

A Hand that Rocks the Cradle: A Study through Neonatal Mortality in India

Atanu Sengupta

Professor, Department of Economics, University of Burdwan, Burdwan, West Bengal
email: asengupta@eco.buruniv.ac.in

Proma Chakraborty

Research Scholar, Department of Economics, University of Burdwan, Burdwan, West Bengal
email: p4proma@gmail.com

Abstract

In the standard economic analysis, an individual decision maker who chooses between the present and the future determines the course of social outcomes. However, in an underdeveloped economy, families are more important for individuals. The decision made by an individual is often motivated by a family norm that may sometimes go against their interest in a narrow sense. We then use the NFHS data from India to construct a family-level indicator of child mortality. Here, we choose the neonatal mortality. Here, we try to relate the variable to the set of various factors that influence a family's decision towards child health. Our result indicates that an improvement in the network, the acquisition of human capital within the family, and a higher level of female empowerment tend to improve the child's survival possibility. The Neonatal mortality (NM) at the unit level is a result of both the society's attitude towards women as reflected in the family parameters and the government's action towards reducing neonatal child mortality (NM)

Keywords: Health, Neonatal Mortality, Gender, Empowerment.

JEL Classification: E21, I12, I15, J13, H75.

1. INTRODUCTION:

The relationship between development and health is an old issue (Sen, 1999). Health is a component of human development. Also, human development parameters have both direct and indirect effects on development (Banerjee, Bardhan and Basu, 2005). It is clear that the expansion of human development increases the human capacity to contribute in a greater way towards the economic development of the society. However, human development is a complex phenomenon (Ray, 1998). It consists of various parameters - health, education, livelihood, inequality, sustainability, justice and so on. Unfortunately, in the common perception, education seems to play a more vital role as a link between human development and economic development. Normally, most of the studies of these linkages supposedly pass through the gleaning of education.

Most of these studies are based on aggregate macro-level data. However, this macro concept fails to capture the risk of a child's survival in her life. To get a micro perspective, we need to

concentrate on more unit-level information. Instead of the average rate we concentrated on the child mortality from a micro point of view.

In this present paper, we wish to develop a micro-level measure of NM. The neonatal mortality (NM) is defined as the number of newborns dying at less than 28 days of age divided by the number of resident of live births, multiplied by thousand. We want to gauge the probability that a neonate could not avoid death at the family level using the unit-level data. After constructing this variable, we have considered some socioeconomic factors that help to bring out more root causes that are responsible for the survival of a child.

Economists have emphasised the socio-economic factors. Prof. A.K. Sen (2001) has emphasised the gender of the child as an important parameter for their survival. In a country such as India, with a high proportion of male bias, lack of health care, and other social neglect, tends to fall disproportion of the female child. This starts from the very act of fatal sex determination to the neglect of health care and nutrition that are so vital for child survival at the neonatal stage. Similarly, the poverty of the family may adversely affect the prospect of child survival, and social caste and discrimination may play their role too. All these we should study in the present exercise. To our knowledge, this is among the few studies that consider micro-level child survival in the context of India.

In this paper, we will try to understand the effects of different socio-economic variables on neonatal mortality. The main concern of this analysis is to understand the importance of the socio-economic scenario on child survival. NFHS data gives us unit-level data for this analysis.

The paper is divided into six sections. In Section 1 is introduction. In Section 2, we give a brief review of some of the important works in the field. In Section 3, we give a brief description of the data, and Section 4, discusses the methodology and basic analytical results. Section 5, concludes the results.

2. LITERATURE REVIEW:

Social inclusiveness of child health care policies

Bango and Ghosh (2023), Reducing infant and child mortality, assessing the social inclusiveness of child health care policies and programs in three states of India. This study explains that the overall infant mortality rate and child mortality rate have considerably declined in India; the marginalised groups, Caste and Scheduled Tribes, continue to have higher mortality rates. There is a need to critically analyse the current health programs aimed at reducing IMR and CMR to make them attuned to the needs of marginalised communities.

Bhargava, Guntupalli, et al. (2011), Health care utilisation, socioeconomic factors, and child health in India. This paper explains the proximate determinants of height, weight, and haemoglobin concentration of over 25,000 Indian children using data from the NFHS3. The results from models for children's heights and weight showed the beneficial effects of child vaccinations against DPT, polio, and measles, and the negative effects of not utilising government health facilities. The models for children's haemoglobin concentration indicated beneficial effects of food consumption patterns and treatment against intestinal parasites.

Chaurasia and Ranjan (2020). Explain the Long-term trend in Infant Mortality in India, using regression analysis from 1971 to 2018. In this paper author explains the long-term trends of 3 Infant Mortality in some selected states. India accounts for the largest number of infant deaths. This study provides annual estimates of IMR from the Indian official sample registration. IMR is not only an indicator of Infant death but also explains the socio-economic conditions and general health status of a nation. An interesting finding is that the states that have a low infant mortality rate decrease the IMR faster, and the states that have a high IMR decrease the IMR slowest, so IMR for different states of India diverged, not converged, over time.

Impact of public health expenditure on infant mortality

Barenberg et al. (2015) investigated the impact of public health expenditure on the infant mortality rate using an unbalanced panel of 31 Indian States and Union Territories from 1983–84 to 2011–12. Using a simultaneous equation model, they found that public health expenditure helps in reducing IMR among the Indian States. **Bhatia and Singha (2021)**, Health Sector Allocation in India's Budget (2021–2022): A Trick or Treat, this paper shows that the government health expenditure was 1.8% of GDP, this is extremely low when compared to other countries in the world, such as Sri Lanka, China, Thailand, the United Kingdom, and the USA. India has a higher infant mortality rate (under 5) than Bangladesh and Nepal; its bed population and doctor population ratios are also worse than those of other countries in the region, including China, Sri Lanka, Thailand, and Nepal. Out-of-pocket expenditure as a share of health spending is over 65% in India, compared to other countries such as China (32%), Sri Lanka (38%), Thailand (11%), and Nepal (60%) (OECD/WHO, 2018). This is also reflected in the shortfall of human resources and other public health infrastructure.

Bhalotra (2007), on the other hand, restricts the sample to rural households, allows for lagged effects, and finds a significant effect of health expenditure on infant mortality rates by using the rural households' sample. Some other health expenditure-related studies are the

impact of decentralization on rural infant mortality rates in India, the cyclicity of public health expenditure, and causality from health expenditure to economic growth in selected Indian States (Behera and Dash, 2019; Rajeshkumar and Nalraj, 2014).

Deolalikar (2005) finds that current health expenditure does not have a significant effect on mortality rates using the Indian State panel for 1980–1999. 8. Farahani et al. (2010) evaluated the relationship between state-level public health spending in India and individual mortality across all age groups using household-level data from the NFHS II conducted in 1998–1999. The probit regression results showed that a 10% increase in public spending on health decreases mortality by about 2%, with effects mainly concentrated on women, the young, and the elderly.

Gupta and Mitra (2005) conducted a study that included 15 states in India and revealed that there existed a positive association between per capita public health expenditure and health status. Many studies have shown that human capital development is the most suitable way for developing countries like India and China to grow rapidly. Therefore, developing countries should improve their expenditures on sectors such as education and healthcare services.

Kaur (2020), Health Status, Government Health Expenditure and Economic Growth Nexus in India: A Toda–Yamamoto Causality Approach study investigates by explains the causal linkage among government health expenditure, health status, and economic growth in India for the period from 1981–1982 to 2015–2016. The results indicate that government health expenditure, health status, and economic growth have a long-run relationship in India.

Rana and Alam et al. (2018) explain the empirical evidence on how the relationship between health expenditure and health outcomes varies across countries at different income levels. The results indicate that the health expenditure and health outcome link is stronger for low-income countries compared to high-income countries. Moreover, rising health expenditure can reduce child mortality, but it has an insignificant relationship with maternal mortality at all income levels.

Out-of-pocket spending on outpatient care

Gupta, Chowdhury et al. (2016). Explain the out-of-pocket spending on outpatient care in India, which is a district-level study. In this paper, they show that the economically vulnerable sector spends more on the outpatient department as a portion of per capita consumption expenditure because the private health system is increasing today, it creates more problems for poor people, but due to geographical and other factors, people tend to choose private health facilities. So more public health system is needed to overcome this problem.

Raasi et al. (2018) explain the effect of both private and public health expenses on IMR (infant Mortality rate), which has proven that apart from per-head income, govt spending is more important in any country. Linden says that public health expenses reduce infant Mortality rates.

Child mortality and its socioeconomic variations

Kunjumon, Sivakami et al. (2024) analysed NFHS-5 (2019–21) data to understand the factors influencing under-five mortality among the Scheduled Tribes (ST) of India. The study reveals that under-five mortality is higher among children born at home. It is also higher among mothers with no formal education. It is predominant among mothers having a higher birth order (four or more). On the other hand, lower mortality was observed among children of literate mothers. Wealthier households do exhibit lower child mortality. The study reveals some polarisation even among the STs.

Patel and Olickal (2021) use the NFHS-4 (2015–16) data to examine the factors influencing under-five mortality in India. Relatively elder mothers (45–49 years) tended to have higher under-5 child deaths. Among the socio-economic factors, lack of education, rural residency, and mothers with high birth order (more than six children) are positively related to child mortality. In contrast, mothers who regularly read newspapers had lower child mortality. The results emphasise the importance of maternal and child factors in reducing under-five deaths. A quick summary of works reveals that all these studies concentrate on aggregate child mortality. Such macro prospects tend to cover up many micro-level variations. Important clues to policy decisions may lie in these micro-level realities. To our knowledge, there are no important works covering micro-level child survival in a broader framework. In this paper, we make a modest attempt to bring in such micro prospects within the Indian framework. For empirical analysis, we wish to concentrate on unit-level analysis.

The objectives of this paper are as follows:

- Understand the micro-level estimate of neonatal mortality
- Understand the impacts of region wise variation on neonatal mortality.
- Effects of socio-economic factors on neonatal mortality.

3. EMPIRICAL STRATEGY

For this analysis, we use the NFHS 2020-2021 data and DHS 7 data. Here, we consider neonatal mortality of children at the unit level is decided by a number of important factors. These factors may be categorized into various subgroups: socio-economic factors, locational factors, and individual-level economic and social factors.

3.1. Data description

The data used in this analysis were collected from DHS's official website and extracted from their official site in Stata format. Here we consider unit-level data from Demographic and Health Surveys. NFHS (National Family and Health Survey) is a large-scale, multi-round survey conducted in a representative sample of households across India based on NFHS data. Three rounds of the survey have been conducted since the first survey in 1992-93. NFHS provides reliable and comparable datasets on health, family welfare, and other emerging issues. Five rounds of NFHS were conducted in 1992–93, 1998–99, 2005–06, 2015–16, and 2019-21 in India.

NFHS gives us detailed information about the child and maternal health. It also collects data on various aspects of women's empowerment, their economic and social roles, and the various types of violence she has experienced in their families. Such large data covering a wide area of India is not readily available it is useful for any brief study of maternal and child health in India. We have taken the recent DHS, 2019-20 unit level data for our analysis. Thus, this round gives us more information that was not readily available in the previous round.

Before delving into the nuances of a more rigorous analysis, first discuss some general pictures of child mortality and socio-economic variables in descriptive form.

3.2. Variables used in the empirical exercise

The dependent variable that we have used is the neonatal mortality. It is a categorical variable denoting 0 if the child dies and 1 if the child survives. The number of neonates who died in a family to the number of children born in a family in the last 28days. It is a type of probability measure given by the frequent definition of probability. These variables should be carefully delineated to prolong the macro variable that we have discussed in the previous section. Those macro variables give an overall picture of the socio-economic reality. However, we use unit-level data for our analysis. These unit-level data may show some variation and individuality that are often law in macro perspectives. For example, families belonging to scheduled caste communities. Despite So despoliation of various aspects of social life, there they yet are still considerable differences in the depth and expand of this deprivation. Some families have a higher percentage of illiteracy than others. Some families may have more members in government jobs. All the individual creators are important for econometric analysis.

Table 1A: Distribution of NM

Variable	Location	
NM (Per Thousand)	Urban	22.35
	Rural	31.62
	Total	30.53

Source: Author's calculation

In Table 1A, we get a brief description of the variable. We see that NM is 22.35 per thousand child births in Urban and 31.62 per thousand in rural and 30.53 per thousand in total. This is comparable to NM for India. It is relatively higher in rural areas compared to urban areas. This is expected because in the urban area, there are greater facilities to maintain the child's health.

Table 1B: Explanatory Variables and Percentage Shares

Variable	Level	Percentage share
Mothers' education	No education	39.53
	Primary	16.03
	Secondary	35.03
	Higher	6.40
Age of Mother	15- 19	0.43
	20-29	21.13
	30-39	38.73
	40 and above	39.71
Caste religion group	Hindu upper caste	35.31
	Muslim upper caste	10.85
	SC & ST	53.84
Family wealth	Poorest	25.45
	poorer	23.59
	middle	20.24
	richer	17.16
	richest	13.57
Toilet facility	Improved	74.17
	Not improved	24.09
Cooking fuel	Safe	46.45
	Unsafe	51.81
Water quality	Improved Source	88.79
	Not an improved source	9.17
Region	North	12.96
	South	13.70
	East	10.55
	West	9.07
	Central	3.80
	Northeast	14.17
	EAG	35.76
Woman empowerment	Not to make a decision alone	97.80

	Makes an alone decision	2.20
Media exposure	Without Media Exposure	53.58
	With Media Exposure	46.42

Source: Author’s calculation

The Table 1B reports a brief picture of the percentage share of independent variables.

In this table, we consider the mother’s education. It is an important variable determining child survival. Our data shows a very sorry picture. About 39.53% mothers have no education and only 6.40% have higher education. Child of an illiterate mother will not get proper care because of the lack of knowledge of child nutrition and health aspect with them.

After that, we consider the age of the mother. This is 21.13% at the age of 20-29, and those below 19th years are 0.43% of mothers. A mother of such a tender age will give rise to a weak child for whom survival is very difficult. Contrarily there are 39.71% have an age above 40. These mothers are generally giving birth to a child of higher order (second, third, or higher order child). These mothers are also very weak in health due to the continuous birth of children at a tender age. Thus, higher-order children have a lower possibility of survival.

Next, we consider the caste religion category. Roughly 54% of the mothers belong to SC and ST categories. The mother and the children of this category face a number of deprivations, both economic and social. Caste deprivation has a higher toll on child survival. 35% of mothers belong to the Hindu upper caste community. In the present paper, we have considered the social hierarchy in the Muslim caste. Traditionally, Islam is an egalitarian religion. Again, no distinction in terms of social and economic differences in the context of religious practices.

But in India, Islam has acquired hierarchical features in forming a closed group regarding marriage and other social customs. We have tried to capture the upper caste Muslims by considering non-OBC Muslims. These Muslims are generally in a better position in terms of social and economic features such as education, health, economics, and so on. Having such it will be manifested in lower NM.

Our next consideration is the wealth category. In our sample, the poorest and the poor constitute about 50% of the total sample, it has a very unsatisfactory position for a child.

We consider three infrastructural factors: Toilet facilities, cooking fuel, and water quality. The worst position regarding them is cooking fuel. Almost 52% of families do not have safe cooking fuel. Use of unsafe cooking fuel creates respiratory problems for the mother and the child. This is a great deterrent for child survival. Roughly 24% of the population do not have

an improved toilet. This leads to many waterborne diseases that give their child a low chance of survival.

Regionally, roughly 36% of the observations are in the EAG region. They are in the Central and Northern parts of India (Sen, 2001). These states were previously called “BIMARU” (meaning sick in Hindi). The conditions of child survival are not very good in these states

The other two variables are women's empowerment and media exposure. The women's empowerment we have considered is women's ability to make decisions alone.

Mothers are important in the life of a child; hence, their decision is important for child's prospective survival. In our data, this is very low.

The media exposure is, however, commendable (46%). Since most of the mothers are illiterate, these media seem to be the audio-visual media rather than the print media. This may have its implicit limitations.

4. METHODOLOGY USED AND ANALYTICAL RESULTS

We have considered the variable NM. It is difficult to apply OLS in such a situation. We have taken recourse to logistic regression. The structure of our analysis is given by the model

The equation of the **Model** is:

$$\begin{aligned} \text{logit}(NMR) &= \ln \frac{P}{1-P} \\ &= a + b_1 \text{education} + b_2 \text{wealthindex} + b_3 \text{residencial_place} \\ &+ b_4 \text{toiletfacility} + b_5 \text{cookingfuel} + b_6 \text{waterquality} \\ &+ b_7 \text{decisionmaking} + b_8 \text{mediaexposure} + b_9 \text{region} \\ &+ b_{10} \text{mother_age} + b_{11} \text{socioeconomiccaste} \end{aligned}$$

The variables include infrastructural, endowment parameters and effects of societal incentives to reduce NM

However, there may be some region-specific factors that affect the relationship. Region-specific factors come into the picture in a variety of ways. First, there is a demonstration effect. The region creates certain common beliefs and psychology that are ingrained in the community that lives in those areas. Good practices induce a positive influence, and bad practices may have a negative impact.

We include factors that are the basis of informal social networks that are created in an area. In India, where the formal network is not so developed, the informal network becomes important. The caste categorisation is an important basis of informal relationships. Information about child care often flows through these informal networks. Also, the age of mothers is considered, since that is an important demographic factor.

Having specified our empirical model, we now proceed to our major findings.

Table 2: Logistic regression of NM on some basic variables

	NMR	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Mothers' education	No education	1	.	.	.	.	.
	primary	.993	.028	-0.26	.796	.94	1.048	
	secondary	.833	.022	-7.03	0	.791	.876	***
	higher	.566	.031	-10.49	0	.509	.63	***
Age of Mother	15- 19	1	.	.	.	.	.
	20-29	.67	.084	-3.18	.001	.524	.858	***
	30-39	.698	.087	-2.88	.004	.546	.892	***
	40 and above	.784	.098	-1.94	.052	.613	1.002	*
Caste religion group	Hindu upper caste	1	.	.	.	.	.
	Muslimuppercaste	.76	.029	-7.24	0	.706	.819	***
	SC & ST	1.102	.026	4.14	0	1.053	1.154	***
Family wealth	Poorest	1	.	.	.	.	.
	poorer	.896	.025	-3.97	0	.849	.946	***
	middle	.82	.028	-5.84	0	.767	.876	***
	richer	.737	.03	-7.52	0	.681	.798	***
	richest	.623	.031	-9.53	0	.566	.687	***
Place of residence	Urban	1	.	.	.	.	.
	Rural	1.054	.03	1.85	.064	.997	1.115	*
Toilet facility	Improved	1	.	.	.	.	.
	Not improved	1.012	.025	0.49	.622	.965	1.062	
Cooking fuel	Safe	1	.	.	.	.	.
	Unsafe	1.056	.027	2.14	.032	1.005	1.109	**
Water quality	Improved Source	1	.	.	.	.	.
	Not improved source	.992	.038	-0.21	.832	.921	1.069	
Region	North	1	.	.	.	.	.
	South	.89	.042	-2.50	.012	.812	.975	**
	East	1.166	.045	4.02	0	1.082	1.257	***
	West	.962	.042	-0.89	.372	.882	1.048	
	Central	1.109	.091	1.26	.208	.944	1.304	
	Northeast	.834	.044	-3.43	.001	.751	.925	***
	EAG	1.331	.038	9.90	0	1.258	1.408	***
Woman empowerment	Not make decision alone	1	.	.	.	.	.
	Makes alone decision	.878	.063	-1.81	.07	.763	1.011	*
Media exposure	Without Media Exposure	1	.	.	.	.	.
	With Media Exposure	1.003	.022	0.15	.878	.96	1.048	
	Constant	.047	.006	-22.46	0	.036	.061	***

Mean dependent var	0.031	SD dependent var	0.174
Pseudo r-squared	0.017	Number of obs	367592
Chi-square	1746.499	Prob > chi2	0.000
Akaike crit. (AIC)	100696.975	Bayesian crit. (BIC)	100978.158
*** p<.01, ** p<.05, * p<.1			

To begin with, NM is greatly dependent on the structural socio-economic parameter. In India, social networking still plays a crucial role in transmitting knowledge of child care and building up healthy practices. (Manoj, et. al, 2025) Caste and religious grouping are important factors in social networking, thus the structural category to which the child's family belongs is most of utmost importance (Sengupta and Mukherjee 2023). The first category that we have considered is the Hindu upper caste. We find a negative relation between the probability of child death and whether they belong to the Hindu upper caste. This is quite obvious, seeing the Hindu upper caste has generally enjoyed a significant dominance in acquiring of physical and human capital, which has led to better performance.

Traditionally, Islam has no hierarchical structure. In India there however occurred many settled group divisions and social hierarchies even among the Muslims (Sengupta and Bhatteerjee, 2024), this is difficult to capture in the absence of any reliable information on this count. This inclusion of the OBC category within Muslims has enabled a shortcut, albeit roughly the upper-class Muslim, by the data on non-OBC Muslims. This distinction is used in the present exercise. Immediately, we find that the possibility of child death is negatively correlated with the structural parameter.

This is again because of the simple reason that the family belonging category enjoys a greater level of physical and human capital compared to the other social groups. Many of them form a part of the Muslim elite in the past, or they are connivers compared to the ordinary Muslim who toiled him menial jobs and low-skilled work. (Ref: Since they have a very low degree of human capital, there is into lower possibility of child survival in India in the seminar)

We have SC, ST, and OBC under a single category denoted as socially backward classes. Traditionally, they have remained at the bottom of the social echelon. They are generally steeped in poverty, malnutrition, and low human capital. (Kunjumon, Sivakami et al. 2024) Consequently, the possibility of child survival is greatly reduced for this category, this is indicated positively significant coefficient in our regression. In short, structural premilitary factors indicate that social deprivation, both current and historical, takes a toll on child survival. The twin paradox postulated by Sengupta and Ghosh (2024) has a significant impact here. It is highly unsatisfying that the fortune of a child will depend on the social category of the family in which she is born.

Our next consideration is the education level of the mother. It has been argued by many researchers that a mother's education plays a positive catalytic role in child survival. Educated mothers have more information, which helps to take measures to prevent child

death. In our exercise, all variables are highly significant. An educated mother is the best way to reduce infant mortality.

Our next variable is economic analysis, the wealth index divided into five classes: poorer, poorest, wealthier, and wealthiest. Child survival is negative in the poorest class and positive in all the other classes. The poorest class does not have the resources to use the child survival techniques. Similar to the structural parameters, this is also an important determinant.

Our next category is the residence of the family. There is a differential impact on NM depending on whether families are legal owners of the residence and those who are not. Among those who own a house, we see both good and bad residential status. It is seen that families with poor residential status are in a very bleak situation. In that family child cannot survive much. Similarly, the family that has legal status of residence but is in a bad condition (as a dilapidated or other) is also in a very precarious condition; for them also child survival is also very difficult.

Only the families that have judicial ownership of good houses can take measures to reduce child mortality. Researchers may ask if this is related to economic factors; in many cases, people get their ancestral home even if they are not economically viable. Also, people are sometimes migrating to other places where they may have good finances but are unable to build have residence as of now, they may live in rented houses, and child survival is adversely affected due to this.

Now consider indices of empowerment. If mothers are empowered, then they make the decision about child survival. This coefficient provides a strong relation with family, where women are not empowered

If there is media exposure, the child mortality is affected to a great extent. Hence description of these parameters is important in this regard.

Among the various parts of India, child health is found to be better in southern and north-eastern India. It is backstage among EAG and Northern States. It is quite unclear in the eastern and central regions. Mother's age is in relation to child mortality. Underage marriage might lead to underage pregnancy and greater child mortality. Child death is highest in the poorest class according to the wealth index of NFHS data. People who are legal residents of good quality have lower child mortality. Safe drinking water lowers child death, and media awareness among mothers lowers child death. Women's empowerment in the form of decision-making lowers child deaths.

EAG states have higher mortality rates, and in eastern and central parts also have relatively higher mortality rates. Though the institutional delivery rate and literacy rates are relatively

low in these states. Women's decision-making percentage is also low in these states. Before going into detailed analytical discussions, we concentrate on the variables that we have used in our present context. These variables should be carefully delineated to prolong the macro variable that we have discussed in the previous section. Those macro variables give an overall picture of the socio-economic reality. However, we use unit-level data for our analysis.

These unit-level data may exhibit some variation and individuality that are often low in macro prospects. For example, though families belonging to lower caste communities face considerable differences in the debt and expansion of this deprivation. So, these variables capture important aspects of social life. Some families have a higher percentage of illiteracy than others. We now discuss the statistical properties of their unit-level variable to get a better understanding of the data we have used. So, we have tabulated all dependent and independent variables in the following tables and we categorized them into

All the variables that are considered their sign and significance in this model. So, their interpretation remains the same. Age of the mother is also considered an important variable. In India, due to high marriage at a lower age, girls become mothers at a tender age. Physical and mental setup in females is not suitable at a tender age; consequently, the probability of survival child of a tender mother is very low. The data reveals this. For the base category from 20-40, as a negative relationship such a category this implies mother's age below 20 has a reduced possibility of child survival, and increasing the age of the mother would be unable to have a healthy child. As usual, mothers over age 40 will also have higher rates of infant mortality. In India, the desire for a male child often forces mothers to be pregnant at ages given above 30- 40 (Le and Nguyen, 2022). This son's preference also adds a pinch of salt towards worsening NM

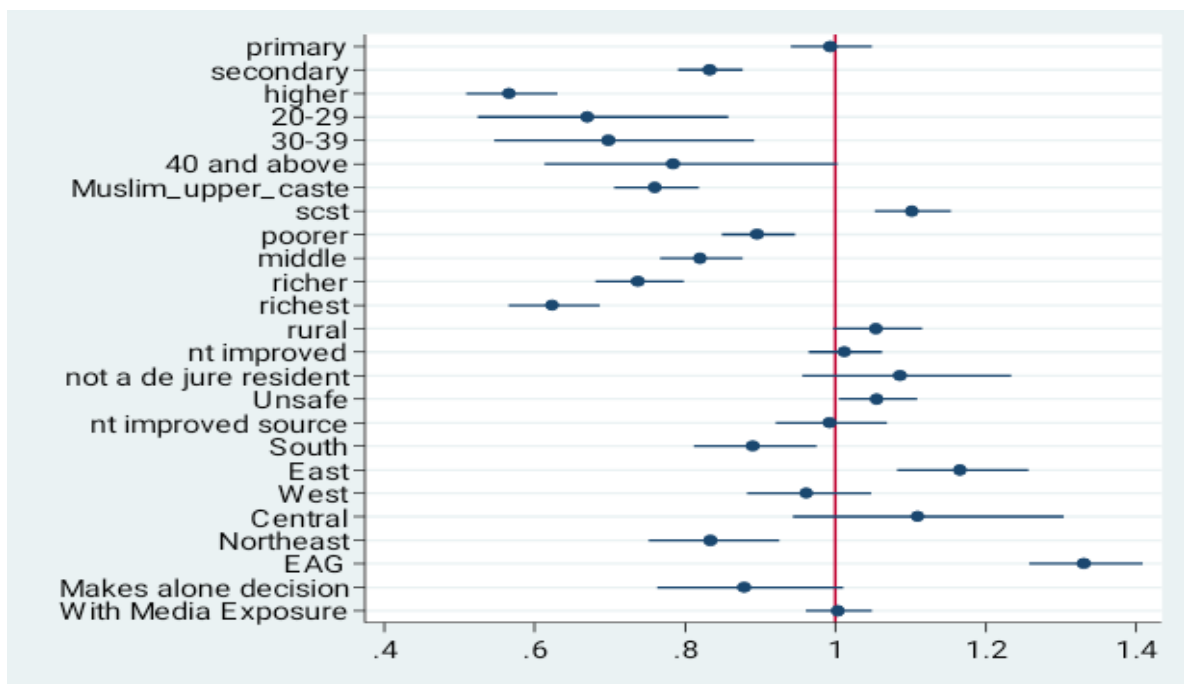
If we consider the distribution among the upper caste Hindus and socially backward categories. Due to the high economic status of upper caste Hindus, both under-five mortality and neonatal mortality are much lower than in the case of SBCs(social backward castes). Due to a higher economic base, they can afford better medical facilities that tend to lower the mortality rates. Also, for the same reason, they have a high rate of institutional delivery. Also, women of the upper caste are much more literate than those of the socially backward caste.

The economic helplessness of the SBC woman is reflected in the high preponderance of the poorest population among SBCs. However, the story is different when we consider the indices of women's empowerment; these indices are much in favour of the SBCs than the upper Hindu caste.

In India, caste and religion are important parameters while analysing the issues of child health. Practices of knowledge of child care often crystallise in the social networking and grouping that are capped by this category.

However, there happens to be wide geographical variation in the social and religious culture among the various corners of India. For example, vegetarianism is a practice among the Brahmins in the northern and southern parts of India. Among the Bengali, however, fish eating is the dominant practice even among the Brahmins. (Shridhar, Dhillon and et al 2014) Similarly, matrimonial practice prevails in the Nambudiri brahmins of Kerala. It is also prevalent in some tribes of India. However, for the majority of the Indian family, patriarchy is the norm. (Menchar, 1965) To bring these factors regional dimension becomes important. For these, we have considered that we have almost a similar picture. Infrastructural variables, awareness and women's empowerment go a long way in affecting NM. However, there exist wide social and regional differentiations. Socially disadvantaged groups (SC, ST, OBC Muslims) face a great disadvantage in terms of a lower possibility of neonatal death. The children born to such groups are susceptible to early death. Similarly advanced regions¹ such as Western and Southern, encompass a more congenial atmosphere for lower NM. Diagrammatic representation shown in Fig-1.

Fig-1: Diagrammatic representation of NMR (Coeplots)



Source: Author's calculation

¹This nomenclature is based on standard practice. See for example, Sen (2001).

This diagram illustrates the results of logistic regression. Here, the odds ratios are measured along the horizontal axis. This diagram displays the estimated coefficient from a logistics regression. This diagram visualises the size and direction of each predictor's effect. Here, on the vertical axis, we measured predictor variables. We find that the effect of education on NM. However, primary education is the least effective, while those of secondary and higher education are highly significant. All the income categories hurt child mortality, but the greatest impact is in the richest category. For others, it is not so significant. As considered to the infrastructural facility, the nonavailability of these factors raises the child mortality. The ownership of houses in which they live is highly significant compared to unsafe cooking fuel, not improved toilet facilities, water source, making decisions alone, and media exposure is seen In families that belong to the central and EAG regions. Given the other things, they have experienced a higher NM compared to similar families living in other regions. In southern and north-eastern states, NM is relatively lower. We have added a regional indicator. It is seen that in families that belong to the central and EAG regions, given the other things, they have experienced a higher NM compared to similar families living in other regions. In southern and north-eastern states, NM is relatively lower. We have seen that in general, younger age mothers are responsible for higher NM. It is clear that at a tender age, mothers experienced relatively higher mortality. Among the socioeconomic caste, if a family belongs to the SC and ST categories, it tends to have a higher NM. In other words, social deprivation leads to higher NM

5. CONCLUSION

Traversing to the data of child mortality and various socio-economic factors at the family level data is some as unit level. According to the authors, there are very few studies related to child mortality and various socio-economic variables at the family level. Our study is somewhat novel in this regard.

The result is expected. It is seen that better infrastructure, women's empowerment, and awareness of child health help to reduce NM. However, India observed a high socio-economic disparity. This disparity is reflected in historical models of other courses of life. Inequalities are reflected in the child's health. Child health is worse in the deprived class compared to the other classes.

The conditional convergence (Barro and Sala-i-Martin, 1995) theory says that a country that invests more in human capital grows faster than a country that does not. Expenditure on

health is a crucial part of human capital formation. Unless the country spends on this, it cannot expect to converge with developed countries.

Our regression gives such a ray of hope, importing education to the female, a social awareness programme to raise the age of marriage an emphasis on child health. Increasing women's empowerment is an important tool that can help in this regard. The recent government policy “Beti Bachao Beti Padhao” (Educate the girl child, Save the girl child) might be a good step in this direction. Also, various types of facilities for girls’ education in different states, such as providing cash to the families to push up girls’ education, might play important roles among the disadvantageous factors for girls in our country. This might go a long way to improve infant mortality.

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