IMPACT OF GOVERNMENT HEALTH EXPENDITURE ON WOMEN AND CHILD HEALTH IN INDIA: AN ECONOMETRIC ANALYSIS

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Abstract: This study examines the impact of government health expenditure on women and child health outcomes in India during 2005-2015 on the basis of maternal and child health indicators. With the use of secondary data and econometric analysis the relationship between health expenditure and key health indicators have been done. The results reveal highly significant negative correlations between health expenditure and mortality indicators (MMR: $r=-0.983$, $p<0.01$; IMR: $r=-0.991$, $p<0.01$) and strong positive correlations with service coverage indicators (Institutional Delivery: $r=0.994$, $p<0.01$; Full Immunization: $r=0.995$, $p<0.01$). Regression analysis demonstrates that every Rs. 1000 crore increase in health expenditure reduces MMR by 0.80 per 100,000 live births and IMR by 0.18 per 1,000 live births. The study shows significant interstate differences with best performing states such as Kerala and Tamil Nadu, spend 4-5 times more per capita on health than Empowered Action Group (EAG) states. The findings highlight the vital role of long-term expenditure on health infrastructure development particularly in underperforming states for improving the equitable improvements in health of women and children.

Keywords: Government Health Expenditure, Women and Child Health & Econometric Analysis

Introduction

Women and child health are fundamental requirements of human development and a key indicator of the socio-economic progress of any country (UNDP, 2015). The health of mothers and children not only show the effectiveness of healthcare delivery systems but also influence the quality of human capital formation and future productivity of any nation (Bloom et al., 2004). Despite significant economic growth over the last two decades, India accounts approximately 17% of the world's population that faces significant challenges in maternal and child health. According to the World Health Organization, India was responsible for roughly 17% of global maternal deaths and 21% of under-5 child deaths in 2015. The government of has consistently prioritized health sector development in successive Five-Year Plans and national health programmes. The National Rural Health Mission (NRHM), which was launched in 2005, was a watershed moment in India's health policy landscape, with the goal of making healthcare more accessible, affordable and high-quality for rural and underserved populations. As a result, programmes which focus on reproductive and child health gained traction with increased budgetary allocations aimed at lowering maternal and infant mortality rates.

Analysis of public health expenditure trends in India, which examined overall health sector financing from 2005 to 2015, and focuses specifically on women and child health outcomes. While Singh's research found that public health expenditure increased at a Compound Annual Growth Rate (CAGR) of 13.13% during this time period, from Rs. 45,428 crores in 2005-06 to Rs. 154,567 crores in 2014-15, the specific impact on maternal and child health indicators remained unknown (Singh U., 2015). This research gap is especially significant given that in 2014-15, approximately 70.6% of total health expenditure was allocated to programs directly related to women and children's health, including Reproductive and Child Health (34.1%), National Health Mission (29.4%), and Family Welfare (7.1%).

The selected period of 2005-2015 has significance for analysis because it includes both the NRHM implementation and major maternal & child health initiatives. During this period India has reported significant demographic and health changes such as chaange in fertility rates, shifts in disease patterns and healthcare infrastructure (Office of Registrar General, 2015). Empowered Action Group (EAG) states- Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand are still lagging behind national averages in most health indicators (Planning Commission, 2013). It is essential to address these disparities to achieve equitable health outcomes across the country.

Research Objectives

This study tracks the following objectives:

1. To examine the statistical relationship between health expenditure and key maternal health indicators (MMR, institutional delivery rates, ANC coverage)
2. To investigate the impact of health expenditure on child health outcomes (IMR, U5MR, immunization coverage)
3. To measure the responsiveness of health indicators to changes in public health investment through elasticity analysis
4. To assess inter-state variations in health expenditure and outcomes with particular focus on EAG states

Literature Review

The relationship between public health expenditure and health outcomes has been generally studied but on women and child health in India comparatively remains limited. This section summarizes key literature relevant to the present study.

International Evidence

Novignon et al. (2012) show for a panel of African countries that higher health expenditure is associated with significantly lower infant mortality with elasticities typically between −0.15 and −0.30, suggest modest but meaningful mortality reductions. Anyanwu and Erhijakpor (2009) similarly report that both public and private health spending improve child and maternal health outcomes in 47 African countries. In Latin America and other developing and transition economies, Gupta et al. (2002) find that greater public outlays on health and education reduce infant and child mortality. Farahani et al. (2011), using cross-country data, conclude that

higher total health expenditure lowers maternal mortality, and its impact is improved when combined with higher female literacy and better coverage of skilled birth attendance.

India and South Asia

For India, Pandey (2010) documents significant associations between per capita public health expenditure and life expectancy, infant mortality and maternal mortality across states during 1990–2005, but also finds large inter-state differences in spending efficiency, pointing to the role of health infrastructure, human resources and delivery systems. Using DLHS data, Bose and Dutta (2015) estimate that the National Rural Health Mission (NRHM) was associated with increases of about 5–7 percentage points in institutional deliveries and 3–4 percentage points in full immunization between 2002 and 2008 with greater gains in better-governed states. In a South Asian comparison, Roy and Chaudhuri (2008) show that despite rising health expenditure, India's progress in reducing child mortality lagged behind smaller neighbours such as Bangladesh and Sri Lanka.

Maternal Health and Public Investment

Evaluating Janani Suraksha Yojana (JSY), Powell-Jackson et al. (2015) find that conditional cash transfers substantially increased institutional deliveries especially among disadvantaged groups but provide mixed evidence on maternal mortality, raising concerns about the quality of obstetric care. Rai et al. (2013) analyze cross-state determinants of maternal mortality and report that the effect of health expenditure is facilitated by female literacy, women's empowerment and the availability of skilled birth attendants.

Child health and Financing

Kumar and Prakash (2011) use panel data for Indian states (1990–2008) and estimate that a 1% rise in per capita public health spending reduces infant mortality by roughly 0.08%, with larger reductions where health infrastructure and female literacy are stronger. Pathak and Mohanty (2010) show that immunization coverage depends on both supply-side factors (facilities, workforce, vaccine availability) and demand-side factors (maternal education, household wealth), indicate that health expenditure influences child health through direct service provision and indirect effects on information and outreach.

Efficiency and Equity

Ghosh (2008) with Data Envelopment Analysis, finds wide variation in the efficiency of state health systems- some states achieve comparatively good results with modest spending while others perform poorly in spite of higher expenditures. Berman et al. (2010) highlight persistent inequities in health financing- out-of-pocket payments remain high and regressive and that increased public spending has not fully protected poor households from financial hardship.

Research Gaps and Contribution

It is clear that higher public health expenditure is generally associated with better health outcomes but several gaps remain. Most studies focus on aggregate indicators rather than disaggregated women and child health outcomes; few combine multiple empirical techniques to measure the expenditure outcome link and relatively little work covers the NRHM decade 2005–2015 in an integrated way. The present study addresses these gaps and connects women and child health indicators with correlation, regression and elasticity analysis over the 2005–2015 period with the use of secondary data.

Data and Methodology

Data Sources: The analysis is based on secondary data collected from Economic Survey (Ministry of Finance), National Health Profile (Ministry of Health and Family Welfare), National Family Health Survey (NFHS-3), Sample Registration System and Maternal Mortality special bulletins (Office of the Registrar General, India) and District Level Household Survey (DLHS).

Data Construction and Interpolation

Given that some health indicators (particularly MMR) are available on a triennial basis while health expenditure data are annual, we employed linear interpolation techniques to construct a consistent annual dataset for 2005-2015. Interpolation was conducted using the following formula:

$$Y_t = Y_{t-1} + \frac{(Y_{t+n} - Y_{t-1})}{n} \times k$$

where Y_t represents the indicator value for year t, n is the interval between survey rounds, and k is the number of years from the last observation.

This approach is justified by the gradual nature of changes in health indicators and is consistent with methodologies employed by international organizations- WHO and UNICEF for inter-survey period estimates (World Health Organization, 2014).

Variables

Table 1: Dependent Variables: Women and Child Health Indicators

Variable	Definition	Unit
MMR	Maternal Mortality Rate	Deaths per 100,000 live births
IMR	Infant Mortality Rate	Deaths per 1,000 live births
U5MR	Under-5 Mortality Rate	Deaths per 1,000 live births
INST_DEL	Institutional Delivery Rate	Percentage of deliveries
ANC_4	ANC 4+ Visits Coverage	Percentage of pregnant women
FULL_IMM	Full Immunization Coverage	Percentage of children 12-23 months

Table 2: Independent Variables: Health Expenditure Measures

Variable	Definition	Unit
HLTH_EXP	Total Public Health Expenditure	Rs. Crores
PC_HLTH_EXP	Per Capita Health Expenditure	Rs. per person
HLTH_GDP	Health Expenditure as % of GDP	Percentage

Analytical Framework

The analytical framework employs three complementary techniques to comprehensively examine the relationship between health expenditure and women and child health outcomes:

1. Correlation Analysis

Pearson's correlation coefficient (r) is calculated to measure the strength and direction of linear association between health expenditure and each health indicator:

$$r_{xy} = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n} (y_i - \bar{y})^2}}$$

where x represents health expenditure, y represents health outcome and n is the number of observations (years).

Statistical significance is tested using the t-statistic:

$$t = r\sqrt{\frac{n-2}{1-r^2}}$$

with $n - 2$ degrees of freedom. The null hypothesis $H_0: \rho = 0$ (no correlation) is tested against the alternative $H_1: \rho \neq 0$ (significant correlation exists).

2. Ordinary Least Squares (OLS) Regression

To quantify the marginal impact of health expenditure on each health indicator, we estimate the following linear regression model:

$$Y_t = \beta_0 + \beta_1 HLTH\_EXP_t + \varepsilon_t$$

where:

- Y_t = Health outcome indicator in year t
- $HLTH\_EXP_t$ = Public health expenditure in year t
- β_0 = Intercept (baseline level of health indicator)
- β_1 = Slope coefficient (marginal impact of expenditure)
- ε_t = Error term

The coefficient β_1 represents the change in the health indicator for a one-unit increase in health expenditure. For mortality indicators (MMR, IMR, U5MR), we expect $\beta_1 < 0$ (negative relationship), while for service coverage indicators (institutional delivery, ANC, immunization), we expect $\beta_1 > 0$ (positive relationship).

Model performance is evaluated using:

- R-squared (R^2): Proportion of variance explained
- Adjusted R-squared: R-squared adjusted for degrees of freedom
- t-statistic and p-value: Statistical significance of coefficients
- Standard error: Precision of coefficient estimates

3. Elasticity Analysis

To assess the responsiveness of health indicators to changes in health expenditure, we calculate elasticity coefficients:

$$\eta = \frac{\%\Delta Y}{\%\Delta X} = \frac{(Y_{2015} - Y_{2005})/Y_{2005}}{(X_{2015} - X_{2005})/X_{2005}}$$

where Y represents the health indicator and X represents health expenditure. Elasticity measures the percentage change in the health indicator resulting from a one percent change in health expenditure.

For mortality indicators, negative elasticity indicates an inverse relationship (desirable), while for service coverage indicators, positive elasticity indicates a direct relationship (desirable). The magnitude of elasticity reveals the degree of responsiveness.

4. Compound Annual Growth Rate (CAGR)

To analyze trends, we calculate CAGR for each indicator:

$$CAGR = \left[\left(\frac{Value_{2015}}{Value_{2005}}\right)^{\frac{1}{10}} - 1\right] \times 100$$

CAGR provides a smoothed annual growth rate, accounting for year-to-year fluctuations.

Model Assumptions and Limitations

The OLS regression model relies on several classical assumptions:

1. **Linearity:** The relationship between health expenditure and outcomes is linear
2. **Independence:** Observations across years are independent
3. **Homoscedasticity:** Variance of errors is constant across observations
4. **Normality:** Errors are normally distributed
5. **No multicollinearity:** Not applicable in simple bivariate regression

RESULTS

Table: 3 Health Expenditure and Women & Child Health Indicators

Year	Exp (Cr)	Exp % GDP	MMR	IMR	U5MR	Inst Del %	ANC4 %	Full Imm %
2005	45,428	0.90	254	58	74	38.7	37.0	43.5
2006	52,126	0.93	248	57	72	40.8	39.2	45.2
2007	63,226	0.96	242	55	69	43.2	41.5	47.1
2008	74,773	1.00	236	53	66	45.9	43.9	49.2
2009	88,054	1.22	230	50	64	48.8	46.4	51.5
2010	100,576	1.29	212	47	59	52.1	49.0	54.0
2011	110,228	1.27	205	44	56	55.8	51.8	56.7
2012	123,264	1.26	178	42	52	59.3	54.7	59.6
2013	146,711	1.29	178	40	49	63.2	57.8	62.8
2014	154,567	1.24	167	39	47	67.8	61.2	66.2
2015	163,000	1.22	167	37	43	72.5	65.0	69.8

Source: Economic Survey (various years), National Health Profile 2015, SRS Bulletins, MMR Bulletins (Govt. of India)

It is clear from the table 3 that public health expenditure increased consistently from Rs. 45,428 crores in 2005 to Rs. 163,000 crores in 2015 with an absolute increase of 258.8% and a CAGR of 13.63%. Health expenditure as percentage of GDP increased from 0.90% in 2005 to a peak of 1.29% in 2010 and 2013. In terms of MMR, it has declined substantially from 254 per 100,000 live births in 2005 to 167 in 2015 and reported a 34.3% reduction. The decline was particularly pronounced between 2010-2012 due to NRHM. Institutional delivery rates increased from 38.7% to 72.5% with an increase of 87.3%. ANC coverage (4+ visits) improved from 37.0% to 65.0%, a 75.7% increase. IMR has also declined from 58 per 1,000 live births to 37, a 36.2% reduction. U5MR showed even greater improvement and declined from 74 to 43 per 1,000 live births, a 41.9% reduction. Full immunization coverage among children aged 12-23 months increased from 43.5% to 69.8% which represents a 60.5% improvement.

Table 4: Pearson Correlation: Health Expenditure and Health Indicators

Health Indicator	Correlation (r)	p-value	Significance
Maternal Mortality Rate (MMR)	-0.9832	<0.001	***
Infant Mortality Rate (IMR)	-0.9914	<0.001	***
Under-5 Mortality Rate (U5MR)	-0.9957	<0.001	***
Institutional Delivery (%)	0.9941	<0.001	***
ANC 4+ Visits (%)	0.9957	<0.001	***
Full Immunization (%)	0.9948	<0.001	***

Source: Author's calculation (**Note:** *** indicates significance at 1% level; ** at 5% level; * at 10% level)

Table 4 presents Pearson correlation coefficients between total public health expenditure and selected indicators and results show exceptionally strong correlations. All mortality indicators reported very strong negative correlations with health expenditure. With the increase of health expenditure mortality rates have declined consistently. U5MR shows the strongest correlation (r=-0.9957, p<0.001) followed closely by IMR (r=-0.9914, p<0.001) and MMR (r=-0.9832, p<0.001). The nearly perfect negative correlations indicate that health-care spending has been extremely effective in lowering mortality rates among both women and children. Service coverage indicators have very strong positive correlations with health expenditure. ANC 4+ visits have reported the highest correlation (r=0.9957, p<0.001) along with full immunization (r=0.9948, p<0.001) and institutional delivery (r=0.9941, p<0.001); these strong positive associations suggest that increased health expenditure has successfully expanded access to critical maternal and child health services in India. High correlation coefficients (>0.98) and significant p-values (<0.001) indicate a strong linear relationship between health expenditure and outcomes during the study period.

Table 5: OLS Regression Results: Health Expenditure Impact on Health Indicators

Dependent Variable	β0 (Intercept)	β1 (Coefficient)	t-stat	p-value	R^2	Adj-R^2
MMR	291.90	-0.000797	-16.17	<0.001	0.967	0.963
IMR	65.98	-0.000182	-22.73	<0.001	0.983	0.981
U5MR	90.23	-0.000264	-27.84	<0.001	0.991	0.990
Inst. Delivery	25.89	0.000270	27.55	<0.001	0.988	0.987
ANC 4+ Visits	26.12	0.000227	28.06	<0.001	0.991	0.990
Full Immunization	33.59	0.000210	29.27	<0.001	0.990	0.988

Source: Author's calculation

Model Specification: $Y_t = \beta_0 + \beta_1 \times HLTH\_EXP_t + \varepsilon_t$

It is evident from the results of simple OLS regression models, the regression coefficients (β_1) measure the marginal effect of a one-unit (Rs. 1 crore) increase in health expenditure on the respective health indicators. The regression coefficients (β_1) measure the marginal effect of a one unit (Rs. 1 crore) increase on health indicator; the value of -0.000797 indicates that for every Rs. 1 crore increase in health expenditure; MMR decreases by 0.000797 per 100,000 live births. For every Rs. 1,000 crore increase in health expenditure, MMR decreases by 0.80 per 100,000 live births. The model disusses 96.7% of variation in MMR (R^2=0.967) with the coefficient high significant (t=-16.17, p<0.001). The intercept of 291.90 represents the estimated MMR level at zero health expenditure. The coefficient of -0.000182 shows that for every Rs. 1,000 crore increase in health expenditure, decreases IMR by 0.18 per 1,000 live births. The model demonstrates excellent fit (R^2=0.983) and highly significant coefficient (t=-22.73, p<0.001). Increase of health expenditure from Rs. 45,428 crores (2005) to Rs. 163,000 crores (2015) the model predicts an IMR decline of approximately 21.4 points, matched the reported decline from 58 to 37.

The coefficient value of -0.000264 shows that U5MR decreases by 0.26 per 1,000 live births by every 1,000 Rs. crore increases. This model achieved the highest explanatory power among all models (R^2=0.991) and the coefficient is highly significant (t=-27.84, p<0.001). The strong relationship suggests that health expenditure has been effective in the reduction of child mortality. The positive coefficient of 0.000270 indicates that increase in health expenditure, institutional delivery coverage increases by 0.27 percentage points. The model explains 98.8% of variation (R^2=0.988) with highly significant coefficient (t=27.55, p<0.001). Over the study period the Rs. 117,572 crore increase in expenditure predicts a 31.7 percentage point increase in institutional delivery just approx. the observed 33.8 percentage point increase. The coefficient of 0.000227 shows that for every Rs. one thousand crore increase, ANC 4+ visits coverage increased by 0.23 percentage points. The model demonstrates excellent fit (R^2=0.991) and highly significant coefficient (t=28.06, p<0.001). This finding indicates that increased health expenditure successfully expanded access to comprehensive antenatal care services. The coefficient values of 0.000210 indicates that every one thousand crore increase have increased full immunization coverage by 0.21 percentage points. The model explains 99.0% of variation (R^2=0.990) with highly significant coefficient (t=29.27, p<0.001). The strong relationship suggests that health expenditure effectively strengthened immunization service delivery infrastructure.

Model Diagnostics: All models demonstrate excellent statistical properties:

- Very high R^2 values (0.967-0.991) indicating excellent model fit
- Adjusted R^2 values very close to R^2 values, confirming robustness
- Extremely high t-statistics (>16 in absolute value) and p-values <0.001, indicating highly significant coefficients
- Positive relationships for service coverage and negative relationships for mortality indicators, as theoretically expected

Table 6: Elasticity Analysis: Health Indicators Response to Expenditure Changes

Indicator	Value 2005	Value 2015	% Change	Elasticity
Health Expenditure	45,428	163,000	+258.81%	-
MMR	254.00	167.00	-34.25%	-0.1323
IMR	58.00	37.00	-36.21%	-0.1399
U5MR	74.00	43.00	-41.89%	-0.1619
Institutional Delivery	38.70	72.50	+87.34%	+0.3375
ANC 4+ Visits	37.00	65.00	+75.68%	+0.2924
Full Immunization	43.50	69.80	+60.46%	+0.2336

Source: Author's calculation

it is clear from table 6 that the percentage change in each health indicator with a one percent change in health expenditure. Recorded increase of public health expenditure by 258.81% during 2005 to 2015, provides a strong basis for elasticity estimation. MMR elasticity of -0.1323 indicates that a 1% increase in health expenditure leads to a 0.13% decrease in MMR; similarly, an IMR elasticity of -0.1399 indicates that a 1% increase in expenditure which lowers IMR by 0.14%. The U5MR has the highest elasticity among all mortality indicators (-0.1619) with same increase and have reduced U5MR by 0.16%. The negative elasticities suggest an inverse relationship between these two. The relatively inelastic response (elasticity < 1 in absolute value) indicates significant percentage increases in health expenditure are required to achieve reductions in mortality rates. This finding is consistent with diminishing marginal returns as mortality rates fall to lower levels. Further, reductions become increasingly difficult and resource-intensive. Institutional delivery has the highest elasticity (+0.3375) which means that a 1% increase in health expenditure results in a 0.34% increase in institutional delivery coverage.

The ANC 4+ visits elasticity of +0.2924 indicates that a 1% expenditure increase improves ANC coverage by 0.29%. Full immunization elasticity of +0.2336 means that a 1% increase in spending increases immunization coverage by 0.23%. The positive elasticities confirm the direct relationship between health spending and service use. Service coverage indicators have a higher elasticity than mortality indicators, implying that health spending is more easily translated into improved service access and utilization than into reduced mortality rates. This pattern is theoretically consistent, as lowering mortality necessitates not only service access but also service quality, health-seeking behavior and socioeconomic status.

Table 7: Compound Annual Growth Rates of Health Indicators

Indicator	Value 2005	Value 2015	CAGR (% p.a.)
Health Expenditure	45,428	163,000	+13.63
MMR	254	167	-4.11 (decline)
IMR	58	37	-4.40 (decline)
U5MR	74	43	-5.28 (decline)
Institutional Delivery	38.7	72.5	+6.48
ANC 4+ Visits	37.0	65.0	+5.80
Full Immunization	43.5	69.8	+4.84

Source: Author's calculation

Table 7 shows CAGR estimates for health spending From 2005 to 2015. It is clear from table that public health expenditure increased by 13.63% per year which was much faster than India's average GDP growth rate of about 7–8% during that time. The U5MR dropped the most quickly (5.28% per year) followed by the IMR (4.40% per year) and the MMR (4.11% per year). The fact that child mortality dropped faster than maternal mortality suggests that child health initiatives (like immunization, nutrition programs and managing diarrhea and pneumonia) were more effective than maternal health programmes during this time. The institutional delivery rate grew the most (6.48% per year) among service coverage indicators. This shows that

NRHM's focus on promoting institutional deliveries through infrastructure development and the Janani Suraksha Yojana conditional cash transfer initiative has worked. ANC coverage grew by 5.80% each year, while full immunization coverage grew by 4.84% each year. The growth rates of service coverage indicators (4.84–6.48% per year) are lower than the growth rate of expenditure on health care (13.63% per year). This means that expenditure more money on coverage improvements was not enough.

Table 8: State-wise Per Capita Health Expenditure and Health Indicators

State	PC Exp	MMR	IMR	Inst Del	ANC4+	Imm
Better Performing States						
Kerala	2,856	66	12	99.4	96.2	82.0
Tamil Nadu	1,689	90	21	98.9	92.4	76.8
Maharashtra	1,456	87	24	90.3	84.3	71.3
Karnataka	1,234	133	28	94.2	86.7	74.5
Gujarat	1,178	122	33	89.9	82.1	69.7
EAG States						
Uttar Pradesh	567	285	46	67.8	56.3	51.1
Bihar	478	208	42	63.8	48.9	46.2
Madhya Pradesh	523	221	47	80.8	64.5	53.6
Rajasthan	645	244	45	84.5	69.8	54.8
Jharkhand	598	208	32	60.3	52.1	47.3
Odisha	712	180	51	85.4	70.3	68.4

Source: National Health Profile 2015, SRS Bulletins 2014-15, State Economic Surveys 2014-15

The table above shows significant differences between states in terms of health expenditure and outcomes. Per capita health expenditure varies across states from Rs. 478 in Bihar to Rs. 2,856 in Kerala which represents a nearly sixfold difference. Better-performing states (Kerala, Tamil Nadu, Maharashtra, Karnataka and Gujarat) consistently spend 2-5 times more per capita than EAG states (Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, Jharkhand, Odisha). Health outcomes closely resemble expenditure patterns. Kerala's MMR (66 per 100,000) is roughly one-quarter of Uttar Pradesh's MMR (285 per 100,000). Similarly, the IMR in Kerala (12 per 1,000) is less than one-third that of Madhya Pradesh (47 per 1,000). Service coverage indicators show comparable disparities with institutional delivery from 60.3% in Jharkhand to 99.4% in Kerala.

Despite recent improvements the EAG states (approximately 45% of the total population of India) have significantly lower health indicators. Uttar Pradesh has the highest MMR (285) among the other EAG states, while Odisha has the highest IMR (51). These states face multiple challenges with lower expenditures, weaker health infrastructure, lower female literacy and higher poverty rates. Jharkhand has a relatively higher IMR (32) than other EAG states despite having a lower per capita expenditure (Rs. 598) indicate potential efficiency in child health programmes. In contrast, Karnataka has a relatively higher MMR (133), despite being a better-performing state with higher expenditure (Rs. 1,234), indicating potential quality or accessibility issues in maternal health services.

Discussion

The results indicate a strong positive association between public health expenditure and women and child health outcomes in India over 2005–2015. Very high correlation coefficients and regression fit statistics show that rising expenditure coincided with sizable reductions in maternal, infant, and under-five mortality and marked improvements in institutional delivery, antenatal care, and immunization coverage. The magnitudes of the coefficients imply that the large increase in real spending over the decade can plausibly account for much of the observed decline in mortality, suggesting that public outlays have been broadly effective.

At the same time the analysis reveals that coverage indicators respond more elastically to spending than mortality indicators which underscore expanding access is easier than translating access into survival gains. Infrastructure expansion, additional health workers, and targeted programmes such as JSY, JSSK and the Universal Immunization Programme likely drove rapid growth in institutional deliveries and service use, but further mortality reductions will require stronger emphasis on quality of care, timely emergency obstetric and newborn services, and complementary investments in nutrition, sanitation, and female education. Pronounced inter-state disparities particularly between better-performing southern and western states and the EAG states show that gains have been uneven and closely tied to governance and administrative capacity.

Conclusion

This study provides comprehensive empirical evidence on the relationship between government health expenditure and women and child health outcomes in India during 2005-2015, the period of significant reform under the National Rural Health Mission in India. During this period, public health expenditure increased at a CAGR of 13.6%, while maternal, infant, and under-five mortality rates decreased and institutional delivery, antenatal care, and immunization coverage improved significantly. The econometric findings indicate very strong, statistically significant links between higher expenditure, lower mortality, and increased service use. At the same time, the relatively low elasticities for mortality compared with service coverage suggest that further improvements will require sustained increases in expenditure and a stronger focus on quality of healthcare, rather than simply expanded access. Large disparities between states remain crucial for universal health coverage for all. States that invest more per capita have significantly better maternal and child health outcomes than Empowered Action Group states. The paper contributes by providing a focused econometric analysis of women's and children's health over the NRHM decade. The findings indicate clear policy priorities for poor performing states that states and the central government must maintain real growth in public health budgets, direct additional funds and technical assistance to lagging states, improve the quality of obstetric and child health services and align health spending with larger efforts in education, nutrition, sanitation and women's empowerment.

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