than other media, was largely responsible for raising awareness regarding smart watches. According to the findings of this study, consumers are of the opinion that smart watches may be used to perform both personal and professional responsibilities in a manner that is highly convenient. Consumers are of the opinion that the prices of smart watches are acceptable when considering all of their capabilities. According to the findings of this research, it is possible to draw the conclusion that customers will likely buy smart watches in the future to conduct a variety of jobs. There are a great number of additional considerations, such as the perceived behavioural control and the convenience of usage, etc. have been ignored for the purposes of this study. The perceptions of consumers who are already knowledgeable are investigated in this study; nevertheless, there is a possibility that those who are informed about smart watches will be more willing to buy one in the future. Consumers view smart watches as a "want" item, and they are likely to own smart watches for the purpose of receiving notification alerts. Because smart watches may be synchronised with smartphones, users can check their email, as well as messages from social networking sites, directly from their

wrist. The internet, more so than other media, was largely responsible for raising awareness regarding smart watches. According to the findings of this study, consumers are of the opinion that smart watches may be used to perform both personal and professional responsibilities in a manner that is highly convenient. Consumers are of the opinion that the cost of smart watches is acceptable given the variety of functions that they offer. According to the findings of this research, it is possible to draw the conclusion that customers will likely buy smart watches in the future to conduct a variety of jobs.

Melo(2017) : Paper titled "The Future of Smart watches – A case on the current status and expected category evolution on the Portuguese market", a study on the current status and expected category evolution on the Portuguese Market . smart watches owners reviewed positive and happy attitude towards smart watches while some of them isn't fully aware about the category particular but while looking in the price perception, there is some disparity of opinions.

Visuri et.al.(2017): Research paper titled "Quantifying Sources and Types of Smart watches Usage Sessions," the study analysis shows that current smart watches are used more frequently than smartphones, and that smart watches are used in ways that have not been observed in the analysis of smartphone usage. The title of the research paper is "Quantifying Sources and Types of Smart watches Usage Sessions." Research paper titled "Quantifying Sources and Types of Smart watches Usage These findings are based on comparing datasets that were collected on smartphones and smart watches simultaneously. As a result, one could argue that stand-alone smart watches could capitalise on these several distinguishing features. In addition, our research shows that user behaviour on both types of devices is comparable in terms of how they interact with notifications and the content of applications. According to the study's interpretation, this suggests that users' top priorities remain the same when it comes to the type of information, even when the way of engagement has shifted to accommodate the specific qualities of the smart watch.

Gurusamy et.al.(2018): the title of this research paper is "A Study On Consumers' Behavior Towards Wrist Watches In Paavai Educational Institutions At Namakkal," and it was written by Namakkal Paavai. This study found that fast track watches are more popular than its competitors among the general public. In addition, a number of people who participated in the survey stated that they have been using Fastrack watches for longer than a year and that they are pleased with the products that the company produces. The shortcoming of this study is that it only discusses one brand, namely Fast Track, rather than mentioning any of the other well-known brands. The research focused on Fast Track because it was the subject of the researcher's primary interest.

Afrouz and Wah (2019): Under research continued their research in Germany and found that despite all of the positive aspects of smart watches that have been outlined in the course of thesis, it is crucial to mention that the use of wearable technologies – and smart watches in particular – also involves some social and ethical issues. The thesis was titled "Watch out for Wearable-Factors that influence the purchase intention of smart watches in Germany." In this sense, concerns over invasions of privacy are one of the primary areas of worry. People's personal health data, locations, and shopping histories can be gleaned from the data collected by smart watches, among other types of sensitive information about their day-to-day activities.

Huynh et.al.(2020): Research paper with the heading "Life cycle assessment summary of Samsung galaxy watch," under this to make the decisions that are the most environmentally conscientious. Instead of instantly discarding the merchandise, the customer should make an effort to fix it or find another use for it. Throwing it away because the amount of primary materials, energy, and water used in the manufacturing process takes up a significant amount of space. Although the manufacturing process is responsible for at least half of the emissions produced by a device over its lifetime in most cases, the user of the device has the ability to reduce the total impact by selecting options that are more energy-efficient throughout the lifetime of the item. In addition, by using recycled materials.

When an electronic product reaches the end of its useful life, there is a possibility of offsetting 15 percent of the total CO2 emissions associated with its production and use. Despite this, climate change has always represented a significant threat to the planet. Now that the EU has declared that a climate emergency directive has been issued, it is an extremely important time for all conceivable technology improvements to be made in order to combat climate change. In order for consumers to make decisions that are environmentally responsible, they must first have an understanding of the products they buy and then be prepared to compensate for the CO2 emissions caused by those buys.

Objectives

1. A Study on the impact of social media on consumer buying behaviour of smartwatches in Ludhiana.
2. To identify the factors, influence the consumers to purchase smartwatches through social media.

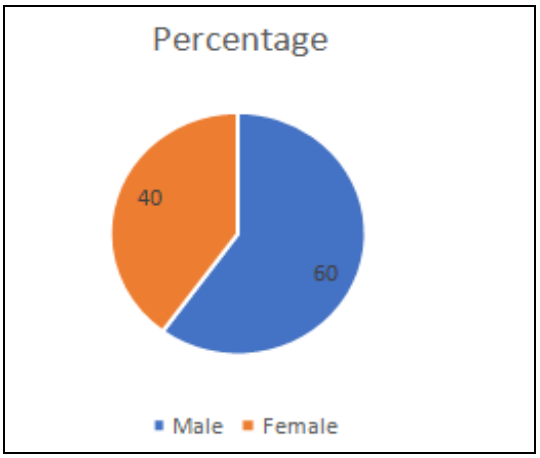
Research Methodology

For research to be carried out effectively, both planning and implementation are required. Although there are many causes and variables that contribute to the successful completion of a research project, selecting the most appropriate research methodology is one of the most challenging and perplexing decisions. It is essential to choose a research methodology to underlie your work and procedures you utilise in order to collect data. This is because the kinds of approaches you follow will be determined by the findings of your research. When conducting research, selecting an appropriate methodology is critical to ensuring that you are able to compile all of the necessary information and successfully complete the objectives of the study.

Because the purpose of this research is to determine the influence of social media, the primary data for this paper was gathered by means of an online questionnaire that was distributed via various forms of social media. From Ludhiana and the cities in the surrounding area, a total of 314 replies were gathered.

Empirical Findings

1. From the data collected from the questionnaire out of 314 respondents 188 were male and 125 were females which was almost 60-40 percent. As shown in the pie chart 1.



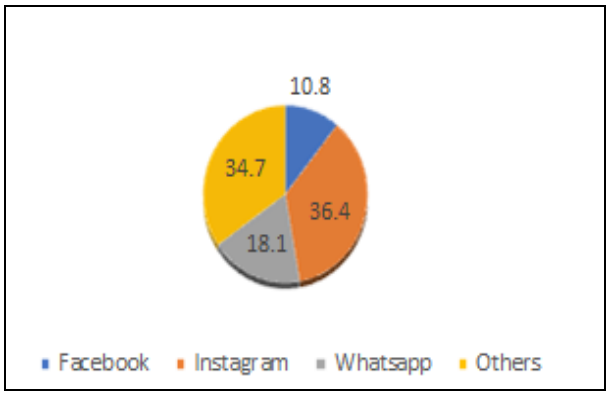
(Pie chart 1)

2. From the data collected from the questionnaire, out of 314 respondents, around 94.5% of respondents are between the ages of 18-30, while others are above 30 and below 18, which shows that most social media users are between the ages of 18-30, which was influenced by the social media for the purchase.
3. Out of the total percentage around 65 % of respondents have completed their graduation.
4. From the data collected from the questionnaire, out of 314 respondents, 144 i.e., 36.4% of respondents are liked to buy smartwatches on Instagram while the others have been as shown in the table 1 and pie chart 2.

Classification of Social Media Site is Likely to buy Smartwatches

S.NO	Particulars	No. of Respondents	Percentage
1	Facebook	34	10.8 %
2	Instagram	114	36.4%
3	WhatsApp	57	18.1%
4	Others	109	34.7%
TOTAL		314	100%

(Table1)

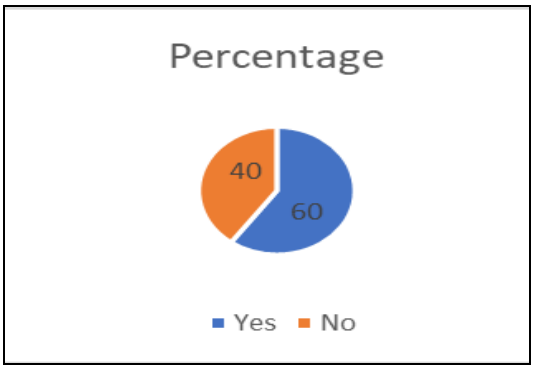


(Pie chart 2)

5. The results showed that around 188 respondents out of 314 respondents were triggered by social media for the Purchase of smartwatches. As shown in the table 2 and pie chart 3.

S.No	Particulars	No.of Respondents	Percentage
1	Yes	188	60%
2	No	126	40%
Total		314	100%

(Table 2)



(Pie chart 3)

6. The results showed that around 204 respondents out of 314 respondents around 65% of respondents said that social media influence smartwatches buying decisions. As shown in the table 3.

S.No	Particulars	No. of Respondents	Percentage
1	Yes	204	65%
2	No	110	35%
Total		314	100%

(Table 3)

7. From the below table 4 , on classification of Social Media Sites that Influence Smartwatches on the Day to Day life it is inferred that 40% of respondents said that social media sites influenced only when they needed time for smartwatches purchase.

S.NO	Particulars	No. of Respondents	Percentage
1	Daily	40	12.7%
2	1-2 times a week	57	18.2%
3	3-4 times a week	35	10.9%
4	Once a month	57	18.2%
5	Only when need	125	40%
TOTAL		314	100%

(Table 4)

8. From the below table 5, 58 % of respondents agreed that the social network channels are a more valuable marketing channel than the traditional ones as they have direct impact on the minds of the consumers for the products as compared to the traditional once.

S.NO	Particulars	No. of Respondents	Percentage
1	Strongly disagree	25	8%
2	Disagree	37	12%
3	Neither agree nor disagree	6	2%
4	Agree	182	58 %
5	Strongly agree	64	20%
TOTAL		314	100%

(Table 5)

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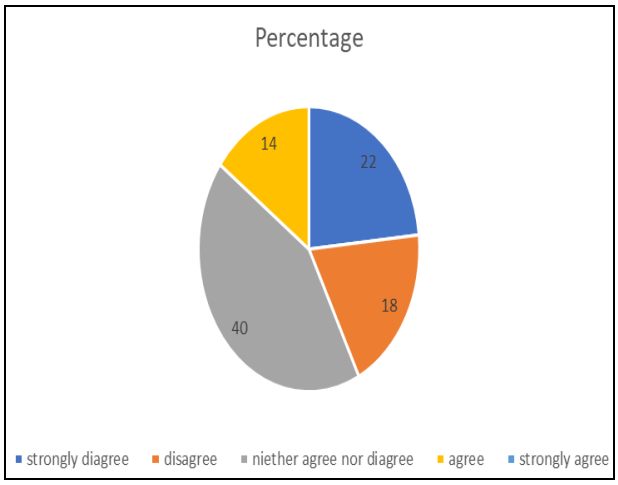
8. From the table below 6 , it is inferred that 40 % of Respondents' decision is neutral for social media advertisements influence to try new smartwatches brand while 14% agree that the social media influence them to buy new brands as showed in the pie chart 4.

S.NO	Particulars	No. of Respondents	Percentage
1	Strongly disagree	67	22%
2	Disagree	56	18%
3	Neither agree nor disagree	125	40%
4	Agree	42	14%
5	Strongly agree	24	8%
TOTAL		314	100%

(Table 6)



(Pie chart 4)

Conclusion

In this study, several Social Websites that perform the function of Networking, such as Facebook, WhatsApp, Twitter, and many others, have been taken into consideration. According to the findings of the study, consumers attend, process, and select knowledge from social media platforms before making a purchase. According to the findings, individuals strive to play an active part in information search on social media in relation to traditional forms of media. Nevertheless, information exposure throughout the process of knowledge search is selective and subjective. The findings indicate that social the consumption of media has an effect on the level of customer satisfaction. The processes of searching for data and evaluating different options, with one's level of contentment increasing. The end user or buyer goes in the direction of the goal according to the technique buy decision making as well as appraisal following the purchase The findings obtained from carrying out this research imply that believe businesses should concentrate their efforts on being present on social networks, indexed by search engines, and accessible through provide ongoing input through the web platform. In conclusion, the findings businesses specialising in shows should focus on strengthening their perception on the internet through active participation of customers because it's one of the most common ways that consumers can interact with a company. These days, consumers choose whether or not to shop for a product.

Scope of Future Research and Limitations

The limitation of this research was that it only targeted the Ludhiana city and nearby people due to the constraint of time and money. The areas of other regions of Punjab wouldn't be covered, so this research only related to the nearby Ludhiana region. The study is only about marketing through social media, and the only way people could respond was online.
Additional questions and additional aspects that contribute to the sales of smart watches, such as design, price, colour, and material utilised, etc., would be covered in a subsequent study that would focus on the other part of the province of Punjab.

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A STUDY ON BRAND PREFERENCES OF CONSUMERS FOR SELECTED BRANDS OF HAIR CARE PRODUCTS IN URBAN AREAS OF PUNJAB

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ABSTRACT

Consumers are learning more about different cultures, lifestyles, and brands nowadays. Through many advertisement mediums, including television and various social networks, they are made aware of this issue. They are an individual who, in essence, has their own desires, tastes, lifestyles, and perceptions; hence, they purchase various goods and services in accordance with their particular needs. Brand awareness is the level of consumer knowledge with the existence and accessibility of the product. The degree to which a consumer links a brand with a product they want to buy is known as brand awareness. FMCGs are those products that can be consumed within short period of time.

Keywords: *Consumers, Brand Preferences, FMCG.*

Introduction

Markets all across the world are undergoing unprecedented changes as a result of liberalization and globalisation. Because of the impact of the media and communication explosion, customers are continuously exposed to innovative ways of life, as well as an unrivalled diversity of products and services. At the same time, thanks to consumers' steadily improving economic standing, there has been a significant shift in their attitudes and desires. As a result, emerging brands that are multifunctional and category specialized are frequently flooding markets around the world. In an overloaded economy, Fast Moving Consumer Goods (FMCGs), among other types of consumer goods, are fighting for shelf space. Today's markets are characterized by fierce competition. Every company aspires to capture a significant portion of the market. This is accomplished through forging a distinct brand identity in the marketplace. Businesses can be made or broken by their brands. The brand name conveys reliability and integrity. This paper investigates consumers' expectations from their favorite brand of selected FMCG goods in terms of aspects such as level of satisfaction, brand recognition, praise from friends, value for money, social acceptability, and the factors they consider when choosing their favorite brand, such as brand name, brand popularity, brand image, availability of the brand, current trend, and so on, to determine the most preferred brands of selected FMCG goods. Hair Care Products (Shampoo and Hair Oil) are taken for my study.

Objective of the Study

To Study the Brand Preferences of Consumers for selected FMCG products(Shampoo and Hair Oil).

Review of Literature

Vernekar, SS(2011): The Paper titled, "An empirical study of Consumers' Attitudes and Perception regarding Eco-Friendly FMCG's products with special reference to Delhi and NCR region" has found that the majority of buyers consider the package to be the most essential aspect of green products, and urban Indian shoppers have a high level of awareness of green products. They are also willing to pay a premium for green products.

Jha, M.(2013): The Paper titled, "Brand Awareness and Consumer Preference with reference to FMCG's sector in rural Bihar" has investigated brand awareness and customer preferences in Bihar's rural communities, as well as consumer preferences in the fast-moving consumer goods sector. According to the findings, the rural FMCG market has been steadily growing over time and is now larger than the urban market.

Rani,P.(2014): The Paper titled, " Factors Influencing Consumer Behaviour" has investigated the elements that influence customer behaviour. Many elements and qualities influence the individual in what he is and the customer in his decision-making process, shopping habits, buying behaviour, the

brands he buys, and the businesses he visits. Cultural, social, personal, and psychological aspects all impact consumer purchasing behaviour. The study of customer purchasing behaviour is a key to market success.

Somireddy(2018): The Paper titled, "Impact Of Advertisements on Consumers towards Fmcg Products: A Study In Hyderabad City" has investigated the impact of media on Personal demographic characteristics and on Consumer Buying Behaviour regarding FMCG products. Primary as well as Secondary data has been used. Primary Data has been collected from 174 respodents through Structured Questionnaire. It has been found that media vehicles, advertisements and advertisement appeals have a beneficial impact on customer purchases of specific fast moving consumer goods products.

Shamshuddin et al.(2020): The Paper titled, "Buying Behaviour and Preferences of Consumers with Reference to Fmcg Goods in North Coastal Andhra Pradesh" has studied buying behaviour of consumers in FMCG sector. Consumers have become more aware of diverse brands in the FMCG sector, according to data collected from three districts in Andhra Pradesh. The main source of media via which consumers learn about FMCG products is television advertising. Consumers' purchasing decisions are heavily influenced by price. In order to make marketing decisions, marketers must first understand consumer behaviour.

Research Methodology

Data Collection

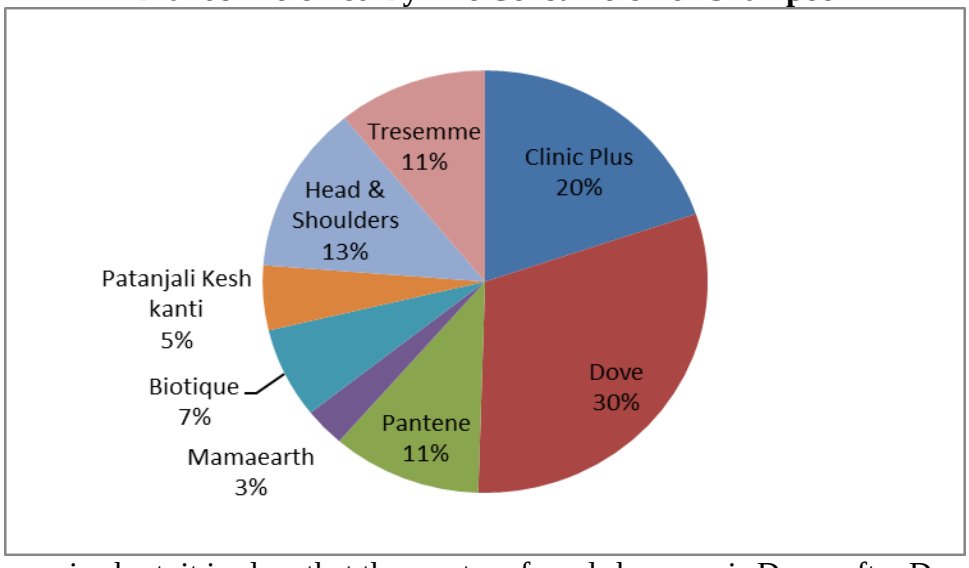
Primary Data were collected from 65 respondents from 4 districts of Punjab i.e. Ludhiana, Amritsar, Jalandhar and Patiala using a structured questionnaire. Secondary data were used for Literature review.

Data Analysis

Table No. 1

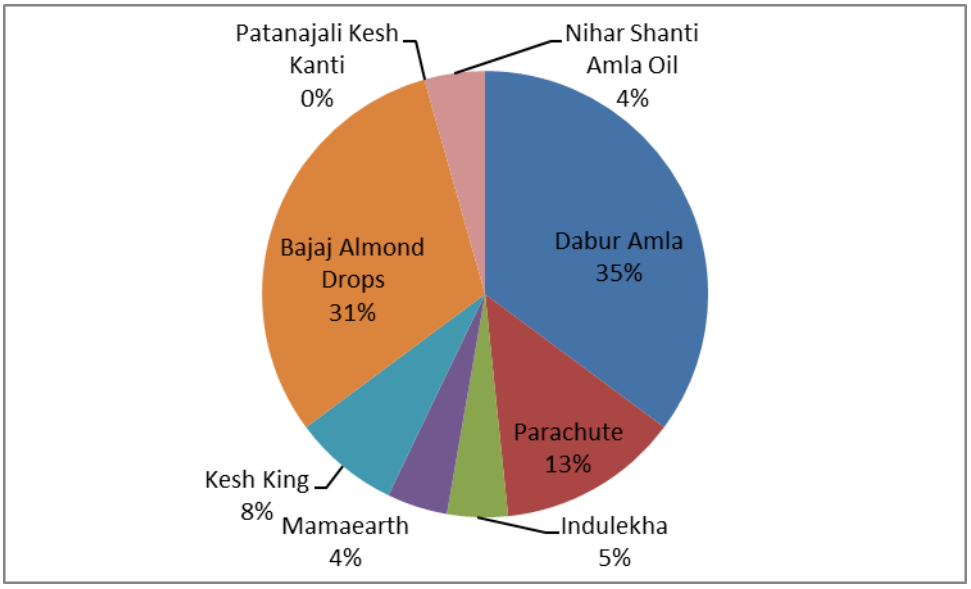
Demographic Variable	Number of Respondents	Percentage
GENDER		
Male	24	36.9%
Female	41	63.1%
AGE		
Below 20 years	10	15.3
20-30	25	38.5
30-40	13	20
40-50	15	23
Above 50 years	2	3.2
Location		
Jalandhar	10	15.4
Ludhiana	27	41.5
Patiala	12	18.5
Amritsar	16	24.6
Educational Qualification		
Upto 10+2	32	49.2
Graduate	11	16.9
Post Graduate	22	33.9

Brands Preferred By The Consumers For Shampoo



From the above pie chart, it is clear that the most preferred shampoo is Dove, after Dove the second most preferred shampoo is Clinic Plus and the least preferred shampoo is Mamaearth.

Brands Preferred By The Consumers For Hair Oil



From the above pie chart, it is clear that the most preferred Hair Oil is Dabur Amla, the second most preferred is Bajaj Almond Drops and no one prefer Patanjali Kesh Kanti oil.

Findings of The Study

- It has been found that 30% of the respondents prefer Dove and only 3% prefer Mamaearth Shampoo.
- It has been seen in Hair Oil category that 35% of the respondents prefer Dabur Amla and no one prefer Patanjali Kesh Kanti.
- It has been concluded that out of various Shampoos Dove is the most preferred brand and out of various Hair Oils Dabur Amla is the most preferred brand.

Limitations Of The Study

1. Only 65 respondents are taken for the study due to the shortage of time.
2. Due to time constraints factors affecting brand preferences are not taken into consideration.

Conclusion

A consumer's preference for a certain brand is based on the benefits that brand can provide. As a result of these consumer preferences, the brand can fetch a higher price and more loyalty. Marketing variables such as Advertisement, brand name, and brand image play an important role in creating customers' preferences for a particular brand, therefore a marketer must understand how the consumer makes his purchasing decision regarding a particular brand. The data gathered in this study will help organisations that are already in the industry or are seeking to enter strategize appropriately.

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GOLD AS AN INVESTMENT OPTION COMPARED TO OTHER INVESTMET OPTIONS

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ABSTRACT

In today's world, money plays an important role in everyone's lives—everyone saves money for future requirements. People who are saving put their money into a variety of assets in order to satisfy their future demands. Individual savings are put into assets based on risk and profit expectations, security money, and liquidity. One of the best alternative investment options is gold investing. According to numerous research, the majority of gold in Indian households is in the form of jewellery. Jewellery, coins, bullions, ETFs, mutual funds, and e-gold are just some of the ways to invest in gold. In the current market climate, which is highly volatile and frequently changing, the various techniques of investing in gold cause uncertainty among investors. . The study's objectives are to better understand the various investment options available to investors, the factors and know-how involved in gold investing, the benefits and drawbacks of various forms of investment, and to assist investors in becoming more aware of the various gold investment options. The study gathered both primary and secondary data. A website, a research article, and a magazine questionnaire serve as the primary data, while supplementary data is gathered from other sources. According to research, many investors prefer to invest in ETFs, Futures, and options to make their investments more profitable and comfortable. Investors are encouraged to own gold through gold mutual funds.

Introduction

"Gold is a basis of wealth and savings in India, and it is a crucial aspect of Indian society. A further growth in gold jewellery and investment demand is expected as consumers adjust their pricing expectations upwards, and this trend is expected to continue. Long-term, as local investors acquire gold for the purpose of accumulating wealth, the market will continue to exist."Jeni Branson (2014, Jeni Branson, Jeni Branson, Jennifer Branson, Jennifer Branson, Gold has emotional worth as well as cultural and financial significance, all of which contribute to its continued demand across generations. Now, However, it is obvious that a growing number of Indians are realising that gold deserves a role in their lives beyond the gold mines. Not only in their kitchen cabinets or bank lockers, but also in their investment portfolio. Until recently, gold reserves served as the foundation for all financial transactions financial systems around the world Gold

Research Objectives

The research is based upon the following objectives

To study about the diversified options available to investor while investing in gold.

Literature Analysis

According to Andy Soos (2011), nearly half of all new gold produced is used in jewellery, 40% in investments, and 10% in industrial. The major factors driving an investment

M. Ashok (2015), are:principle safety, liquidity, income stability, and appreciation are all important factors to consider.Investors cannot avoid risk, but they may reduce it by investing in secure investments.a profit of some sort Bank deposits are the most popular investment option in Coimbatore, followed by gold and silver investments.

Timothy Worstall (2016) Unfortunately, gold isn't the most lucrative investment, it doesn't pay off on a regular basis, and it's a negative asset.a stumbling block for the economy as a whole, despite the fact that it is actual Indian culture, for the most part, has a very extensive history. Because life in the villages hasn't altered all that much, customary behaviour is based on extremely old historical precedents. Physical gold is a very liquid market that appeals to a large number of people. A small bit of gold can be pawned or sold if necessary. Gold, whether in the form of gold jewellery or in the form of gold coins, is an excellent way to save money.

Alan Greenspan(2017), the former Chairman of the Federal Reserve, recently expressed his grave anxiety about the economy's prospects gold's long-term value and quoted in the

developed world "Inflationary pressures will eventually raise the price of goods.
gold's price Gold is a good insurance investment right now." Celia Dallas is the Chief Investment Strategist for a worldwide asset management organization.

Methodology of Study

Primary data were collected from 58 respondents from 6 districts of Haryana Primary data was gathered through questionnaire that was well-designed. Secondary data were used from literature review.

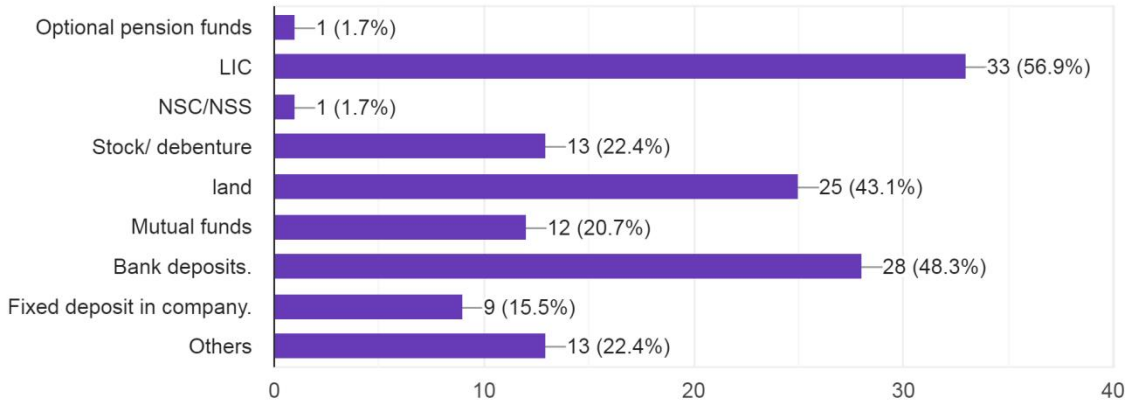
Data Analysis and Interpretation

To study influencing the choice of investment in gold in comparison to other investment options.: Investing money in gold is worth because it is a hedge against in action. Over a period of time, the return on gold investment is in line with the rate of in action. It is also worth investing in gold for a one more very valid reason. That is gold is negatively correlated to equity investments, the equity markets started performing poorly whereas the gold has performed well.

TABLE 1

VARIABLES	NO. OF RESPONDENTS	PERCENTAGE
GENDER		
MALE	40	60%
FEMALE	18	39%
AGE		
18-20	5	13.8%
20-30	36	48.3%
30-40	12	27.6%
40-50	3	8.6%
50-60	2	0%
LOCATION		
AMBALA	27	44.8%
Hisar	0	0%
Karnal	10	19%
Sonipat	12	12.1%
Fridabad	1	1%
Gurugram	8	10%
EDUCATIONAL QUALIFICATION		
12^{th}	22	34.5%
Graduate	22	34.5%
Post graduate	12	25.9%
Doctorate	2	5.1%

Investment Options Prefefferd By People Comparison To Gold Investment



Findings Of The Study

- it has been found that 56.9% respondents used LIC and only 1% respondents preferred optional pension funds and NSC/NSS and few of them 15%use fixed deposits in company.

Limitations Of The Study

1. Only 58 respondents were selected for sampling.
2. Due to time constraints, the researchers were unable to completely compare how other factors of respondents influence in gold investment.

Conclusion

The research enhances the understanding of investor's attitude and awareness regarding gold investment decisions and other investment options. Investors go through the information search and market analysis before backing the investment decision. Research exhibit that gold is already known and marked by the people for its return and all the respondents mostly have investment in gold or plan to obtain more gold.

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ASSESSMENT OF VITAL CAPACITYAMONG TRAINED AND UNTRAINED ADOLESCENT BOYS LIVINGAT DIFFERENT ALTITUDES

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ABSTRACT

The purpose of the study was to assess the vital capacity among trained and untrained adolescent boys living at different altitudes of Kashmir region.To achieve the purpose of the study three hundred sixty adolescent boys living at different altitudes of Kashmir region India were randomly selected as subjects .These were divided into two groups trained and untrained, one hundred eighty (180) adolescent boys were selected from trained group and one hundred eighty (180) were selected from untrained group with an age of the subjects were ranged from 13 – 18 years were selected as subjects .The data collected from high, moderate ,and low altitude adolescent boys for both trained and untrained groups on selected variable vital capacity was measured by using spirometer and were statically analysed by using 2x3 factorial ANOVA (Group x Altitude) whenever the obtained F ratio value for interaction was found to be significant the simple effect test was applied as follow test in all cases the level of the significance was fixed at 0.05 for the test which was considered as an appropriate. The result of the study show that the trained adolescent boys brought significant increase ofvital capacity onhighaltitude and moderatealtitude have significantly showed increased in vital capacity as compared to the trained adolescent boys of low altitude.The result also reveals that the increase in vital capacity is significantly more for highaltitude as compared to moderatealtitude adolescent boys.And also untrained adolescent boys brought significant increase on vital capacity of highaltitude and moderatealtitude adolescent boys have significantly showed increased vital capacity as compared to lowaltitude untrained adolescent boys.Whereas for vital capacity there was no significant difference between low and moderatealtitude as compared to highaltitude adolescent boys.

***Keywords**: vital capacity, trained and untrained, adolescent boys. high altitude, low altitude, moderate altitude*

Physiology

Physiology is the study of physical functions and phenomenon of living beings. It analyses the efficiency of living beings, how it adapts to changing conditions, and how it creates new generations. Physiology is a science that examines the roles of living organisms how the different parts of the body naturally functions and how their behaviours are controlled, organized, and incorporated to maintain the well-being of the body as a whole. **Singh (2001**)The term physiology was derived from the Greek word physiologikos, meaning discourse on natural knowledge, physiology dealing with the normal function of the body. Exercise physiology is a scientific study of physiological changes in the body of athletes with a long-term and short-term exercise effect. Various environmental changes such as mindset, atmosphere, temperature, humidity, national status etc. Have a near correlation with the optimal performance of an athlete. **Shamal Kaloy (2007**) In order to be fit for the physiological system of the body, they must perform well enough to support the scientific operation of the person. In addition, various tasks create different demands on the body, which are unique to the circulatory and neurological processes of the activity. Physiology is characterized in dictionaries as the "science of the normal function and the phenomenon of living things."

Historically, the subsequent sense 'physiology' is well demonstrated by the manner in which the term is used in the following two quotations. The first one is from 1704. (J. Harris, Lexicon Technician) 'Physiology' is also a part of physics by others (i.e., Medicine), 'It teaches the constitution of the body in such a way that it sounds, in its nature state; and seeks to find the reason for its functions and operations, by means of anatomy and natural philosophy. The second one (a definition of Charles Darwin's colleague T.H Huxley) 150 years later, it is practically similar to current

use 'whereas that part of the biological science that deals with shape and structure is called morphology, that which concerns itself with function is physiology. **Bangsbo (2000)**

High levels of performance in sports and games would rely on physiological make up and have been recognized that physiological competence was required for high level of performance. In order to suit the particular physiological system of the body, they must be adequate to help the specific game that the player is playing. Since various games impose different demands on the body with regard to neurological, respiratory and temperature control functions, physiological fitness is unique to activity. Physiological processes are highly adaptable for exercise. **Gianetti et al., (2008**)

Altitude

It is the vertical distance of an object above some datum plane, such as sea level or a reference point on the surface of earth. Based on arterial oxygen content and its physiological effects on performance decrements, altitude exposure is classified as low altitude, moderate altitude, high altitude, very high altitude and extreme altitude. Altitude or height sometimes known as depth is defined based on the context in which it is used (aviation, geometry, geographical survey, sport, atmospheric pressure, and many more). As a general definition, altitudeis a distance measurement, usually in the vertical or "up" direction, between a reference datum and a point or object. The reference datum also often varies according to the context. Although the term altitudeis commonly used to mean the height above sea level of a location, in geography the term elevation is often preferred for this usage. The connection of decreased ambient oxygen to altitude illness and performance decrements provides a categorization of altitude coverage based upon arterial oxygen contented and its physiological effects. From the sea level to 1525 meters is considered as low altitude. Moderate altitude starts from 1525 meters to 2440 meters, where arterial haemoglobin infiltration is normally above (92%) any effects of altitude are soft and temporary. High altitude starts from 2441 meters to 4270 meters, **Plowman and Smith, (2013).**

Adolescence

The word adolescence is derived from adolesce mean to grow to maturity. This is a period of maturity the individual has develop physically intellectually emotionally and socially to a full man. Further development is only nominal. His IQ has practically reached its height his physical Charteris tics have been developed emotionally he has become what he has to be for the whole life. It's very crucial period of once life the growth achieved the experience gained responsibility felt and relationship developed at this stage destine the complete future of an individual **Kanwar, (2007).** Adolescence covers the age group 11-20 and distinction is made between early adolescence (11-14) middle adolescence (15-17) and late adolescence (18-20) the world health organisation defines adolescence as the period from 10 -19 years age **Ayeras et al., (2007**).Adolescence end with the achievement of complete physical maturity or adulthood i.e. at about 17/18 years in case of girls and at about 18/19 years in case of boys **Srivastava, (2006)**

Vital capacity

Vital capacity is the overall air capacity that can be inhaled or exhaled from the lungs. This is one of the measurements taken by the spirometer or pulmonary function test. Vital capacity is calculated by the use of spirometer. **Ronald et al., (2005).** Spirometry being the most commonly performed lung function test, is considered as first choice in diagnosis of lung pathology. Spirometry is a technique used to measure amount and flow of air inhaled and exhaled. It measures amount of air that can be moved in and out of one's lungs. Vital capacity is the maximum amount of air that a person can remove from the lungs after a deepest inhalation. It is equivalent to any inspirational reserve volume, tidal volume and expiratory reserve volume. Individual vital capacity can be measured by a wet or normal spirometer. **Macintyre& Neil. R. (2012**) Most measured entity of lung function is vital capacity. Change in volume of lungs after taking maximal inhalation followed by maximal exhalation is called vital capacity of lungs. It is the sum of tidal volume, inspiratory reserve volume and expiratory reserve volume. Vital capacity of

normal adult's ranges between 3 to 5 litres. A human's vital capacity depends on the age, sex, height, weight and ethnicity. Lung volume and lung function is related to air volume associated with various phases of the respiratory cycle. The lung volume is determined directly, while the lung capacity is inferred from the volumes. **Muhammad et al., (2006).** The average of an adult human male is around 6 litres of air, although only a small amount of this capacity is used for normal breathing. Tidal breathing is natural resting breathing, the volume of tidal breathing is the volume of air that is inhaled or exhaled in a single breath. The average of human respiratory rate is 30-60 breaths per minute at birth which falls to 12-20 breaths per minute in adults. Vital capacity is a concept that refers to the full volume of the human breathing in the lungs. It depends on several factors, such as how fit some of them and other factors which influence are smoking, obesity, height, weight, sex, body size and posture**. Marieb & Hoehn, (2010)** It is generally accepted that the ratio of forced expiratory volume is 1 s (FEV1) to forced vital capacity (FVC), the established index for diagnosing airway obstruction, decreases from childhood to old age **Quanjer et al., (2010)**. This potentially affects the total lung capacity (TLC) as well as the FVC, whereas the development of flows, and hence FEV1, is determined by airway calibre and the elastic properties of lungs and airways. Thus, airway properties, thoracic growth, changes in the mechanical properties of the chest age and muscular strength interact from birth to early adulthood. During the adolescent growth spurt, this is associated with differences in the timing and rate of growth of lung volumes, flows and body dimensions. It, therefore, seems counterintuitive that the FEV1/FVC ratio should fall linearly with age or height during childhood and adolescence as it does in adults, or that the ratio of residual volume (RV) to TLC should remain constant. **Quanjer P, H. et al., (1995)**

Methodology

The purpose of this study was to find out the significant difference of trained and untrained adolescent boys living at different altitudes. The vital capacity was selected as a criterion variable. To achieve the purpose of the study three hundred sixty(360) adolescent boys living at different altitudes of Kashmir region India were randomly selected as subjects .These were divided into two groups trained and untrained, one hundred eighty(180) adolescent boys were selected from trained group and one hundred eighty (180) were selected from untrained group with an age of the subjects were ranged from 13 – 19 years were selected as subjects .The data collected from high, moderate and low altitude adolescent boys for both trained and untrained groups on variable such as vital capacity was measured by using wet spirometer and were statically analysed by using 2x3 factorial ANOVA (Group x Altitude) whenever the obtained F ratio value for interaction effect was found to be significant the simple effect test was applied as follow test . in all cases the level of the significance was fixed at 0.05 for the test which was considered as an appropriate.

Result of the study

Table – I : Mean and Standard Deviation of vital capacity Among Trained and Untrained Adolescent Boys Living at Different Altitudes

Groups /Altitude		High Altitude	Moderate Altitude	Low Altitude	Combined
Trained	**Mean**	3750.83	3661.66	3375.50	3596.00
	SD	157.87	136.09	429.96	
Untrained	**Mean**	3444.16	3405.65	3278.83	3376.10
	SD	209.85	162.00	144.49	
Combined	**Mean**	3597.50	3533.65	3327.16	

Table – I indicates that the mean and standard deviation value of vital capacity between high altitude trained adolescent boys and high altitude untrained adolescent boys were 3750.83 ±157.87 and 3444.16 ±209.85 with combined mean value of 3597.50. The

moderate altitude trained adolescent boys and moderate altitude untrained adolescent boys mean and standard deviation values on vital capacity were 3661.66±136.09 and 3405.65± 162.00 with combined mean value of 3533.65The low altitude trained and untrained adolescent boys mean and standard deviation values on vital capacity were 3375.50 ± 429.96and 3278.83 ± 144.49 with combined mean value of 3327.16. The combined mean value on vital capacity of high, moderate and low altitude trained adolescent boys was 3596.00 The combined mean value on vital capacity of high moderate and low altitude untrained adolescent boys was 3376.10. And were graphically represented in fig.1

Graphical Representation of Mean and Standard Deviation on vital capacity Between Trained and Untrained Adolescent Boys Living at Different Altitudes

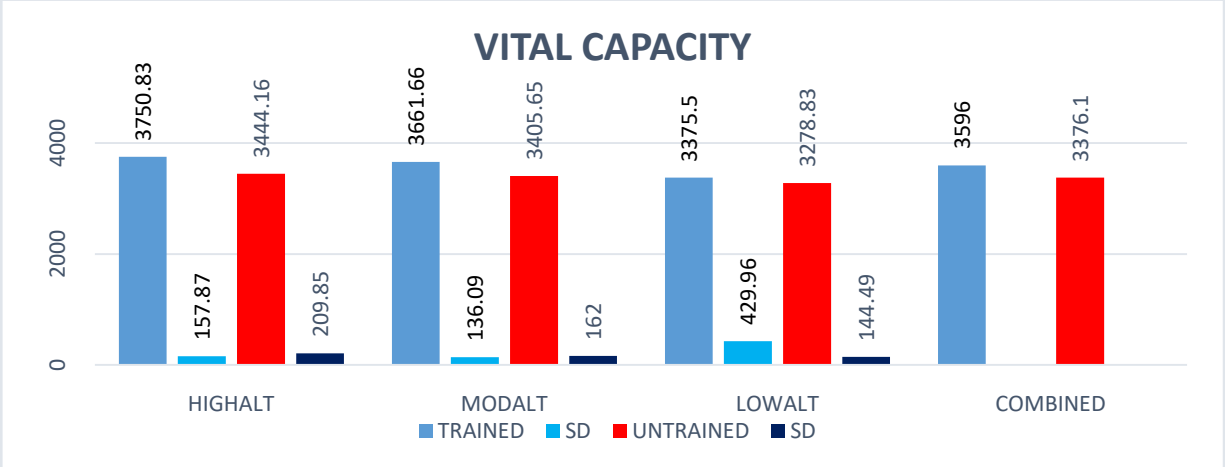

Table –I-A : Two Factor ANOVAforvital capacityofGroups (Trained &Untrained)And Different Altitudes of Adolescent Boys

Source of Variance	Sum of squares	df	Mean squares	'F' ratio
Factor A (Group)	4347424.22	1	4347424.22	81.48*
Factor B (Alttest)	4791787	2	2395893.55	44.90*
Factor A & B (Interaction)	720578.45	2	360289.22	6.75*
Residual	18886798.98	354	53352.53	

**Significant at 0.05 level of confidence. The required table value for significant at 0.05 level of confidence with df 1 to 354 is 3.84and 2 to 354 is 299*

Table I-A shows that the obtained 'F' ratio value on Vital capacity was 81.48 for factor-A (Group- trained and untrained) irrespective of their altitude difference high moderate and low which was greater than the table value of 3.84with df 1 and 354 required for significance at 0.05 level of confidence. The result shows that significant difference exist between trained and untrained irrespective of different altitudes of adolescent boys on vital capacity .

The obtained 'F' ratio value on vital capacity was 44.90 for factor-B different altitudes high, moderate low irrespective of trained and untrained adolescent boys which was greater than the table value of 2.99 with df 2 and 354 required for significance at 0.05 level of confidence. The results show that significant difference exist among different altitudehigh moderate and low irrespective of group (trained and untrained) on vital capacity.

The obtained 'F' ratio value on vital capacitywas 6.75 for interaction (AB factor - (Group x Altitude) was also greater than the table value of 2.99 with df 2 and 354 required for significance at 0.05 level of confidence. Since, the obtained 'F' ratio for the interaction was found significant, the simple effect (SE) test was applied as follow up test and it is presented in Table I-B.

TABLE I-B: Simple Effect for Groups (Trained and Untrained) Adolescent Boys Living at Different Altitudes on vital capacity

Source of variance	Trained	Untrained	Sum of squares	Df	Mean square	F-Ratio
Group and high Alttude	3750.83	3444.16	2821395	1	2821395	52.88*
Group and moderate Altitude	3661.66	3405.65	1966234	1	1966234	36.85*
Group and low Alttude	3375.50	3278.83	282328.2	1	282328.2	5.29*
Error			18886798.98	354	53352.53	

Significant at 0.05 level of confidence. The table value required for significance at 0.05 level of confidence with df 1 and 354 was 3.84).

Table I-B shows that the obtained 'F' ratio values on vital capacity is 52.88, 36.88 and5.29 for (group and high altitude test), (group and moderate altitude) and (group and lowaltitude) respectively was greater than the table value of 3.84 with df 1 and 354 required for significance at 0.05 level of confidence. The results show that significant difference exist between high, moderate. and low altitude adolescent boys on vital capacity.

Table I-C : Simple Effect Scores for Different Altitudes (High, Moderate &Low) Adolescent Boys and Groups (Trained and Untrained) On vital capacity

Source of variance	Mean			Sum of squares	Df	Mean squares	F -ratio
	High Altitude	Moderate Altitude	Low Altitude				
Altitude and trained	3750.83	3661.66	3375.50	4614229	2	2307114	43.24*
Altitude and untrained	3444.16	3405.65	3278.83	901984.7	2	450992.3	8.45*
Error				18886798.98	354	53352.53	

***** Significant at0.05 level of confidence. *The table value required for significance at 0.05 level of confidence with df 2 and 354were 2.99 respectively*

Table I-C also revealed that the obtained 'F' ratio value on vital capacity was 43.24 and 8.45 for different altitudes (low, moderate and high) trained and untrained adolescent boys which was greater than the table value of 3.84 with df 2 and 354 required for significance a 0.05 level of confidence. The vital capacity performance differs among different altitudes (low, moderate and high) trained and untrained adolescent boys. To find out the mean differences Scheffe's test was applied. Table I-D

Table I-D: Scheffĕ *S* Test for The Difference on Mean Values of vital capacity Among Groups (Trained and Untrained) Adolescent Boys Living at Different Altitudes

Groups	Different Altitudes				
	High Alttest	Mod Alttest	Low Alttest	MD	CI
Trained	3750.83	3661.66		89.17	116.85
	3750.83		3375.50	375.33*	116.85
		3661.66	3375.50	286.16*	116.85
Untrained	3444.16	3405.65	\	38.51	116.85
	3444.16		3278.83	165.33*	116.85
		3405.65	3278.83	126.82*	116.85

Table – VI shows that the mean difference between trained high altitude and trained moderate altitude adolescent boys, trained high altitude and trained low altitude adolescent boys, boys trained moderate and trained low altitude adolescent boys are 89.17, 375.33 and 286.16, respectively on Vital capacity of group trained and different altitudes. which are greater than the confidence interval value of 116.85at 0.05 level of confidence. untrained high altitude and untrained moderate altitude adolescent boys, untrained high altitude and untrained low altitude adolescent boys, boys untrained moderate and untrained low altitude

adolescent boys are 38.51, 165.33 and 126.82, respectively on Vital capacity of group untrained and different altitudes. which are greater than the confidence interval value of 116.85at 0.05 level of confidence the results of the study shows that the (trained high altitude and trained moderate altitude adolescent boys) had significant increase in Vital capacity as compared to the (trained low altitude). The result also reveals that the increase in Vital capacity is significantly more for trained high-altitude boys) as compared to trained low altitude). Also, (untrained highaltitude and untrained moderate altitude) had significant increase in Vital capacity as compared to the (untrained low altitude). The result also reveals that the increase in Vital capacity is significantly more for (trained high altitude) as compared to (untrained adolescent boys).

Discussion of the study

The result of the study shows that trained adolescent boys brought significant increase on vital capacity of highaltitude and moderatealtitude as compared to lowaltitude trained adolescent boys. The result also reveals that the increase in vital capacity is significantly more for high altitude as compared to low altitude trained adolescent boys and also untrained adolescent boys brought significant increase on vital capacity of untrained highaltitude and untrained moderate altitude boys have significantly showed increased vial capacity as compared to untrained low altitude adolescent boys .There are many studies in support of findings of present study .

Venkata Venu Gopala Raju (2013) have provedpulmonary function test values of children and adolescents, a marked increase was observed in all the five parameters (FVC, FEV1, ERV, FEF 25-75%, and PEFR), from childhood to adolescence as per the body needs of oxygen. It is important to understand the improvement of Pulmonary function test values with age among adolescents, in interpretation of PFT variations in different clinical settings**Schoenberg et al. (1978),** have found interpreting lung function test results, the changing pattern in FEV1/FVC and RV/TLC should be considered. Prediction equations for children and adolescents should take into account sex, height, age, ethnic group, and, ideally, **Knudson et al. (1983)** have studied American population over age 6 years for flow volume curve. We compared our data for boys between age 6-12 years and girls between age 6-11 years. Our values for FVC and FEV1 in this age range are significantly lower ($p<0.005$) than Knudson study for both boys and girls. However, mid expiratory flow rates FEF 50% and FEF 25-75 did not reveal any significant difference. The simplest explanation for these findings is that young children lack the coordination to deliver a full vital capacity, and so they inhale insufficiently or terminate the expiratoryeffort prematurely. However, children have been shown to be capable of performing acceptable FVC man oeuvres **Vilozni et al. (2009)** Thus the FEV1/FVC and RV/TLC ratio fall in early childhood. Maximum respiratory pressures increase with age in schoolchildren's **Tomalak et al., (2002),** The increasing inspiratory and expiratory pressures increase vital capacity at the expense of RV. In addition, the greater pressure generated by males explains, at least in part, the difference in vital capacity, and hence in FEV1/FVC and RV/TLC ratio, between males and females. **Sandeep Budhiraja et al., (2010)** The present study shows, all the three independent variables (age, weight and height) have linear positive correlation with lung function parameters, both for boys and girls Lung function values in boys were significantly higher as compared to that of girls. Urban children had higher lung function parameters than rural children except IRV, FEF25%. Among all anthropometric parameters, height was the most independent variable with maximum coefficient of correlation**. Vijayan et al., (2000**)have proved correlations of forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) were, in general highest with height followed by weight and age. Peak expiratory flow rate (PEFR), forced mid-expiratory flow (FMF) and forced expiratory flow rates at 25%, 50% and 75% of FVC (FEF25% FVC, FEF50%FVC and FEF75%FVC) were also significantly correlated with physical characteristics (age, height and weight). With a view to find out regression equations to predict spirometric functions based on physical

characteristics (age, height and/or weight), the functions were regressed over all possible combinations of regressor variables, i.e., age, height and weight separately for boys and girls. **Nair et al., (1997)**, have found the results show an increase in "lung volumes" and "flow rates" with increase in age, height and weight. FMFT and MVV(IND) also increase with increase in anthropometric measurements. All the lung functions except FEF75-85% and the ratio between different lung volumes show significant positive correlation with age, height and weight. Regression equations were derived for predicting normal lung functions for healthy South Indian boys. **Sitarama Raju et al., (2004),** have examined the regression equations to predict the pulmonary functions were presented using the independent variables like height, fat free mass and chest circumference or age, since these variables have shown very strong predictability for FEV1, FVC and PEFR. The equations presented in this study can be considered as referral standards for Indian girls**Tahera et al., (2010**) have found to be statistically significant in the study groups. For FVC and FEV (1), highest correlation was found with age in girls and height in boys. For FEV (1) %, significant negative correlation was found with age and height in both sexes, but positive correlation was found with surface area. Similarly, PEFR showed highest correlation with surface area in boys and girls. Variables such as FVC, FEV(1) and PEFR show good positive correlation with height, age and body surface area in both sexes. There is a need to have regional values for the prediction of normal spirometric parameters in a country like India with considerable diversity**. Chatterjee& Mandal (1991),** have proved prediction equations were derived on the basis of age and height for all the pulmonary function measurements except FEV1% and FET. The prediction equations for FVC, FEV1, MVVF, and PEFR were reliable, but relative variability of predicted FEF25-75% and FEF75-85% was very large. A comparative study of FVC, FEV1, and PEFR values of our subjects, standardized for age and height, was much closer to the boys of Delhi in FVC but higher than South Indian boys in FEV1, North and South Indian boys in PEFR

Conclusion

The result of the study show that the trained adolescent boys brought significant increase on vital capacity of highaltitude and moderate altitude have significantly showed increased in vital capacity as compared to the trained adolescent boys of lowaltitude. The result also reveals that the increase in vital capacity is significantly more for moderate altitude as compared to low altitude adolescent boys .And also untrained adolescent boys brought significant increase onvital capacity of high altitude and moderatealtitude adolescent boys have significantly showed increased vital capacity as compared to lowaltitude untrained adolescent boys .Whereas for vital capacity there was no significant difference between low and moderate altitude as compared to high altitude adolescent boys.

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IMPACT OF HORTICULTURAL GROWTH ON LIVING STANDARD OF PEOPLE IN THE HORTICULTURAL BLOCKS OF YARIPORA AND KADDER IN KULGAM DISTRICT

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ABSTRACT

The horticulture sector is one of the most important sectors of Jammu and Kashmir's economy, as it shares 9 percent of SGDP. 33 lakh of the population, or seven lakh families, are involved in this sector. An attempt has been made toexamine Impact of horticultural growth on living standard of people in the horticultural blocksof the study area. Both primary and secondary data have been used to get the result. For primary data, descriptive statistics and crosstabulation have been used for analyses. And for secondary data, annual growth has been used to show the annual growth rate, area, and production in the horticulture blocks of Yaripora and Kadder. This study concludes that the area under apple cultivation increased from 918 to 1081 hectares and apple production has increased from 7706 to 133391 from 2010–11 to 2020–21 in the horticulture block of Yaripora. Similarly, the area under apple cultivation increased from 1700 hectares to 2431 hectares and apple production increased from 13600 TMTs to 27530 TMTs during the same period. More than 60% of the people who answered agree that their living standards have gone up because apple production is going up.

Keywords: *Horticulture. Growth Rate, Production, Diversification*

Introduction

The horticulture sector plays a vital role in the development of Jammu and Kashmir's economy, as it contributes 9 percent of SGDP. It is one of the core sectors for the state of Jammu and Kashmir as it provides employment and seasonal employment. Almost 70 to 80 percent of Jammu and Kashmir's population is directly or indirectly dependent on it. In Jammu and Kashmir, the horticultural sector employs 33 lakh people, or seven lakh families, directly or indirectly. The horticulture department of Jammu and Kashmir has recently separated from the agriculture sector. A full-fledged department of horticulture is being set up so that first attention can be focused on this sector, which helps most people make money and improve their economic situation.

The horticulture sector also provides job opportunities to other traders who have relevance with horticultural inputs such as fertilizers, pesticides, etc. In 1972–73, horticultural production in Jammu and Kashmir was only 1.83 metric tonnes, but by 2015–16, it was 24.94 LMTs, with a turnover of about Rs 6000 crore.(Wikipedia, 2015)

The horticulture sector of Jammu and Kashmir at the division level is headed by the Director of horticulture and at the district level, it is headed by the Chief Horticulture Officer. In their own areas, these officers do things and run programmes like area expansion programs, putting in place plant protection measures, improving irrigation infrastructure, coming up with awareness and training programs, etc.

The horticulture sector of Jammu and Kashmir is also working towards reviving the old orchards by providing basic needs like irrigation facilities and providing information to the farmers about the process of cultivation of crops. (http://www.agrilearner.com, 2019)

Review of literature

Mir, et al., (2022) carried out a study about the "Growth and Performance of apple production in Kulgam district of Jammu and Kashmir". The study aimedto enhance the growth and performance of apple production in Kulgam District. Secondary sources of data have been used from 2010-11 to 2018-19. Descriptive statistics and annual growth rate were used for analyses. The study finds that the production has increased from 2010-11 to 2018-19 from 1139180 metric tons to 1851723metric tons. This study also found that diversification is the

only reason from the last decade for increasing apple production in the study area.

Khursheed.et al., (2019),A study was carried out to find out the horticultural development in the Kashmir valley and it also focused on determinantsthat influence the horticulture sector of Jammu and Kashmir. Secondary sources of data have been used to find out the result. Bhatia's method was applied for analysis. The study concludes that the efficiency of horticulture has varied from a maximum of 913.35 in Budgam as to low as 66.10 in the Bandipora district of Jammu and Kashmir. This study also finds that some districts of central Kashmir are having a low percentage of horticulture area.

Rather, et al., (2013), carried out a study, "An Analytical study on production and export of fresh and dry fruits in Jammu and Kashmir". In their study, an attempt has been made to explore the potential and strength of Jammu and Kashmir in its production and export of fresh and Dry fruits. This study also found that 77 percent of apples and 90 percent of Walnuts are produced and exported from Kashmir valley, and more than 80 percent of the population is engaged with the horticulture sector in the study area.

Shah, et al., (2016), a study was carried out about the cropping pattern change in Jammu and Kashmir, A case study of Kulgam district. The crops are usually classified into two crops food crops and cash crops. Food crops are used to fulfill the basic needs of humans, whereas, cash crops (like Apple) are mainly used to generate income. This study was based on secondary sources of data. The Chi-square test was used to analyze the data. This study found that the area under the cultivation of food crops has been diversified into cash crop production (Like Apple) in the study area from the last decade. Asa result production of food crops have been decreased and cash crops have increased.

Ahmad, et al., (2020), a survey was conducted on district-wise contribution and improvement of horticultural production of fresh fruits and the growing area under the cultivation of fresh fruits in Jammu and Kashmir. All districts have been selected for analysis. Secondary sources have been used. The survey found that district Baramulla has the highest area under apple cultivation and production. While on the other hand,Leh district is the highest producer of Apricots. This study also finds that the region produces almost all fresh and dry fruits. Like Guava, Mango, citrus, and litchi in the Jammu division and Apple Walnut Pear, almonds, etc. in the Kashmir division. And apricots in Ladakh region. Horticulture also plays an important opportunity in generating income in the study area.

Specific aim of the study

To examine the impact on living standards due to the growing rate of apple production in the study area.

Data sources

The present study is based on both primary and secondary sources of data. The secondary sources of data have been collected from the directorate of the Horticulture department Jammu and Kashmir from the period 2010-11 to 2020. 21. Some journals magazines and websites are used for data collection. While on the other hand a well-structured interview schedule has been papered by the researcher for collecting primary sources of data.

Methodology

The study area (Kulgam District) is divided into ten (10) horticulture blocks by the horticulture department of Jammu and Kashmir. Among these ten (10) horticulture blocks two blocks have been selected. 1. Horticulture block of Yaripora and 2. Horticulture block of Kadder. To analyze the secondary data, annual growth rates have been used. And for primary sources of data, the concerned percentage and crosstabulation methods have been used.

Sampling Technique

Random sampling technique has been used to select horticultural blocks of Kulgam district. The unit of sampling is households. The Kulgam district has been divided into 10 horticulture blocks by the horticulture department of Jammu and Kashmir. Two horticuiltural blocks of Kulgam district have been selected i.e., Yaripora and Kadder. Four (4) villages of each block have been selected.

In the horticulture block of Yaripora, the villages are Humshalibugh, Matibugh, Badroo, and Katapora in the horticulture block of Kadder the selected villages are Katrosoo, Tungdanoo, Sursona, and Zaban. 10 households of every village have been selected, which becomes a total of 80 respondents.

Analyses and enterprtation

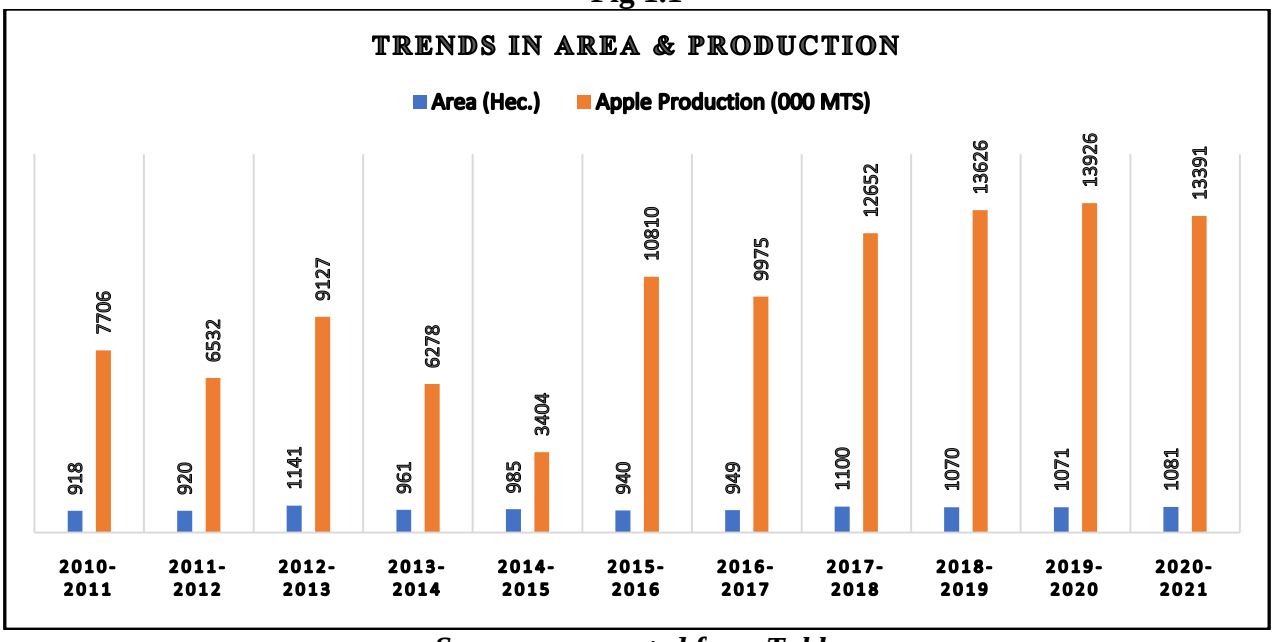
Table 1.1

	HORTICULTURE BLOCK OF YARIPORA	
Years	Area (Hec.)	Apple Production (000 MTS)
2010-2011	918	7706
2011-2012	920	6532
2012-2013	1141	9127
2013-2014	961	6278
2014-2015	985	3404
2015-2016	940	10810
2016-2017	949	9975
2017-2018	1100	12652
2018-2019	1070	13626
2019-2020	1071	13926
2020-2021	1081	13391

Sources: Directorate of Horticulture Department of Kulgam

Table 1.1 represents the change in areain hectares andproduction inmetric tons of apple cultivation in the horticulture block of Yaripora from 2010-11 to 2020-21. It is found that in the year 2010-11, the area under apple cultivation was recorded at 918 hectares, and in the same year, the apple production was recorded at 7706 metric tons. The area under apple cultivation increased continuously inthe last decade and was recorded at 1081 hectares in 2020-21. Apple's production also shows an increasing trend, but in 2014-15, its production decreased, because the whole valley was under the floods. Which affects the production of all the horticultural blocks in the study area. Almost 50 percent of apple production decreased in 2014-15 due to the floods. After that, the production of apples increased and recorded 133391 metric tons in 2020-21.

Fig 1.1



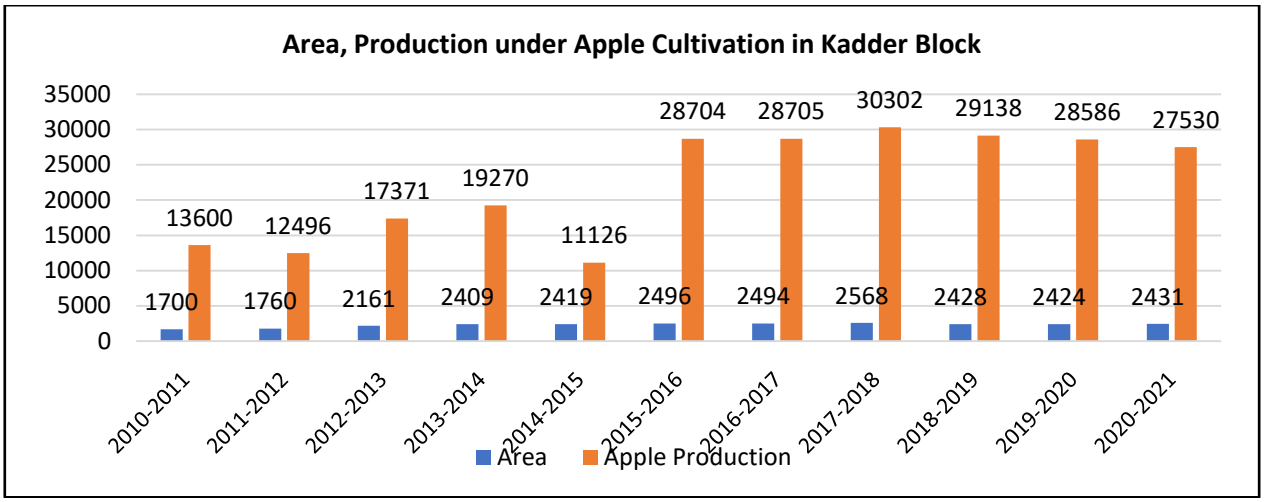
Sources: computed from Table

Fig. 1.1 shows that clearly shows that there was a slide change in the production of apples from the period of 2010-11- to 2013-14. but the production of apples decreased in 2014, due to the flood in Jammu and Kashmir 2014. After that, the production shows an increasing trend up to 2020-21.

Table 1.2		
(Apple, Area, and Production in the Horticulture Block of Kader)		
Years	Area (Hec)	Apple Production (000 metric Tons)
2010-2011	1700	13600
2011-2012	1760	12496
2012-2013	2161	17371
2013-2014	2409	19270
2014-2015	2419	11126
2015-2016	2496	28704
2016-2017	2494	28705
2017-2018	2568	30302
2018-2019	2428	29138
2019-2020	2424	28586
2020-2021	2431	27530

Sources: Directorate of Horticulture Department of Kulgam

Table 1.2 represents that the area and production of apple cultivation show an increasing trend. The area under apple cultivation was recorded at 1700 hectares in 2010. Due to large diversification in the study area, it has increased and was recordedat 2431 hectares in 2020-21 in the horticulture block of Kadder. The production of apples has also increased from 2010-11 to 2013-14, from 13600 metric tons to 19270 metric tons. But the great floods in Jammu and Kashmir in 2014, affects the production of Apple and recorded only 11126 metric tons. After that, the production of apples in the study area showedan increasing trend and recorded 27530 metric tons in 2020-21.



Sources: computed from Table

The above chart clearly shows that in the year 2014, the production of apples has been recorded at 11126 metric tons only which was recorded lowest production from the last decade in the horticultural block of Kadder.

The annual growth rate of Apple production in the horticultural blocks of Yaripora and Kadder from 2010-11 to 2020-21.

Table 1.3

YARIPORA BLOCK			KADDER BLOCK	
ANNUAL GROWTH RATE OF APPLE PRODUCTION			ANNUAL GROWTH RATE OF APPLE PRODUCTION	
YEAR				
2010-2011	7706	-0.17	1360	-0.08
2011-2012	6532	0.28	1246	0.28
2012-2013	9127	-0.45	1731	0.09
2013-2014	6278	-0.84	1920	-0.73
2014-2015	3404	0.68	1116	0.61
2015-2016	10810	-0.08	2874	3.48
2016-2017	9975	0.21	2875	0.05
2017-2018	12652	0.07	3032	0.66
2018-2019	13626	0.02	9118	-2.18
2019-2020	13926	-0.03	28586	-0.03

Sources: computed from Table

Table 1.3 represents the annual growth rate of area and production in the horticultural block of Yaripora and Kadder of Kulgam District From 2010-21 TO 2020-21. Some years are showing the decreasing growth rate of apple production. 17 percent of apple production was decreased in 2012. 45 percent, 84 percent 08 percent, and 03 percent were recorded in the years 2013,2014,2015, and 2019 respectively in the horticultural block of Yaripora. 84 percent of apple production was recorded in 2014 due to the floods in Jammu and Kashmir. Similarly, the annual growth rate of apple production varies from 2010-11to 2020-21 in the horticulture block of Kadder.

Table 1.4

Compared to ten years How is your economic condition today to the change in apple production? Cross tabulation

			Compared to ten years ago, how is your economic condition today					
			Much better	Better	Same	Worse	Much worse	Total
What happened to Apple production in the last ten years	Increased	Count	32	16	16	1	2	67
		% of Total	40.0%	20.0%	20.0%	1.3%	2.5%	83.8%
	Decreased	Count	0	0	0	1	3	4
		% of Total	0.0%	0.0%	0.0%	1.3%	3.8%	5.0%
	Did not change	Count	0	0	0	6	3	9
		% of Total	0.0%	0.0%	0.0%	7.5%	3.8%	11.3%
Total		Count	32	16	16	8	8	80
		% of Total	40.0%	20.0%	20.0%	10.0%	10.0%	100.0%

Sources: Primary Data

Table 1.4 represents the effect on the living standard of respondents with the change in apple production in the study area. Among 80 respondents 67 respondents (83.8) are in favor of the production of apples have been increased inthe last decade. Due to this increment ofapple production among 83.8 percent of respondents, 40 percent and 20 percent of respondents have becomea much better and better impact on living standards respectively.

4 respondents (5 per cent) are agreeing that apple production has decreased inthe last decade. Asa result, their living standard has been worse and much worse. Similarly, 9 respondents (11.3 per cent) are agreeing that there has been no change in apple production from the last decade. Their living standard has become worse and much worse.

16 respondents (20 per cent) have the economic conditions whether the production of apples has increased or decreased, it did not have an impact on their living standard.

However, most of the respondents in the study area, due tothe increase in apple cultivation their living standards have improved fromthe last decade. Therefore, diversification is one of the main reasons for increasing apple production and improving their living standard.

Table 1.5
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.557	.251		2.221	.029
	What happened to Apple production in the last ten years	1.367	.175	.662	7.796	.000
a. Dependent Variable: Comparative Economic condition						

Computed from table 1.5

It has been observed from Table 1.5 that, there is a high impact on the economic conditions of the respondents due to changes in apple production. That means the increase in apple production leads to an improvement ontheir living standard. Therefore, there is a positive impact on the living standard of the respondents. As the coefficient value is 1.367

at a significance level of 0.05, which is greater than the significant value of .000. Hence, there is a positive relationship between apple production and the living standard of the respondents in the study area.

Findings and conclusion

- The horticulture sector of Jammu and Kashmir shares 9 percent of SGDP, and more than seven lakh families are engaged with this sector.
- 163 hectares of the area have been diversified from other crop to apple production in the horticulture block of Yaripora, which asa result apple production has also increased by 5685 TMTs from 2020-11 to 2020-21.
- 731 hectares of the area have been diversified from another crop to apple production in the horticulture block of Kadder, which asa result apple production has also increased by 13930 TMTs from 2020-11 to 2020-21.
- More than 60 percent of respondents are agreeing that due to the growing rate of apple production, their living standards have also improved. This study concludes that due to the increase in apple production the economic conditions have been improved in both the horticultural blocks of Yaripora and Kadder.

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IMPACT OF VARIED INTERVAL TRAINING PROTOCOLS IN MODIFYING SPEED ANDSPEED ENDURANCE OF UNDER-17 SOCCER PLAYER

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ABSTRACT

The primary goal of this research was to examine the impact of two different interval training programmes–supramaximal intensity interval training (SMIT) and high intensity interval training (HIIT)–on measures of speed and speed endurance performance. A total of 30 trained male soccer players 15-17 years of age from Bishnupur District, Manipur, India, were randomly chosen as subject.They were divided into three groups of 10 each.Group-1 was given supramaximal intensity interval training (SMIT) and Group- 2were given high intensity interval training (HIIT) and Group- 3 acted as control group (CG). Group-1 and 2 were given training for 12 weeks (3days/week) and all players performed physical assessments before and after the 12-week training programme. Outcome measures were: Speed and Speed endurance to check the two parameters by 30 meters and 110 yards sprint tests respectively. The collected data were analyzed by using paired sample t-test to present mean, mean differences, 't'-ratio and percentage of change. Further univariate (ANCOVA) was used to determine whether there are any significant differences between the groups on the dependent variable. When interaction was found significant, 'Scheffe's test' was utilized. The level of confidence was fixed at 0.05.The results shown that there was a significant difference in speed and speed endurance the obtained 'F' ratio for adjusted post-test scores (15.88 > 3.37) on speed and 16.69>3.37 table value for df 2 and 26 on speed endurance. The study shows it is possible to improve the speed and speed endurance by proper varied interval training added to the normal training load. The observed effects are meaningful to the training practices of elite athletes seeking a competitive edge in team sports when otherwise well matched.

Keywords: *Interval training, Speed, Speed Endurance, Supramaximal Intensity Interval Training (SMIT), High Intensity Interval Training (HIIT).*

Introduction

Soccer is one of the world's most popular team sports, especially among kids and teenagers. Its complexity is due to the combination of technical, tactical, and psychophysical abilities. Many studies of soccer performance in children, particularly among this age group, focus on technique and tactics while ignoring other conditional factors such as endurance, strength, and speed. Soccer joins intermittent loads ranging from high to low intensities. The varying nature of the sport causes rapid changes in speed during training and competition, with average distances covered of about 10-12 km at an intensity close to the anaerobic threshold. **(Tomas, 2005)**

In general, little is known about supramaximal (SMIT) and high-intensity interval training (HIIT), particularly in soccer. The activities of under-17 players are naturally composed of short, high-intensity activities. In comparison to adults, studies have shown that during repetitive bouts of sprints separated by short recovery periods, children of this age maintain their performance without significant fatigue. Repetitive intervals at high velocities close to or higher than the maximal heart rate, separated by short recovery periods, may also induce speed and speed endurance.

Supramaximal intensity interval training is generally unused. Little research has been published on the effects of SMIT and HIIT on aerobic and anaerobic performance. As a result, effective training programmes such as SMIT and HIIT could improve speed and speed endurance performance while still leaving time to improve other limiting skills such as technique and tactics. The primary goal of this study was to examine the impact of SMIT and HIIT on speed and speed endurance performance in under-17 soccer players. It was hypothesised that SMIT and HIIT would improve speed and speed endurance performance.

Methods

The study included a pre and post-diagnostic phase as well as one training period with two experimental groups and one control group to test the hypothesis of whether SMIT has a greater effect on speed and speed endurance performance than HIIT. All participants completed a 30 meter and a 110 yard sprint test

during both diagnostic phases. During the intervention, participants exercised using either the SMIT or HIIT programmes. Throughout this time, all of the subjects' heart rates were monitored on a regular basis.

Subjects

A total of 30 subjects took part in this study (15-17 years). All subjects were accustomed to a training workload and have been involved in soccer training and matches for at least 2-3 years. All the subjects were from Bishnupur district of Manipur, India. The subjects were divided into two training group and one control group randomly.

Training Protocol

Both groups' intervention was limited to the speed part of the training session and was administered as an extension of the regular soccer-specific training. The research was carried out during the winter training session, with three sessions per week for 12 weeks, totaling 1-1.5 hours of practiced. All training sessions were designed in the same way during the study (Figure 1): The training sessions began with a 7-10 minute warm-up period that included flexibility exercises and the incorporation of game-specific actions. Following that, a phase of Shuttle Runs 15 meters for 5 minutes ensued, with the focus in this phase being on determining the target heart rate. Training was equal for both groups as a result of this training design. Following the shuttle run session, SMIT or HIIT training was added, followed by a cool down session. Throughout the session, the heart rate was monitored. Both training methods included high intensity interval intervention, which included various types of interval training with and without a soccer ball, as well as rest. During SMIT, all subjects should perform at or above 100% of their individual VO2max, while HIIT should achieve or maintain 70-90% of their individual VO2max, separated by rest periods according to the training programme.

Testing Procedure

All players within a given test procedure were tested on the same day. At first, all subjects completed a 15 minute warm-up at approximately 40–50% of their individual maximal heart rate. Then, 30 meter and 110 yard sprint test was conducted.

Statistical Analysis

The acquired data were statistically examined descriptive analysis using paired sample t-test, and analysis of covariance (ANCOVA) to see if there were any changes between the adjusted posttest means on selected dependent variables independently for each variable. If the acquired 'F' ratio for the adjusted posttest was found to be significant, the Scheffe's test was used as a post hoc test to determine any matched mean differences. The.05 level of confidence was set as the level of significance for testing the 'F' ratio derived by analysis of covariance, which was deemed adequate.

Result

The descriptive analysis shows mean, percentage of improvement and ‘t’ ratio of the collected data on speed and speed endurance among experimental and control groups are presented in table-1.

Table-1: Descriptive Analysis of the Data on Speed and Speed Endurance of Experimental and Control Groups

Variable	Training	Pre-test	Post-test	M.D	% change	T-ratio
Speed	**SMIT**	4.87	3.99	0.88	18.06	5.98*
	HIIT	5.00	4.50	0.5	10	2.59*
	CG	5.05	4.98	0.07	1.38	0.37
Speed Endurance	**SMIT**	14.61	13.13	1.48	10.13	11.78*
	HIIT	14.74	13.85	0.89	6.03	3.44*
	CG	14.76	14.64	0.12	0.81	0.49

Table t-ratio at 0.05 level of confidence for 9(df) = 2.26

The obtained t-ratios of 5.98, 2.59 on speed and 11.78, 3.44 on speed endurance are greater than the required table value of 2.26. It is clear that there was a significant difference between pre-test and post-test on speed and speed endurance of SMIT and HIIT groups. As a result, it is obvious that it was determined to be significant.Further, according to the findings, SMIT caused 18.06% changes in speed and 10% changes in HIIT. It also shows that SMIT affected 10.13% of speed endurance and 6.03% of HIIT.

Table 2: Analysis of Covariance on Speed and Speed Endurance of Experimental and Control Groups

	SMIT	HIIT	CG	SOV	SOS	df	M.S	f-ratio
Speed	4.01	4.50	4.97	**BG**	4.49	2	2.24	15.88*
				WG	3.67	26	0.14	
Speed Endurance	13.15	13.84	14.62	**BG**	10.74	2	5.37	16.69*
				WG	8.36	26	0.32	

(Table value – 3.35 (df =2 & 27) and 3.37 (df =2 & 26). **Significant (.05 level).*

The adjusted post-test mean values of SMIT, HIIT and control groups are 4.01, 4.50 and 4.97on speed13.15, 13.84 and 14.62 on speed endurancerespectively.The obtained 'F' ratio of speed and speed endurance are 15.88 and 16.69 which was greater than the required table value of 3.37 for df 2 and 26 for significance at 0.05 level of confidence. It was concluded that, there was a significant differences exist among the SMIT, HIIT, and control groups on speed and speed endurance.

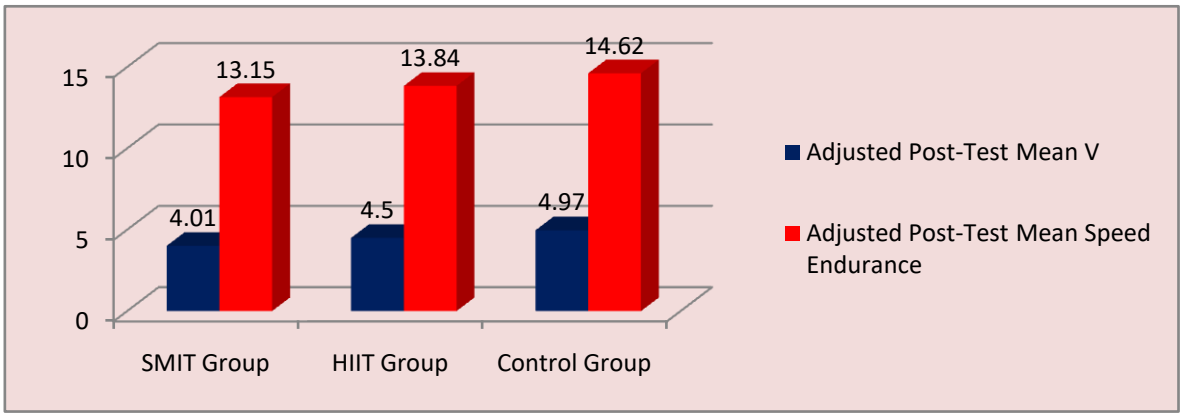
Table-3: Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Speed and Speed Endurance

	SMIT	HIIT	CG	MD	CIV
Speed	4.01	4.50	_	0.49*	0.43
	4.01	_	4.97	0.96*	
	_	4.50	4.97	0.47*	
Speed Endurance	13.13	13.85	_	0.72*	0.65
	13.13	_	14.64	1.51*	
	_	13.85	14.64	0.79*	

**Significant at .05 level.*

As shown in table-3, the Scheffe's post hoc test analysis proved that significance mean differences existed between SMIT and HITT groups; SMIT and control groups; HIIT and control groups; on speed and speed endurance. Since, the mean differences 0.49, 0.96 and 0.47 on speed andmean differences of 0.72, 1.51 and 0.79 on speed endurance are higher than the confident interval value 0.43 and 0.65 respectively. Hence, it was concluded that due to the impact of SMIT and HIIT the speed and speed endurance was significantly improved among trained under-17 soccer players. And also the results found that SMIT group was better than HIIT group in improving speed and speed endurance among under-17 male soccer players.The adjusted post-test mean values of experimental and control groups on speed and speed endurance is graphically represented in the figure-I.

Figure-I: Bar Graph Showing the Adjusted Post Mean Values on Speed and Speed Endurance of SMIT, HIIT and Control Groups



Discussion on Findings

Speed and speed endurance performance improved in experimental groups as a result of supramaximal intensity interval training and high intensity interval training when the time to complete each test was compared between groups. The nature of training in SMIT and HIIT involves high intensity exercises with rest intervals that madethe experimental groups show better improvement while compared to control group. When the experimental groups were compared, the SMIT group outperformed the HIIT group. SMIT, in summary, provides the most benefits for under-17 male soccer players in terms of concurrent improvements in speed and speed endurance performance.

These findings of the study are in conformity with the results of the following studies by **Cicioni Kolskyet al., (2013)** found that two different interval training programs high intensity interval training (HIIT) and supramaximal interval training (SMIT) significantly improved 40m sprint and endurance performance. They added that SMIT provides the greatest benefits for concurrent improvements in sprint and endurance performance. Further **Sperlich et al., (2011)** suggested that 5 weeks of high-intensity interval training and volume training in 14-year-old soccer players significantly improve speed.This was well established by **Kamal Firdaus (2015)** that extensive interval training method and fartlek training method can improved the speed endurance of 20x150 meters football referee in Padang. The extensive interval training method gives a greater influence than the fartlek training methods.

Conclusion

From the results of the study and discussion, the following conclusions are drawn.

1. Due to impact of supramaximal intensity interval training and high intensity interval training, the speed and speed endurance performance of under-17 soccer players was significantly improved.
2. Supramaximal intensity interval training and high intensity interval training was better than the control group while improving speed and speed endurance among under-17 soccer players.
3. Supramaximal intensity interval training was better than the high intensity interval training in improving speed and speed endurance among under-17 soccer players.

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SPECTROPHOTOMETRIC DETERMINATION OF CHLORAMPHENICOL AND ITS DEGRADATION PRODUCT IN OPHTHALMIC FORMULATION

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ABSTRACT

A simple, rapid and sensitive UV spectrophotometric method has been developed for simultaneous quantification of Chloramphenicol and its degradation product (AMPD) in a mixture. Chloramphenicol degrades easily to AMPD in an ophthalmic formulation when exposed to sunlight. Simultaneous equation method was developed through spiking method. For chloramphenicol and AMPD, the absorbance was measured at 237 and 253 nm respectively. The method was discovered to be linear, sensitive, rapid and accurate. ICH guidelines were followed in developing the procedure.

***Keyword**: AMPD, Chloramphenicol, spiking method, UV spectrophotometric method, ICH*

Introduction

Chloramphenicol is a bacteriostatic antimicrobial compound which was derived from the bacterium *Streptomyces venezuelae.* It was the first antibiotic to be manufactured synthetically on a large scale [1]. It is a broad-spectrum antibiotic, effective on many micro-organisms. It is used in ophthalmic solutions as eye drops for treating bacterial conjunctivitis or pink eye [2]. It is a broad spectrum antibiotic effective against Gram positive, Gram negative and anaerobic bacteria. Chloramphenicol works by inhibiting protein synthesis by binding to the 50S ribosomal subunit and directly preventing the formation of bacterial protein [3].

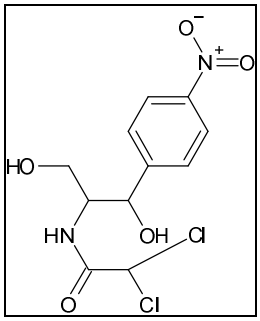

Fig.1 Chloramphenicol

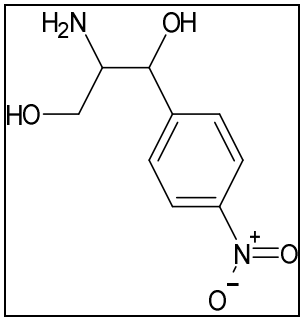

Fig.2 2-amino-1-(4-nitrophenyl) propane-1,3-diol

Chloramphenicol can be administered topically as eye or ear drops, or as an eye ointment. Chloramphenicol ophthalmic solutions are unstable at room temperature[4]. Chloramphenicol (Fig.1) loses its activity by the hydrolysis of amide group to give 2-amino-1-(4-nitrophenyl)propane-1,3-diol(Fig.2).

Many methods have been employed for the analysis of chloramphenicol in presence of its impurities, intermediates and degradation products[5,6].

Photo-degradation is the major cause of hydrolysis of chloramphenicol solutions. Several products are formed by this type of degradation[7]. Light exposure to the solutions of chloramphenicol slowly turns it to yellowish – yellowish brown due to oxidation, reduction and condensation reactions[8,9]. Products formed are 4-Nitrobenzaldehyde, 4-nitrosobenzoic acid and 4,4'-azoxybenzoic acid. AMPD further undergoes oxidation to form 4-nitrobenzaldehyde, formaldehyde, formic acid and ammonia. In this study, chloramphenicol and AMPD has been determined selectively and preferably at the same time[10].

Materials and Methods

Instrumentation and reagents

UV – Visible spectrophotometer (Shimadzu 1700, Japan) was used for the development and validation of the method. Analytical balance

(Mettler Toledo Ab204-S/Fact) was used for weighing. Ultrasonic bath (PCI analytics 3.5 L capacity) was used as sonicator.

Chloramphenicol (Standard) and its degradation product (AMPD) were used in this method. Purified water, Methanol was also used.

Ophthalmic solution was kept under sunlight for 6 hr.s daily for 15 days to get it degraded. When the solution turned to yellow in color, it was used for further work.

Preparation of Chloramphenicol solution –

About 25 mg of CAP was weighed and taken in 25 mL volumetric flask and dissolved in 10 mL Methanol with gentle shaking and volume was made up to 25 mL with Methanol to get a concentration of 1 mg/ml. The resultant solution was sonicated for 10 minutes.

The Calibration curve (CC) standard solutions were prepared by diluting suitable quantity of CAP stock solution with methanol. The CC standard solutions were prepared of concentration 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0, 24.0 and 26.0 µg/mL in duplicate.

Preparation of AMPD solution –

About 25 mg of AMPD was weighed and taken in 25 mL volumetric flask and dissolved in 10 mL Methanol with gentle shaking and volume was made up to 25 mL with Methanol to get a concentration of 1 mg/ml. The resultant solution was sonicated for 10 minutes.

The Calibration curve (CC) standard solutions were prepared by diluting suitable quantity of AMPD stock solution with methanol. The CC standard solutions were prepared of concentration 6.0, 8.0, 10.0, 12.0, 14.0, 16.0, 18.0, 20.0, 22.0, 24.0 and 26.0 µg/mL in duplicate.

For ophthalmic solutions-

To make a mixed working solution, 0.5ml of aliquot of ophthalmic solution was transferred to a 10 ml volumetric flask and diluted to mark with methanol to get solution of 5µg/ml.

Results and Discussion

UV – Vis spectral studies were done for both CAP and AMPD in methanol and spectra obtained are presented in Fig.1 and Fig.2 with their respective absorption maxima.

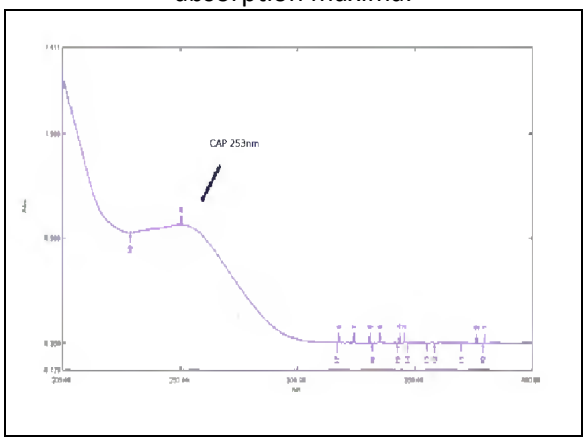

Fig.1 UV – Visible spectra of CAP

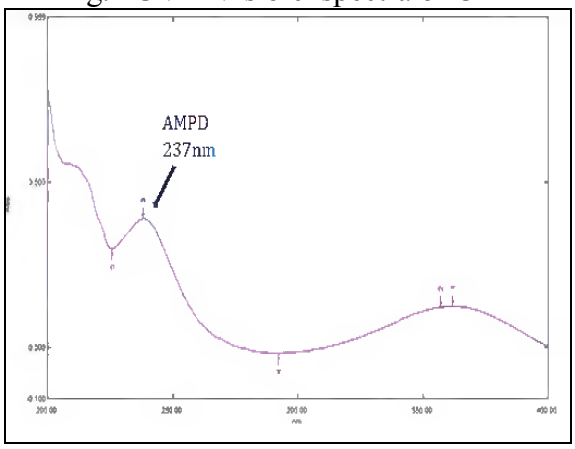

Fig.2 UV-Visible spectra of AMPD

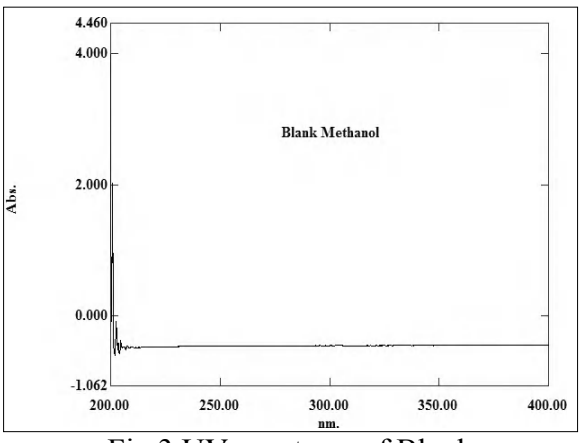

Fig.3 UV spectrum of Blank

For U.V. assay method validation of AMPD and CAP, methanol was used as solvent. The drug had shown good linear relationship between wide concentration range and absorbance in selected diluent. For the current method 15µg/ml was taken as test concentration for AMPD and 15µg/ml for CAP because it can be serially prepared from the stock solution. AMPD showed optimum response ~0.364 at wavelength 237.00 nm.

CAP optimum response ~0.559 at wavelength 253.00 nm.

Absorption spectra of the both AMPD and CAP came out to be over lapped as presented in Fig.4. It is clearly observed that determination of these compounds was not possible by direct measurements of absorbance in zero-order spectra.

On the other hand, derivative spectroscopy and the simultaneous equation method through spiking method shows more resolution and makes it possible to analyze each drug in presence of one another as well as in the presence of other excipients without requirement of any pre-treatment.

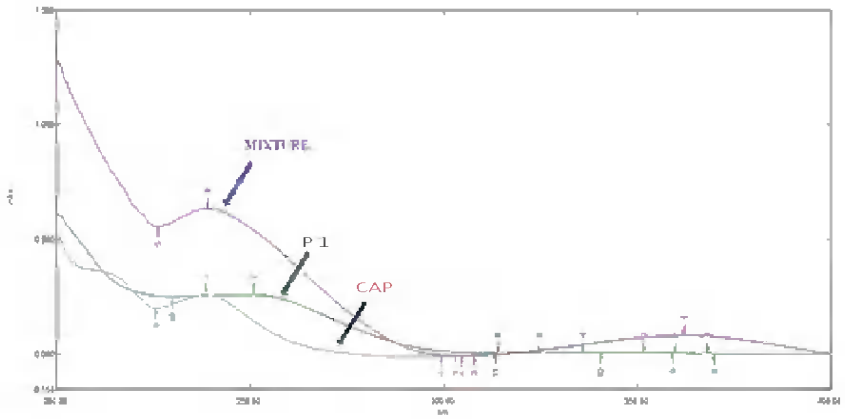

Fig.5 Overlay spectra of CAP, P1(AMPD) and mixture

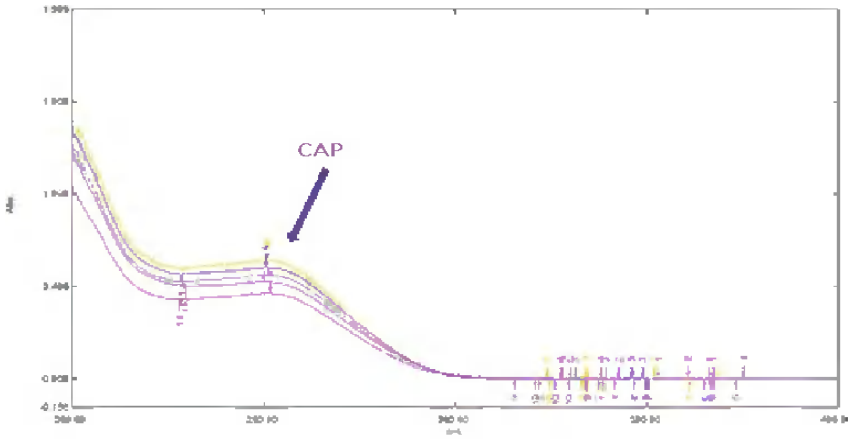

Fig.6 Linearity overlay absorption spectra for CAP

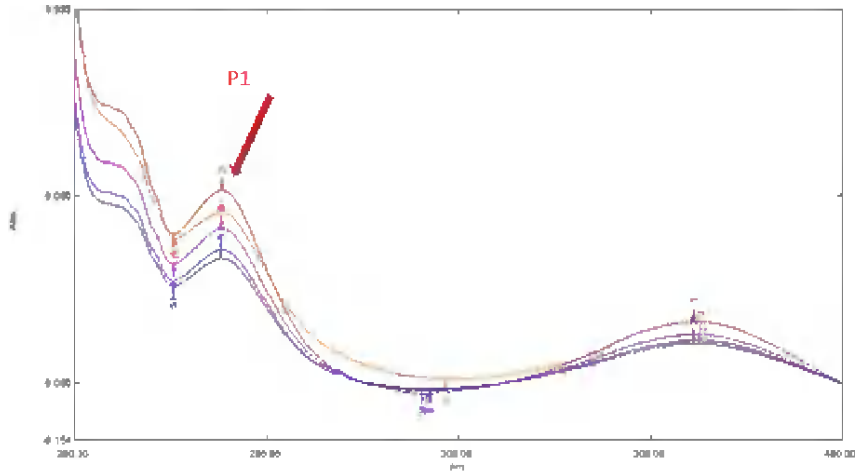

Fig.7 Linearity overlay absorption spectra for P1 (AMPD)

Linearity and range

For the assay method validation 15µg/mL and 15µg/mL were taken as test concentration. Within the working range there may exist a linear response range. Linearity range was established in the concentration range of 80%-120% and 80%- 120% respectively using Methanol as solvent for stock solution because both were found soluble in it, presented in Fig.6 and Fig.7. The linearity standard solutions were prepared in triplicate. The absorbances were taken in triplicate and mean absorbance was calculated and used to generate linearity plot.

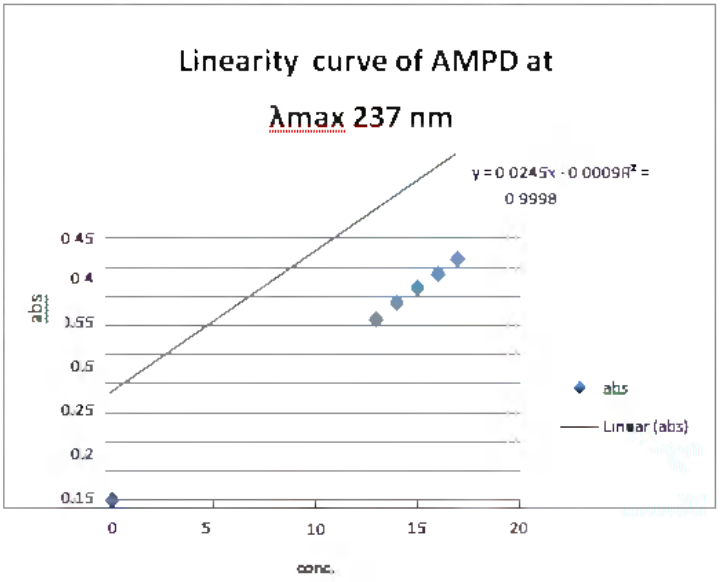

Fig. 8 Linearity plot of AMPD

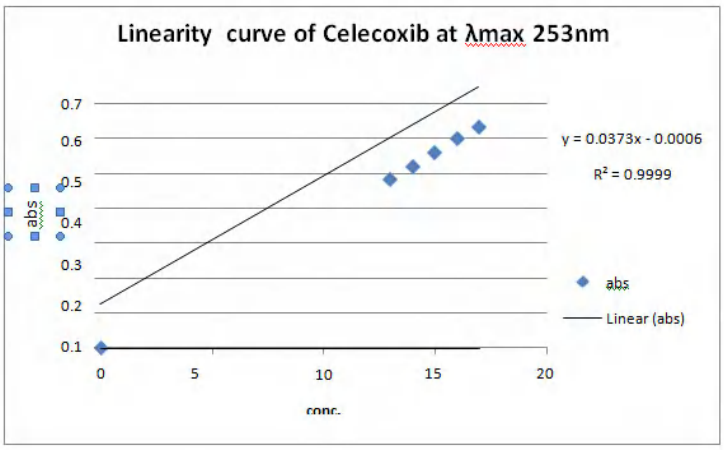

Fig. 9 Linearity plot of CAP

Limit of Detection (LOD) and Limit of Quantification (LOQ)

Detection and quantification limits (LOD and LOQ) are two fundamental elements of method validation. Rigorous statistical definitions for both the parameters exist, but in the case of UV-spectroscopy they could not be implemented. The most commonly used is the signal-to-noise ratio criterion.

Others are based on the dispersion characteristics of the regression line, either simple or weighted. In the present method validation approach, the LOD and LOQ on the basis of regression lineare summarized in Table 1.

Validation Parameter	AMPD	CAP
Absorption maxima, λ_{max} (nm)	**237**	**253**
Linearity range (µg/mL)	4-34	6-26
Coefficient of determination r^2	0.999	0.998
Regression equation (y)	y = 0.025x - 0.000	y = 0.038x - 0.000
Slope (b)	0.025	0.038
Intercept (a)	0.022	0.013
Limit of detection (µg/mL)	0.19	0.31
Limit of quantification (µg/mL)	0.89	0.61

Table 1. Summary of resulting parameters of linearity, LOD and LOQ method

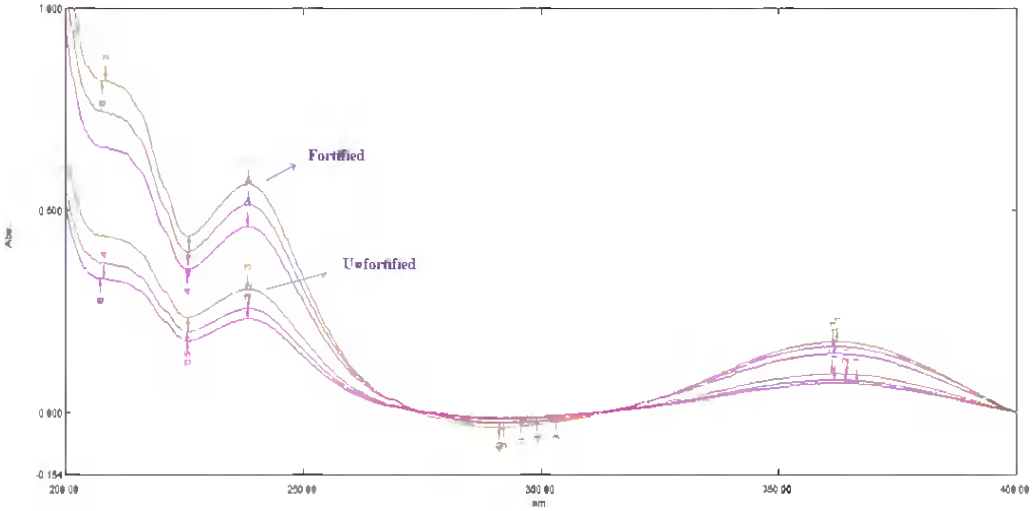

Fig. 10 Overlay UV spectra of AMPD fortified and unfortified samples

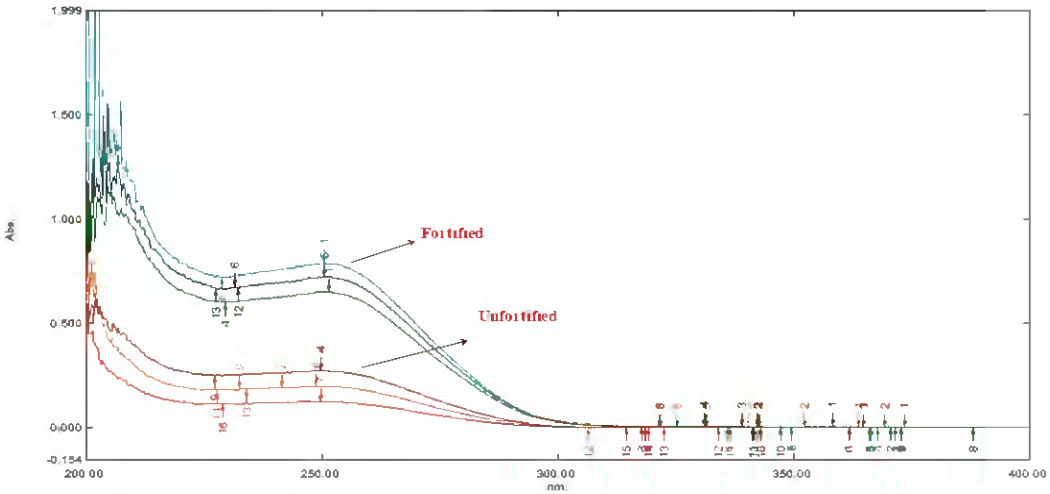

Fig. 11 Overlay UV spectra of CAP fortified and unfortified samples

Recovery studies were carried out by addition of standard drug solution at the level of 80, 100 and 120% of the test to the pre-analyzed sample. Results of the recovery study were found to be within the acceptance criteria 100±10 %, indicating a good degree of sensitivity of the method towards detection of analytes in a sample. In this method, the known concentration standard drug was added to the assay sample. The amount present was calculated and the assayed amount was reduced from it, which gives the amount recovered. The average percentage recoveries for AMLO and CXB were obtained are shown in Table 4.9 and the fortified and unfortified sample spectra are given in the Figure 4.9 (a) and 4.9 (b).

Table 2 Results of recovery studies of UV method

Drug	LEVEL (%)	Amount fortified + Unfortified (µg/mL)	Amount Recovered (µg/mL)	% Recovery	Mean % Recovery (100±5)	S.D.	% RSD
AMPD	80	12+15	12.05	100.42	100.11	0.279	0.279
	100	15+15	14.98	99.86			
	120	18+15	18.01	100.05			
CAP	80	12+15	12.02	100.17	100.45	0.259	0.258
	100	15+15	15.08	100.53			
	120	18+15	18.12	100.45			

Conclusion

The proposed method is simple in nature. The method was found to be accurate and precise as indicated by recovery studies close to 100 and RSD is near to 2. The summary of validation parameters of proposed UV-Visible method is given. This method is found to be simple, precise and accurate. The analytical solution is found to be stable up to 48 hrs. at room temperature. Hence, the method is validated and can be used for analysis of chloramphenicol in bulk also.

Declaration Of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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INTERACTION BETWEENINTELLIGENCE, AND ACADEMIC ACHIEVEMENT IN SECONDARYSCHOOL STUDENTS

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School of Education, Sanskriti University, Mathura, Uttar Pradesh, India

ABSTRACT

This paperis focused on interaction between Rajyoga Meditation and type of school in relation to cognitive capabilities, emotional intelligence, and academic achievement in adolescents in Himachal Pradesh (India). The quasi experimental pre-test post-test research design was used for this study. This study was conducted in two schools (one Government and other private) on 100 adolescents aged 13-14 years. The sample was divided into two groups: experimental group and waiting control group. After the exposure to the Rajyoga Meditation Programme for 88 days, the data available for analysis was reduced to 82. The data was analysed with two way analyses of variance (ANOVA). The results indicated that there is no significant interaction between Rajyoga Meditation and type of school in relation to cognitive capabilities, emotional intelligence, and academic achievement in adolescents.

Keywords: *Rajyoga Meditation, Cognitive capabilities, Emotional intelligence, Academic achievement.*

Introduction

From the NAEP (National Assessment of Education Progress) results and other data, we conclude that more than 70% of high school graduates are not prepared to do the ordinary geographic reasoning that everyone in our society must do in the course of caring for themselves and their families, making consequential decisions in the workplace, and participating in the democratic process. (Edelson, Shavelson, & Wertheim, 2012) Over the past 20 years, social studies and geography in particular, have been marginalized in the curriculum (McMurrer, 2007). With the rise of high stakes testing and rigid accountability mandates, teachers often "abandon student centered, community based instruction in an effort" (Mathews & Adams, 2016, p. 297) to cover the required curriculum. Further compounding the status of geography as a protected subject within social studies is the precarious place that it holds within teacher education programs across the country (Schell, Roth, & Mohan, 2013; Theobald, Dixon, Mohan, & Moore, 2013). On a more positive note, advances in technology (Milson & Kerski, 2015), renewed emphasis on inquiry teaching (NCSS, 2013; NCSS 2014), more attention to global issues (Lipscomb & Doppen, 2013), and collaborative efforts on the part of national geographic associations (Edelson, Wertheim, & Schell, 2013), provide geography educators with an opportunity to improve their practice like never before. What Does the Research Say About Geography Teaching Practice? Over the past four decades, a small group of dedicated geography educators and researchers have fought to maintain geography's place within the social studies curriculum. This struggle, although it has had its share of successes over the years, is in need of a reboot. Although national commissions and standards documents have highlighted the importance of geography to citizenship education, there has "been no measurable improvement in overall NAEP scores" in geography assessments given to US students over the past 17 years (Edelson, Wertheim, & Schell, 2013, p. 2). Geography has fallen victim to the same traditional pedagogical mindsets and practices (Knowles & Theobald, 2013) as the other social sciences that constitute social studies. That is, a superficial understanding of the discipline, on the part of teachers, students, and social studies teacher education programs dominates preservice and inservice experiences. The good news is that, within the literature on geography teaching practice, there has been a recent push to balance geographic knowledge (i.e., geographic body of knowledge represented by the "5 Themes" content) with geographic action (i.e., inquiry and problem solving). This development in the field stresses the importance of integrating geographic knowledge and geographic practices in instruction rather than teaching them separately. A traditional view, and one that

would feel more comfortable to many people, would be that factual understanding should be taught first, followed by conceptual understanding, and then reasoning skills. However, educational research teaches us that it is ineffective to separate learning of facts, concepts, and reasoning because they need to be used together in practice. (Edelson, Wertheim, & Schell, 2013, p. 4) Research on the teaching of geography is a mixed bag (Segall & Helfenbein, 2008)—some studies point to an emphasis on "doing geography" (Bednarz, Downs, & Vender, 2003) while others support the assertion that traditional pedagogy dominates most geography classrooms (Knowles & Theobald, 2013; Marran, 1994). In addition, there is some evidence that the ideals that teachers bring to the geography classroom do not always match those same teachers' enacted curriculum. In a survey by the Texas Alliance for Geographic Education (Acheson, 2003), it was revealed that geography teachers approach their subject in highly idiosyncratic ways and that they believed that they were teaching students to "think geographically," paying attention to higher order thinking concepts in the field. However, when these same teachers were asked to describe the content of their geography lessons, they were mainly teaching students to read maps. In short, "their higher-order goals were not supported by their lower-order practices" (Bednarz, Acheson, & Bednarz, 2010, p. 125). In recent years, the "Creating a Road Map for 21st Century Geographic Education" (http://education.nationalgeographic.org/programs/road-map-project/) project has attempted to address these persistent issues within geography education in the United States. The National Geographic Society, the Association of American Geographers, the American Geographical Society, and the National Council for Geographic Education have joined together for the "Road Map" project to address research, assessment, instruction, and professional development in geography. For the purposes of this article, we will point to two of their recommendations and how they fit with and may be supported by the concept of Authentic Intellectual Work (AIW). First, we examine the notion of geographic inquiry and how this may be used to improve geography teaching and learning. After all, " …the aspect of geography that has been implemented the least in schools is the application of geography understanding to answer questions or solve problems" [emphasis added] (Edelson, Wertheim, & Schell, 2013, p. 3). Secondly, we focus on six categories of geographic practice identified by the committee that should drive inquiry focused geography instruction. These geographic practices are: Posing geographic questions, Acquiring geographic information, Organizing geographic information, Analyzing geographic information, Answering questions and designing solutions, and Communicating geographic information. We believe that the 2 core concepts of inquiry and geographic practice can be used as starting points for geography instruction that utilizes AIW as a framework for organizing and implementing curriculum. What Does It Mean to do Authentic Intellectual Work? "Authentic" is used here not to suggest that students are always unmotivated to succeed in conventional academic work, or that basic skills and proficiencies should be devalued, but only to identify some kinds of intellectual work as more complex and socially or personally more meaningful than others. (Newmann, King, & Carmichael, 2007, p. 3). Social studies education scholars have long pointed to the low quality of instruction found in many social studies classes (Barton & Levstik, 2003; Cuban, 1991; Levstik, 2008; Ross, 2000). The stereotype of lower-order thinking activities, worksheet dominated classes, and memorization of isolated facts continues to be pervasive in our field. If the purpose of the social studies as a school discipline is "…to help young people make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world" (NCSS, 2010, p. 9), then our social studies classes/spaces should reflect this ideal. In short, social studies classes should reflect the activities, mindsets, and skills that are actually required of citizens—social studies should match the world/space that students enter/inhabit. Authentic Intellectual Work ensures that students are engaged with challenging (i.e., real) tasks that, rather than

representing a "series of contrived exercises to earn credentials" (Newmann, King, & Carmichael, 2007, p. 2), represent activities that are required of citizens in their day-to-day lives. In this sense, the term "authentic" does not necessarily mean "real" (although it can) but it does serve a term that separates the work that students typically do in schools (for grades) and the organized, purposeful application of knowledge in a meaningful ways (for jobs and daily problem solving). Because AIW is focused on applying knowledge and ideas to real world issues and tasks, the in-depth study of a problem concludes with products that have meaning beyond the traditional classroom parameters (i.e., assignments and grades simply to earn a grade). With this brief introduction in mind, AIW can be summarized by its focus on 1) construction of knowledge, 2) disciplined inquiry, and 3) value beyond school (Newmann, King, & Carmichael, 2007). Construction of Knowledge When framing social studies instruction around the "Construction of Knowledge" idea, we are essentially asking our students to take on the mindset of social scientists doing work in a discipline. In this way, they are producing knowledge in much the same way as historians or geographers. For example, in a geography classroom examining the racial segregation in the city of Detroit (http://www.metrotimes.com/Blogs/archives/2015/08/31/the-racial-dot-map-shows-theworld-just-how-segregated-metro-detroit-is_), students would use "documents, graphic sources, and inferential reasoning to make judgments" (Scheurman & Newmann, 1998, p. 2) to answer inquiries about why people live where they do. In the same way the geographers attempt to answer questions about society using geographic tools and reasoning, so would our students. Having students use the tools of social scientists to answer real questions is, in some school climates, aradical idea and constitutes a very different type of social studies experience for students (Newmann & Associates, 1996). As King, Newmann, and Carmichael (2009, p. 44) write, AIW involves "organizing, interpreting, evaluating, or synthesizing prior knowledge to solve new problems." Allowing students to develop geographic inquiries directed towards problems in their communities allows students to "do geography" with an eye towards the local, and that supports their investigation from a disciplinary perspective (next section). In this way we are helping students to understand the philosophical foundations of geography as well as how geographic knowledge is created, used, and represented. Disciplined Inquiry With the publication of the NCSS C3 Framework (2013), there is a renewed interest in inquiry pedagogy in social studies education. Within this category of AIW, students are asked to 1) "use a prior knowledge base, 2) strive for in-depth understanding rather than superficial awareness, and 3) develop and express their ideas and findings through elaborated communication" (King, Newmann, & Carmichael, 2009, p. 44). As teachers know, social studies content is better understood if it connects to some prior knowledge the student already possesses. Prior knowledge in social studies could take the form of any number of experiences (Newmann, Marks, & Gamoran, 1996). In geography, the good news is that all students have had some experiences with this subject matter from watching the news to using GoogleMaps on their smart phones to getting lost on a road trip. In fact, everything happens somewhere, thus geography is everywhere. Depending on the lesson, prior knowledge in social studies can be strengthened by infusing common readings, videos, discussions, or mini-lectures into your unit of study. The task of "indepth understanding" requires that we look beyond the superficial understandings (i.e., labeling place names) and work to understand how geography can be used as a lens (Alleman, 2010) for understanding the world. Students in a geography class would need to understand the problems and issues that are inherently a part of the discipline (Segall, 2010; Schmidt, 2011). Finally, the concept of elaborated communication speaks to the ways in which students use the language that experts within a given field use in their day-to-day work. "The language they use—verbal, symbolic, and visual—includes qualifications, nuances, elaborations, details, and analogues woven into extended expositions, narratives, explanations, justifications, and dialogue" (Newmann, Marks, & Gamoran, 1996, p. 284). When students have the requisite prior knowledge and

in-depth understanding, they can begin to use the language of geography to convey their understanding of the inquiry under investigation (see Pang, Fernekes, & Nelson, 2010; Todd, 2011). Value Beyond the Classroom If you have ever had a student ask the question "Why do we have to learn this?" then you are familiar with the "Value Beyond the Classroom" aspect of AIW. Teaching and learning that addresses this part of AIW has meaning beyond a grade or a checkmark for credit. "When experts in history, geography, economics, or political science do their work, there is a purpose to their work that is outside the bounds of simply displaying their competence in a field. Most assignments in school, by contrast, are only designed to document the 'competence' of the learner" (Chandler, Branscombe, & Hester, 2015). Assignments that are simply connected to grades "lack meaning or 4significance beyond the certification or success in school" (King, Newmann, & Carmichael, 2009, p. 45). Students find geography more interesting and consider it more useful when they are allowed to engage in projects and activities that foster active environments that challenge students' thinking (Trygestad, 1997). In the next section, we briefly outline some simple ways that geography teachers can begin to integrate aspects of AIW into their teaching practice. Authentic Intellectual Work In Real Life: Interdisciplinary Unit in Physical Geography When I was a student, I can remember asking the million-dollar question, "When am I going to use this after high school?" That question now drives my decision-making when I create lessons for my students. Now the question is "How can this material best prepare my students for life after high school?" When trying to prepare for my first year of teaching, I read and researched a lot to try and make the transition through my first year smoother. Armed with my beliefs and research, I came across AIW. During my teaching, AIW is woven throughout my classroom lessons; in fact, it is foundational part of my classroom culture as well. Below I share some brief examples of how I integrate this idea into my geography classroom. Specifically, the purpose of this lesson was help students understand the negative impact that rainforest deforestation has on climate and ecosystems. Construction of Knowledge: Construction of Climate Maps For the first part of our human-environment interaction unit, I co-taught with a science teacher about climate types around the world. My geography students and the science students were heterogeneously grouped to construct a map of the world as well as to color code the climates on the map. Previously, the students had learned about the climates around the world. They learned about location, seasons, weather, plants, and animals. By creating these maps, students were constructing something tangible and this helped to make a connection between where those climates were located on a map and what places had similar climates. After the students created the maps, each group had to research a "food chain" for one of the climates. In each group there were at least two science students that had to explain what a food web was and what aspects of their climate to research. Students utilized computers to research "producers and consumers" that were related within each climate. The importance of this lesson was for students to see how organisms survived in different climates and what the effect could be if an organism was removed from the area. Students were able to understand where animals were on the food chain depending on that certain climate. This information was being used to create a base of knowledge as they approached the next part of the unit. Disciplined Inquiry: Deforestation With climate types and food webs as prior knowledge, students were able to work together to solve real world problems. One of the problems the world faces today is the destruction of the rainforests. The school I currently teach at has a strong emphasis on teaching towards standardized tests because most students only need to pass the Ohio Graduation Tests (OGTs) in order to graduate. In order to accommodate real world issues and standardized tests, I researched past OGTs to find questions that would accommodate real world issues and standardized tests. Forexample, a question that has popped up in previous science and social studies OGTs involves negative environmental consequences. I wanted my students to study not only the climates around the world, but also how they can be affected by human interaction. Instead

of just giving students the answers, they used prior knowledge of climates and food webs to work in groups and discuss how to develop a solution. The students were using a real world example of human environment interaction and a higher order of thinking to come up with the possible solutions to this issue. As some additional insight, students were all given the same problem about providing negative consequences of rainforest deforestation, which ultimately challenged students to come up with several different consequences of this deforestation process. Elaborated communication: Impact of Rainforests A technique that I utilized for communication was a process called "Think, Pair, Share" which allowed students to first work individually on their conclusions before they discussed in a group setting. As students felt more comfortable with their conclusions and rationales, they were then able to pick fellow classmate to partner with and further discuss their responses. After about ten minutes, the pairs joined with another pair to become a group of four to repeat this process in larger groups. In the groups of four, students had to create a response of two negative consequences for deforestation. Once students came up with a strong response, the discussion opened up to the class. The groups were able to discuss their findings with a great sense of confidence because of all the previous steps that were taken. During this process, most groups said pollution, loss of animal habitats, and the dangers of the climate changing. Because of this group discussion, students were able to see how much damage was being done by humans negatively interacting with the environment. The use of machines creates pollution that damages our environment and can cause human suffering due to poor air quality. The loss of animal habitats would lead to animals becoming extinct and disrupting the food web. The biggest realization to the students was that the climate in the rainforest was dependent on the trees. When more trees are cleared, the whole system is disrupted. After the discussion, students had to complete an exit ticket. The exit ticket helped me to assess if the students learned the objective of explaining two negative consequences of rainforest deforestation. One of the questions on the exit slip for the students to answer was, "How can rainforest deforestation change the climate in places like Brazil?" Value Beyond School: School Recycling Program As a bell ringer the next day, I asked students to write down three to five ways that they individually and negatively impact the environment. Having discussed some of their responses, I then asked them to think of ways they could reduce their negative impacts on the environment. For example, one student said cutting down on the amount of hairspray she uses would have a positive impact on the environment, and another student said to walk more places rather than driving. To elaborate on the discussion further, I created a lesson to connect to students' lives by thinking about what the school does as a whole that negatively impacts the environment—then we brainstormed on ways to "fix the problem." A matter that came up through discussion was the fact that our school does not have a recycling program. Because of this unit, students are currently writing letter to the principal to see if that situation can be changed. I spoke to the principal firstand told him that the students were going to try and change something around this issue. If the students are able to make this happen, my hope for them is that they realize that they can foster positive change in their worlds and make a difference. Moving forward as I plan a unit such as this in the future, I hope to make it overall a stronger, more comprehensive lesson. To do this, I plan to have a field trip to a recycling center or water treatment plant to ensure that the students fully understand the processes they are suggesting. As another idea, I would request my class do an art project with recycled goods and to have an interdisciplinary lesson with the art teacher. After the students wrote the letters, there was a formal test on the material. The test consisted of multiple-choice and short answer items. The multiple-choice questions were about climates and map reading. The short answer questions were focused on defining deforestation, where deforestation was occurring, and naming 2-3 consequences of deforestation. Below is a chart that helps show our ideas and how they connect to the 6 geographic practices and AIW. Organization Interdisciplinary Unit Authentic Intellectual Work 6 Geographic Practices

Content, Methods, Outcomes Construction of Knowledge 1. Posing Geographic Questions 2. Acquiring Geographic Information Climate Maps Disciplined Inquiry Deforestation Elaborated Communication 3. Organizing geographic information 4. Analyzing geographic information 5. Answering questions/designing solutions6. Communicating geographic information Think-Pair-Share, Exit Tickets Value Beyond School Recycling Program Conclusion Ultimately, strengthening geography in the US will involve highlighting its usefulness towards citizenship education. As this very brief example bears out, this sort of geography instruction is possible. We believe that AIW can aid in this process. As scholars (King, Newmann, & Carmichael, 2009) of AIW have noted, this idea is uniquely suited towards this end. Authentic intellectual work prepares our students for the workplace and citizenship, increases student engagement, and "strengthens the professional community" (p. 49) of teachers. Meaningful geography instruction that draws from recent developments in the field of geography and that deploys AIW as a teaching stance is only limited by our imagination.

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IMPACT OF CAPITAL STRUCTURE ON PROFITABILITY: A STUDY OF SELECT AUTOMOBILE COMPANIES IN INDIA

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ABSTRACT

Capital structure decision is a very significant area of financial decision making due to its impact on other financial decision variables. Studies have proven the impact of capital structure decision on profitability. Present study aims at establishing the relationship between capital structure and profitability. Financial variable ROCE is considered as a dependent variable against. With fifteen years data and sixteen Automobile companies, both pooled regression and panel regression (Fixed effects and Random effects models) have been used and the best fitted model have been selected through Hausman test and Wald Test. The best fitted model was found to be the Fixed Effects model and according to that equity and short-term debt affects return on capital employed (ROCE) positively and negatively respectively and both are highly statistically significant. The model explained almost 57% variation in ROCE with no autocorrelation problem in error term. The study is of high significance to the investors as well as firms for decision making as the study reveals ROCE is fairly explained by Capital Structure composition.

***Keywords**: Capital structure; profitability; Fixed effects model; Random effects model; Hausman test; Wald test.*

1.0 Introduction

In the wake of globalization and liberalization of economic policies across the world, investment opportunities have expanded, financing options have widened and above all, dependence on capital markets has increased. A new business requires capital and the firm will require even more capital as it grows. The requisite finance can come from different sources and also in different forms as well. Firms can finance their assets using either debt or equity capital, but the best choice is a combination of both. Capital structure decisions are one of the most valuable decisions in corporate finance (Williams, 2007; Harris and Raviv, 2000).

Theories suggest that the choice of capital structure may help mitigate this agency cost. As noted by Grossman and Hart, (1982) under the agency costs hypothesis, a high leverage or a low equity to total asset ratio reduces agency costs of outside equity and increases firm value by constraining or encouraging managers to act more in the interests of shareholders.

Capital structure and its influence on the firm financial performance in general and Shareholders return in particular and overall value has been remained an issue of great attention amongst finance scholars since the decisive research of Modigliani & Miller, (1958) arguing that under perfect market setting capital structure doesn't influence the value of the firm. This proposition explains that value of firm is measured by real assets and not the way they are financed.

Jensen and Meckling (2006) posited that high leverage may initiate clashes between managers and shareholders due to selection of investment either equity, debt or hybrid (Myers, 2004), the risk they want to take (Jensen and Meckling, 2006, Williams, 2007), circumstances due to which firm might be liquidated (Harris and Raviv, 2010), and the dividend policy. Verifiable predictions of such type of models is that the raise in leverage should decline agency costs of ownership and debt holders thus improving business performance, everything else remained the same as before. However, when the leverage is relatively high to a certain limit, leads to an increase in debt and it will increase cost of debt, including an increase cost of bankruptcy or financial distress due to conflicts between equity holders and bondholders. To make distinction between these two sources of agency costs empirically is very difficult.

There exists a debate as to whether capital structure variables and financial performance or value of the firm are associated or not. There are two segments of believers: Modigliani and Miller and others who are in favour of non-

association and Jensen and Meckling and others who are strong believers of association between capital structure and value of the firm.

2.0 Literature Review

The underlying concern for any researcher behind conducting the comprehensive survey of existing literature is to explore the relevance of ongoing research study in relation to earlier research studies done in the field of his/her interest. It is an attempt to explore deep knowledge into the existing body of available literature to look what has already been explored and what is there yet to be explored Kumar, Sinha, Arora, & Aggarwal (2018) have analysed the impact of Capital structure expenditure on the profitability of companies listed on BSE from four different industries, being information and technology, Automobile, cosmetics & toiletries and the petroleum. They found that Capital structure expenditure on the profitability are positively correlated but the magnitude of association varies from industry to industry. Finally they have concluded that the public image of an industry greatly influences this relation between CSR activities and financial performance.

Dhananjaya (2017) in his paper tried empirically to know the impact of market value on the capital structure decision making of the manufacturing firms. He found that the market value influences the debt ratio negatively both in short term as well as long term, thereby conforming to the market timing theory proposed by Baker and Wrugler (2002). Further, he has concluded that this negative impact comes not from either changes in retained earnings or debt retirement but from changes in equity issues.

Ramachandran and Madhumathy (2016) studied ten textile companies from financial years 2004-2005 to 2013-2014. They used Percentage analysis and multiple correlation tests to analyse the collected data. They used Debt Equity ratio as proxy for capital structure and Net Profit Margin, ROCE, Return on Net worth, ROA and EPS as proxy for Financial Performance. Correlation analysis result showed that Debt Equity ratio is negatively associated with all the Performance measures, but only Net Profit Margin and Return on Net worth was statistically significant at 5% level.

Badu and Vitor (2012) studied 7 listed banks in Ghana from 2000 to 2010 and analysed the data using regression analysis. ROCE and ROA was used as proxy for bank performance and different capital structure variables were used. The result showed a negative relationship between capital structure variables and bank performance. Azhagaiah and Deepa (2011) in a study titled "Impact of firm size on the relationship between profitability and capital structure" analysed the impact of sales size on the relationship between Profitability and leverage, considering the size as the control variable. Their findings proved that there exists a positive correlation between Profitability and leverage in case of small size firms while, it showed a negative relation between Profitability and leverage in case of large firms providing evidence that debt capital decreases with increase in SIZ of the firm.

3.0 Identification of Problem

Due to the controversial results revealed by previous researchers as discussed in the previous section 'Literature Review', this situation provides an opportunity to add knowledge by analysing the effect of capital structure on company financial performance as measured in terms of shareholders return of a particular industry, here, Indian Automobile Industry.

4.0 Objectives of the study

Based on the published literatures on the topic and the problem as defined in the previous sections, the following objectives have been set:

(1) To know the degree of association among shareholders return and capital structure variables of Indian Automobile industry.
(2) To understand the movement of shareholders return in the context of capital structure composition through appropriate panel data model.

4.1 Research Methodology

For this Causal Research, Panel data of 16 cross-sectional Automobile companies across the four segments (i.e. two wheeler, three wheeler, four wheeler and commercial vehicle) have been collected from 'Capitaline Database'

from the financial year 2001- 2002 to 2015-2016 (i.e. it is a balanced panel) making altogether 240 observation in the study.

Capital structure is the composition of long-term liabilities, short-term liabilities like bank notes, common equity, and preferred equity which make-up the funds with which a business firm finances its operations. Hence to see the Impact of Capital Structure on Shareholders return, some capital structure variables have been identified and used in the study. Equity to Total Assets (ETA), Short-Term Debt to Total Assets (SDTA), and Long-Term Debt to Total Assets (LDTA) have been used as Proxy for Capital Structure. Shareholders return has been measured in terms of Return on capital employed (ROCE).

While measuring the 'impact of capital structure on shareholders return', some Control Variables (control variable is a variable that is held constant in order to assess or clarify the relationship between two other variables) have been identified and used in the study, viz. Return on Assets (ROA), Assets Turnover Ratio (ATR), Total Assets (TA). As ROCE also depends on profitability of the company, so ROA has been used as proxy for profitability. ROCE also depends on the management's efficiency as to the use of assets, as such ATR is used as proxy for efficiency. ROCE can also be explained by the firm's size, so TA has been used as proxy for size.

In this study, Pearson Correlation (correlation is one of the most common and most useful statistics. A correlation is a single number, irrespective of the unit of measurement, which describes the degree of association or relationship between two variables) Analysis has been performed for the overall industry. Correlation coefficient (r) will always turns out to be between – 1.0 to + 1.0. If correlation is negative, then there is a negative relationship and if it is positive, then there is a positive relationship between the variables.

The main objective of the study, i.e. to know the movement of shareholder's return in the context of capital structure composition, is achieved through regression analysis. First of all statistical Pooled OLS Regression or Constant Coefficient Model (CCM) have been applied and then Panel Data Regressions i.e. Econometrical Fixed Effect and Random Effect Models have been applied. Finally, Hausman Specification Test and Wald Test have been used to choose the appropriate model for final discussion.

How Do I Choose Constant Coefficient or Fixed Effect or Random Effect Model? To shed light on this question I have applied Durbin–Wu–Hausman test (also called Hausman specification test), so as to determine the appropriate model statistically.

"The null hypothesis underlying the Hausman test is that the FEM and ECM estimators do not differ substantially. The test statistic developed by Hausman has an asymptotic χ 2distribution. If the null hypothesis is rejected, the conclusion is that the ECM is not appropriate because the random effects are probably correlated with one or more regressors. In that case, FEM is preferred to ECM." (Gujarati, 2012). In other words, Random effects (RE) is preferred under the null hypothesis due to higher efficiency, while under the alternative fixed effects (FE) is at least consistent and thus preferred. As I get a significant P – Value, I have chosen FEM over REM.

Afterwards, I have checked which model is appropriate, Fixed Effects or Pooled OLS regression model using Wald Test.

Null Hypothesis: Pooled Regression Model

Alternative Hypothesis: Fixed Effect Model.

As again I got a significant p-Value, I have chosen FEM over CCM. As ultimate model in this study was found to be the Fixed Effects Model, so next I have briefly discussed FEM below.

5.0 Fixed effect model (FEM)

In this model also, all 240 observations are pooled, but it allows each cross-section unit (i.e. Automobile companies in this study) to have its own intercept value. Fixed Effects assumes that the individual specific effect is correlated to the independent variable.

5.1 Why would we use a fixed effects model?

- Controlling for unobserved heterogeneity when heterogeneity is constant over time and correlated with independent variables. When there are certain non-random characteristics you don't want ending up in your error term.
- Smaller standard errors (more powerful)

Taking the variables of the study, ROCE (proxy for firm performance) as dependent variable and ETA, SDTA, LDTA, ROA, ATR, and TA as independent variables, the following Fixed Effect regression model have been constructed:

*ROCEit = B1i + B2*ETAit+ B3*SDTAit+ B4 *LDTAit+ B5*ROAit+ B6*ATRit + B7 *TAit+ uit*

i = 1,2,3,……..,16

t = 1,2,3,……..15

In this Fixed Effect model equation, the subscript "i" on the intercept term (B_{it}) suggest that the intercept of sixteen companies may be different. The difference may be due to the special features of each Automobile companies, such as managerial style, management philosophy, or the type of market each Automobile company is serving.

In the econometric literature, the above model is known as Fixed Effect regression model (FEM). The term "Fixed Effects" is due to the fact that, although the intercept may differ across subjects, each entity's intercept does not vary over time, i.e. it is *time-invariant.*

The above model is one-way fixed effects model because I have allowed the intercept to differ among companies. There is also time effect, we it is believed that ROCE changes over time because of the factors, such as change in technology over time, change in government regulations and/or policies over time, and others. If the intercept is allowed to change over time also, then the model would be known as two-way fixed effects model, and this is because of the fact that the intercept, in that case, would be allowed to differ for both the individual and time effects.

In this study the truthiness of the statement is tested by either accept or reject the hypothesis statement at 5% significance level. There was only one hypothesis statement which was divided into null and alternative hypothesis.

The Null Hypothesis (H0) and Alternative Hypothesis (H1) was as follows: Ho: There is no significant relationship between capital structure and shareholder's return.

H1: There is a significant relationship between capital structure and shareholder's return

For data analysis purpose I have used Econometric Software EViews (Econometric Views), more specifically, EViews. 9.5 Student Lite version, developed by Quantitative Micro Software (QMS), now a part of IHS Markit Ltd. (INFO, Information Handling Services), which is a company based in London, United Kingdom.

5.2 Research Findings, Analysis and Discussion

Table 1 shows the correlation coefficient results between dependent variable ROCE and independent variables ETA, SDTA & LDTA AND between dependent variable ROCE and control variables ROA, ATR & TA. This result shows correlation for the entire Indian Automobile Industry, i.e. all the four segments taken together, which means all the 240 observations for each of the variables have been considered.

The signs of correlation indicate a negative association between ROCE and all the three independent variables, namely ETA, SDTA & LDTA. But a positive association is being indicated between ROCE and all the three control variables, namely ROA, ATR & TA.

Table 1: Correlation Result for IAI

	ETA	SDTA	LDTA	ROA	ATR	TA
ROCE	-0.2066	-0.1400	-0.3664	0.6167	0.3817	0.0434

***Source**: Compiled by the Author with EViews 9.5*

But the magnitude of the correlation (i.e. correlation coefficient) shows a low negative association between ROCE and SDTA (coefficient is - 0.1400). A moderate negative association is found between ROCE & ETA and ROCE & LDTA as the coefficients are - 0.2066 and - 0.3664 respectively.

As found in Das (2012) "the proportion of variation explained by regression is equal to the square of correlation coefficient (r), i.e. r^2=proportion of variation explained by regression. The value of r^2, therefore, enables us to state the amount of variation in the dependent variable which can be explained by

the regression equation." (p. 285). This means ETA only can explain 4% variation in ROCE (r^2=0.0426). Similarly, ceteris paribus, SDTA & LDTA can, respectively, explain almost 2% (r^2=0.0196) and 13% (r^2=0.1342) variation in ROCE. Further, the control variables such as ROA, ATR and TA can, respectively, explain almost 38% (r^2=0.3803), 15% (r^2=0.1456) and 0.2% (r^2=0.0018) variation in explained variable i.e. ROCE.

Table 2 shows the summary result of Hausman Test. As discussed before, this test is used to select the best fitted model out of Fixed Effects and Random Effects Model. The Null Hypothesis of the test is that the Random Effects model is the best and the Alternative Hypothesis is that the Fixed Effects model is best.

Table 2: Summary of Hausman Test Result

Correlated Random Effect - Hausman Test			
Test Cross section Random Effects			
Test Summary	Chi - Sq Statistic	Chi - Sqd.f.	Prob.
Cross Section Random	18.9495	6	0.0042*

***Source**: Compiled by the Author with EViews 9.5 [* = Significant at 1% Level]*

The test follows Chi-Square (χ^2) distribution. The above tables show the χ^2 value and Probability of Chi-Square. The P value of χ^2 is less than 0.01. This means rejection of Null Hypothesis of Random Effects Model and acceptance of the Alternative Hypothesis of Fixed Effects Model with 99% confidence level. From the Hausman test the Random Effects model is nullified and what we left with are the Fixed Effects model and Pooled OLS method. Now, to eliminate one between the Fixed Effects model and Pooled OLS method and select the ultimate and the appropriate model, let us check the Wald test result.

Table 3 shows the summary result of Wald Test. This test is used to select the best fitted model out of Fixed Effects Model and Pooled OLS method. The Null Hypothesis of the test is that all the individual coefficients are equal to zero, that means under null hypothesis the Pooled OLS Method is the best and the Alternative Hypothesis is that all the individual coefficients are significantly different from zero, which means under alternative hypothesis the Fixed Effects model is preferred as it is the best and appropriate for the data set.

Table 3: Summary of Wald Test Result

Wald Test			
Test Statistic	Value	d.f.	Probability
F - Statistic	22.2269	(7, 233)	0.0000*
Chi - Square	155.5885	7	0.0000*
Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=0			

Source: *Compiled by the Author with EViews 9.5 [* = Significant at 1% Level]*

As can be seen in Table 3 above, the Probability values (P values) of both the F - Statistic and Chi-square are less than 0.01, which means it is highly statistically significant even at less than 1% level of significance. So with 99% confidence level, the null hypothesis of Pooled OLS Method can be rejected and simultaneously, the alternative hypothesis of Fixed Effects Model is accepted.

Now, after applying Hausman test, the Random Effects model have been nullified and thereafter, by applying Wald test, the Pooled OLS method have been excluded. Finally what we left with is the Fixed Effects Model which is statistically best suited model for the data set used in this study. So the Fixed Effects model has been picked for further discussion in this regard as under.

The main objective of the study was 'to understand the movement of shareholder's return in the context of capital structure composition through appropriate Panel Data Model'. So, here the appropriate panel data model is Fixed Effects model Through the

result of this model let us understand the movement of shareholder's return in the context of capital structure composition.

From Table 4 for fixed effects model result, it can be seen that the dependent variable is ROCE; here the Return on capital employed (ROCE) has been used as a proxy for shareholders return. The three independent variables, namely ETA, SDTA and LDTA have been used as a proxy for capital structure composition. The three control variables, namely ROA, ATR and TA have been used as proxy for Profitability, Efficiency and Firm Size respectively.

Table 4: Summary Result of Fixed Effects Model

Dependent Variable		ROCE
Method		Panel Least Squares
Variable	Coefficient	Prob
C	3.1119	0.5428
ETA	0.3185	0.0001*
SDTA	-0.0814	0.0021*
LDTA	-0.1179	0.2521
ROA	0.5621	0.0001*
ATR	8.3774	0.0045*
TA	-0.0002	0.2480
R-squared		0.5657
F – Statistic		13.5194
Probability of F - stats.		0.0000*
Durbin-Watson Stat		1.7883

***Source**: Compiled by the Author with EViews 9.5 [* = Significant at 1% Level]*

Looking at the individual coefficients and their respective probabilities it can be observed that ETA, SDTA, ROA and ATR are the four variables which are statistically significant at 1% level of significance, whereas, LDTA, TA and the Constant term are not statistically significant even at 10% level of significance.

Now, with the coefficient values, let us frame the final estimated model to predict ROCE based on independent and control variables. The final model is as under:

$$ROCE_{it} = 3.1119 + 0.3185*ETA_{it} - 0.0814*SDTA_{it} - 0.1179*LDTA_{it} + 0.5621*ROA_{it} + 8.3774*ATR_{it} - 0.0002*TA_{it} + u_{it}$$

$$i = 1,2,3,\ldots\ldots,16$$

$$t = 1,2,3,\ldots\ldots.15$$

The estimated equation shows the intercept 'C' being 3.1119, which is expected means value of ROCE when all independent variables = 0. In other words, even if all the independent and control variables are zero, then ROCE will become 3.11119%. Though this result is statistically not significant even at 10% level of significance (as the p Value of the intercept term > 0.10).

The coefficient of ETA is found to be 0.3185, which implies if ETA ratio increases by 1% point then ROCE will increase by 0.3185%. This result is highly statistically significant even at less than 1% level (as the p Value of the intercept term < 0.01). The coefficient of SDTA is found to be '- 0.0814', which implies if SDTA ratio increases by 1% point then ROCE will decrease by 0.0814%. This result is highly statistically significant even at less than 1% level (as the p Value of the intercept term < 0.01). The coefficient of LDTA is found to be '- 0.1179', which implies if LDTA ratio increases by 1% point then ROCE will decrease by 0.1179%. But this result is not significant statistically even at 10% level of significance (as the p Value of the intercept term > 0.10). The coefficient of ROA (used as a proxy for Profitability) is found to be 0.5621, which implies if ROA ratio increases by 1% point then ROCE will increase by 0.5621%. This result is highly statistically significant even at less than 1% level (as the p Value of the intercept term < 0.01). The coefficient of ATR (used as a proxy for management efficiency) is found to be 8.3778, which implies if ATR ratio increases by 1% point then ROCE will increase by 8.3778%. This result is highly statistically significant even at less than 1% level (as the p Value of the intercept term < 0.01). The coefficient of TA

(used as a proxy for Firm Size) is found to be '-0.0002', which implies if TA increases by 1% then ROCE will decrease by 0.0002%. But this result is not significant statistically even at 10% level of significance (as the p Value of the intercept term > 0.10).

The R - squared value, the coefficient of determination, is a statistical measure of how well the regression line approximates the real data points. Here, for the appropriate model, i.e. Fixed Effects Model, the R2 value of 0.5657 implies as much as 56.57% variation in ROCE have been accounted for by the independent variables and control variables, and the remaining 43.43% variation is still unaccounted for. Higher the R 2 value better the model and consequently greater the predictability.

The 'F'statistic and the probability of F statistic shows whether the overall predictability of the model is statistically significant or not. Here the probability of F statistic is highly statistically significant. Because the P value of F statistic (0.000) is less than 0.01, this means the model is significant even at less than 1% level. This means we can reject the null hypothesis of no linear relationship and accept the alternative hypothesis of linear relationship between capital structure composition and shareholder's return in terms of ROCE.

As we know Durbin-Watson Stat (D-W Stat) can vary from 0 to 4. Value close to 2 meaning there is no autocorrelation in the residuals. Looking at the table above, the D - W stat is 1.7883, which is very close to 2. So it can be stated that adjacent residual/ error term (for first order only) are not correlated. So, the assumption of independent errors (no autocorrelation) is met in this Fixed Effects Model.

So, after the analysis and discussions above, it can be inferred that the capital structure composition has a bearing on shareholder's return in general, and on Return on capital employed (ROCE) in particular.

6.0 Conclusion and Recommendations

The main objective of the study was to understand the movement of shareholder's return in the context of capital structure composition through appropriate Panel Data Model, which in this case came Fixed Effects Model. According to this model as much as 56.57% variation in ROCE can be explained through the capital structure composition and hence it can be concluded that financing decision is vital decision which should be made strategically keeping an eye on its effect on shareholders return so as to attract more investors and investment in the companies.

The Indian Automobile industry with high domestic production and sales trend and a considerable export trend has a high potential to compete the other countries in this domain and emerge as a leader of Automobile manufacturers. With the high driving population and low passenger vehicle density, the Government and the Industry concerned should endeavour to enable a proper regulatory environment, develop talent and skills, fast-tracking Infrastructure, incubate R&D and innovation, and try to enhance supply chain competitiveness, so as to make India one of the leading Automobile manufacturing hub.

The Company Management of Indian Automobile companies should increase the short term debt to total asset ratios (SDTA) because they have much influence on company performance in terms of return on capital employed (ROCE) if compared with other capital structure ratios. Moreover, Investors of Automobile companies in India should review the capital structure of companies before investing in them because the strength of a company capital mix determines the level of returns. So, more Automobile companies in India should put their financial information through different stock exchange in Indian (like BSE, NSE) in order to allow investors to review their capital structure and attracts more investors and investment in their companies.

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SMART AGRICULTURE IOT BLOCKCHAIN DESIGN FOR ENHANCED SECURITY AND SAFETY

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ABSTRACT

The Internet of Things (IoT) is developing into thorough knowledge that can be used in all intelligent systems and will be a part of future internet generations. Like the Blockchain, IoT is a burgeoning technology in which each node has a distributed ledger that improves transparency and data security. Because of the blockchain broadcaster's ability to implement smart contracts and consensus, illegal users cannot carry out any fault transactions. The Blockchain and the Internet of Things can be combined to enhance the application's performance outcome. The technical problem will always be controlling the IoT environment's sensor-connected gadgets and processing the Blockchain. In this context, the essentials of blockchain technology and its attributes are summarized. In this article, a proposed design for smart agriculture by fusing Blockchain and IoT, is suggested and several new architectural frameworks devised.

Keywords: *IoT, Blockchain, Distributed ledger, Mining, Sensors*

1. Introduction

Any number of sensor nodes can make up a blockchain. Each node has a shared ledger that enables numerous nodes to read and modify the catalog in a single edition while also sharing and maintaining control. A decentralized ledger that securely and permanently a history of interactions between both the nodes is included in each of the Blockchain's nodes[1]; equipment eliminates the need for second-party intermediaries, which existed earlier necessary to act as trustworthy agents who can verify, synchronize and store, the events, by exchanging the databases amongst the nodes. Blockchain technology successfully provided information from the ledger [2] that was formerly maintained in a secure method by advancing the knowledge from traditional central to a decentralized then to a decentralized network, as seen below in Figure. 1, 2. Business networks can leverage blockchain technology. Any organization or group of people that join with the intention of transferring or sharing assets is portrayed as part of a business network. These resources can be physical (like food, materials, technology, or finished goods), digital (like music or data), or both. Those resources may be exchanged between members by recording the things tracked by a shared distributed, expected, [3] disseminated throughout the commercial network. So every member will have access to the most recent accounting record as well as documentation of the transaction. Blockchain uses a consensus to build smart contracts and distributed ledger trust across a corporate network. The public ledger keeps track of all transactions' histories and the assets' present condition. Blockchain technology can only be updated with new transactions. A trade could be taken out of the distributed network once it has been put to it [6]. Every transaction in the public ledger is encrypted to prevent manipulation by unauthorized users. The Blockchain also changes blockchain technology, and because it is immutable, it can serve as the network's source of precision and proof.

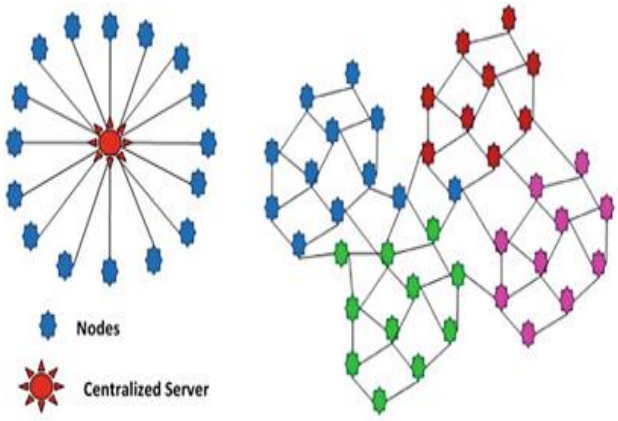

Figure 1 (a) System architecture with centralization (b) Architecture for distributed systems

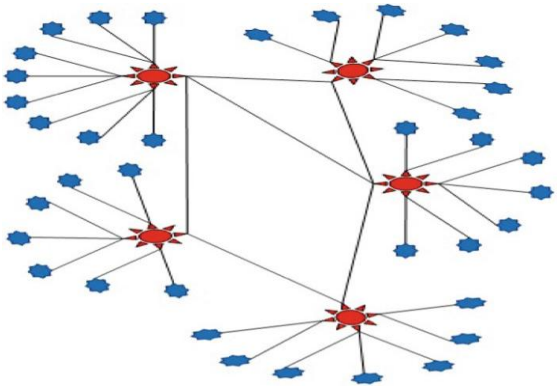

Figure 2 Decentralized system design

Preliminaries:

2.1. Blockchain

A distributed system of nodes uses a blockchain, a data model, to generate a digital ledger [7]. Using cryptography techniques, every node user on the network manipulates the shared ledger safely without a centralized authority [8]. The elements of the blockchain are the Prior Block Header, Time and date, Nonce, and Merkle Core Hash.

2.1.1 Elements of Blockchain:

The tree construction demonstrates how the Merkle root [8] is produced. Each operation generates a hash. The process kept going till the very last transaction. When new transactions are added, Merkle hash base modifications by the current hash value are very safe. The primary components of Blockchain are displayed in Figure. 3.

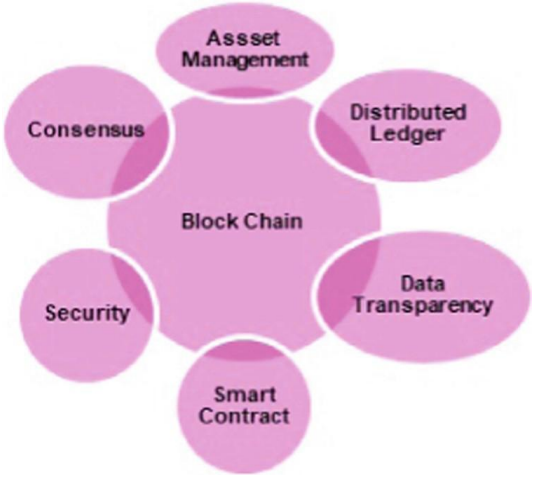

Figure 3 Blockchain elements

2.1.2 Blockchain Architecture:

A dispersed network of nodes can obtain consensus using the blockchain design in Figure. 4 without such necessity for this centralized authentication.

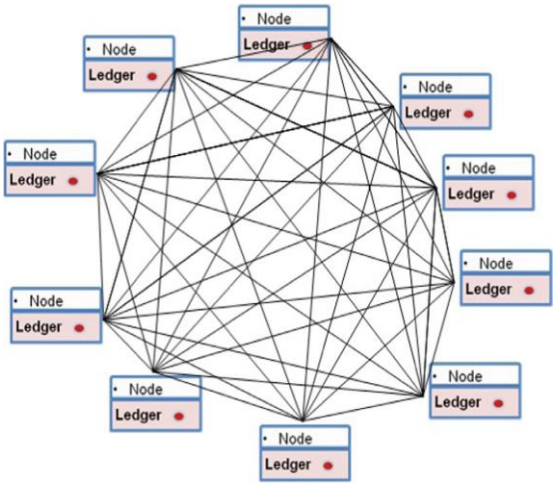

Figure 4 Blockchain architecture

These are the several types of blockchain architecture:

1. Public Permissionless Figure. 5 allows everyone to join the blockchain network and contribute.
2. Blockchains with private permissions Figure. 5 - Users should have permission to participate.

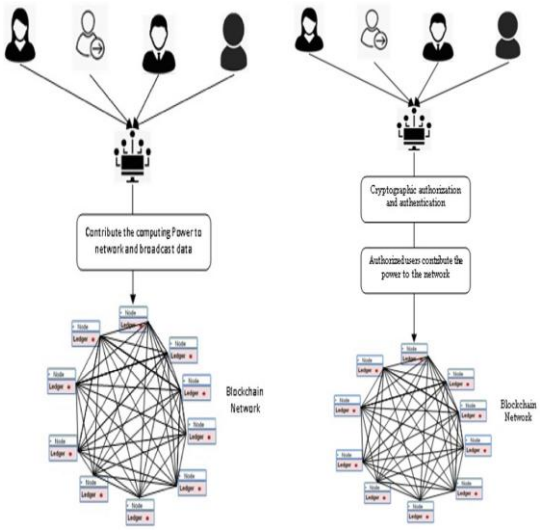

Figure 5 Public permissionless blockchains (left) and private permissioned blockchains (right)

2.1.3 Blockchain Method:

The stages a blockchain network takes are displayed in Figure. 6.

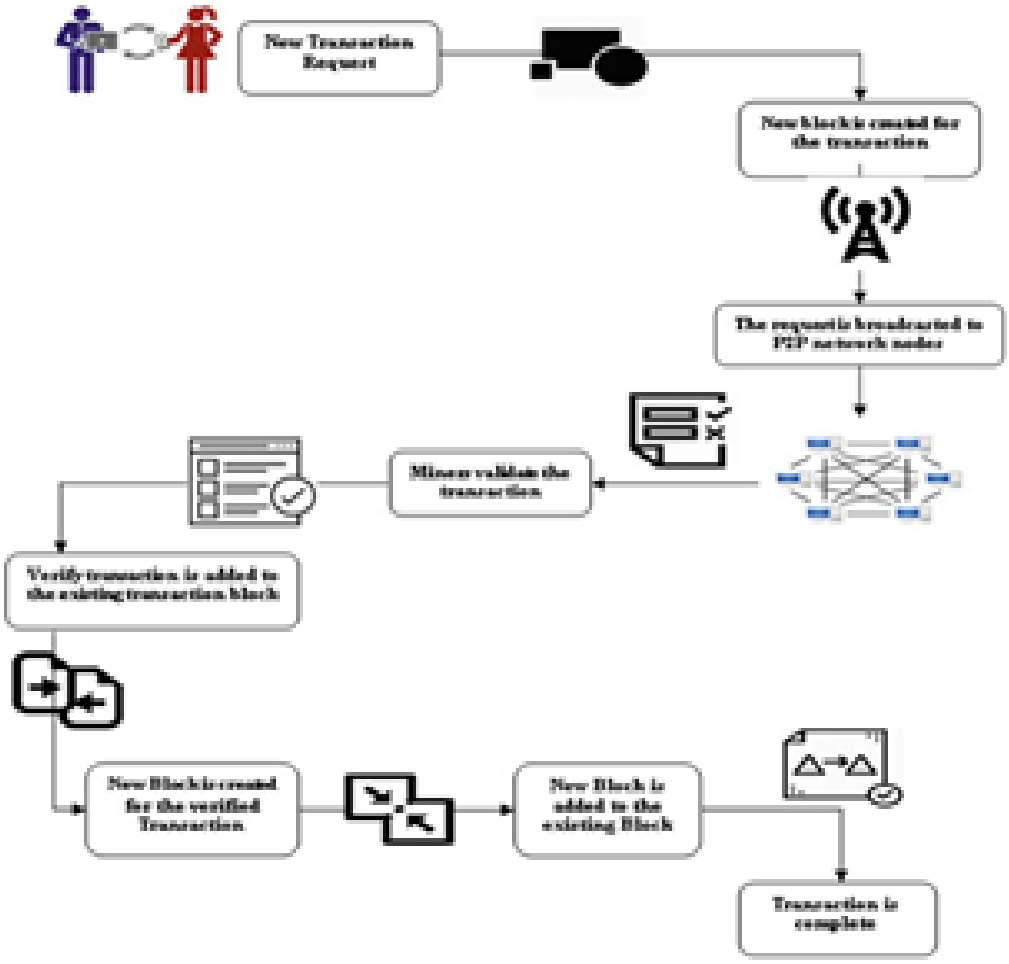

Figure 6 Blockchain architecture

2.2 IOT:

Internet-enabled gadgets must be built so the data they give is trustworthy enough for the purposes it is intended, such as extensive data analytics [9]. The IoT enables end devices, such as computers, to control other devices or portable. In the IoT, any devices can be linked together. The sensors gather data about objects, which the computer can access with internet gateways, and remote devices are related to the gadgets. It's over devices connected to an Internet of Things network without human interaction. Adaptability [8] in the Internet of Things is exceptionally high. The one drawback, however, is that there is a potentially significant danger of losing access to information from IoT devices. The devices that you want to monitor constantly are connected to the sensors and devices.

3. IoT-Based Smart Agriculture with Blockchain Proposed Design

In this work, we focus on designing a blockchain-based IoT infrastructure for use in intelligent agriculture. The blockchain networks engaged in smart homes collect data from the sensors linked to objects used in monitoring smart agriculture [10, 11]. The following list and illustration depict the nodes participating in Blockchain-based Smart Agriculture in the IoT in Figure. 7. The following are the node requirements for IoT Smart agriculture based on Blockchain:

- PH Node Control
- Node for Temperature Sensors
- Fire and Smoke Control Node
- Node for Pressure Sensor
- Fire and Smoke Control Node
- Lighting Control Node
- Water Moisture Control Node
- Air Control Node, wind speed
- Node for pollution control
- Pressure Control Node, CO2

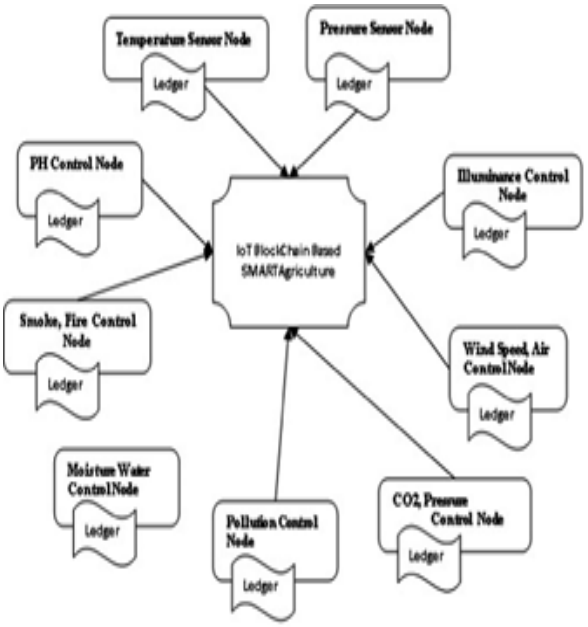

Figure 7 Smart IoT blockchain technology agricultural nodes

3.1 IoT Blockchain-Based Smart Home System Proposed City Architecture

The complete architecture is demonstrated and is created for IoT-based Smart Agriculture using Blockchain in Figure. 8.

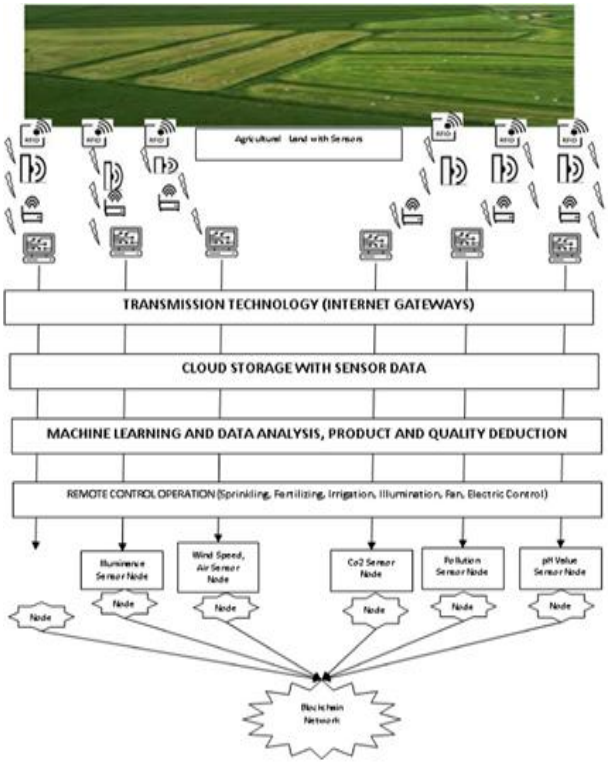

Figure 8 Proposed innovative farm system architecture based on IoT blockchain

Here, we have described how to use a smoke fire control node.

3.2 Node for Smoke Fire Control

The network's nodes all function as miners. Every node forwards a localized copy of the Blockchain that contains all authorized transactions. Each node's transactions entail reading, collecting, and keeping track of sensor information. Including the actual storing operation, updating the information[12,13,14] is also required. Let's now focus on the Smoke Fire Suppression Node, which is a single node. Use case illustration for Accessing the Smoke Fire Detail Transactions Blockchain-Based Smart Agriculture in IoT displayed, and the activities of the Smoke Fire Control Nodes are always as follows in Figure. 9.

- Control of Smoke Fire Transaction
- Transaction Details Store Smoke Fire
- Access the Smoke Fire Transaction information
- Keep track of the Smoke Fire Status Transaction.

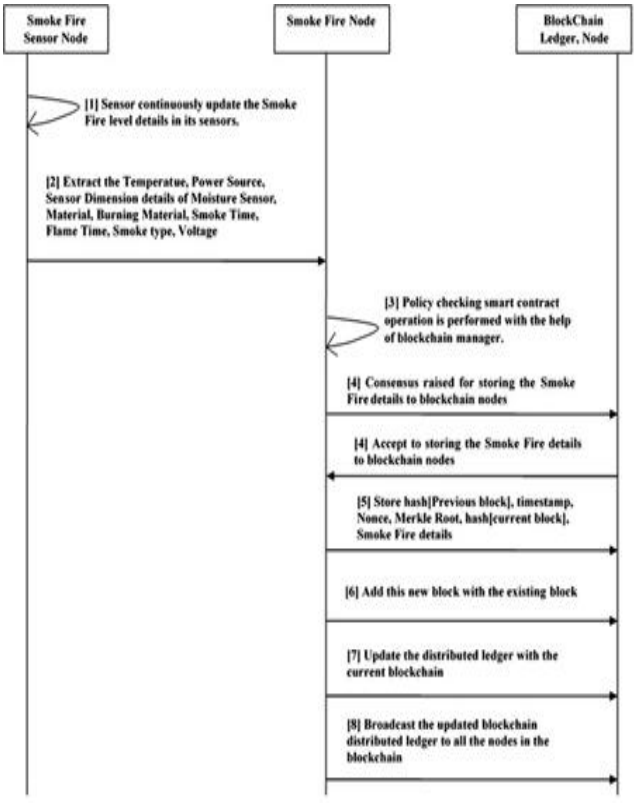

Figure 9 Use IoT blockchain-based smart agriculture to get smoke fire details transactions Diagram of a proposed use case

Algorithm 1: Control of Smoke Fire Process

1. Begin the remote-switching procedure for the fire detector sensors that are situated on farms near water motors, land, power distribution transformers, and densely wooded areas.
2. The information on the moisture level in the smoke sensor sensors detector is continuously updated.
3. Obtain the information about the Smoke Chemical, Power Source, Temperature, and Smoke Fire Detector Sensor's Dimension.
4. Obtain information about smoke fires from the smoking utilizing web gateways as a fire detection sensor.
5. Data from Data analysis: Smoke Fire is saved on the cloud.
6. The Smoke Fire Suppression Node retrieves data that Smoke Fire has analyzed.

Algorithm 2: Transaction Details Store Smoke Fire

1. Utilize the sensor node to obtain information about the installation locations for agriculture's smoke fires.
2. To store in the Blockchain, smart contracts that do policy verification are used.
3. To store the Smoke Fire information from those other blockchain nodes, unanimity was raised.
4. Permit the Blockchain to be upgraded with the Smoke Fire data.
5. Save the following information: smoke fire), hash(previous block), time, Merkle Root, Nonce, and hash(current block characteristics.
6. Include the existing block and this new block.
7. With the most recent Blockchain, refresh the shared ledger.
8. Publish the most recent version of the distributed ledger on the Blockchain to all nodes.

Algorithm 3: track the status of the smoke fire transaction

1. Monitor the smartphone's frequently changing Smoke Fire information first from Sensor Node.
2. The smart contract policy should get Smoke Fire data later in a specific time frame.
3. To keep track of the Smoking Fire data, smart contract operations are carried out that check policy.
4. Automatic the alarm to go off and the freshwater pump if the necessary Smoke Fire specifics to be above the idle level.
5. Get the smoky fire data from the sensor node if the time limit has passed.
6. To store the Smoke Fire information from those other blockchain network, the consensus was established.
7. Permit the Blockchain to be upgraded with the Smoky Fire data.
8. Save the following information: smoke fire data, timestamp, Nonce, hash(previous block), Merkle Root, and hash(current block).
9. Include the existing block and this new block.
10. With the most recent Blockchain, refresh the shared ledger.
11. Distribute the revised Blockchain - based distributed ledger to all blockchain nodes

Algorithm 4: Obtain Smoke Fire Transactional Information

1. Use the sensor node to obtain information about the smoke fire in the agricultural field.
2. Retrieve the following message: Battery Power, Flame Visible Boss, Conspec smoke types, and Voltage level.
3. To record on the Blockchain, smart contracts undertake policy-checking operations.
4. To store the data from those other blockchain nodes' Smoke Fire services, consensus was raised.
5. Permit the Blockchain to be upgraded with the Haze Fire data.
.6 Include the current block and this additional block.
7. With the most recent Blockchain, update the shared ledger.
8. To all blockchain nodes, broadcast the updated distributed ledger on the Blockchain.

4. Implementation of Proposed Work

In this paper, a blockchain network on the Ethereum Private Blockchain network serves as the Prototype for the proposed model. In Ethereum, there seem to be two different kinds of identities. They include Contract accounts that are managed by the Agreement code as well as overseas bank accounts[15,16,17,18]. Here, the complete set of nine machines in this network is deployed underneath the Contract account Monitoring Agriculture but are publicly owned in Figure. 10. When the Contracts accounts receive the message, the code is carried out. To build public key pair for each device that uniquely identifies an IoT device, the LibCoAP code was changed[19,20,21,22]. The benchmarking software CoAPBench is utilised in this work to evaluate the overall system performance. Before sending the subsequent confirmable request, it sends the previous one and waits for the response. The Javascript interface that makes up a large part allows an Internet of Things (IoT) device that connects to a blockchain network. It receives the request, uses RPC to retrieve the content from the blockchain, and then sends the answer back to the IoT devices[22,23,24,25,26]. It is determined how the management hub's throughput influences the latency of the blockchain operations[27,28], which is demonstrated in Figure. 11, 12

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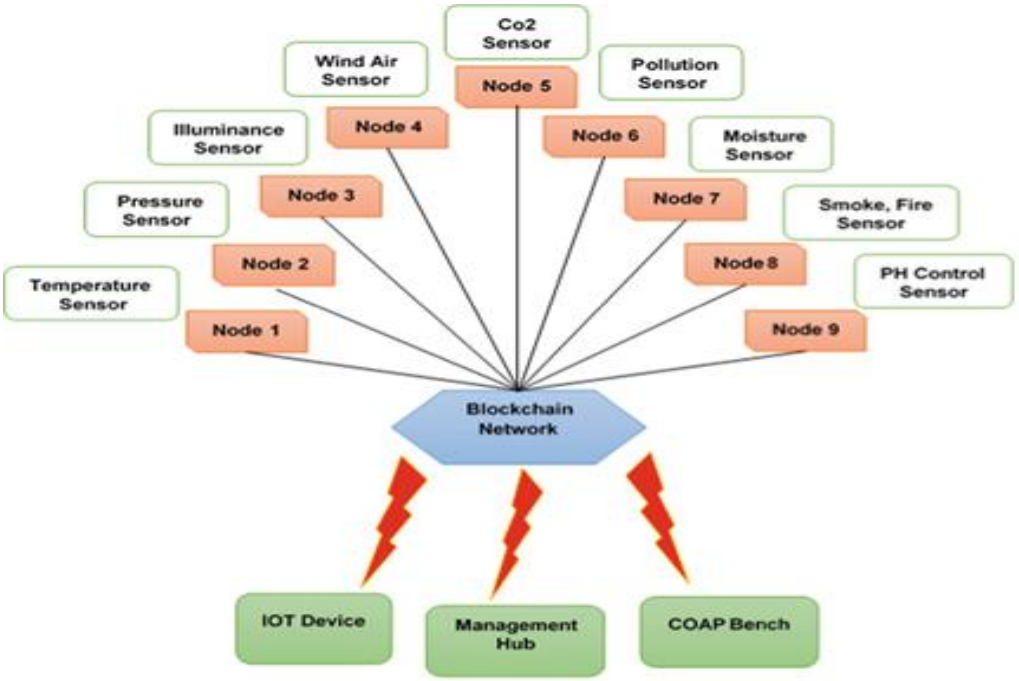

Figure 10 Use IoT blockchain-based smart agriculture to get smoke fire details transactions proposed use case diagram

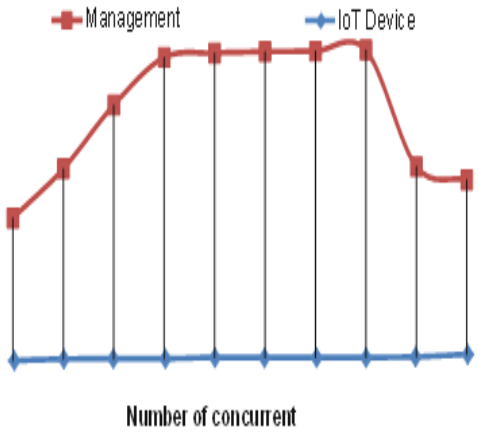

Figure 11 Throughputs of suggested IoT blockchain-based smart agriculture's management hub transactions

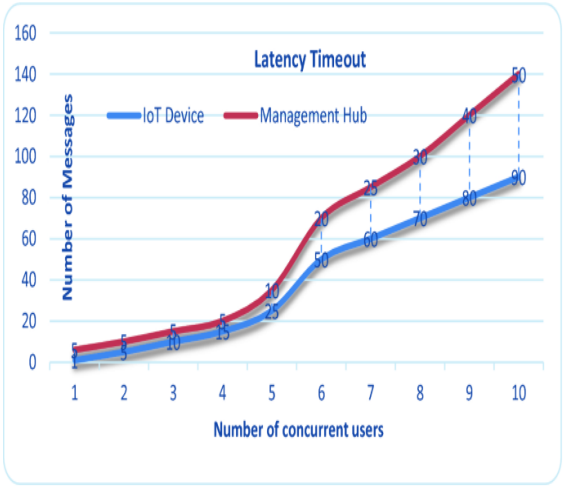

Figure 11 The management hub's timeout latency for the planned Smart IoT blockchain technology agricultural

5. Conclusion

This paper aims to explore the fundamentals of blockchain technology as well as this essay's characteristics. An IoT blockchain-based system for sustainable farming is suggested in this article, so a new integrated framework developed that improves data security transparency. The blockchain nodes and architecture have been well displayed. The work will be continued to improve the system by using distributed consensus techniques to forecast the performance metrics.

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ROLE OF TECHNOLOGY IN MANAGERIAL DECISION MAKING-REVIEW

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ABSTRACT

Organizational productivity and decision-making are concurrently increased by technology and communication skills. However, relying too heavily on technology might reduce the advantages that nonverbal communication can offer. Decisions made by an organization might make or ruin it. Making decisions is a multifaceted, difficult process. When it comes to enterprises, especially in the competitive business world of today, this procedure becomes considerably more complicated and challenging. Nowadays, decisions may be made in a virtual setting, while also being made in the midst of uncertainty and with little to no information. It's conceivable that decision-makers aren't speaking face-to-face. In order to effectively use technology, particularly information technology, in managerial decision-making, it is essential to understand the challenges, complexity, and advantages of doing so. Such an understanding is important for building future management techniques and organizations as well as for evaluating the effectiveness of managers and their companies.

Keywords: *Decision-making, ICT, information technology, non-verbal communication, organization.*

1. Introduction

Technology is a powerful weapon that gives you the freedom to use it anyway you see fit, not only as a tool to make your everyday tasks simpler. The benefits of technology are readily apparent in the modern environment, particularly when it comes to businesses, commerce, and trade.

Technology-based tools offer vital information for decision-making. A few examples of contemporary technological platforms that enable almost rapid information flow and dissemination are e-mail, text messaging, and video conferencing. More information is transmitted, which speeds up the decision-making process. A more rapid study than past investigations has been published by (Muzellec) and colleagues (Bartelt & Dennis, 2014). O'Raghallaishin 2018, a background for the influence of communication technology on decision-making was provided. Technology and communication abilities are essential for the work. Boost decision-making while raising output at work. As technology develops, costs go up, and it becomes clear that information will be sent farther and faster. Stakeholder interactions, both internal and external, are happening more often than previously (Teeroovengadum, Heeraman, & Jugurnath, 2017). According to a 2015 study (Omoniyi), 58 percent of respondents thought technology has increased their ability to communicate with and make decisions about their local bank. Technology makes it possible to share knowledge, but electronic conversations could do so more quickly, which could cause misunderstandings and prevent further conversation (Fomichov et al. 2014, Fomichova).

Fig 1: Prime technology cities of India

1.1 Technology Acceptance Model

A theoretical model that describes how people come to embrace and use information technology is called the Technology Acceptance Model (TAM). The Theory of Acceptance Model (TAM) is an expansion of the preceding Theory of Reasoned Action, which concentrated on user behavior.
The idea holds that when consumers encounter new technology, a number of factors, such as the following, influence their decision regarding how and when to use the technology:

Perceived usefulness - According to Fred Davis, this is "the level of a person's belief that employing a certain system will boost their ability to accomplish their job." It refers to a person's perception of the technology's utility for its intended application.

Perceived ease-of-use – Davis in 1989 defined it as the degree to which a person believes that using a particular system would be simple. The barriers will be gone if the technology is easy to use. If something is challenging to use or has a complex user interface, nobody likes it.
TAM has been widely used to a range of various technologies, including personal computers, web-based programs, and mobile devices, in the field of information technology. The model may be applied to create interventions that can boost user acceptability and adoption as well as to anticipate and analyze user adoption and usage trends.

1.2 Decision-making tendencies in technology

(I) Everything becoming digitalized: The usage of computer systems, computerized data, communications, and other infrastructures through the internet is the technology trend that has been detected in the contemporary business and organizational operating environment. Digitization is the term used to describe the entire process of shifting processes to the computer system environment. The fad has been around for a while and has an impact on people's life in many ways. Automated Teller Machines (ATMs), internet retailers like Amazon, and personal marketing are a few examples of this. To improve their management and performance, business organizations have been able to adapt to new systems and equipment. Health care organizations have embraced the trend as well by using digital technology to manage their services (Lientz & Rea, 2016). The way we communicate and receive news has also changed. There are now more outlets available for the distribution of news, including websites, newspapers, email, and social media.

(II) Internet of Things: This technical viewpoint may be compared to a collection of tiny electronic gadgets that are capable of self-learning and self-awareness. The gadgets have been designed to be able to manage their own networks. The dispersed and deployed devices may locate one another and afterwards communicate with the server systems. IoT typically offers functions and capacities for data gathering and retrieval in corporate settings. Utilizing the gadgets makes corporate procedures more automated and efficient, which boosts overall productivity. Additionally, this guarantees that all pertinent information is gathered and that no crucial information is omitted. It encourages thoroughness in how business is conducted.

1.3 Systems employed in making wise decisions

Technology provides the following systems to help decision-makers in any business make crucial judgments quickly:

(I) Decision support systems (DSS)–Decision support systems assist in the administration of an organization's processes and levels of development as well as in assisting individuals in making decisions regarding issues that may change rapidly and are difficult to estimate beforehand, or when a problem lacks structure. Systems for supporting decisions might be entirely automated, operated by humans, or a hybrid of the two.

(II) Group decision support system (GDSS) –The company may need to make a number of decisions together. To develop a plan and solution for any issue or product, the company may require the participation and collaboration of numerous personnel. An organization may run a software programme, for instance, and decide as a team whether to correct any bugs or add new features.

(III) Geographical information systems (GIS) –The goal of this decision support system is to locate, provide, operate, research, and complete the geographic information. Users of GIS tools may create queries, check the accuracy of the data, change data maps, and exhibit the outcomes of all these activities.

(IV) Artificial intelligence (AI) –Machine learning is another name for artificial intelligence. It has been proven that machines are unconcerned with the inherent intelligence displayed by people and other animals. Computer science's field of artificial intelligence (AI) emphasizes the development of intelligent computers that function and react much like people. One use of AI is speech recognition.

(V) Expert systems –A computer system known as an expert system can make decisions on par with trained humans. Instead of using conservative technical code, these kinds of systems often use cognitive information processing, mostly expressed as if-then logic, to tackle complicated issues.

(VI) Neural network –Computing systems inspired inexactly by biological brain networks are called artificial neural networks. These systems often lack any task-specific programming with distinct patterns and instead learn to do tasks by taking into account instances.

(VII) Genetic algorithm –A genetic algorithm is an evolutionary algorithm, which is a larger class of metaheuristics inspired by the process of natural selection in computer science and operations research.

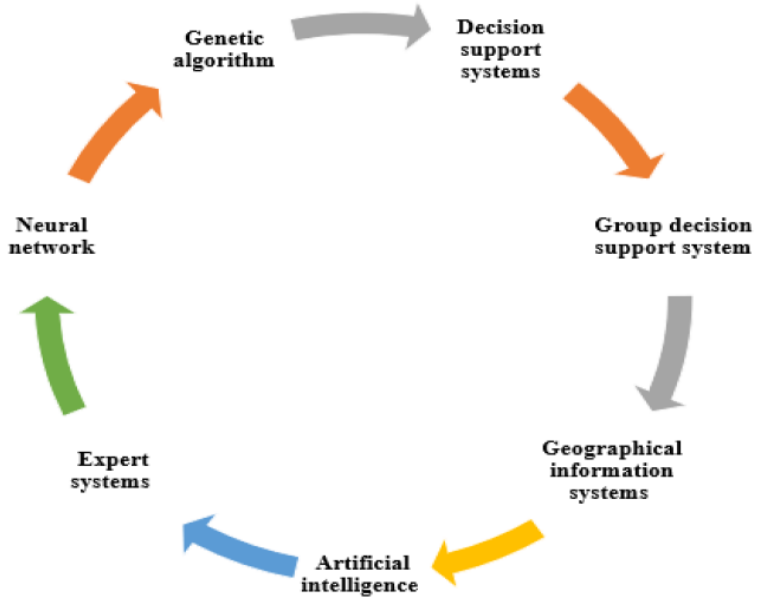

Fig2. Systems that help people make good decisions

2. Background of the Study

This study set out to examine how technology is used in decision-making and determine whether sacrificing information accuracy for speed has any unfavorable effects. Employees use of nonverbal communication abilities to make choices has been impacted by the development of communication technology. In technological communication techniques like email and text messaging, body motions are less crucial. Unfortunately, an inability to understand physical cues can lead to a reduction in emotional intelligence. Communication that is ineffective is influenced by a lack of empathy. The rapid development of technology and the growing usage of information and communication technology (ICT) in business companies have recently come into emphasis. The aspect of decision-making that requires time and effort is the search for and collecting of information. Utilizing ICT shortens the time needed to acquire information and makes it easier to obtain fresh data. Information may be obtained more quickly than in the past because to ICT

methods like email, social networks, video sharing, worldwide broadcasting, mobile phones and online management information systems. In addition, these technologies make it possible for us to access a lot more data than we could before due to increased connectivity and information flow. This is how information and communication technology (ICT) improves the manager's capacity to access more information more quickly, reducing the limitations of the limited information and time managers have to make decisions. ICT aids in reducing the expense of organizing meetings.

Despite the availability of technology for communication, it should not take the place of face-to-face interaction, which can improve your morale and eliminate the gap of interaction. Presentation of thoughts and emotions to others is a part of communication. Whether or whether they agree with them on the subject, people communicate in order to affect the understanding, attitude, and actions of others. Additionally, communication is a two-way process in which any information that is transmitted requires a response from both sides. Unconsciously, nonverbal communication is a valuable addition to spoken communication. This sort of nonverbal communication is significant because it conveys information about a person's personality, mood, social standing and goals. It follows that the efficiency of the communication process plays a significant role in an organizations quality.

Although using technology as a means of communication is beneficial to an organization's daily operations, it should not take the place of face-to-face conversation. In an organizational context, using non-verbal cues can improve decision-making and communication. As a result, studies from a wide range of sectors demonstrate the potential benefit of recognizing non-verbal signs when conversing. Every day, about 55% of all communication acts that have the potential to make an effect on the target audience involve nonverbal communication.

The kind of nonverbal behavioral cues used to communicate in settings requiring face-to-face communication between two or more individuals may have an impact on the receiver's mood and expected reaction. These unintentional nonverbal acts may directly affect how encounters turn out.

3. Problem Statement

Changes in company practices are frequently necessary to attain organizational health. New technology is typically included into these developments. When making decisions, consider the advantages and difficulties of technology management. This will help you execute change effectively. This thesis will look at the problems with technology management that affect how well changes are implemented. A case study will be developed to do this. The objective is to provide a formal approach for the change management process. To enable the favorable effects of change implementation and prevent the unfavorable effects, the tool will combine and embrace crucial components of technology management.

4. Objectives of the Study

The goal of this descriptive study is to determine if over reliance on technology might lessen the value of nonverbal communication in corporate decision-making. Utilizing technology only to generate and distribute information might be detrimental to individual productivity. In their opinion, using technology as the main means of communication at work places more trust in technical systems than in human resources.

Digital technology has made it possible for more forms of human communication, fostering ties across many communities, cultures, and continents. However, little is known about how various means of communication impact our ability to accurately recognize and use nonverbal behavior cues.

Technology has always played a role in decision making, but its role has become increasingly important in today's fast-paced and interconnected world. Technology provides us with the ability to gather and process vast amounts of data quickly and efficiently, which can be used to make informed decisions. It also allows us to communicate and collaborate with others around the globe instantaneously, which can help us to reach consensus on difficult decisions.

In many ways, technology has made the process of decision making more efficient and effective. However, there are also some potential pitfalls to consider. One is that technology can sometimes create an illusion of certainty, leading us to believe that we know more than we actually do. Another is that technology can lead to groupthink, where everyone relies on the same data and comes to the same conclusion without considering alternative viewpoints.

Overall, technology plays a vital role in decision making, but it is important to use it wisely and not allow it to override our own judgment and common sense.

5. Literature Review

The specific issue was that if technology was used excessively for decision-making, it may reduce the advantages nonverbal communication could have for organizational leadership decision-making. When executing a sales transaction, people who were able to recognize the nonverbal indications of consumers may have greater customer satisfaction ratings and more sales (Puccinelli et al., 2013). The purpose of this study was to increase organizational leaders' knowledge of the specific issue in order to encourage good social change. In order to meet this objective, the study had to present evidence in support of the idea that technology and nonverbal communication may enhance decision-making when utilized in tandem.

This qualitative exploratory multiple case study's goal was to investigate how excessive reliance on technology may reduce the advantages non-verbal communication might have for organizational leadership decision-making. Organizational executives frequently make decisions and communicate using technology (Xiaojun & Venkatesh, 2013). Technology may be useful in an organizational context, but if it is used too much, it can make it difficult for a leader to read the nonverbal signs of the audience.

Organizations must have the capacity to interact with internal and external stakeholders at any time in the linked world of today. While ICTs give businesses the capacity to engage instantaneously with their target audience, there is still a chance that decisions may be made incorrectly. The chance of making poor decisions rises along with the communicators reduced capacity to recognize particular non-verbal signs that emerge throughout communication.

No one can contest the immense advantages that digital communication offers. The ability to converse with individuals without seeing or hearing them, however, also has drawbacks. We stop seeing the social clues that nonverbal communication provides.

ICTs and nonverbal communication organizations must have the capacity to interact with internal and external stakeholders at any time in the linked world of today. While ICTs give businesses the capacity to engage instantaneously with their target audience, there is still a chance that decisions may be made incorrectly. The chance of making poor decisions rises along with the communicators reduced capacity to recognize particular non-verbal signs that emerge throughout communication. Information may be distributed quickly thanks to ICTs thanks to technological platforms like video conferencing, text messaging, and email. Users may send text and multimedia messages to one or more recipients via email and text messaging in just a few seconds. The simultaneous sharing or viewing of visual and audio data is possible with video conferencing.

ICTs and nonverbal communication each offer advantages that may contribute to the organization's success. Negotiations with potential clients benefit from nonverbal communication in addition to verbal communication. Since nonverbal indicators are subconscious, it might be challenging for someone who isn't taught to hide their true feelings. ICTs and nonverbal communication each have drawbacks in terms of organizational applicability. Because there are so many different cultures and subcultures, it is difficult to examine the universal norms of non-verbal communication, hence research studies tend to generalize their findings. ICT user training is necessary. Users who are not properly trained might reduce corporate productivity.

The combination of three ideas that are common in organizations—decision-making, nonverbal communication, and technology—provided the conceptual framework for this

study. Combining these ideas allowed me to study the issue of how overusing technology may reduce the advantages nonverbal communication could have for organizational leadership decision-making.

ICT usage is supported by relational and contractual governance. In order to build and maintain long-term bilateral relationships that are based on trust and integrity, relational governance strongly emphasizes interpersonal interactions and cooperation. The strategy used to guarantee that the outcomes established between a firm and its suppliers are being met is known as contractual governance. The main reason to ICT project fails is to use the contractual governance to implement new technologies instead maintaining the equilibrium between relational and contractual governance. Organizations are forcing to use ICT technology as result trust between employees will vanish and there will be decrease in the success rate of the implementation.

The relationship between in-person interactions and online forums helped set the stage for decision-making. Users using video teleconferencing can converse with one other as if they were in the same room. Web cams, the internet, and a computer are used by video teleconferencing applications to link individuals online. The made it easier to comprehend how both in-person and online interactions might strengthen decision-making and communication.

People who contribute to their company, both leaders and non-leaders, must choose two separate choices. The first choice is whether or not to produce, and the second choice is whether or not to take part. These choices aided in the explanation of the motivating elements that influence people's decision-making.

Several different categories of nonverbal communication exist. Among them are the following: vocal intonation, prosemic space, chronemic time, touch (shaking hands), vocal intonation, touch (style of clothing), and environment (space and distance) (Ili Kristyanti, 2012). Prisca Della (2014) and Ruben & Stewart, 2005 both contend that there are many ways to communicate nonverbally, including paralanguage, which comprises audible and auditory signals created in the same way as speech. It also covers the pace of speaking, loudness or weakness of voice, intonation, tone of speech, and tone of voice.

The next step is face movement (kinesics), which refers to how you use your arms, legs, face, and eyes to communicate with others. While speaking or listening, our faces will continually shift without our awareness. Maintaining eye contact is a crucial part of non-verbal communication since it shows that the other person is engaged in the topic at hand.

A touch is the third (haptics). According to Emmert & Donaghy (1981), the greatest way to communicate positive and negative attitudes is through touch or bodily contact. Contact duration and frequency can also be indicators of friendship and desire between those involved. Shaking hands, embracing, slapping, punching, rubbing heads, kissing hands, and other similar actions are examples. One of the means of nonverbal communication is physical appearance, along with closeness (distance). It has significance because of how it tries to feel and use space as individuals are perceived in action communication. Proxemics considers both the physical orientation and the distance between the two participants in a discourse.

5.1 Technology's Potential for Managerial Decision Making

A group of employed employees or members might use the group decision support system by utilising and incorporating technological breakthroughs and modern computer infrastructures. This technique is essentially used to make snap judgments that are well-informed. Among the skills offered by IT to decision-making are those for brainstorming, issue categorization, and analysis.

Brainstorming: In this part, ideas are largely generated by the organization's team. An illustration of a scenario may be that the team is assessing the organization's strengths, weaknesses, potential for growth, and threats. Users and members will be able to enter recommendations and comments simultaneously using GDSS (Helfat & Peteraf, 2015). Following the collection of this data, the team members' separate stations show the findings. By reducing time wasted, this skill

gives the company a competitive edge. Given the importance of time as a resource, a business that uses time effectively stands out from the competition.

Identifying and classifying issues: Individual team members can classify the thoughts and proposals offered in this part of the decision-making process into manageable groups. Each recommendation and idea is then evaluated based on its merit and contribution to the project's goal after additional discussion and clarifications have been provided. These concepts are categorised, sorted, and put into their relevant files by the GDSS (Helfat & Peteraf, 2015). It is possible to make comments and recommendations by opening these folders.

Effective data and information administration and assessment are accounted for by this competency. Other businesses are given a competitive edge by this. The organization's goals and objectives are realized when information is properly examined and managed.

5.2 Ability to Think

thought does, however, have significant constraints and drawbacks. Over time, organizations must embrace new techniques for managing and operating their institutions. This is because technology and information systems have some advantages over the way humans think.

(I)Inventory Management Systems: Stock management is a major issue for business enterprises. The quantity of each asset and item is tracked by the inventory systems. The management department is informed if there is inadequate stock, and the stock is upgraded (Pearlson et al., 2016). This is a time-consuming and stressful process that the human brain is fundamentally incapable of doing.

(II)Data management: The most valuable resources and assets of a company are data and information. Therefore, it is crucial to treat each data component as required. The quantity and type of information available to human thought has a limit (Pearlson et al., 2016). Utilizing information systems and technology allows for the augmentation of functions by managing and analyzing data, producing reports, and retaining records for potential future retrieval.

The machine learning technique known as supervised learning involves categorizing data in order to make sure that a function or pattern may be realized from the data. Unsupervised learning is a type of machine learning in which conclusions are drawn from input data that hasn't been labelled (Zhao & Liu, 2007). Unsupervised learning aims to identify hidden groupings or patterns in unlabeled data.

5.3 How supervised learning is used by artificial neural networks (ANNs) to forecast outcomes in decision-making

In supervised learning, artificial neural networks (ANNs) are used to predict outcomes for decision-making. A series of computing models called artificial neural networks (ANN) is based on connectionist architecture. The vector input is given to the network at the time of supervised learning training, and the network subsequently outputs a yield vector. An artificial neural network (ANN) performs pattern recognition and picture data categorization to anticipate outcomes in supervised learning (Pedregosa et al, 2011).

5.4 Examples from the real world

Studying the relationships between the consumers of a product and the items can serve as an example of unsupervised learning for associations. The customer (person) will discover similar items after purchasing one since there is a connection between the two. To ensure an increase in sales when new items are introduced to the market, they are connected with the existing ones.

Data analysts employ categorization to start an effective relation in the context of supervised learning. This is an illustration of how a bank might assess a customer's capacity to repay a loan before deciding to provide one. This may also be done by taking into account factors like savings, consumer earnings, and financial history. As a result, this information was obtained from historical loan data.

Artificial neural networks are mathematical models inspired by how organic neurons function and are organized. There are several differences in artificial neural networks that are

connected to the type of task that the network was given to complete. The neuron is modelled in a variety of ways as well. These models sometimes closely mimic biological neurons (e.g., Gluck and Bower, 1988; Granger et al., 1989), but other times they significantly deviate from how real neurons actually behave. Even non-linear functions can have a rough approximation using artificial neural networks. Piecewise estimations of functions can also be estimated using artificial neural networks.

Artificial neural networks may automatically divide the sample space into distinct functional regions by utilizing one or more hidden layers in the network architecture. In other words, artificial neural networks are perhaps capable of creating piecemeal non-linear models. A excellent illustration of such a model is the artificial neural network model for the exclusive OR function (Wasserman, 1989, pp. 30-33). When Collopy and Armstrong (1992) plotted forecasting experts, they discovered that the experts valued extrapolation techniques that could recognize and maintain sudden changes in historical data patterns, indicating the value of piece-wise models.

Due to how the models are evaluated, several statistical time series approaches have specific restrictions. Many different statistical time series models require human engagement and review for approximation. However, automatic estimation of artificial neural networks is possible (Hoptroff, 1993). Additionally, as fresh data are collected, multiple statistical models need to be periodically re-estimated. There are several incremental artificial neural network methods.

Additionally, artificial neural networks have flaws. While many statistical modelling approaches are stable and advanced, artificial neural network methodology and modelling systems are rapidly evolving. Software for statistical techniques is readily available, although the development of commercial ANN software is sometimes delayed. Many forecasting methods are easier to comprehend and provide physical meaning to than artificial neural network models. Compared to the majority of statistical forecasting methods, artificial neural networks cover extra estimation restrictions. Similar to statistical models, artificial neural networks require more computer time.

6. Future scope

Identification of problems, formulation of solutions, evaluation of those options, selection of an alternative, implementation of the decision, and evaluation of the efficacy of the choice are all steps in the decision-making process. Today, technology is used more and more in every organization's decision-making process. Any effective invention is essential to the continued operation of the organization in high-tech service facilities. The likelihood of innovation success is linked to the methodical reduction of decision uncertainty as a result of organizational measures for acquiring, disseminating, and analyzing evidence. Every business uses different decision-making tools, and without the decision-making process, the objective cannot be reached. In conclusion, supervised learning guarantees that a function or pattern may be realized from the data, whereas unsupervised learning seeks to define the hidden groupings or patterns in data from unlabeled data. The usage of data is the primary distinction between supervised and unsupervised learning. Unsupervised learning uses data that is unknown or poorly labelled, whereas supervised learning uses input data that is highly labelled and known.

7. Research gap

The non-verbal communication is beneficial in communicating in the organization. Since the technology came into existence it plays the main role in communication at workplace which increases rapidly which results in the excessively dependency of organization on the technology. The main objective of this study set out to examine how technology is used in decision-making and determine whether sacrificing information accuracy for speed has any unfavorable effects. The overall issue is that the high reliance on the technology as mode of communication may leads to failure of leadership of company and understanding the consequences of communication.

The specific concern was that excessive reliance on technology in decision-making might diminish the importance of nonverbal cues in organizational leadership judgments.

Another objective of the study is to encourage positive societal change. The results can lead to a discussion on how technology is applied in the organization.

8. Conclusion

Misunderstandings of the directives sent from the senior leadership to the lower management will result from communication breakdowns. Although it is not impossible, it will lead to disagreements and conflicts in the organization's management. In conclusion, it is evident that the efficacy of process communication plays a major role in an organization's quality. This data clearly supports the opinions of management and communication academics who highlight that communication should be at the center of an organization's operations. Information flow, communication, and human contact are therefore the three major elements of communication.

Additionally, communication is a crucial component of organizational success in enhancing organizational performance and flexibility to every change in the current commercial climate, ensuring that the company may continue to exist even as they gain a competitive edge. The organization can get the required information by having effective communication among the people and parties directly engaged both within and outside of the organization.

In the digital age, managers must utilize ICT to involve stakeholders strategically. The effectiveness of the relationships they develop with customers, workers, and suppliers has a substantial impact on the sustainability of the enterprises they run. Managers may better comprehend customer and competitor behavior by using ICT technologies, which helps them decide how to create and update goods and services. Similarly, managers identify, choose, and begin working more effectively with both new and current suppliers. ICT also enhances the accuracy, responsiveness, and interactivity of decision-making with employees. The use of ICT enhances management choices about the renewal of goods and services, the search for and selection of new suppliers, and the dissemination of choices to staff members.

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PLGA-LOADED NANOPARTICLES: AN OVERVIEW OF RECENT METHODS OF PREPARATION

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ABSTRACT

Polymeric PLGA nanoparticles have recently been developed to lessen their toxicity and enhance medication release patterns. The market offers various grades of PLGA by altering the polyglycolic acid and polylactic acid concentrations. Various techniques are employed to create PLGA-encapsulated nanoparticles. The amount of drug entrapped in the chosen emulsification process varies for various medications. More specifically, the reverse salting out approach is primarily employed for thermolabile materials, while the nanoprecipitation process produces particles based on stirring and rapid diffusion. The microfluidics technology, which has great reproducibility and is mostly utilized to create tissue-engineered products, is followed by the novel classical emulsion-templated method. This review also covered coacervation phase separation, solvent evaporation, solvent extraction, and salting out techniques are also covered. The novel classical emulsion technique is mostly used for PLGA-loaded drug delivery. The use of several methodologies, including stirring speed, temperature, polymer ratio, type and amount of solvent, Phase inducers, and type of electrolytes, shows various parameters' effects on particle size on nanoformulation. The preparation and development of polymeric PLGA nanoparticles in response to demand may be aided by this relevant information on current trends.

Keywords: *Nanoparticles, emulsification, Precipitation, evaporation, salting out*

Introduction

Nanocarriers find a useful application implementation in minimizing toxicity and improving drug solubility, stability as well as modifying of release pattern of the drug in a sustained manner, improving Pharmacokinetics and drug targeting capability. Various types of polymeric natural and synthetic ingredients are used and among them, a wider used biodegradable polymer PLGA approved by FDA for medicinal devices as well as for different drug products and it is commercially available in different grades[1]. PLGA-based products such as implants and microspheres are available in the market. The different types of methods made it possible to encapsulate organic and inorganic molecules into PLGA for a successful drug delivery system. During polymerization different grades of PLGA can be obtained; among them, PLGA 50: 50 is frequently used in nanotechnology. Depending upon the PLA and PGA ratio and molecular weight the degradation time of PLGA ranges from months to years. PLGA is mostly utilized for administrating injectables as intramuscular or subcutaneous. Even though many PLGA materials have already found a market, researchers are continuously working to create fresh preparation techniques that give them precise control over their natural properties. The next section will cover the most popular PLGA nanocomposite preparation techniques. To create PLGA nanoparticulate carriers, a variety of emulsion-templated nanoencapsulation procedures are used. Representative examples include membrane emulsification, nanoprecipitation, salting-out, single- or double-emulsion solvent evaporation/extraction, and microfluidic technology. Each nanoencapsulation method has unique benefits and drawbacks. All of these nanoencapsulation techniques combine an antisolvent with a PLGA-distributed organic phase (either in the form of droplets or in bulk). The usual methods for removing solvents include evaporation, extraction, or a combination[2].

Methods Of Preparation Employed For Preparing Plga Nanoparticles

1. Single- and double-emulsion methods of solvent evaporation.
2. Nanoprecipitation technique
3. Reverse salting-out procedure for emulsification
4. Emulsion solvent diffusion (ESD) technique
5. Use of microfluidics

1. Single- and double-emulsion methods of solvent evaporation

These methods are generally used to formulate oil in water emulsification in a single emulsion process to encapsulate insoluble drugs in water such as steroids. A double emulsification procedure using oil and water is appropriate for medications that dissolve in water, such as proteins, peptides, and vaccines and the polymer is used in the single emulsion technique. Drugs are dissolved in this polymeric solution using organic solvents like dichloromethane and chloroform and then the mixture is emulsified into an aqueous solution to create an o/w emulsion. The surfactants and emulsifying agents such as gelatin, poloxamer-188, Polyvinyl alcohol, and polysorbate 80 are incorporated in it. The organic solvent gets evaporated under pressure by using high-speed homogenization and sonication under reduced pressure and particles are obtained by freeze-drying. The particle size may be regulated by factors such as controlling the kind and quantity of the dispersion agent, the viscosity of solvent added, the stirring rate and the temperature used [3]. In some cases, the double emulsion is more suitable than the single emulsion as double emulsion shows higher encapsulation efficacy of hydrophilic drugs [4-7]. The stepwise process of emulsification shown in Figure 1.

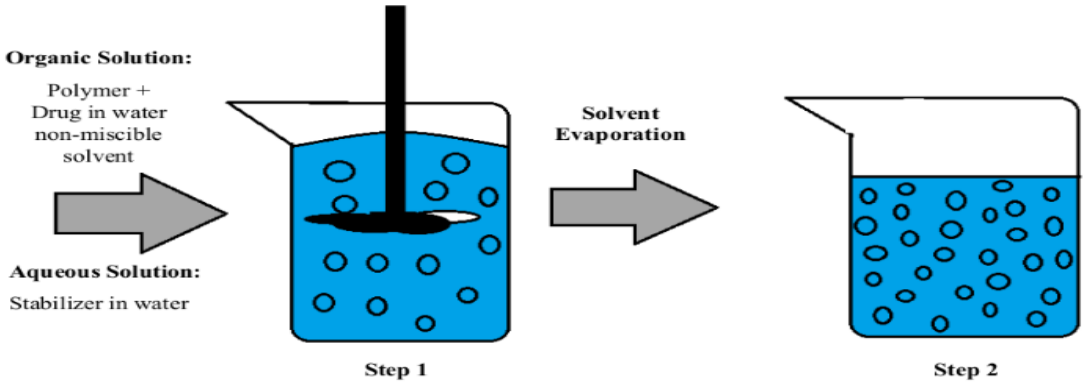

Fig 1: Schematic representation of emulsification solvent evaporation method

Advantages

i. Encapsulating both hydrophobic and hydrophilic drugs.
ii. High production rate

Disadvantages

i. Difficult to remove residues of solvents and stabilizers.
ii. Double emulsion unstable
iii. Heating is required for the evaporation process [3].

2. Nanoprecipitation technique

This is one step method also known as the solvent displacement method [8.] It involves a simple stirring method [9-11.] It contains three major components polymer, organic solvent (water miscible), and nonsolvent polymer. It involves the dropwise addition of a solution in a controlled manner containing drugs into an aqueous solution containing stabilizers and surfactants. Precipitation occurs and nanoparticles are formed by the rapid diffusion method under reduced pressure to remove the solvent. The nanoprecipitation method incorporates both hydrophilic and hydrophobic drugs. The water-miscible solvent used to dissolve drugs and polymers is acetone, ethanol, methanol, and acetonitrile. The properties of resultant particles depend upon molecular weight and ratio of polymer, the concentration of solvent used, and the mixing force applied to prepare particles [12].

Advantages

i. Single-step involved in preparation
ii. Low energy level required
iii. Reproducibility

Disadvantages

i. Suitable for small batch preparation as there is a chance of changing properties on scaling up production [9-12].

3. Reverse salting-out procedure for emulsification

This approach involves mixing acetone, a water-miscible solvent, the drug and polymer, as well as an aqueous solution including salting out agents' calcium chloride and magnesium chloride as well as polyvinyl pyrrolidone as a stabilizing agent. This mixture is stirred continuously and forcefully by using a magnetic stirrer. Once the resultant emulsion has been thoroughly diluted with water, the creation of nanoparticles is caused by increased acetone diffusion in the aqueous phase. The salting out agents and residual solvents were removed by the cross-filtration method. The emulsification diffusion technique is a modification of the salting out method as it eliminates the salt through the purification process [13 &14]. Sengul et al. employed a process that combined emulsification and salting out to encapsulate meloxicam in PLGA nanoparticles with varied mol. Wt. (5-15 and 40-75 kDa). The findings demonstrated that more stable particles were developed by greater molecular weight polymers[15.] Figure 2 represents the emulsification reverse salting out method.

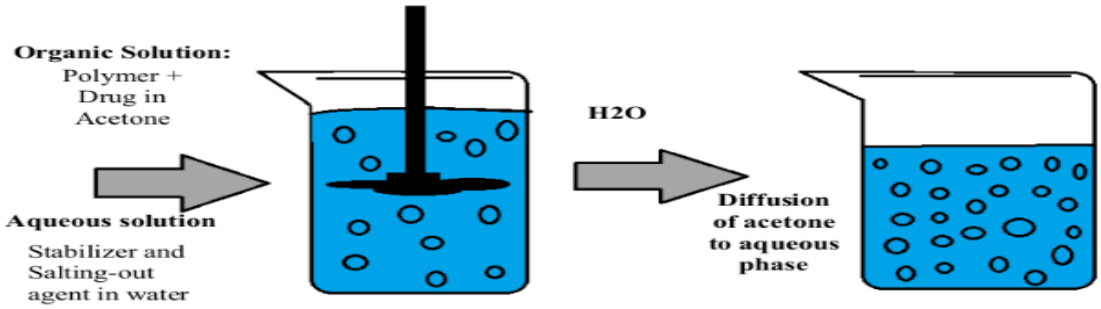

Fig 2: Schematic representation of emulsification reverse salting out method

Advantages

i. Suitable for thermolabile material as there is no requirement for heating for the process [14.]
ii. Minimizes tension to protein encapsulants

Disadvantages

i. Extensive washing steps [13].

4. Emulsification solvent diffusion (ESD): The method includes slight modification of the nanoprecipitation method to prepare the nanoparticles and to make them harder[16]. During this technique, a binary solvent mixture was used. Later, the drug is emulsified in the aqueous phase, and in the organic phase, the polymer and polyvinyl alcohol are used as a stabilizer. This process is followed by high-speed homogenization and water is added during regular stirring to the o/w emulsion system it causes phase transformation which results in outward diffusion by decreasing interfacial tension between the phases to produce nanoprecipitation. The Solvent evaporation and steam distillation method are used at the end to prepare the solid nanoparticles by removing the solvent [2,14 &17]. Figure 3 illustrates the diagrammatic representation of the emulsion solvent diffusion method.

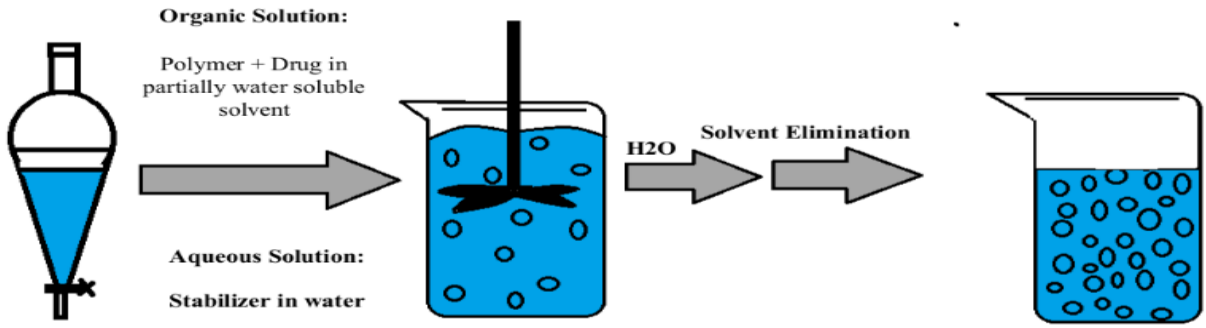

Fig 3: A diagram of the emulsion solvent diffusion method

Advantages

i. High encapsulation efficiency
ii. Narrow size distribution

Disadvantages

i. Chances of the water-soluble medication leaking into the external phase due to emulsification [14 & 18].

5. Microfluidics method

The microfluidic method produced controlled-size nanoparticles and polymeric nanoparticles with a high reproducibility rate. This method is classified into three categories:

a) Breakup co-flowing stream
b) Break up cross-flowing stream
c) Break up in the elongated flow

The Breakup co-flowing is infrequently used for the formulation of PLGA nanoparticles, and the production of PLGA nanoparticles T-Junction microfluidic device is mainly used [19,20]. Xie and smith used this device, they inserted a syringe needle through a water stream. After that, they feed the solution of PLGA which is already dissolved in acetonitrile, and produced nanoparticles in the series of 140 to 500 nm and have slighter size distribution as compared to conventional nanoparticles. The prepared nanoparticles are tightly packed and firm in structure and capable of burst release [21].

It is possible to enhance the microfluidics T Junction device to coat particular macromolecules on polymeric nanoparticles[22]. The previous microfluidic system T junction device has one inlet channel and the modified device consist of two channels. The modified device feeds two different types of dispersed phases, one of which was created by emulsifying doxorubicin Hcl in PLGA dissolving methylene chloride, and the other by emulsifying paclitaxel, acetone, and PLGA. By this method, they can produce hydrophobic and hydrophilic paclitaxel. And the encapsulation efficiency of both drugs was greater than 80% [23].

Martın-Banderas et al. encapsulate gemcitabine a water-soluble compound into PLGA nanoparticles, showing higher encapsulation efficiency of 97.3% as compared to nanoparticles 57.5% of it was created using the w/o/w emulsion process. A 3D multi-parallel microfluidic device has been developed by Lim et al. to improve the size of nanoparticle manufacturing while also preventing the fouling of microchannels by PLGA [24].

6. Spray-Drying Method: Spray-drying is a great way to synthesize PLGA particles at a larger scale. It is an efficient approach with minimum processing requirements. A W/O emulsion is sprayed into a heated air stream, causing particles to form. The hydrophobicity of the loading in the w/o dispersion affects the choice of solvent. The fact that the particles frequently stick to the interior walls of the spray drier is a significant demerit of this technology.

7. Electrospinning Method

For the synthesis of scaffolds, several methods are employed, including twin-screw extrusion, phase separation, porogen leaching, and gas foaming. Electrospinning is by far the most common, though. Due to its adaptability, simplicity and low manufacturing cost, electrospinning technology has gained greater attention in recent years. When creating scaffolds for tissue engineering, this technology has proven to be very helpful. In a nutshell, it comprises a straightforward setup in which a PLGA aqueous solution is held in a syringe and injected through a needle by using a strong electrical current. As a result, nanofiber jet spinning is accomplished and the needle becomes unstable. After that, the nanofiber is gathered on a conducting substrate. It is possible to alter some variables, like the voltage applied, the injection rate, and the collector type to alter the fibers' diameter. This technique typically produces scaffolds made of nanofiber sheets of a few nanometres to several micrometers [25].

Classical Emulsion Templated Nanoencapsulation Technique

1. Water-in-Oil (w/o) Emulsion Coacervation /Phase Separation

The PLGA is dissolved in an aqueous solution such as methylene chloride and it emulsifies an aqueous medication solution in it. The different Phase inducers such as vegetable oil, silicone oil, and mineral oils are a substance that is introduced to the emulsion to intensify the coagulation around the inner aqueous phase

and fusing produces polymeric particles. Then prepared emulsion is further hardened with organic solvent heptane, which acts as a solvent for phase inducer and dispersed solvent and acts as nonsolvent for PLGA [26]. Due to their insoluble organic solvent, the hydrophilic drugs provide higher encapsulation efficiencies. This approach has high expenses associated with processing oils in large amounts, and it is challenging to manage the coacervation while using this method.

2. Oil-in-Oil Emulsion solvent extraction/Evaporation method

The medication, organic solvent, and PLGA are all distributed using an extraction or solvent evaporation method, the solvent is eliminated from a continuous oil phase (such as silicon oil, liquid paraffin, or vegetable oil). After the solvent was removed and the PLGA nanoparticles were recovered using the centrifugation method, the remaining mineral oil was removed by washing with n-hexane [27]. Kashi et al. emulsified the dispersed phase in solutions containing Span 80, acetonitrile mineral oil, PLGA, and minocycline [28].

3. Water-in-Oil-in-Oil Emulsion Solvent Evaporation/Extraction method

Hydrophilic medications are encapsulated into PLGA nanoparticles using this technique. This process involves dissolving the hydrophilic medication in the water while dissolving the polymer in a solvent that is insoluble in water. The polymeric organic solution emulsifies the aqueous phase (w_1). This main emulsion (w_1o) is combined once more with an aqueous phase that contains an emulsifier (w_2), creating a double emulsion ($w_1/o/w_2$) before the organic solvent is eliminated to get PLGA nanoparticles. Low molecular weight pharmaceuticals are difficult to encapsulate with this method because of their tendency to escape into the (w_2) phase; therefore, it is substituted with an organic solvent that is miscible with the dispersed organic solvent and functions as an antisolvent for the polymer PLGA.

For instance, Afshari et al. dissolved PLGA and Span 80 in methylene chloride and then emulsified a methotrexate aqueous solution. This w/o1 emulsion was introduced to liquid paraffin (o_2) during homogenization. By using a centrifuge, the PLGA nanoparticles were separated, then washed with n-hexane after agitating the $w/o_1/o_2$ emulsion for 5 hours. An average 51.2% encapsulation efficiency was obtained using this nanoencapsulation method.

4. Water-in-Oil-in-Water Extracting ($w_1/o/w_2$) or evaporating an emulsion solvent

PLGA nanoparticles are utilized to encapsulate mostly hydrophilic drugs. In this method, the drug is dissolved in water (w_1 and the PLGA is dissolved in a solvent that is not water-soluble, and the polymeric organic solution emulsifies the aqueous phase (w_1). This primary is combined once more in an aqueous phase that contains an emulsifier (w_2). As a result, double emulsion $w_1/o/w_2$ is produced. The organic solvent is eliminated to produce the PLGA nanoparticles. Small-molecular-weight medications are often poorly encapsulated by this method due to their propensity to escape into the w_2 phase during nanoencapsulation [29].

5. Salting-Out Oil-in-Water (o/w) Technique

As a dispersion solvent for PLGA, the water-miscible organic solvent is employed. This method involves emulsifying an organic into an electrolyte-rich water solution a polymeric drug-containing solution. The electrolytes (sodium chloride, magnesium chloride, and magnesium acetate) are employed to completely saturate both the aqueous and polymeric dispersion phases. The salting-out effect prevents the organic solvent from combining with the water to form a stable o/w emulsion. Too much water is added to the emulsion to produce a reverse salting-out effect. This causes the water-miscible solvent to diffuse into the aqueous phase, causing nanoparticles to form [30-33]. The major advantage of this method is that PLGA is used in nano-halogenated solvents for which high-pressure energy is not necessary to produce emulsion [34].

Conclusion

By enhancing their stability and preventing their breakdown, PLGA is the polymer that has been approved for the delivery of pharmaceuticals. These techniques enable the targeted administration of hydrophilic and lipophilic medications, and in some circumstances, double emulsions

demonstrate greater encapsulation effectiveness than single emulsions. The procedure of a single step and lower energy is sufficient to prepare particles during nanoprecipitation. Without heating, more stable nanoparticles are created. High-speed homogenization during the emulsification solvent diffusion method exhibits improved encapsulation efficiency, demonstrating advancement in the nanoprecipitation method in the case of the reverse salting emulsification operation. The processing of oils makes the W/O emulsion coacervation procedure more expensive. Additionally, $w/o/w_2$ emulsion solvents and $w_1/o/w_2$ emulsion solvent evaporation are primarily utilized in the traditional emulsification method. Nano-halogenated solvents are employed during the salting out o/w procedure so that high pressure and energy are not needed.

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Declaration: The authors have no relevant financial or non-financial interests to disclose.

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A COMPARATIVE STUDY OF ONLINE AND FACE-TO-FACE EDUCATION FOR TEACHERS IN GOVERNMENT AND PRIVATE SCHOOLS OF PUNJAB

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ABSTRACT

This study aims to make a comparison between face to face and online education for teachers in government and private schools in Punjab, India. We have analysed the importance of teaching through face-to-face and online platforms in addition, this study has been conducted to explore significant differences between those two teaching platforms. Different challenges and recommendations to mitigate those challenges effectively have been depicted in this study. For this purpose, private schools in Punjab have been explored. Most of the schools are in urban areas. 6 schools are from urban areas and 4 schools are from rural areas. 400 teachers from different places have been surveyed to acquire effective information regarding teaching through face-to-face and online platforms. Hypotheses have been built to create a significant understanding of education process and critical approach in Punjab. In this study, we have utilised descriptive analysis, bivariate correlation and regression analysis to test efficacy of this acquired dataset. It has been found that development of communication skills can be acquired through online education and application. It has helped to understand the relevance of online education in Punjab. However, a significant relationship between online platforms and relevant note-sharing and support with devices has not been acquired in this study. In this study, it also has been found that face-to-face teaching acquires more efficacy than online platforms as a preferred mode of study induces more effectiveness in this aspect. Additionally, this study concludes that online platform in Punjab needs to be developed further to acquire a significant educational environment while accumulating relevant equipment and efficacy in the teaching process within online platforms.

Keywords: *Face-To-Face Education, Online Education, Teachers in government private schools*

1. Introduction

Education is one of the major aspects of human lives. Students can learn through two major processes including face-to-face learning and learning through different online platforms. Covid19 pandemic is one of the major reasons behind the increasing margin of learning through different online platforms. The authorities of both the government as well as private schools in India have focused on learning through online platforms during the COVID19 pandemic (Daumiller et al. 2021). The reason behind it is the blockage of the transportation system during the pandemic. Apart from that, teachers of different institutions have also been habituated to the usage of different learning tools to teach students through online platforms. However, there are some differences between the face to face learning and learning through online platforms. Teachers who do not have much knowledge of the usage of technical aspects can face a huge challenge the teaching through online platforms (Tartavulea et al. 2020). On the other hand, different other negative outcomes can also be faced by students during learning online.

Figure 1 shows the impact of different technical aspects on the learning process in India during the covid19 pandemic. According to the above figure, the Smartphone is a widely used technical aspect that has been used by students during this pandemic. The beginning of online education has created possibilities for teachers in obtaining a quality education with limited flexibility and busy lives. It is observed that in comparison with traditional teaching in classroom, Web-based instruction created possibilities in offering classes globally through a single connection to the internet. However, various advantages can be drawn from online education over traditional education online instruction has still some disadvantages that include little collaborative synergies. It is also observed online education seems to be a way for many teachers to evaluate appropriate teachings.

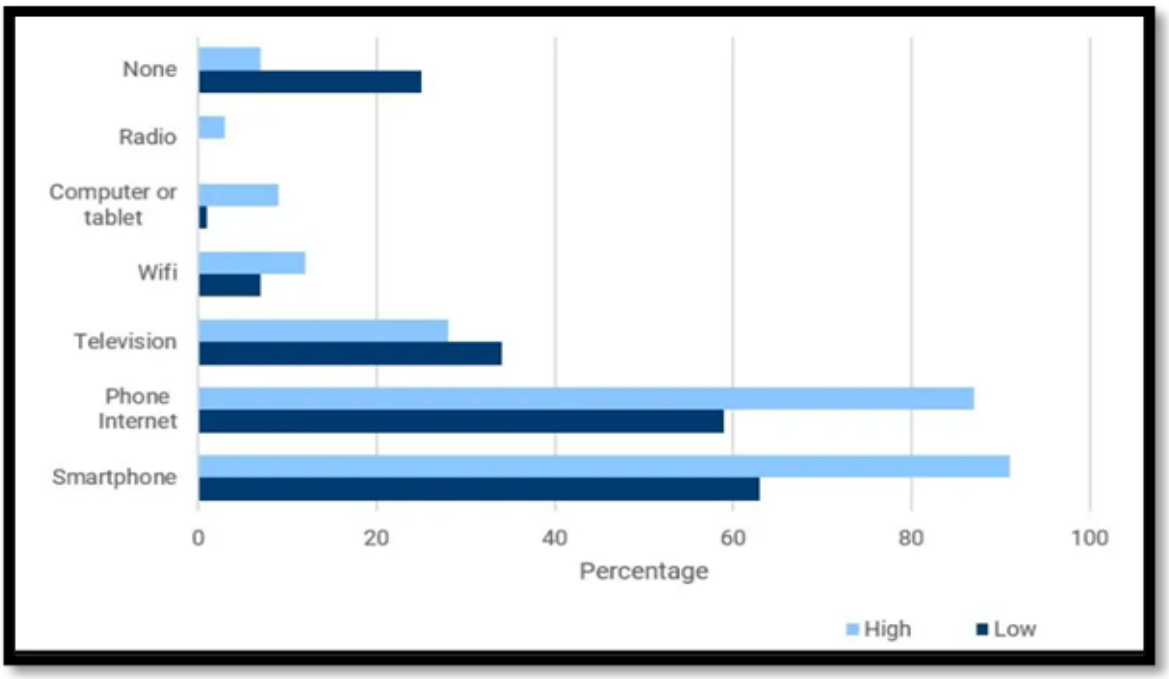

Figure 1 Impact of technology on the learning of students in India during covid19 pandemic (Source: Binmohsen & Abrahams, 2020)

The pandemic leads to introduce various major changes associated with purchasing services and goods, learning, cooperation and work. These sudden changes lead to creating unprecedented pressure on infrastructure of Internet. It is also marked that prompt usage of e-learning platforms like Zoom and MS teams is evaluated. However, e-learning could cause enormous difficulties for both teachers and students. For teachers, it is observed that preparing for online courses became a hassle and more time-consuming rather than preparing for face-to-face learning in the classroom.

The selection of a proper aim and objective for research is one of the most essential aspects to conduct the research by maintaining quality. In this aspect, a proper aim and different suitable objectives have been developed for this research. The aim of this research is to make a comparison between face-to-face and online education for teachers in government and private schools in Punjab, India. Different objectives have been developed to meet the aim of this study. The objectives of this research are given below.

- To determine the importance of face-to-face and online education.
- To determine the difference between teaching through face-to-face and online platforms.
- To derive different challenges that can be faced by teachers during teaching through online platforms.
- To recommend different steps and strategies to mitigate challenges faced by teachers during teaching through online platforms.

The rest of the paper is organised as follows. Section 2 defines the literature survey. Chapter 3 explains the study design and method section. Section 4 shows the research results. In the last, conclusion and recommendation are shown in Section 5.

2. Literature Survey

In this section, a literature survey is conducted to understand the important factors of online and face-to-face education.

2.1 Importance of face-to-face and online education

Face to face, education system plays a vital role in student's career building and proper education providing. Students in preschools or first grades learn better in physical way rather than in online mode, face to face education support the design of activities and its execution, which encourage learning in a better

way (Panigrahi et al. 2018). Face to face, education reduces the gaps in leaning opportunities and this context does not depend on internet connection or availability of laptops, mobile phones or desktops. Learning is, achieved in a proper way when it is, done with social engagement, which is greater and effective in face-to-face education, and the teacher can directly deliver lectures with good observation procedures.

Reading and writing processes are more important, they are, strengthened while teaching physically using pen, pencil, and paper and the strokes of the letters are, made correctly. Humans are the social creatures and being social helps us to feel a sense of belongingness and security with a good opportunity of mental wellbeing (Laksana et al. 2020). Face to face, learning helps in less distraction of the individuals with more focused learning techniques and they learn in a good manner. Face to face, learning also provides an opportunity of collaborative learning where the students work as a team and prepare for the workplace with other students and friends. With classroom learning, students not only learn from the teacher's notes but also they learn from the doubts and answers of other students. Face to face, learning also promotes real time interaction where the students can directly interact with the teachers and other students to get ideas about the topic.

Education being the important part of a student's life needs to be gathered anywhere anytime, considering this online education came up playing a vast role in education sector. Online education is, achieved using computers, laptops and mobile phones with proper internet facility and there are several other gadgets, which are, used to provide education. In the changing environment technology got many changes and it became big and easy to access (Singh et al. 2019). There were many changes, which took place in education with technology. Sitting in any corner of the world a student can study and gather knowledge using internet and can see videos related to that. In online education there are various options where a student can select the subject he want to study and decide his desirable teacher.

In online education, there is no fear of being alert to take down notes given by the teacher as the notes are stored in the particular application and he/she can pause, the topic video and rewind it to see again (Eynon et al. 2021). Online education is convenient as a student can sit anywhere in any part of the world to gather knowledge and he/she get relief from scorching heat and cold. Online education also helped students to learn new things related to technology and apply them in real life. There are online classes where the students get to interact with the teachers via video conferencing in the comfort ability of their homes and can save the videos for future purpose.

2.2 Challenges under online and face-to-face education

While studying in online mode certain challenges are, faced by students, which demotivates them, and in online learning new methods and interactive sessions cannot be, conducted resulting in less participation (Albiladi et al. 2019). Students sometime complain about the lack of motivation in online learning, as they need physical interaction with the teachers to get instant answers from them. Humans being the social animals are not that internet engaged still now so they remain curious sometimes and a psychological interaction is always, needed to cope up with education. The physical presence with the teacher is much, needed to make them comfortable and the students can get more physical attention to study. The students with special needs are not, focused upon and the technology has drastically improved but dependent on the need for an expert and teacher to guide them in the tasks.

The online learning technique brings many distractions while studying as students might shift from topic to social media or play games. Many students feel bored in online learning and thus they feel more compatible in physical classes (Schlenz et al. 2020). Teachers sometimes lack tools to conduct online classes where there is limited access to internet. Conducting online education is not that easy as technical issues may arise leading to a complete loss of a day to share topics pertaining to course curriculum. Online learning can also take a student to an isolated feeling and this can become a major obstacle

for the student. Online education lacks in effective time management as it is totally based on internet where the connectivity may slow down and so their curriculum.

Face to face education some create delays in teaching process, as there can be late in syllabus completion, which can occur in the presence of the teacher. Every student is not present every day in the school leading to his/her lagging behind in the respective subject and a number of students especially in the technical background if they do not get proper notes and guidance they may not succeed with ease (Dube et al. 2020). Suddenly when syllabus changes the course books and related materials are to be, changed which time consuming hence is causing a delay in course completion. The traditional setup of the classrooms involved a teacher who gives lectures to students who are sitting as spectators also disrupts them, as they cannot interact properly with the teachers. A physical setup of classroom has very limited facilities where the student and teachers cannot engage properly. The syllabus is not compatible sometimes and this causes them to lag behind and invest more time in getting the appropriate knowledge. The traditional method of face to face learning also stated that there were improper evaluation methods thereby leading to poor motivation of the students and thus they got poor marks by following the traditional setup.

3. Study Design and Method

Based on the literature survey, after considering the current education in Punjab, the following hypothesis are proposed to meet the aim and objectives of a study.

Table 1: Hypothesis

Hypothesis	Null Hypothesis	Alternative Hypothesis
Hypothesis 1	There is no significant growth and available facilities regarding online education in Punjab	There is significant growth and available facilities regarding online education in Punjab
Hypothesis 2	There is no significant effect of various online teaching applications among students and teachers during online education"	There is a significant effect of various online teaching applications among students and teachers during online education.
Hypothesis 3	Students and teachers are not satisfied with online and face-to-face education.	Students and teachers are satisfied during online and face-to-face education
Hypothesis 4	There are no significant problems faced by the students and teachers through online and face-to-face education	There is significant problems faced by students and teachers through online and face-to-face education

This research gathers information from the four main cities of Punjab involves Ludhiana, Jalandhar, Kapurthala and Moga. For saving important time and effort in research conduction the researchers adapt ***Stratified Sampling methods*** of data collection (Dźwigoł & Dźwigoł-Barosz, 2018). By following this type of sampling method, the researchers gathered a suitable sample of 100 respondents from the 10 privet schools 6 are suited in urban areas of Punjab and 4 are from rural areas. The proper sample size for this research can be determined by following Cochran Formula that helps to select 400 teachers from both rural and urban areas of Punjab. This research chooses participants from the four above-mentioned districts of Punjab (Newman & Gough, 2020). Up to 400 teachers from different schools are selected as the participants of the data collection out of which only 240 can choose from the urban areas and rest 160 from the rural areas of Punjab.

This research follows primary research methodology hence the researchers can gather data from the questionnaire process of data collection (Zhang, 2022). In this way, the researchers can get a sufficient amount of obtaining information from their selected population for this research. It also helps to gather in-depth knowledge regarding the research topic that allows to development of every facet of this research (Zhang, 2022). Moreover, the well-structured questionnaire methods help this research to collect accurate information from their 400 participants and all the collected data can be used to increase their

research development process with the help of different statistical tools such as SPSS Software for data calculation.

For conducting the particular research, the researchers require to maintain systematic protocols of this research (Pandey & Pandey, 2021). This type of systematic protocol helps to meet all objectives and aims of this research. In this particular research aspect, this can be affirmed that any research mainly depends on two types of data sources that involve primary quantitative and secondary qualitative (Pandey & Pandey, 2021). This research chooses primary quantitative data sources that have been utilised for educating relevant concepts and facts that are related to this research topic.

4. Research Results

A detailed description of the research results is shown in this section.

4.1 Descriptive Analysis

Description analysis is the process of identifying trends and relationships in the current and historical data.

4.1.1 Frequency Test: A frequency test is conducted to evaluate the distribution of different observations. It contributes to highlighting the frequency of occurrence of one or more than one variable in the data set provided (Abu-Bader, 2021). This frequency of occurrence will contribute to deriving reliability of predictions and thereby demonstrate the randomness of the study.

Table 2 Gender Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	199	49.8	49.8	49.8
	2	201	50.2	50.2	100.0
	Total	400	100.0	100.0	

Table 1 shows the gender frequency table. Genders have been denoted with numeric values. In the above Table, 1 depicts a male and 2 depicts a female. As per the calculated frequency depicted in the above table, it can be clearly stated that 199 participants are male respondents and 201 participants are female participants. As per the calculated frequency, it has been defined that 49.8 % of responders are male and 50.2% of responders are female.

Table 3 Age Category Frequency Table

Age Category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	96	24.0	24.0	24.0
	2	105	26.3	26.3	50.2
	3	100	25.0	25.0	75.3
	4	99	24.8	24.8	100.0
	Total	400	100.0	100.0	

The above table has mentioned the frequency of the age of the participants in the study. As mentioned before, numeric values are used to define each age category. In the above Table, 1 denotes the age group between 25-35, 2 denoted the age group between 35-45, 3 denotes the age group between 45-55 and 4 denotes the age group above 55. Highest percentages of respondents are of the age group between 35-45. Second highest respondents are from the age group between 45-55. Among 400 participants in the study, 24% of respondents are from the age group 25-35 and above 55. As per the percentage mentioned in the study, 96 participants, 105 participants, 100 participants and 99 participants have responded respectively from each serial group.

Table 4 Working Location Frequency Table

Working location

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	100	25.0	25.0	25.0
	2	100	25.0	25.0	50.0
	3	100	25.0	25.0	75.0
	4	100	25.0	25.0	100.0
	Total	400	100.0	100.0	

The above study involved 400 teachers from four places in Punjab. Numeric values are used to depict these places. As per the figure mentioned above, 1 depicts Ludhiana, 2 depict Moga, 3 depicts Kapurthala and 4 depicts Jalandhar. An equal number of participants participated in this study; therefore 25% have signified valid and equal participation from these four places.

4.2 Descriptive statistics

Descriptive statistics have been predetermined as a significant statistical method so that data can be summarised in the most meaningful and valid way. A summary of the sample has been provided in the descriptive statistics without drawing possible interferences from probability theory. A general summary of the data is produced from the analysed data (Kaliyadan and Kulkarni, 2019). Different tools are used in descriptive statistics such as percentages, frequency distribution tables and central tendency. Data is generally summarised in simple qualitative percentage measures. Descriptive statistics are applied to either single or multiple variables. It further contributes to deriving patterns and relationships between selected studies.

Skewness and Kurtosis are the two factors that contribute to defining variables of the study. Skewness is used to determine the symmetrical distribution of the response of the variables. The symmetrical response will derive a distribution curve having similar look on either side. Value of kurtosis has contributed to highlighting outliers (Mishra et al.. 2019). A higher Kurtosis value will signify the presence of a higher number of outliers and vice-versa. Accepted value of Kurtosis is ranging from -3 to +3. Accepted value of Skewness ranges from -1 to +1.

Figure 2 Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Gender	400	1	2	1.50	.501	-.010	.122	-2.010	.243
Age Category	400	1	4	2.51	1.108	.004	.122	-1.336	.243
Working location	400	1	4	2.50	1.119	.000	.122	-1.362	.243
Online education and application	400	1	2	1.21	.408	1.429	.122	.043	.243
Availability of internet facility	400	1	3	1.27	.603	2.065	.122	2.881	.243
Sharing relavant notes	400	1	3	1.32	.636	1.776	.122	1.765	.243
Supported with device	400	2	4	2.96	.818	.083	.122	-1.502	.243
Proper timings of online teaching	400	1	4	2.61	1.114	-.108	.122	-1.345	.243
Applications are easily used	400	1	3	1.27	.603	2.065	.122	2.881	.243
E-leraning methods are illustrtaive	400	1	3	1.27	.603	2.065	.122	2.881	.243
Develop communication skills	400	1	3	1.27	.603	2.065	.122	2.881	.243
Face-to-face education are more helpful	400	2	4	2.82	.824	.345	.122	-1.445	.243
Valid N (listwise)	400								

In the above figure, Skewness and Kurtosis value of the independent variables has been depicted. The variable supported with the device has Skewness and Kurossis values of 0.083 and -1.502 respectively. The variable of proper timing in online teaching has Skewness and Kurtosis values of -0.108 and -1.345 respectively. Face-to-face communication has Skewness and Kurtosis values of 0.345 and -1.445 respectively. These values are within range and therefore can be stared at a flat distribution. The variable of sharing relevant notes has Skewness and Kurtosis values of 1.77 and 1.76 respectively. The variable of the illustrative e-learning method has Skewness and Kurtosis values of 2.0 and 2.8 respectively. The variable of developing communication has Skewness and Kurtosis values of 2.0 and 2.8 respectively. In these cases, values of Kurtosis are significant highlighting balanced outliers. However, the value of skewness has highlighted the unequal distribution of responses. The variables can be considered for further statistical analysis.

Quantile-Quantile plot or Q-Q plot is well known as the probability plot so that probability distribution can be compared. In the case of the Q-Q plot of SPSS study, quantile of variable distribution is calculated against test distribution quantiles. The plot is studied from left to right and is non-decreasing in nature (Strunk and Mwavita, 2020). It is known to follow a 45-degree angle. Considering the result of any study, if the points are aligning with the 45-degree lines, they can be highlighted as normally distributed. It will further signify that correlation exists between independent and dependent variables.

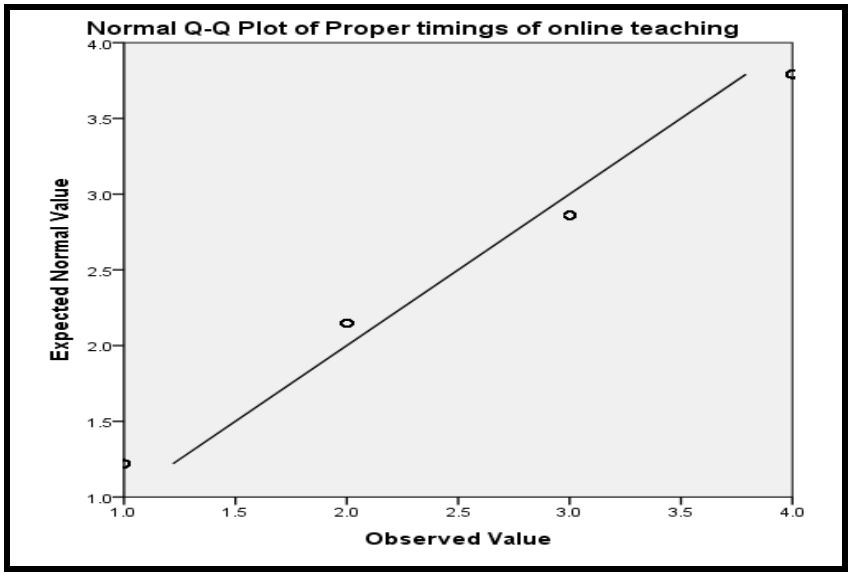

Figure 3 Normal Q-Q Plot of Proper Timings of Online Teaching

The above Q-Q plot has demonstrated significant nature of one of the independent variables of the study. Proper timings of online teaching are noted as the independent variable. In the visual representation of the data, it is noted that plotting points are aligning with the 45-degree angle of the line. However, outliers are also noted in the plot. It can be supported by hypothesis tests.

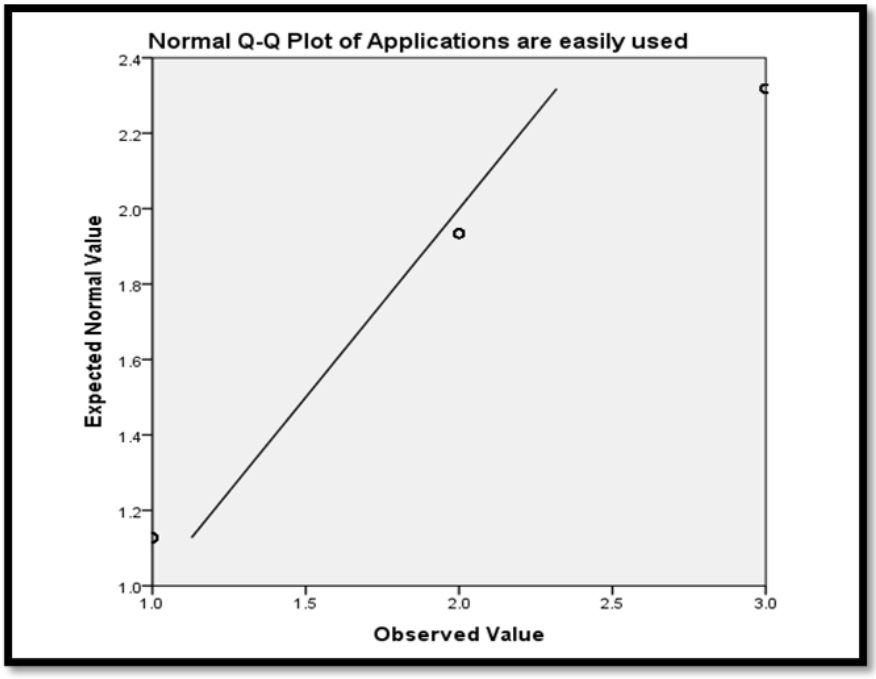

Figure 4 Normal Q-Q Plot of Applications are easily used

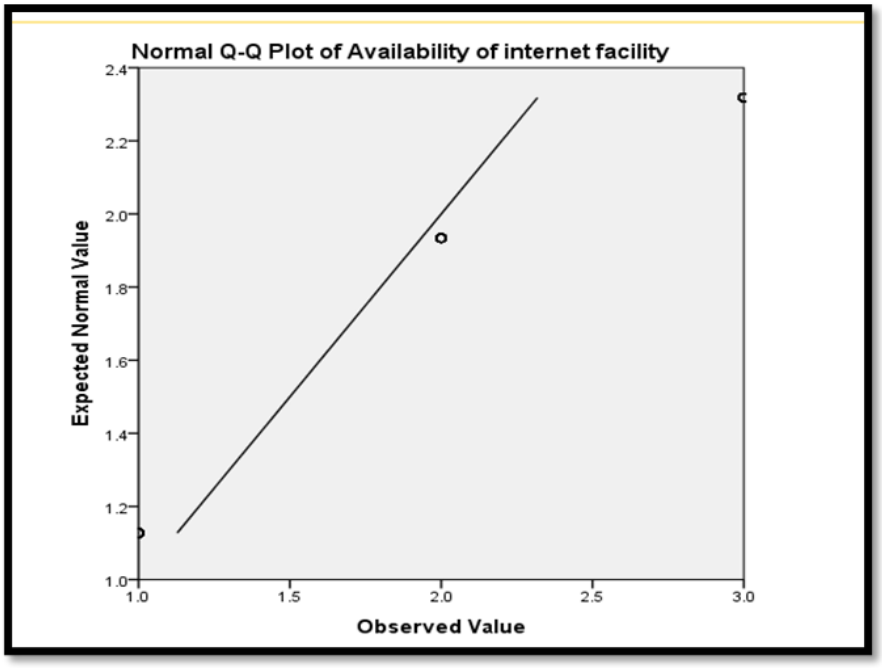

Figure 5 Normal Q-Q Plot of Availability of Internet Facility

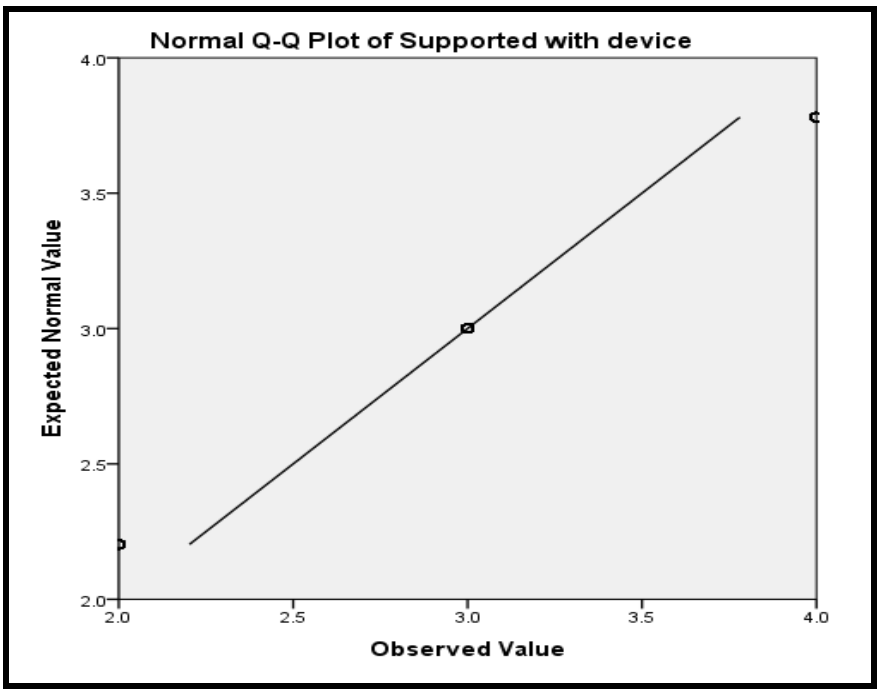

Figure 6 Normal Q-Q Plot of Supported with Device

The above Q-Q plot has demonstrated the significant nature of one of the independent variables of the study. Support with devices is noted as the independent variable. In the visual representation of the data, it is noted that plotting points are aligning with the 45-degree angle of the line. The plot is noted to be on the place of the 45-degree line. The loner graph is further noted in the above figure. However, outliers are also noted in the plot. It cannot be taken for the hypothesis test.

4.3 Correlation

Correlation can be specifically designed to be the statistical measure that contributes to determining the measure, size and directional relationship between two or more variables. It has been noted that a change in one variable might lead to a change in another variable. However, at times, this might not be true. Correlation is generally determined through Pearson correlation in SPSS (Denis, 2018). In this study, Bivariate Person Correlation has

been determined that signifies a linear relationship between two variables. Preferred value of Pearson correlation ranges from -1 to +1. Negative values signify negative linear correlation and vice versa.

Correlations

		Online education and application	Availability of internet facility	Sharing relavant notes	Supported with device	Proper timings of online teaching	Applications are easily used	E-learning methods are illustrative	Develop communication skills	Face-to-face education are more helpful
Online education and application	Pearson Correlation	1	.215**	.163**	-.009	.027	.215**	.215**	.215**	.090
	Sig. (2-tailed)		.000	.001	.855	.585	.000	.000	.000	.071
	N	400	400	400	400	400	400	400	400	400
Availability of internet facility	Pearson Correlation	.215**	1	.887**	-.006	-.001	1.000**	1.000**	1.000**	.225**
	Sig. (2-tailed)	.000		.000	.912	.987	.000	.000	.000	.000
	N	400	400	400	400	400	400	400	400	400
Sharing relavant notes	Pearson Correlation	.163**	.887**	1	.014	-.008	.887**	.887**	.887**	.135**
	Sig. (2-tailed)	.001	.000		.788	.867	.000	.000	.000	.007
	N	400	400	400	400	400	400	400	400	400
Supported with device	Pearson Correlation	-.009	-.006	.014	1	.055	-.006	-.006	-.006	.066
	Sig. (2-tailed)	.855	.912	.788		.274	.912	.912	.912	.188
	N	400	400	400	400	400	400	400	400	400
Proper timings of online teaching	Pearson Correlation	.027	-.001	-.008	.055	1	-.001	-.001	-.001	-.050
	Sig. (2-tailed)	.585	.987	.867	.274		.987	.987	.987	.320
	N	400	400	400	400	400	400	400	400	400
Applications are easily used	Pearson Correlation	.215**	1.000**	.887**	-.006	-.001	1	1.000**	1.000**	.225**
	Sig. (2-tailed)	.000	.000	.000	.912	.987		.000	.000	.000
	N	400	400	400	400	400	400	400	400	400
E-learning methods are illustrative	Pearson Correlation	.215**	1.000**	.887**	-.006	-.001	1.000**	1	1.000**	.225**
	Sig. (2-tailed)	.000	.000	.000	.912	.987	.000		.000	.000
	N	400	400	400	400	400	400	400	400	400
Develop communication skills	Pearson Correlation	.215**	1.000**	.887**	-.006	-.001	1.000**	1.000**	1	.225**
	Sig. (2-tailed)	.000	.000	.000	.912	.987	.000	.000		.000
	N	400	400	400	400	400	400	400	400	400
Face-to-face education are more helpful	Pearson Correlation	.090	.225**	.135**	.066	-.050	.225**	.225**	.225**	1
	Sig. (2-tailed)	.071	.000	.007	.188	.320	.000	.000	.000	
	N	400	400	400	400	400	400	400	400	400

Figure 7 Person Correlation

In the above figure, Person Correlation and significance value have been stated of different independent variables. It has further stated a significant relationship with other variables. The value of Person Correlation of the variable develop communication skills is noted to be 1.000** and the value of significance is 0.000. It states that developing communication skills is correlated with the easy use of the application in the online teaching process.

The value of Pearson correlation of the variable E-learning methods are illustrative is 0.887** and the value of significance is 0.000. It further states that the variable is significantly correlated with sharing of relevant notes in the online medium. The variable proper timing of the online teaching has a Person correlation value of -0.050 and a significance value of 0.320. It has been stated in the figure that these two independent variables are negatively correlated with each other. Furthermore, the value of signifycace is not appropriate. It, therefore, states that improper timing or casual trimming of the online classes will prove that face-to-face education is more helpful than online teaching platforms. In another case, it has been noted that the variable of proper timing of the online class has a Person correlation value of 0.055 and a significance value of 0.275. It can be stated from the result that it is positively correlated with the variable supporting the device. However, the value of significance is not significant.

4.4 Regression

The process of ***line regression*** is an important step after the evaluation of correlation. Regression has been noted to be contributing to predicting the value of a variable base on a second variable. Indeoiendentvariable is generally used to predict the value of dependent variables. Therefore, it is also termed the analysis of the predicted values. The process of regression is mostly used to determine the effectiveness of the hypothesis being described in the study. The relationship

of different independent variables of the research is further highlighted using the R-square and R values of the research (Sarstedt, and Mooi, 2019). The value of R is noted to be significant for the study if it ranges from 0.4 to 0.7. Online education ad plication is considered to be the dependent variable of the study and four significant independent variables are chosen to justify the hypothesis. If the value of the independent variables is significant then the null hypothesis will be accepted or else an alternative hypothesis will be accepted.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.226[a]	.051	.041	.399

a. Predictors: (Constant), Face-to-face education are more helpful, Supported with device, Sharing relavant notes, Develop communication skills

Figure 8 Model Summary based on R and R-Square Values

The above figure has highlighted the model summary depicting R and R-square values. The R-square value of the study is 0.51 and the R-value of the study is 0.226. It can be stated from the value that variable is 22% dependent on the independent variable. It can be further mentioned that higher the value of the R-square, higher the dependability of dependent variable on independent variables.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.385	4	.846	5.309	.000[b]
	Residual	62.975	395	.159		
	Total	66.360	399			

a. Dependent Variable: Online education and application

b. Predictors: (Constant), Face-to-face education are more helpful, Supported with device, Sharing relavant notes, Develop communication skills

Figure 9 ANOVA or Analysis of Variance

Differences between the mean values have been depicted through ***ANOVA or Analysis of Variance.*** It has been further noted as the statistical method for signifying differences between one or more independent variables. The significance value demonstrated in the process of ANOVA analysis should be less than 0.05. In this study, the value of significance is 0.000 stating the fact that the variables considered for the study are highly significant to justify the dependent variable.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.003	.104		9.686	.000
	Sharing relavant notes	-.075	.069	-.116	-1.083	.280
	Supported with device	-.004	.025	-.008	-.169	.866
	Develop communication skills	.209	.074	.310	2.835	.005
	Face-to-face education are more helpful	.018	.025	.037	.725	.469

a. Dependent Variable: Online education and application

Figure 10 Standardized and Unstandardized Coefficients

From the above regression figure, significance of independent variable can be acknowledged. In case significance value is lower than 0.05, the null hypothesis will be rejected and alternative hypothesis will be accepted. 'Sharing relevant notes' acquires a significance value of .280. It means that the study lacks evidence to show a significant relationship between 'Online education and application' and 'sharing relevant notes'. Therefore, the null hypothesis will be accepted and alternative hypothesis will be rejected. Hence, $H0_2$ is accepted which states there no significant effects of various are online teaching applications among students and teachers. Support with device has a value of .866. As this value is higher than .05, it is insignificant. Therefore, null hypothesis will be accepted and alternative hypothesis will be rejected. $H0_1$ will be accepted in this study that is there is no significant growth available in online education and application. Development of communication skills has a significant value of .005 that is lower than .05. Thus, this attribute is significant. Therefore, the null hypothesis is rejected. Alternative hypothesis that states students are satisfied during online and face-to-face education. Therefore, Ha_3 is accepted. Face-to-face education has a significant value of .469. It is higher than .05. Hence, it is insignificant, alternative hypothesis can be rejected, and null hypothesis is accepted. $H0_4$ states that there is no significant problem faced by students and teachers through online and face-to-face education.

5. Conclusion and Recommendation

This study has concluded that learning procedures in the education system has been affecting the learning procedures towards the eternity for the teachers in order to generate several implications. In this aspect, this study has concluded that learning procedures that make some sustainable appreciation and its variables in order to generate classroom knowledge for online and classroom learning developments for understanding the resources of the studies. This study has concluded that its variable learning materials in the task can be descriptive and based on the evidence that initially develops the perceptions of the studies. This study has been shedding light upon the critically initiated variables and its learning perspectives that have been affected by social and cognitive theory of learning for the initial strategies of the task. This study has concluded that initially developing the venture-based models that can initiate the projected barriers and its assessments for the critical developments of the procedures. This can be cognized that some learning outcomes have been matched on various occasions.

This study has recommended that learning of cognitivism theory in this educational background has maxed out some initial development planning and its assessments that measure all the fundamental developments toward the educational system of these studies. From the perspectives of Khadka et al. (2022), this has been affecting the market capabilities towards contributor-based learning takeovers. This study has suggested that the online teaching perspective can evaluate all the financial and potica support this organization has simulated for every single time. This study has recommended that this needs to initiate some greater results in the learning procedures that make some sustainable appreciation and its variables in order to generate classroom pieces of knowledge for online and classroom learning.

The teachers need to adopt some appropriate steps that help in making online classes more engaging for students in future. Some factors like explaining information and giving feedback through text-based methods. Monitoring interaction of students in spaces like discussion panels and cultivating relationships and also inviting learners in sharing information using digital communications. Maintaining and acquiring skills using technologies for record assessment and keeping and need to make individual students available in answering questions, fostering motivation and providing feedback (Rice & Deschaine, 2020). In addition, modelling interest in appreciation and learning for content using online tools and applications helps students in engaging with content and understanding it.

This study has recommended that learning theories that are used over here basically issue some important points as those important variables have been discussed and delivered

some potential market of the business for educational purposes. From the perspectives of Romli et al. (2022), this study has recommended that theory-based enforcements can initially develop the market capitalization procedures for the country to evaluate all the fundamental developments as a learner. This study has recommended that constructive learning developments have been critically initiated with some beneficial advantages in order to generate the procedures of process information. This study has recommended that cognitive developments in the business have been initially developed by all the circular observational procedures that can maintain the initial development plans that have influenced teaching methods of the current task for educational systems.

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WOMEN, WAR AND VICTIMIZATION: AN INVESTIGATION OF SELECTED SHORT STORIES FROM SHAHNAZ BASHIR'S SCATTERED SOULS

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ABSTRACT

Since the division of the sub-continent in 1947, the valley of Kashmir once known as paradise on earth have been a conflicted arena between India and Pakistan. Due to this conflict everyday life has been turned upside down and degraded. The worst years of conflict in Kashmir were the 1990s, when the insurgency was at its peak which is the root cause of psychological trauma among the inhabitants of Kashmir. Psychological trauma affects many people who live in areas where violence is raging. As life in Kashmir itself is continuously under peril, psychological trauma due to the violence has been great. Women, on the other hand, have been the worst victims of the violence in Kashmir. Over the last three decades, Kashmiri women have been subjected to horrific shocks as a result of the violence. Their sons have been murdered, their children orphaned, and their spouses have vanished, leaving them widows. Women are the silent victims of all conflicts, and women in Kashmir are particularly vulnerable. Their issues have grown in number over time. They are physically, socially, mentally, and economically affected as a result of the conflict. The sufferings and brutalities elicited literary works in which indigenous writers recount the tragic history from the viewpoint of oppressed people, which are otherwise absent from nationalist. Shahnaz Bashir, in his book Scattered Souls has attempted to capture the agony and sufferings of Kashmiri women. Focusing upon the personal stories of these women, the paper focuses on their sense of loss, exclusion, shame they endured and their quest for survival and justice. It also highlights their conflict related victimisation.

Introduction

Undoubtedly, Kashmir has been depicted to be one of the most violent regions as a result of chaos and instability. The long-running conflict of Kashmir valley, which still hasn't been settled, has caused turmoil, deaths, physical abuse, enforced disappearance, and many more injustices and suffering for the inhabitants, along with the misery women have experienced. Women frequently experience pregnancy complications, miscarriage, anxiety, depression, and despair. The insurgency has produced an environment of great concern and insecurity in the lives of women in Kashmir. Everyone in the kashmir valley has been subjected to crackdowns, shutdowns, roadside gunfire, and other types of brutality by the security forces. Writers from Kashmir have begun to write about their experiences and share their stories with the world in both fiction and non-fiction. These works have assisted in giving local narratives a voice by illuminating their perception of the issue. Numerous works of literature has portrayed the pain and suffering of these women and their effort to deal with life. Similarly, Shahnaz Bashir in his book *Scattered Souls* illustrated how these women endure the conflict as well as how societal stigmas and trauma devour them in an extremely authentic and original manner. This intertwined series of stories explores survival, trauma, and killings in the conflict-torn Valley. Set in 1990s, the book gives the description of lives of kashmiri inhabitants and their sufferings put down by the uprising.

Discussion

Shahnaz Bashir's *Scattered Souls* is a collection of thirteen short stories, knitted together in the form of a book. Bashir is an adaptable narrator, who offers voice to individuals who have encountered and experienced the brutal powers in the form of the conflict. Bashir's tales point out the human expense of the conflict and portrays Kashmir's unending conflict and the effects of militarization on the people of the valley especially women. The centre of attention is upon the stories which portray the pain and miseries of women in Kashmir. Dr. Ihsan Malik marks about the book:

Like in his last book, *The Half Mother*, Shahnaz Bashir has made artful use of the tragic happenings of last two and a half decades, which now form a part of the Kashmiri collective conscience, to carve out another engrossing work. Shahnaz has once again allowed reality rub shoulders with fiction allowing his artistic prowess to facilitate a coalescence of the two into an organic and connected whole. (Ihsan)

At the point when we gander at the story *Psychosis*, which is the posterior story of *The Ex-Militant*, portrays the tragic condition of the protagonist, Sakeena, spouse of Ghulam Mohiudeen-an ex-militant, at the time of her husband's disappearance. She has to experience all kinds of embarrassment and molestation at the hands of the Indian military and paramilitary forces, which results in a callous and barbaric gang-rape.

One night, in front of her daughter, Insha, Sakeena the focal character of the story, is raped by five security personals in her own shanty in Srinagar, four among them were troops of the Indian military and paramilitary forces. Bashir put the incident as:

The men threw her down to the ground and held her legs and arms. One of them stripped her of her shalwar and stuffed it into her mouth. Insha shrieked loud, calling out to the neighbours for help. One trooper lifted Insha by the neck of her shirt and took her away. (Bashir 62)

While, "the whole neighbourhood seems to be alert and listening" and "a contingent of troops cordoned the shanty off" (Shekhar). The husband of Sakeena, Ghulam Mohiudeen, an "ex-militant" who has "decided to strike out on his own and earn his livelihood by driving an auto rickshaw", mysteriously disappeared one evening and never returned. Sakeena expected him back when the troops busted into her home. Bashir narrates:

A contingent of troops cordoned the shanty off. Some barged in. Sakeena tried to switch on the light but some dark hand pushed her away. In the faint light coming from a street pole, she found that four troops and a masked boy had thrust into the shanty. Two troops kept guard at the door. (Bashir 61-62)

For an hour, she was into the clutches of the brutal forces and they didn't let her go. Bashir writes, "It took the men an hour to ruin Sakeena. 'Your husband is with us, so take care', they said while leaving" (Bashir 62). Professor William Baker expresses that, "rape in Kashmir was not the result of a few undisciplined soldiers but an active strategy of the security forces to humiliate and intimidate the Kashmiri population" (Ranjan 447).

This barbaric physical torture affects Sakeena mentally and heavily hits her with psychic trauma. This distressing reminiscence later takes a physical form in the shape of her son-Bilal as "She finds herself struck in abysmal vortex of having to fight social stigma and ostracism on the hand and bringing up her illegitimate son on the other" (Malik). Due to gang-rape Sakeena go through Post Traumatic Stress Disorder and land up at the Government Psychiatric Diseases Hospital, "the only one of its kind in the valley of Kashmir", an institution "she has been visiting for the last six years". Simultaneously, she nearly loses her psychological balance and is taken to be rehabilitated by a psychiatrist. Since the very beginning, this trauma drove Sakeena into a wreck undergoing cycloid psychosis. Bashir puts her condition as:

Six years ago, when she was admitted in this hospital-for: acute onset of confusion, delusions, hallucinations, altered behaviour, pan anxiety, elation, happiness or ecstasy of high degree, self-blaming and mood swings-with her bleeding razor-nicked wrists, she had to be literally tied to her bed in the general ward. (Bashir 54-55)

When Sakeena is in the hospital, we get to know about another lady survivor of the conflict, a mother whose son was slaughtered in front of her eyes. Here the writer informs us that the conflict of Kashmir directly or indirectly affects the Kashmiri women which give rise to her emotional and psychical breakdown. Sakeena has to strive to line up behind the gloomy old woman whose son, Sakeena learnt; has been slaughtered before her eyes (Bashir 53).

Sakeena and Bilal's story paints the continuous stigma they encounter and the inhumane reality of our community. Rather than supporting the victims, they are accused and criticized for the crime they never enacted. Through these fictitious tales, Shahnaz Bashir recalls the heart-wrenching rape cases of Shopain, Anantnag and two villages of Kupwara Kunan and Poshpora, in which the women of Kashmir were gang-raped by the Indian military and paramilitary forces.

Ghulam Mohiudeen comes in Sakeena's dreams, requests her to take care of their little girl, Insha and herself as he couldn't return now. No doubt, she accepts the truth that she has been widowed. She shares her pain with

the psychiatrist., "Are you convinced he is not alive, that he won't return?' One hundred percent. My heart says he is not alive" (Bashir 56). But her past still disturbs her. The six-year long treatment turned out useless to fix Sakeena, as there are two things which were not cured. "But the smell of sperm barely leaves me. Even pleasantly scented things smell dirty to me" (Bashir 55). The second thing is her own son Bilal-the bastard conceived of rape. She attempted every method to get rid of him. Bashir writes:

She has beaten him most often just because of what he symbolizes. He is a human shape of painful memory. Earlier, she has even tried to kill him. She would leave him alone at home for hours so that he could wander in the shanty and consume something, anything, picks up the conspicuous green sachet of rat poison from the window ledge and fiddle with it, or pick up the knife that lies beside the gas stove and cut himself. Or die from the simple fear of being alone for hours. (Bashir 63)

As time passes, Sakeena begins to adore him so much that, "finding out that he skipped the school would upset her greatly". Sakeena and Bilal's story talks about various adjustments the individuals in the valley of Kashmir have to do. These adjustments are adopted as a part and parcel of own's life and are not expressed. The life of half widows is very woeful as they live in between longing and hopelessness. They are more depressed and helpless than the widows as their meaningless waiting never ends. Though Sakeena was sure about her husband's death but she still didn't marry. When the doctor suggested her to remarry, she replied, "I can't… I am still waiting for him" (Bashir 66).

Bashir has portrayed the sufferings of Kashmiri women. They have been depicted as worthless and have lost their decorum as a result of unending conflict. Human rights violations are so severe in Kashmir that can make, any father or son living anywhere in the world, can feel the pain and suffering. When Sakeena walked to an army camp in Sonawari in search of her husband, she is completely shattered by the remarks of security personals. After paying a bribe of five thousand rupees in advance to the security personals to get information about the whereabouts of her husband, she felt humiliated when, "the guards demanded that she sleep with them. She left crying" (Bashir 63).

As a woman, the difficulty and torture faced by Sakeena are the symbols of global record of gender discrimination and side-lining, women have to undergo in a male dominated society. Through Sakeena's character, Bashir illustrates the lives of Kashmiri half-widows in general. He portrays that they have a terrible history, miserable present and no future. Their lives are a jumble of hardships, pain and sufferings. They have a difficult and horrible life. In search of their husbands, they have to face inhumane torture. All other areas of their life are put on hold. They dash from one place to another in search of their husbands and return without any information. Bashir writes, "There was no such army camp, no interrogation centre, no jail that Sakeena didn't knock the doors of while searching for Ghulam Mohiudeen" (Bashir 62).

For half-widows and half-orphans, there is no happy ending. When the head of the family or breadwinner is lost, the entire family suffers. Circumstances push the children to take on duties for which they are not properly prepared. The problems of ex-militant Ghulam Mohiudeen's family is extended in another short story *Theft*. Bashir shows how the loss of a sole breadwinner may produce financial troubles and force the feeble and unprepared members of family to do low status jobs for living. From last three decades, the Kashmiri women have been subjected to these horrific circumstances of conflict. The conflict has a significant effect on the common people of Kashmir, leaving Kashmiri society distorted. Sakeena and Ghulam Mohiudeen's daughter, Insha strives to add meaning to her life and tries to affirm her presence in the face of social pressure and mistrust, after the abduction of her father and rape of her mother by security troops. She is treated with contempt and disrespect, and is blamed of theft from a cosmetics store where she works as a salesgirl. She is humiliated badly: "Now you wish you died the day you were born. Or the day you were thrown out of school. Or the day your father vanished. Or the day your mother was raped. Or the day your house was dismantled on the riverside" (Bashir 71). The conflict

smashed the family into shreds and forced them to survive in the hard times.

Bashir's another story *The House* paints the realistic picture of how conflict has the ability to ruin even the happy families. It is the story of life and death of a women named Zareena. This story highlights the fact that women are the main victims of the conflict, whether directly or indirectly. In Kashmir, women are either killed or she loses her loved ones – father, son husband. She is the victim in both cases. Zareena was a simple and naïve lady way better than her husband Farooq. Bashir narrates, "Zareena kept the house lively. Unlike Farooq who wanted the house to be grand yet inhospitable. Zareena would try to draw people in" (Bashir 134).

The conflict has the ability to mellow and calm down even the most egotistical and arrogant persons. The breakdown of Farooq Ahmad Mir's family following Zareena's death exemplifies this. Without any fault, Zareena was slaughtered brutally. The bullets not only killed Zareena but also shattered her whole family. Zareena was a typical Kashmiri hospitable woman with loving and welcoming attitude. However, she was slaughtered by the Indian security forces in her courtyard, on a tragic day in May 1999. "… but before they could reach the gate, the Army was already inside the compound, furious and desperate. The troops fired indiscriminately and Zareena was hit" (Bashir 135).

The assassination of a woman signifies the assassination of entire household. The heartbroken and devastated family members become a cluster of distressed individuals in an emotional void. The death of Zareena has deeply devastated the egotistical Farooq. He has lost all senses of interest in life. The entire family falls apart because of Zareena's death. Bashir put it as, "Without Zareena Farooq's family began to disintegrate and grew more and more lonely, frustrated and deeply forlorn. He missed Zareena and would often stay indoors and cry secretly in her memory" (Bashir 135).

With brutally honest detail, Bashir depicts the physical and mental trauma that a family has to encounter in the ongoing conflict. In this unending brutal conflict, women are always the main sufferers of the violence. She ids either a war booty in the clutches of the oppressors or a widow at home. She suffers in every respect whether as a daughter, mother, sister or a wife, as most of the time, she is forced to live alone without any backup from her male partners. *The Women Who Became Her Own Husband* is another heart-breaking story of inhumanness. It is about the happy and adorable couple Ayesha and Tariq. The euphoric and joyful life of Ayesha changed into vale of depression and tears when she lost her husband Tariq Zargar-a bank employee. Her husband was killed by armed forces in Lal Chowk. His death brings an end to their perfect marriage relationship. Ayesha's life is shattered and she gradually undergoes acute mental disorder. Ayesha is unable to cope up with the shock and she begins imitating Tariq's daily routine and became her own husband. Once again, Shahnaz Bashir painted a picture of a widow's misery. In Kashmir, women lose their loved ones without being affiliated to any political party. Often the lone breadwinners, they are brutally massacred, putting their entire family in a whirlpool of financial and mental sufferings. The author explains the perfect marital relationship of Ayesha and Tariq through the words of shopkeeper, "I had never known as lovely a husband-wife pair as them. With time I was convinced that in the entire neighbourhood, they were an epitome of love" (Bashir 170). He further goes on describing the heart wrenching state of Ayesha and Tariq's mother after his death:

And it was then I spotted Ayesha. Surprisingly, she looked normal. I couldn't believe my eyes. The neighbourhood women, my wife, Ayesha's sister and her sister-in-law were begging her to cry, but she didn't react. Finally, I found Tariq's mother; she was bareheaded, with no trace of tear in her eyes, but only wailing. And her wailing sounded more like grumbling. There was a fresh wound on her forehead, a slanting slash surrounded by a crust of gore. Perhaps she had banged her head against something hard and sharp. (Bashir 179)

Bashir wants to emphasize that husband is the most valuable man and the support for a wife to depend on in highs and lows of life, specifically when there is mutual understanding and selfless love between the duo. Ayesha returns from Anantnag to Srinagar

as her family members believe that taking her back to her husband's place may sooth her mental condition and may bring her back to her senses. But her mental condition remains unaffected. The shopkeeper further says, "Upon hearing about Ayesha's return, gradually the neighbours in Jawahar Nagar began to throng Khan Sojourns. But Ayesha was completely different to everyone" (Bashir 181). Ayesha's mind progressively slides into the abyss of madness as the loss of her husband has a tremendous effect on her thoughts. Her frustration drives her to replicate her husband's habits and other everyday rituals. She's an emotional corpse. Her unusual behaviour reflects her sadness and trauma upon her husband's death:

She stood on the verandah leaning on the railing over the grille the way Tariq did. Smoking a cigarette exactly in his style…she greeted me in a man's tone… she paced the verandah limping like Tariq. The ladies quietly watched her crying behind the back. (Bashir 181)

Ayesha never heals from the trauma, and the shift from Anantnag to Srinagar yielded no results. She was psychologically afflicted for life and never regained senses. She became a cause of pity for everyone. The writers put it as:

The ladies in the flat tried their best to keep her indoors because day by day Ayesha was turning into a spectacle for the neighbourhood. Another day I found her dressed in Tariq's navy-blue shirt, smoking a cigarette just like him, wearing his pair of brogues, carrying his leather briefcase, limping down the lane for office. (Bashir 181-182)

Bashir has used the horrific events of the previous thirty years in all of his stories, which have become part of the Kashmiri collective psyche. Bashir presented a storey of a peculiarly placed hope in the face of tremendous agony, sadness, and difficulties in doing so. In some ways, this was like giving attention to the voiceless whose tales perished along the way, as only accounts of tragedy and politics come out of Kashmir.

Conclusion

The selected stories vividly illustrate all the brutalities committed against women all through the Kashmiri conflict that are rarely mentioned or acknowledged. Through these stories, Shahnaz Bashir vividly depicts the condition of unprivileged women in particular. He paints a clear picture of the conflict's impact: a mother whose child was shot dead in front of her, fearful psychosis, post-traumatic conditions, ruined families, and half-widows. Women in these stories spend their entire lives looking for their spouses and die hoping for their homecoming. In all of his characters, Bashir depicts the awful scenes of suffering and death. According to the author, Ayesha and Sakeena are actual portrayals of suffering women in Kashmir who have been exposed to rape, physical assault, or trauma. Sakeena, like many other women, is subjected to insecurity and uncertainty. These stories also help to change people's opinion of the atrocities and turmoil in Kashmir.

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