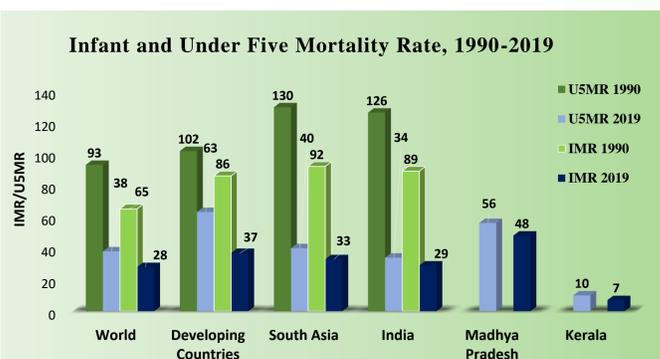


Abstract

Though it is necessary to increase the public expenditure on health care from a policy perspective, earlier pieces of literature gave a mixed picture. The present study revisits the effect of public health spending to reduce infant and under-five mortality. The study investigates India's journey of public-health expenditure through health and macroeconomic policies from (1980-2016) using four cross-sectional rounds of the National Family Health Survey. Two-Stage Probit regression is used for the multivariate analysis, and State-level per capita gross fiscal deficit is used as an instrument to model. Regional disparities in public health expenditures have increased over the past years. After adjusting the other state, household and individual variables, regression analysis explains a 1% increase of public health expenditure (as a share of state domestic product) reduced 0.17 (95% CI: -0.22, -0.13) of infant deaths and 0.16 (95% CI: -0.21, -0.13) of under-five deaths. Like public health spending, per capita income has an adverse impact on infant mortality across the States. This study suggested extending bigger budgets to lower-priority areas such as a rural area that are more likely to impact infant and under-five mortality.

Introduction

- India recorded an impressive 73% and 69% reduction in under five and infant mortality rate from 1990 to 2019. But India still constitute 17% of the total infant deaths in the world.



- One of the probable reasons for India's unsatisfactory performance on child health indicators could be the low level of public health expenditure.
- India spends only 1.02 percent of its GDP on health – which remained unchanged in over a decade amongst the lowest in the world.

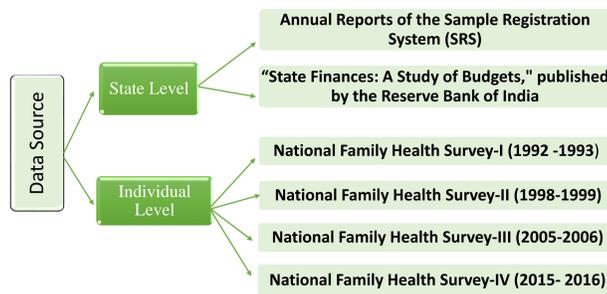
Rationale for the study

- Several policies and programs launched by the Indian government in recent years have fostered a rapid increase in public expenditure on health in general expenditure on child health in particular.
- Literatures suggest that the association between public expenditure on health and childhood mortality remains inconclusive.
- Though it is necessary to increase public spending on health care from a policy perspective, but earlier pieces of literature gave a mixed picture.
- While a piece of literatures established that public expenditure on health care has very little effect on health, others find some positive impact.
- But none of these works of literature captured the long-run impact of public health expenditure on infant and under-five deaths.

Objective of the study

The aim of the present study is to investigate the long-run effect of public health spending on Under-five and Infant Mortality in India over more than three decades.

Methods and Materials



Statistical Analysis

Univariate level

Descriptive statistics

Bivariate level

Preston curve

Two-Stage Probit regression

Ordinary least square was used to predict public health spending as a function of state-level per capita gross fiscal deficit and other explanatory variables.

Multivariate level

Infant mortality and under five mortality were regressed on predicted values of public health spending and other variables using the probit model

Results

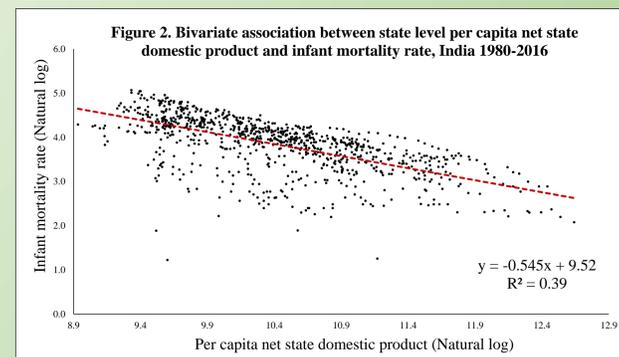
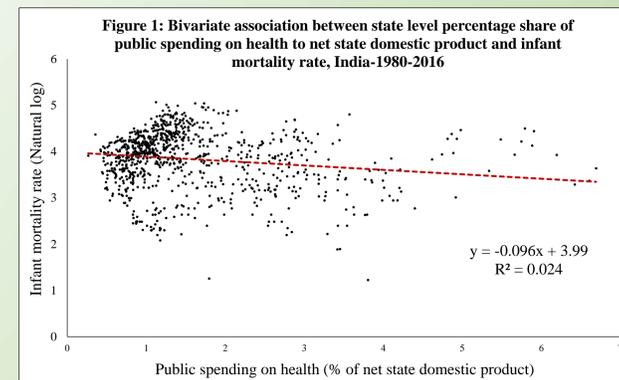


Table 1. Sample characteristics, India 1980–2016

Variables	Mean (proportion)	Number
Infant death	0.06	1757401
Under five death	0.07	1757401
Public spending on health (% of net state domestic product)	1.45	1757401
Per capita net state domestic product (Indian Rupee) [®]	29966	1757401
Gross fiscal deficit (% of net state domestic product)	5.05	1757401

Note-[®] - at the constant price of 2011-2012

Results

Table 2. Instrumental variable probit regression coefficient of infant and under-five death, India, 1980-2016

Variables	Infant deaths Coefficient (95% CI)	Under-five deaths Coefficient (95% CI)
Public spending on health (% of net state domestic product)	-0.17* (-0.22, -0.13)	-0.16* (-0.21,-0.13)
Per capita net state domestic product (India rupee –natural log)	-0.15* (-0.20, -0.10)	-0.12* (-0.17,-0.08)
Sex of the child		
Male [®]		
Female	-0.05* (-0.06, -0.04)	0.003 (-0.01,0)
Birth order and Birth interval interaction		
First birth order [®]		
2/3 birth order & <24 months	0.17* (0.16, 0.18)	0.22* (0.21,0.22)
2/3 birth order & ≥24 months	-0.20* (-0.21, -0.19)	-0.15* (-0.16,-0.14)
4+ birth order & <24 months	0.35* (0.34, 0.36)	0.41* (0.4,0.42)
4+ birth order & ≥24 months	-0.06* (-0.08, -0.05)	-0.01 (-0.02,0.01)
Mother's age at time of birth of index child		
20-29 age [®]		
15-19 age	0.19* (0.18, 0.20)	0.19* (0.18,0.19)
30+ age	0.02* (0.01, 0.03)	0.02* (0.01,0.03)
Mother's education		
No education [®]		
Primary	-0.06* (-0.07, -0.05)	-0.09* (-0.1,-0.08)
Secondary	-0.16* (-0.17, -0.15)	-0.21* (-0.21,-0.2)
Higher	-0.34* (-0.36, -0.31)	-0.39* (-0.41,-0.37)
Caste		
Non-Scheduled Caste/Tribe [®]		
Scheduled caste/tribes	0.02* (0.01, 0.02)	0.05* (0.04,0.06)
Place of residence		
Urban [®]		
Rural	0.08* (0.08, 0.09)	0.1* (0.1,0.11)
Constant	0.79* (0.14, 1.44)	0.62* (0.02,1.21)
First stage regression coefficient of percentage share of gross fiscal deficit to net state domestic product	0.02* (0.02, 0.03)	0.02* (0.02, 0.03)
Year of birth dummies	Yes	Yes
State dummies	Yes	Yes
Wald test of Exogeneity (p-Value)	0	0

Note – Both Models are adjusted for household size, sex of head of the household, and religion; * p<0.05; [®] Reference category

Table 3. Instrumental variable probit regression coefficient of public spending on health (% of net state domestic product) on infant deaths for population-subgroups, India 1980-2016

Selected sample	Infant deaths Coefficient (95%CI)	Under-five deaths Coefficient (95%CI)
Boys	-0.16* (-0.23, -0.1)	-0.16* (-0.22,-0.1)
Girls	-0.19* (-0.26, -0.12)	-0.18* (-0.24,-0.11)
No education	-0.03 (-0.09, 0.03)	-0.06* (-0.11,-0.01)
Primary	-0.30* (-0.44, -0.17)	-0.29* (-0.41,-0.16)
Secondary	-0.26* (-0.35, -0.17)	-0.25* (-0.35,-0.17)
Higher	0.16 (-0.11, 0.44)	0.13 (-0.13,0.4)
Non-Scheduled Caste/Tribe	0.01 (-0.04, 0.07)	0.01 (-0.04,0.06)
Scheduled Caste/Tribe	-0.48* (-0.57, -0.39)	-0.47* (-0.55,-0.39)
Urban	-0.15* (-0.25, -0.05)	-0.14* (-0.24,-0.05)
Rural	-0.18* (-0.23, -0.13)	-0.17* (-0.22,-0.13)
EAG States	0.01 (-0.04, 0.05)	0.01 (-0.04,0.04)
Non-EAG States	-0.30* (-0.38, -0.23)	-0.3* (-0.37,-0.22)

Note: - All coefficients of population subgroups are adjusted for the variables mentioned in table2 except own population characteristics; * p<0.05; 95% Confidence Interval presented in parenthesis.

Conclusion

- Regional disparities in public health expenditures have increased over the past years.
- Both per capita public health expenditure and per capita income have played a major role in the improvement of the infant and under five deaths of Indian States over the decades.
- This study suggested extending bigger budgets to lower-priority areas such as a rural area that are more likely to impact mortality.
- Balanced allocation of public health expenditure among states will lead India to achieve the health goals by targeted near future.