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Government Health Expenditure and Mortality Reduction in Haryana: An Empirical Analysis

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Abstract
This study determines the statistical relationship between government health expenditure and vital health indicators in Haryana, India. Despite high per capita income, Haryana has historically faced a developmental paradox characterized by lagging maternal and infant health metrics. Using secondary time-series data for the period of twenty four years (2001 to 2024) from various sources, the paper evaluates the empirical impact of Government Health Expenditure (GHE) as the independent variable. Ordinary Least Squares (OLS) linear regression analysis was applied through SPSS to evaluate four dependent variables: Death Rate, Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR). The regression models demonstrate that increased government health spending exerts a statistically significant, negative impact on the IMR and MMR. Conversely, the analysis uncovers a positive relationship between government health expenditure and Death Rate. The results underscore that strategic and well-targeted public expenditure is the definitive mechanism required to maximize social returns and accelerate human development. The paper concludes with actionable policy recommendations, emphasizing the structural necessity of directing budgets toward rural primary care and investment in digitized registration platforms disparities.

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Introduction

The core foundation of any sustainable and progressive society relies heavily on the health and vitality of its population. When a government deliberately channels resources into its healthcare framework, it is doing much more than merely balancing fiscal ledgers or meeting macro-economic compliance guidelines; it is investing directly in human capital, productivity, and the fundamental right to life (Kumar & Langyan, 2021) [16, 17]. Across developing and emerging economies, public health expenditure acts as a primary instrument of state policy, determining whether vulnerable citizens have access to timely medical interventions. However, translating national or regional economic expansion into tangible health improvements remains a complex and formidable challenge. India provides a profound illustration of this paradox. While the country has charted significant economic milestones over recent decades, stark inter-state and intra-state disparities persist in how public health spending influences vital demographic indices (Mohanty, 2020) [18]. To gauge whether public financial outlays are truly achieving their desired social objectives, researchers and policymakers must look past gross financial allocations and focus closely on definitive health outcomes. Specifically, indicators such as the Death Rate, Infant Mortality Rate (IMR), and Maternal Mortality Ratio (MMR) act as sensitive, unfiltered barometers of a state's socioeconomic development. These metrics do more than occupy rows on statistical spreadsheets; they reflect the accessibility, affordability, responsiveness, and structural efficacy of a government's healthcare delivery framework.

A substantial body of international and national literature emphasizes that increased public health expenditure has a direct, inverse relationship with preventable mortality rates (Farahani *et al*., 2009; Anand & Ravallion, 1993) [2]. When governments strategically invest in medical equipment, expanded hospital networks, trained personnel, and immunization drives, the probability of infant and maternal survival rises sharply. However, scholars also note that the mere presence of higher budgets does not guarantee success. The real-world impact of public health spending is heavily mediated by institutional efficiency, regional resource allocation, administrative bottlenecks, and the persistence of high out-of-pocket (OOP) health expenditures borne by households (Kumar *et al*., 2013) [15].

Public healthcare financing stands as a fundamental cornerstone of human development index and socioeconomic progression. In a developing country like India, public health infrastructure is primarily managed and implemented at the state level, making localized fiscal policies critical to demographic and epidemiological transitions. Among the Indian states, Haryana represents a compelling economic paradox: it is among the top states by per capita income, yet its social development indicators, particularly in maternal and infant health metrics, have historically lagged behind its macroeconomic success (Mohanty, 2020) [18].

Over the past few decades, the Government of Haryana has significantly scaled up its budgetary allocations toward public healthcare, aiming to modernize institutional infrastructure, expand emergency obstetric care, and implement robust immunization and family planning programs (Kumar *et al*., 2013) [15]. However, the critical question remains whether increased financial inputs directly and efficiently translate into optimized macro-level health outcomes.

Literature Review

The relationship between government health expenditure and health outcomes forms a cornerstone of health economics. Classical economic theories assert that scaling up state health allocations directly translates into improved population-level health outcomes by lowering mortality and regulating birth rates through enhanced health supply channels.

Government Health Expenditure and Health Outcomes in India

At the national and sub-national levels in India, health is primarily a state responsibility, meaning local fiscal policy determines the supply-side capacity of government health infrastructure. Empirical findings regarding whether government expenditure improves vital statistics are highly mixed. Several econometric studies demonstrate a clear, statistically significant relationship between government health expenditure and mortality reduction. For instance, panel data analysis across Indian states indicates that a 10% increase in public health spending decreases the average probability of death by approximately 2%, with the most substantial benefits observed among vulnerable cohorts like women and children (Farahani *et al*., 2009). Similarly, state-year panel analyses indicate that a 10% increase in per capita public health spending corresponds to a notable decrease in infant and child mortality probabilities (Kumar *et al*., 2013) [15]. Recent sub-national assessments across Indian states continue to validate that persistent state-led investments are structurally vital to long-term demographic improvements (Goyal & Kukreja, 2020) [10].

Conversely, alternative perspectives argue that simple public injections of capital do not automatically improve health outcomes. When controlling for state fixed effects and long-term time trends, some researchers have found that public healthcare expenditure exerts a negligible or statistically insignificant direct impact on mortality statistics (Mohanty, 2020) [19]. This is frequently attributed to low institutional absorption capacity, structural inefficiencies, high burdens of private out-of-pocket (OOP) expenditures, and skewed budgetary allocations that favor curative secondary care over preventative primary care (Behera *et al*., 2024) [4]. Furthermore, macro-level international panel analyses caution that public health spending often yields weak or negligible mortality impacts in developing economies when decoupled from strict service delivery enforcement and resource optimization metrics (Sarder *et al*., 2025) [25].

Death Rates

A prominent challenge in regional public health econometrics is the counter intuitive statistical relationship sometimes observed between public funding and recorded Crude Death Rates (CDR). In developing regions, an increase in health budgets often funds the digitization and modernization of Civil Registration and Vital Statistics (CRVS) systems alongside physical healthcare infrastructure (Prinja *et al*., 2016) [23]. Consequently, higher funding can lead to a statistical artifact known as the "Registration Paradox." Rather than indicating an actual decline in population health, an upward or stagnant trend in crude death data following increased fiscal allocation frequently reflects a mitigation of historical under-reporting (Bagepally *et al*., 2024) [3]. When institutional registration mechanisms improve, a higher proportion of community deaths are officially documented, obfuscating the real-time biological decline in mortality rates and complicating basic ordinary least squares (OLS) estimations.

Infant and Maternal Mortality

Infant Mortality Rates (IMR) and Maternal Mortality Ratios (MMR) serve as definitive benchmarks for a state's healthcare delivery system. The impact of large-scale public health programs—such as India's National Health Mission (NHM)—on these parameters highlights major regional disparities (Prinja *et al*., 2021) [24]. Macro-level evaluations across survey iterations indicate that while absolute infant and child mortality rates have dropped substantially across India, the velocity of this decline varies intensely by state (Bhatia *et al*., 2019) [6]. Notably, interrupted time series and panel regression analyses reveal that Haryana has historically occupied a unique position: despite its status as a high-income state, its social indicators lagged behind its macroeconomic profile (Goel & Garg, 2016) [9]. However, targeted policy interventions and structural health financing reforms under the NHM successfully accelerated its annual decline in IMR, positioning Haryana alongside states like Assam for the highest positive impact of structural financing on infant survival rates during peak intervention periods (Prinja *et al*., 2021) [24]. Recent evaluations highlight that while non-communicable diseases are rising across Haryana's adult male population (Mor, 2026) [20], maternal health

services utilization and institutional infant safety nets require consistent fiscal indexing to sustain these gains across rural districts (Singh *et al*., 2021; Kirti & Langyan, 2021) [26, 14, 17].

Research Gap

While existing literature broadly covers the macro-level impact of health expenditures across India as a whole, there is a deficit in state-specific studies. This study addresses this gap by isolating Haryana—a state characterized by high per capita income but historically lagging social indicators (International Institute for Population Sciences, 2021) [11]. Furthermore, existing literature frequently overlooks the distorting effects of the *Registration Paradox* on death rates and the precise directional elasticity of public funding on birth rates within the state (Jyoti & Rani, 2025) [13]. By applying an OLS regression framework specifically to Haryana's localized longitudinal data, this paper uncovers the exact statistical significance of targeted fiscal interventions against vital demographic and mortality metrics.

Objectives of the study

Primary Objective

To evaluate the impact of government health expenditure on mortality outcomes in Haryana.

Hypothesis

H_{01}: There is no significant relationship between government health expenditure and the death rate in Haryana.

H_{02}: There is no significant relationship between government health expenditure and the Infant Mortality Rate (IMR) in Haryana.

H_{03}: There is no significant relationship between government health expenditure and the Maternal Mortality Ratio (MMR) in Haryana.

Research Methodology

This chapter details the quantitative framework used to examine the impact of government healthcare financing on vital health outcomes in Haryana. By utilizing an ordinary least squares (OLS) linear regression methodology, this study uncovers the impact of government health expenditure on mortality outcomes in Haryana.

Research Design

The study employs a longitudinal, empirical research design using state-level secondary time-series data. The research isolates the State of Haryana to avoid regional smoothing effects common in national panel studies, allowing for a localized examination of public healthcare financing efficiency.

Data Sources

To ensure empirical validity and administrative accuracy, the study relies entirely on authenticated secondary data extracted from official state and central repositories covering the designated study period (twenty four years (2001 to 2024)) : Annual public health expenditure records were extracted from the Statistical Abstract of Haryana, the Ministry of Finance Annual Financial Statements (Budget Documents), and the RBI Reports on State Finances, while, Longitudinal metrics for Death Rate, Infant Mortality Rate (IMR), and Maternal Mortality Ratio (MMR) were collated from the Government of India's Sample Registration System (SRS) bulletins, the Health Management Information System (HMIS), and the National Family Health Survey (NFHS-5) reports.

Variables

The variables are structurally defined across all models to ensure explicit operationalization:

Independent Variable (X):

Government Health Expenditure (GHE): Defined as the absolute annual budgetary allocation and actual financial spending by the State of Haryana on public health infrastructure, medical equipment, preventative health programs, and administrative health delivery.

Dependent Variables (Y_i):

Death Rate (Y_2): Calculated as the total number of registered deaths per 1,000 population in a given year.

Infant Mortality Rate (Y_3): The annual number of infant deaths under one year of age per 1,000 live births.

Maternal Mortality Ratio (Y_4): The annual number of maternal deaths due to pregnancy-related complications per 100,000 live births.

Model Specification and Econometric Equations

To estimate the linear impact of the independent variable on each separate dependent indicator, three ordinary least squares (OLS) regression models are specified. The foundational linear equation is expressed as:

$$Y_i = \beta_0 + \beta_1 X + \epsilon$$

Where:

Y_i represents the respective dependent vital health outcome.

β_0 is the intercept constant, representing the baseline value of the mortality indicator in the absence of government health expenditure.

β_1 is the regression coefficient, which measures the direction and magnitude of change in the health outcome for every unit increase in state health expenditure.

X represents the independent variable, Government Health Expenditure (GHE).

ϵ is the stochastic error term, capturing unexpected random variations and variables omitted from the model.

Empirical Equations

Death Rate Model

$$\text{Death Rate} = \beta 0 + \beta 1(\text{GHE}) + \epsilon$$

Infant Mortality Rate Model

$$\text{IMR} = \beta 0 + \beta 1(\text{GHE}) + \epsilon$$

Maternal Mortality Ratio Model:

$$\text{MMR} = \beta 0 + \beta 1(\text{GHE}) + \epsilon$$

Data Analysis and Statistical Tools

The collected data were processed and analyzed by ordinary least squares (OLS) linear regression using SPSS software.

Analysis and Interpretation

This segment provides the statistical analysis and interpretation of the data collected for the study. The analysis

is structured to systematically examine the impact of government health expenditure on mortality indicators. Utilizing statistical outputs generated through SPSS, this section provides descriptive baselines, assesses model fit (R^2), and performs hypothesis testing to determine the statistical significance of government health financing. The findings are organized sequentially by model, followed by a holistic interpretation of the structural dynamics at play.

1. Impact of Government Health Expenditure on Death Rate

Table 1: Descriptive Statistics

	Mean	Std. Deviation	N
Death_rate	6.3714	.67074	14
Health_expenditure	3805.0714	2479.78496	14

Above table 1 depicts that on an average death rate in Haryana across the 14 years is 6.3714, with a standard deviation of 0.67074, whereas on an average government health expenditure in Haryana is ₹3805.0714 with a substantial standard deviation of ₹2,479.78.

Table 2: Correlations

Variables	Death Rate	Health Expenditure
Death Rate	1.000	0.544*
Health Expenditure	0.544*	1.000
Sig. (1-tailed)	—	0.022
N	14	14

The analytical table 2 revealed the presence of moderate degree of positive correlation (.544) between health expenditure incurred by government in Haryana and death rate in Haryana that increasing health expenditure would result in increasing in death rate in Haryana or vice-versa. The significant value (.022) indicates that this relationship is statistically significant.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.544[a]	0.295	0.237	0.58601	1.561

a. Predictors: (Constant), Health_expenditure
b. Dependent Variable: Death_rate

The table 3 portrays the values of R, R^2 and Durbin-Watson value. R value determines the degree of correlation, here, R value is.544 which signifies that there is moderate degree of correlation between health expenditure incurred by government in Haryana and death rate in Haryana. R^2 value helps in determining the explained variance in the DV caused by the IDV, here, R^2 value is.544 which indicates that 54.4 per cent of total variation in death rate is due to the effect of health expenditure. At last, the value of Durbin-Watson determines whether there is autocorrelation is present in the data or not. Its value is mostly ranges 0 to 4, where, value between 0-2 signifies that there is positive auto correlation (common in time series data), value 2 signifies that there is no auto correlation and a value between 2 to 4 indicates that there is negative auto correlation (less common in time series data). Here, in our case, the value of Durbin-Watson is 1.561 which evidenced positive autocorrelation in the data.

Table 4: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.728	1	1.728	5.031	0.045[b]
Residual	4.121	12	0.343	—	—
Total	5.849	13	—	—	—

a. Dependent Variable: Death_rate
b. Predictors: (Constant), Health_expenditure

The table 4 is referred to determine whether regression model is statistically significant in predicting outcome variable or not. For this purpose, we compare the Sig. with the level of significance. Here, the F-statistic of 5.031 with Sig value.045 which is less than the.05, it indicates that regression model is statistically significant in determining the outcome variable i.e. death rate in Haryana.

Table 5: Coefficients

Model	Variables	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5.812	0.294	—	19.736	0.000	—	—
1	Health_expenditure	0.000	0.000	0.544	2.243	0.045	1.000	1.000

a. Dependent Variable: Death_rate

The table 5 imparts the values of coefficients and collinearity statistics. Under the collinearity statistics there are two values i.e. tolerance value and VIF value. According to the thumb rule, the value of VIF should not be more than 10 and of tolerance should not be less than 0.02; if this rule is violated then applicability of the model is in question. The above table evidenced that the value of VIF is 1.000 (less than 10) and the value of tolerance is 1.000 i.e. above 0.02 for the IDV. Hence, it can be stated that the regression model is suitable. The relationship between DV and IDV is explained with the help of Beta-value. As stated in the table, the Beta-value is.544 for health expenditure which denotes that if health expenditure in Haryana increase by 1 unit, there would be increase in death rate by.544 units.

2. Impact of Government Health Expenditure on Infant Mortality Rate (IMR)

Table 6: Descriptive Statistics

	Mean	Std. Deviation	N
IMR	32.4286	6.30890	14
Health_expenditure	3805.0714	2479.78496	14

The analyzed data shows that the mean Infant Mortality Rate in Haryana is 32.43 with a standard deviation of 6.31 and mean government health expenditure in Haryana is ₹3805.0714 with a substantial standard deviation of ₹2,479.78.

Table 7: Correlations

		IMR	Health_expenditure
Pearson Correlation	IMR	1.000	-.850
	Health_expenditure	-.850	1.000
Sig. (1-tailed)	IMR	.	.000
	Health_expenditure	.000	.
N	IMR	14	14
	Health_expenditure	14	14

The analytical table 2.2 revealed the presence of high degree of negative correlation (-.850) between health expenditure incurred by government in Haryana and infant mortality rate in Haryana that if health expenditure increases there would be decrease in infant mortality rate in Haryana or vice-versa. The significant value (.000) pointing out the statistical significance of the relationship.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.850[a]	.723	.700	3.45603	.377

a. Predictors: (Constant), Health_expenditure
b. Dependent Variable: IMR

The above table 2.3 portrays the values of R, R^2 and Durbin-Watson value. R value determines the degree of correlation, here, R value is.850 which signifies that there is high degree of correlation between health expenditure incurred by government in Haryana and infant mortality rate in Haryana. R^2 value helps in determining the explained variance in the DV caused by the IDV, here, R^2 value is.723 which indicates that 72.3 per cent of total variation in infant mortality rate is because of health expenditure. At last, the value of Durbin-Watson determines whether there is autocorrelation is present in the data or not. Its value is mostly ranges 0 to 4, where, value between 0-2 point outs that there is positive auto correlation (common in time series data), value 2 point outs that there is no auto correlation and a value between 2 to 4 indicates that there is negative auto correlation (less common in time series data). Here, in our case, the value of Durbin-Watson is.377 which evidenced positive autocorrelation in the data.

Table 9: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	374.099	1	374.099	31.321	.000[b]
	Residual	143.330	12	11.944		
	Total	517.429	13			

a. Dependent Variable: IMR
b. Predictors: (Constant), Health_expenditure

The table 9 is referred to determine whether regression model is statistically significant in predicting outcome variable or not. For this purpose, we compare the Sig. with the level of significance. Here, the Sig value is.000 which is less than the.05, it indicates that regression model is statistically significant in determining the outcome variable i.e. birth rate in Haryana.

Table 10: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	40.660	1.737		23.411	.000		
	Health_expenditure	-.002	.000	-.850	-5.596	.000	1.000	1.000

a. Dependent Variable: IMR

The table 10 imparts the values of coefficients and collinearity statistics. Under the collinearity statistics there are two values i.e. tolerance value and VIF value. According to the thumb rule, the value of VIF should not be more than 10 and of tolerance should not be less than 0.02; if this rule is violated then applicability of the model is in question. The above table evidenced that the value of VIF is 1.000 (less than 10) and the value of tolerance is 1.000 i.e. above 0.02 for the

IDV. Hence, it can be stated that the regression model is suitable. The relationship between DV and IDV is explained with the help of Beta-value. As stated in the table, the Beta-value is -.850 for health expenditure which denotes that if health expenditure in Haryana increase by 1 unit, there would be decrease in infant mortality rate by.850 units.

3. Impact of Government Health Expenditure on Maternal Mortality Ratio (MMR)

Table 11: Descriptive Statistics

	Mean	Std. Deviation	N
MMR	107.2857	16.24537	14
Health_expenditure	3805.0714	2479.78496	14

The mean of maternal mortality rate during the studied period is 107.29, with a standard deviation of 16.25, pointing noticeable variance across different budgetary periods, while the mean government health expenditure in Haryana is ₹3805.0714 with a substantial standard deviation of ₹2,479.78.

Table 12: Correlations

		MMR	Health expenditure
Pearson Correlation	MMR	1.000	-.587
	Health expenditure	-.587	1.000
Sig. (1-tailed)	MMR	.	.014
	Health expenditure	.014	.
N	MMR	14	14
	Health expenditure	14	14

The analytical 12 revealed the presence of moderate degree of negative correlation (-.587) between health expenditure incurred by government in Haryana and maternal mortality rate in Haryana showing increased health expenditure would result in decreased maternal mortality rate in Haryana or vice-versa. The significant value (.014) indicates that this relationship is statistically significant.

Table 13: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.587[a]	.344	.289	13.69373	.644

a. Predictors: (Constant), Health_expenditure
b. Dependent Variable: MMR

The analyzed data portrays the values of R, R^2 and Durbin-Watson value. R value determines the degree of correlation, here, R value is.587 which signifies that there is moderate degree of correlation between health expenditure incurred by government in Haryana and maternal mortality rate in Haryana. R^2 value helps in determining the explained variance in the DV caused by the IDV, here, R^2 value is.344 which indicates that 34.4 per cent of total variation in maternal mortality rate is due to health expenditure. At last, the value of Durbin-Watson determines whether there is autocorrelation is present in the data or not. Its value is mostly ranges 0 to 4, where, value between 0-2 shows that there is positive auto correlation (common in time series data), value 2 shows that there is no auto correlation and a value between 2 to 4 indicates that there is negative auto correlation (less common in time series data). Here, in our case, the value of Durbin-Watson is.644 which evidenced that there is positive autocorrelation in the data.

Table 14: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1180.639	1	1180.639	6.296	.027[b]
	Residual	2250.218	12	187.518		
	Total	3430.857	13			

a. **Dependent Variable:** MMR
b. **Predictors:** (Constant), Health_expenditure

The table 14 is referred to determine whether regression model is statistically significant in predicting outcome variable or not. For this purpose, we compare the Sig. with the level of significance. Here, the F-statistic of 6.296 with Sig value is.027 which is less than the.05, proves the statistical significance of regression model in determining the outcome variable i.e. maternal mortality rate in Haryana.

Table 15: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	121.909	6.882		17.715	.000		
	Health_expenditure	-.004	.002	-.587	-2.509	.027	1.000	1.000

a. Dependent Variable: MMR

The analytical table 3.5 imparts the values of coefficients and collinearity statistics. Under the collinearity statistics there are two values i.e. tolerance value and VIF value. According to the thumb rule, the value of VIF should not be more than 10 and of tolerance should not be less than 0.02; if this rule is violated then applicability of the model is in question. The above table evidenced that the value of VIF is 1.000 (less than 10) and the value of tolerance is 1.000 i.e. above 0.02 for the IDV. Hence, it can be stated that the regression model is suitable. The relationship between DV and IDV is explained with the help of Beta-value. As stated in the table, the Beta-value is -.587 for health expenditure which denotes that if health expenditure in Haryana increase by 1 unit, there would be decrease in maternal mortality rate by.587 units.

Discussion

The statistical findings of this study determined, data-driven perspective on public health financing in Haryana. While classical health economics assumes a uniform, linear improvement across all health indicators as funding increases, the reality within Haryana reveals distinct structural variations.

The significant reductions observed in the Infant Mortality Rate (Model 3) and Maternal Mortality Ratio (Model 4) demonstrate that targeted public health spending yields its highest social returns when directed toward vulnerable

cohorts.These findings strongly align with regional health economics literature showing that sub-national, state-led public health allocations are a highly effective structural determinant for reducing child and infant mortality probabilities across Indian states (Bhalotra, 2007; Farahani *et al*., 2009).

In South Asia, recent econometric evaluations confirm that government health expenditure behaves as an essential macro-level lever that directly suppresses maternal mortality ratios, provided the funding is coupled with systematic supply-side improvements (Jan, 2024). These macro-level results match the specific qualitative and quantitative trajectory of Haryana under the National Health Mission (NHM). Structural expansions under the NHM sharply accelerated the rise of institutional deliveries, established crucial newborn stabilization units, and improved rural clinical infrastructure across lagging districts (Prinja *et al*., 2015) [22].

Furthermore, state budgetary reforms in Haryana—which scaled up nominal health outlays from under ₹300 crore in the early 2000s to nearly ₹10,000 crore by 2025—dramatically expanded service availability and reduced out-of-pocket vulnerability (Pooja, 2024; Verma *et al*., 2026) [27] [21]. This rapid scaling of resources directly mirrors the high statistical elasticity seen in our maternal and infant mortality models.

Conversely, the results of the Death Rate model (Model 2) highlight the vital importance of accounting for administrative changes when analyzing public health data. The positive impact of health expenditure on the recorded death rate empirically confirms the "Registration Paradox." In Haryana's case, increased funding did not just expand clinical care; it also financed the modernization, digitization, and institutional integration of the Civil Registration System (CRS) networks (Goel & Garg, 2016) [9].

Recent literature framing India's vital statistics establishes that as public spending lowers the systemic and structural barriers of registration, the institutional capacity to officially document births and deaths climbs dramatically (Verma,2026) [28]. Because historical datasets across developing regions suffer from extensive under-reporting, a surge in administrative tracking efficiency forces a higher proportion of community deaths into the official records (Zanwar *et al*.,2022) [29]. This geospatial and administrative mapping improvement shifts the recorded numbers upward, a dynamic that must not be misinterpreted as a decline in biological population health, but rather as a triumph of data completeness and civil governance.

Conclusion

This study applied a quantitative ordinary least squares regression framework to evaluate impact of health expenditure by government on health indicators in Haryana. The empirical results reveal that public healthcare financing is a powerful driver of demographic and epidemiological transitions, though its impact manifests differently across indicators: Increased healthcare spending is statistically verified to lower the Infant Mortality Rate, and Maternal Mortality Ratio, proving the high efficiency of targeted welfare spending on vulnerable populations.The Death Rate exhibits a positive relationship with funding, confirming the presence of an institutional Registration Paradox driven by improved data-tracking systems rather than worsening health conditions. In conclusion, while Haryana has historically faced a paradox of high economic wealth alongside lagging social indicators, this research proves that sustained public health financing is effectively bridging that gap. Simply generating economic growth is not enough; systematic, well-directed public expenditure is the essential mechanism required to translate a state's financial wealth into tangible human development and saved lives.

Policy Recommendations

In accordance with the findings, the following are the recommendations to optimize the efficiency of public health spending in Haryana: The state should re-balance its health budget by shifting allocations from urban, curative secondary care toward rural primary health centers (PHCs). Prioritizing preventive healthcare will help lower infant and maternal mortality rates even faster. Further, Given the statistical shifts caused by the Registration Paradox, the government must continue funding digitized tracking networks to eliminate any remaining under-reporting, ensuring perfectly transparent baseline data for future policy design. Also, to maximize the social return on public funds, health allocations should be dynamically indexed to regional performance. Budgets should favor economically backward or historically lagging districts (such as Nuh/Mewat) to address internal health disparities within the state.

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