THE TREND AND PATTERN OF HEALTHCARE SPENDING AND ECONOMIC GROWTH IN WESTERN STATES OF INDIA

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Abstract
The present study analysed a changing the trend and pattern of healthcare expenditure in three foremost western states in India: Gujarat, Maharashtra, and Madhya Pradesh. This study is completely based on secondary sources of data taken from the RBI database, the World Bank database, and various governmental reports from 1991 to 2020. This study has applied statistical tools like descriptive statistics, linear least square trend, and graphical methods. For analysing the impact of health expenditure on GSDP, it has used the linear regression model.
The percentage share of total health expenditure to GSDP indicates an increasing trend, and the regression analysis results show that healthcare spending has a strong favorable effect on GSDP. An expansion of the health sector contributes to the realization of human capital's maximum productive perspective, which in turn enhances market structure productivity. Governments should take the necessary actions to generate alternative money from various sources, such as foreign grants and alternative tax revenue. It show that healthcare spending has a strong favorable effect on GSDP. An expansion of the health sector contributes to the realization of human capital's maximum productive perspective, which in turn enhances market structure productivity. Governments should take the necessary actions to generate alternative money from various sources, such as foreign grants and alternative tax revenue.
***Keywords**: GSDP, Healthcare, Regression, Time Series Western- India*
JEL: H51, I11, I18

Introduction

Economic development relies on human capital, comprising subsectors such as housing, sanitation, water supply, health and medical care, and education. (Mincer and Becker, 1958)· Human capital Approach came into limelight during the 1960's, after the works of Arrow (1962), Uzawa (1965), and Sidrauski (1967). One of the important features of human capital is health. It is vital for meeting basic human needs and achieving a higher standard of living (WHO, 2001). In 1977, the 30th World Health Assembly recognized that health was a fundamental human right. According to WHO (1979), the attainment by all peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life" should be the most important social goal for government.

Good physical and mental health lowers infant mortality, increases life expectancy, and encourages people to carry out their socioeconomic responsibilities effectively (Novick, 2001). Thus, sustained, inclusive economic growth and development are positively impacted by the accomplishments of the health and education sectors, both directly and through their multiplier effects. In a developing nation, public resources for improved health can help the impoverished free up funds for other investments, like education, as an avenue to escape poverty.

When examining the long-term relationship between income and health, Arora (1999) looks at developed nations worldwide and observes the hypotheses that population health has impacted economic growth, should be a key component of economic productivity, and encourages endogenous growth models. In affluent nations like the United States and the United Kingdom, public spending on health accounts for around 7% to 8% of GDP, whereas in India, it is barely over 1% (Mishra and Mishra 2012).

Review of Literature

This paper addresses the literature on analyzing the trend and pattern of public health expenditure in western states of India with their GSDP growth to provide a quick overview of the theoretical and empirical basis for the current study. Numerous studies have been carried out overseas on a variety of topics connecting to the public financing of social sectors. Mainly its emphases on some of the relevant literature on the above-stated issues to know the problem more precisely and to justify the present research breaks. A few important and relevant key parts of literature are reviewed below.

Altigan et al (2016) have investigated the dynamic relationship between health expenditure and

economic growth for Turkey`s economy during the period 1975-2013. The present study has examined the health -led growth hypothesis for Turkey throughout the study period. They have applied different econometrics tools and methods like-Bounding testing approach, autoregressive distributed lag model and Kalman filter model to examine the co-integration between the above stated variables. The ARDL model was used to examine the short-run and long-run static relationship between the above stated variables. The long-run coefficient for health expenditure is 0.434, which indicates that 0.434% growth in income leads to one percent increase in health expenditure. At last, the Kalman model estimated the co-efficient value is 0.02, which indicates a positive and significant effect on income.

Ercelik (2018) has examined the association between health expenditure and GDP per capital in Turkey. He collected the data from World Bank, OECD (1980-2014), Economy Watch (1980-2014) between 1980-2015. In this study he has applied the technique like-ARDL model, CO-integration test by Pearson, Shin and Smith (2001). The result of ARDL model revealed that the coefficients of investment and total health expenditure are optimistic and statistically significant. Again, the results of bound test to co-integration signify that the variables are cointegrated and there is a significant and long-run relationship between these variables.

Rajeshkumar and Nalraj (2014) have analysed the association among health care expenditure and economic growth. This study has taken four major states in India– Madhya Pradesh, Odisha, Kerala, and Tamilnadu. Data is collected during 1991-2010, from an annual data series on Net State Domestic product (NSDP) and health expenditure. The authors have applied the techniques such as co-integration and Granger Causality tests that resulted in a significant relationship between these above two variables at a one per cent level. Finally, they concluded that a unidirectional relationship between health expenditure and economic growth exists in these four states.

Objective of the study

1. To examine the changing trend and pattern of healthcare expenditure and its contribution to GSDP in three western states of India.
2. To analyse a comparison between total health expenditure and its impact to GSDP in three western states of India.

Hypotheses

1. There has been a decline in total health expenditure among three western states (Gujrat, Madhya Pradesh, Maharashtra) in India.
2. There is no significant impact between total health expenditure and its GSDP in three western states of India.

Database and Methodology

Data Sources : This study is completely based on secondary data taken from various government sources from RBI`s annual report on State Govt. finance published in the RBI bulletin and World Bank database etc.

Study Period:1991-2020 (30 years)

Methods: For examining the trend and pattern - percentage, Line Graph and liner least square method has been used. Again, to analyse a state wise comparison among three western states health expenditure and its GSDP, this study has used Descriptive statistics, and for the impact of health to GSDP Linear Regression model has been used.

Health Expenditure and Economic Growth in Western States of India (Gujrat, Madhya Pradesh, Maharashtra)

The western states of India—Gujarat, Madhya Pradesh, and Maharashtra are key contributors to the nation’s economic growth, characterized by diverse industrial and agricultural activities. Despite their economic importance, the allocation of resources toward health expenditure remains a critical area of analysis, particularly in understanding its alignment with Gross State Domestic Product (GSDP). This study examines the trends and component-wise share of health expenditure in these states over time, analyzing its impact on public health and economic growth. By comparing the recurrent and capital expenditure as percentages of total health expenditure and GSDP, this analysis sheds light on the efficiency and adequacy of health investments in the region. The findings aim to inform policies that balance economic priorities with public health needs.

Table-1. Component-wise % share of health expenditure as a Percentage of GSDP in Gujrat

Year	Revenue as % of total health	Capital as % of total health	He as % to GSDP	Year	Revenue as % of total health	Capital as % of total health	He as % to GSDP
1991	89.16	10.84	1.29	2007	62.15	37.85	0.82
1992	90.18	9.82	1.12	2008	60.79	39.21	0.88
1993	82.36	17.64	1.05	2009	72.79	27.21	0.87
1994	73.66	26.34	1.05	2010	65.39	34.61	0.90
1995	91.10	8.90	0.87	2011	53.36	46.64	0.42
1996	88.60	11.40	1.03	2012	57.73	42.27	0.85
1997	84.46	15.54	1.02	2013	54.47	45.53	0.83
1998	79.44	20.56	1.61	2014	52.79	47.21	0.95
1999	73.44	26.56	1.76	2015	62.70	37.30	0.97
2000	53.43	46.57	1.82	2016	66.03	33.97	1.00
2001	80.34	19.66	0.86	2017	62.59	37.41	0.95
2002	72.63	27.37	1.00	2018	61.50	38.50	0.93
2003	78.30	21.70	1.09	2019	69.65	30.35	0.88
2004	61.34	38.66	0.92	2020	70.78	29.22	0.96
2005	64.89	35.11	0.80	2021	69.64	30.36	1.02
2006	59.75	40.25	0.83	-	- -	-	-

Sources-Computed by Author

Table-1 presents the component-wise percentage share of health expenditure as a percentage to total health and health as a percentage to Gross State Domestic Product (GSDP)in Gujarat's from 1991 to 2021.The revenue expenditure as a % of total health expenditure fluctuate over the years. Initially high, above 80-90% in the early 1990s, it drops significantly in the 2000s, indicating an increasing share of capital expenditure in total health expenditure. It starts higher in the 1990s, gradually decreasing over the years, indicating a declining share of revenue expenses in relation to the state's economy. Capital Expenditure as a % of total Health Expenditure indicates a noticeable increase over time, rising from single digits in the early 1990s to almost 40% in the 2000s, reflecting a shift toward more capital investments. Over time, this value increases, especially in the 2000s, indicating more focus on health infrastructure and long-term capital investments. Total Health Expenditure as a percentage of GSDP remain below 2% throughout the years, though they fluctuate slightly. There is a modest upward trend in recent years, reaching 1.02% in 2020. There is a clear shift from revenue expenditure to capital expenditure over the years, signaling increased investment in health infrastructure. Health expenditure as a percentage of GSDP remains relatively low, under 2%, but shows slight increases in the 2010s and 2020.Capital expenditure as a percentage of GSDP consistently rises, which could indicate growing investment in healthcare facilities and equipment in Gujarat over time.

Table-2 Component-wise percentage share of total health expenditure as a Percentage of GSDP in Madhya Pradesh

Year	Revenue as % of total health	Capital as % of total health	He as % to GSDP	Year	Revenue as % of total health	Capital as % of total health	He as % to GSDP
1991	97.68	2.32	1.58	2007	69.30	30.70	1.33
1992	97.91	2.09	1.54	2008	73.28	26.72	1.19
1993	97.68	2.32	1.83	2009	78.98	21.02	1.14
1994	97.59	2.41	1.87	2010	79.18	20.82	1.26
1995	97.30	2.70	1.69	2011	78.79	21.21	1.22
1996	97.94	2.06	2.58	2012	81.37	18.63	1.25
1997	97.01	2.99	1.70	2013	81.95	18.05	1.16
1998	98.49	1.51	2.76	2014	82.08	17.92	1.38
1999	97.69	2.31	2.49	2015	85.32	14.68	1.44
2000	97.74	2.26	1.69	2016	86.69	13.31	1.49
2001	95.59	4.41	1.31	2017	76.81	23.19	1.70
2002	81.25	18.75	1.40	2018	71.24	28.76	1.35
2003	83.99	16.01	1.55	2019	73.39	26.61	1.40
2004	85.08	14.92	1.21	2020	68.14	31.86	1.51
2005	77.03	22.97	1.30	2021	58.94	41.06	1.68
2006	74.70	25.30	1.19				

Sources-Computed by Author

In the above table-2 shows the component-wise percentage share of total health expenditure as a Percentage of GSDP in Madhya Pradesh, presents yearly data on the percentage distribution of health expenditure relative to the Gross State Domestic Product (GSDP). The data is divided into three components for each year. Revenue Expenditure (RE), Capital Expenditure (CE), and Total Health Expenditure (HE), expressed as percentages of GSDP.

Revenue expenditure as a % of GSDP indicates- in between 1991 and 1996, the percentage remained consistently above 97%. Post-2000, the percentage fluctuates significantly, with a low of 74.70% in 2006 and 58.94% in 2021, showing a downward trend in revenue expenditure relative to GSDP. Revenue Expenditure shows a clear downward trend over the period. This suggests that the state shifted its focus from maintaining existing health services to new investments or capital projects. Capital expenditure as a % of GSDP shows it was generally low during the 1990s, often below 3%. By 2006, capital expenditure had risen to 25.30%, showing a substantial increase in investment. In 2021, it further rose to 41.06%, indicating a shift in focus toward infrastructure or long-term investments. Capital Expenditure shows an upward trend, increasing from 2.32% in 1991 to 41.06% in 2021, indicating a growing emphasis on building health infrastructure.

Total Health expenditure as a percentage of GSDP shows a combining both revenue and capital expenditures. Health expenditure fluctuated between 1.19% (2006) and 1.70% (2001). In 2021, health expenditure was at 1.68% of GSDP, indicating a relatively higher investment compared to the early 2000s. Health Expenditure remains relatively stable, fluctuating around 1.2% to 1.7% over the years, though the balance between revenue and capital expenditures has shifted significantly.

Table-3 Component-wise percentage share of total health expenditure as a Percentage to GSDP in Maharashtra

Year	Revenue as % of total health	Capital as % of total health	He as % to GSDP	Year	Revenue as % of total health	Capital as % of total health	He as % to GSDP
1991	96.93	3.07	1.03	**2007**	97.76	2.24	0.65
1992	97.35	2.65	0.96	**2008**	84.58	15.42	0.59
1993	97.43	2.57	0.85	**2009**	88.26	11.74	0.06
1994	96.90	3.10	0.81	**2010**	91.90	8.10	0.56
1995	98.53	1.47	0.78	**2011**	88.82	11.18	0.05
1996	98.79	1.21	1.16	**2012**	91.93	8.07	0.05
1997	98.49	1.51	0.93	**2013**	92.55	7.45	0.05
1998	98.96	1.04	1.29	**2014**	94.24	5.76	0.06
1999	98.59	1.41	1.18	**2015**	91.40	8.60	0.07
2000	98.32	1.68	0.98	**2016**	95.45	4.55	0.06
2001	97.84	2.16	0.86	**2017**	96.14	3.86	0.65
2002	95.99	4.01	0.81	**2018**	93.66	6.34	0.67
2003	95.99	4.01	1.16	**2019**	93.39	6.61	0.63
2004	97.09	2.91	0.78	**2020**	94.87	5.13	0.73
2005	97.63	2.37	0.79	**2021**	95.17	4.83	1.07
2006	97.97	2.03	0.65				

Sources-Computed by Author

Table-3 indicates total the component-wise percentage share of revenue expenditure (RE), and capital expenditure (CE) and health expenditure (HE), as percentage of the Gross State Domestic Product (GSDP) for Maharashtra over 30 years. The share of revenue expenditure remains relatively high throughout the years, fluctuating but generally above 90%. The share of capital expenditure as a percentage of GSDP tends to be lower compared to revenue expenditure, typically between 2% and 5%. The share of health expenditure, though much smaller compared to RE and CE, shows some variation, ranging between 0.5% to 1.5% over the years.

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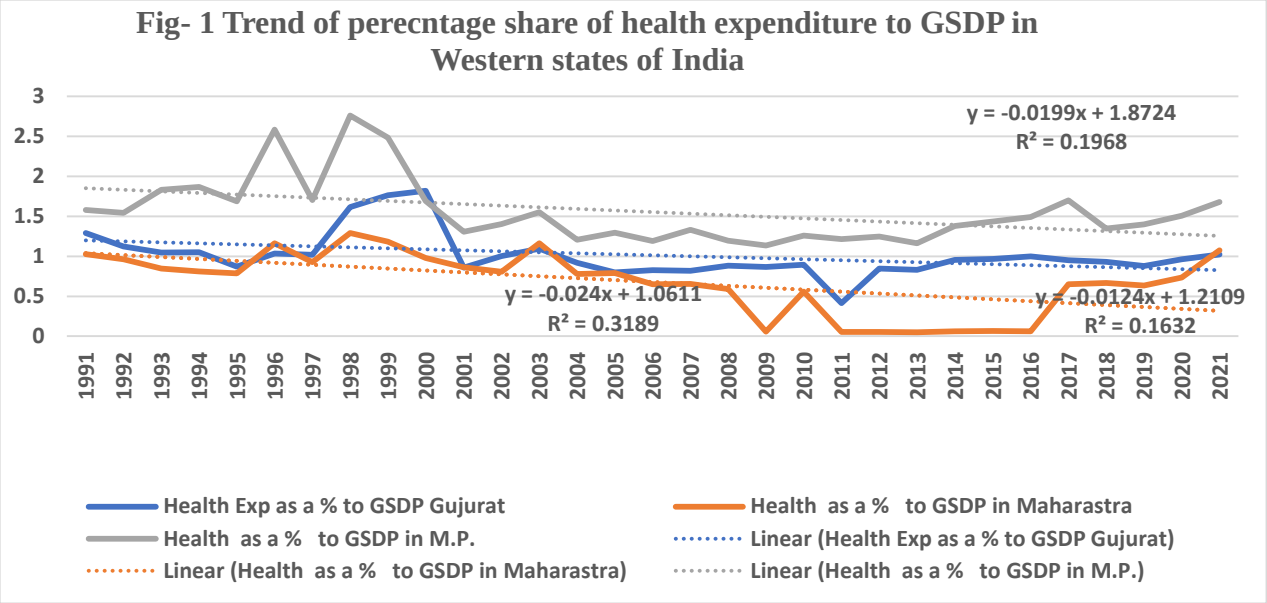

Sources-Computed by Author

Fig-1 indicates a comparative analysis of health expenditure as a percentage of Gross State Domestic Product (GSDP) in three Indian states. Gujarat, Maharashtra, and Madhya Pradesh (M.P.), from 1991 to 2021.The trend line of Maharashtra shows fluctuations, but health expenditure as a percentage of GSDP is generally higher compared to the other states, peaking above 2.5% in some years. The trend equation (Y = -0.024X + 1.0611) suggests a slight decline over time, with an (R^2= 0.3189) indicating moderate variation. In Gujarat the percentage is generally consistent, with a smaller range compared to Maharashtra. The trend line (Y = -0.0124X + 1.2109) indicates a minor decline over time, and the (R^2 =0.1632) suggests limited correlation to time. However, Madhya Pradesh MP has consistently lower compared to the other two states. The trend line (Y = 0.0199X + 1.8724) shows a slight upward trend, with an (R^2 of 0.1968). This figure highlights the inter-state variations and trends in health spending, with Maharashtra typically spending the highest and MP the lowest in terms of GSDP proportion.

Gujarat has a downward linear trend for health expenditure as a percentage of GSDP. This suggests a slight decline in health expenditure relative to GSDP over time. Maharashtra has a downward trend too, with an M.P. shows a similar pattern, with a low, indicating that the data points are less closely fitted to the trendline. Gujarat shows more variability in health expenditure over time compared to the other two states. Overall, health expenditure as a percentage of GSDP appears to be either declining or relatively flat in all three states over the years, with a slight uptick in the recent years (post-2015).

Table-4 Descriptive Statistics (Rs Million) health expenditure to GSDP in Western States of India

Statistical Measures	Revenue as % to total Health	Capital as % to total health	Health as a % to GSDP	Revenue as % to total Health	Capital as % to total health	Health as a % to GSDP	Revenue as % to total Health	Capital as % to total health	Health as a % to GSDP
`	**Gujarat**			**Madhya Pradesh**			**Maharashtra**		
Mean	69.85	30.15	1.01	84.52	15.48	1.55	95.25	4.75	0.68
S. D	11.61	11.61	0.28	11.23	11.23	0.41	3.51	3.51	0.39
Kurtosis	-0.90	-0.90	3.41	-0.89	-0.89	2.81	1.68	1.68	-0.73
Skewness	0.36	-0.36	1.51	-0.20	0.20	1.73	-1.36	1.36	-0.55
Range	38.31	38.31	1.40	39.56	39.56	1.62	14.38	14.38	1.24

Sources-Computed by Author

Table-4 analyse the descriptive statistics related to health expenditure as a percentage of GSDP (Gross State Domestic Product) for three western Indian states—Gujarat, Madhya Pradesh, and Maharashtra. provides a comparative look at how each state allocates its health budget and how it translates into health spending relative to GSDP Maharashtra has the highest percentage of revenue

expenditure on health (95.25%) and the lowest capital expenditure (4.75%), as well as the lowest health expenditure as a percentage of GSDP (0.68%). Madhya Pradesh spends more on health in terms of GSDP (1.55%) compared to the other two states, with a significant portion (15.48%) directed to capital expenditure. Gujarat is somewhere in between, with a moderate balance between revenue and capital expenditures but shows some variability (higher standard deviation and range) over the observed period. Maharashtra shows a smaller range (14.38%) for revenue and capital, and 1.24% for health to GSDP, which indicates that its values are more stable over the period.

Regression Analysis of Total Health Expenditure and GSDP among three western states in India

It is a conceptually straightforward toll for examining the functional relationships between variables. An equation or model that links the response or dependant variable to one or more explanatory or predictive factors is used to express the relationship. To determine the association between GDP growth and total health spending, the regression model is employed. Given the magnitude of the data set (millions) from the RBI bulletin in India, a log-linear regression model will be used to test the association.

Table-5 Regression Result of health expenditure and GSDP in Western States of India

State	Intercept (α)	Coefficient (β)	R^2	T	P-value	Equation
Gujarat	-736.54	0.009	0.98	36.38	0.00	GSDP = -736.54 + 0.009 Health Exp
Maharashtra	17032.81	0.001	0.85	13.06	0.00	GSDP = 17032.81 + 0.01 Health Exp
M.P.	-1573.59	0.015	0.97	35.59	0.00	GSDP = -1573.59 + 0.015 Health Exp

Sources-Computed by Author using SPSS

Table-5 highlight the relationship between Gross State Domestic Product (GSDP) and health expenditure in three western states of India. Gujarat and M.P. have particularly high values (0.98 and 0.97), indicating a stronger relationship in these states compared to Maharashtra (0.85). and the (pvalues =0.00) indicating a statistically significant the relationship between health expenditure and GSDP over the study period.

Result and Discussion

1. Health expenditure as a percentage of GSDP remains relatively low, under 2%, but shows slight increases in the 2010s and 2020.Capital expenditure as a percentage of GSDP consistently rises, which could indicate growing investment in healthcare facilities and equipment in Gujarat over time
2. Health Expenditure remains relatively stable, fluctuating around 1.2% to 1.7% over the years, though the balance between revenue and capital expenditures has shifted significantly. (M.P.)
3. The share of revenue expenditure remains relatively high throughout the years, fluctuating but generally above 90%. The share of capital expenditure as a percentage of GSDP tends to be lower compared to revenue expenditure, typically between 2% and 5%. The share of health expenditure, though much smaller compared to RE and CE, shows some variation, ranging between 0.5% to 1.5% over the years. (Maharashtra)
4. The trendline of health expenditure and GSDP in western states shows that Gujarat has aa slight decline in health expenditure relative to GSDP over time.
5. Maharashtra has a downward trend too, with an M.P. shows a similar pattern, with a low, indicating that the data points are less closely fitted to the trendline.
6. Gujarat shows more variability in health expenditure over time compared to the other two states.
7. Overall, health expenditure as a percentage of GSDP appears to be either declining or relatively flat in all three states over the years, with a slight uptick in the recent years (post-2015).
8. The descriptive statistics provides a comparative look at how each state allocates its health budget and how it translates into health spending relative to GSDP.
9. Maharashtra has the highest percentage of revenue expenditure on health (95.25%) and the lowest capital expenditure (4.75%), as well as the lowest health expenditure as a percentage of GSDP (0.68%).
10. Madhya Pradesh spends more on health in terms of GSDP (1.55%) compared to the other two states, with a significant portion (15.48%) directed to capital expenditure.
11. Gujarat is somewhere in between, with a moderate balance between revenue and capital expenditures but shows some variability (higher standard deviation and range) over the observed period.
12. Maharashtra shows a smaller range (14.38%) for revenue and capital, and 1.24% for health to

GSDP, which indicates that its values are more stable over the period.

13. The regression result shows that the health expenditure in the three western states has a positive impact to its (GSDP). Gujarat and M.P. have particularly high values (0.98 and 0.97), indicating a stronger relationship in these states compared to Maharashtra (0.85). and the (p-values =0.00) indicating a statistically significant the relationship between health expenditure and GSDP
14. Maharashtra has high value of intercept as it is a developed state with high autonomous health expenditure.

Conclusion

This study compares the gross state domestic product (GSDP) and overall health spending in three western Indian states. People's willingness to care about their health is growing as their wealth increases. To determine the balance between the advancement of medical health and economic development, the cost of medical care should be assessed as the economy grows. This analysis demonstrates that the GDP growth pattern for healthcare spending has been positively rising over time. It also concluded that there is a positively significant correlation between GDP and health spending. Lastly, this study designates that government participation is necessary for improved planning, monitoring, and use of funding, particularly in distant locations.

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