

Factors Affecting Under-Five Mortality Rate (U5MR) in India - National Family Health Survey (NFHS) 5 Factsheet What It Speaks?

Nikita Gaur¹, Tanya Singh², Aanchal Singhal³, Abhimanyu Dabas⁴, Sudhanshu Batra⁵, Sidharth Sekhar Mishra^{6*}

^{1,2,3,4,5,6}International Institute of Health Management Research, Delhi, India

DOI: 10.55489/njcm.140220232492

ABSTRACT

Introduction: In developing countries various factors lead to Under-5 Mortality and irreversible losses which can be prevented by proper measures take on factors affecting to it.

Objective: This study was conducted to analyse the changing trends of Under-5 Mortality in India. The new National Family Health Survey (5th round) which was published recently came up with several new findings, which were both encouraging and disheartening and also one of the major Sustainable Development Goals.

Method: A secondary data analysis was conducted of NFHS factsheets to study the U5MR in India. The indicators which had a correlation either positive or negative with the Under-five mortality rate were included.

Result- When we look at the result, few states' performance is encouraging because they have shown some of the best declines. Correlation was found between dependant variable that is U5MR which is a dependent variable and several independent variables which concluded that factors like Women literacy, Men literacy, Breastfeeding, Nutritional insufficiencies, Caesarean delivery, ANC visits and IFA consumptions are negatively associated with U5MR.

Conclusion: Various steps have been taken in order to improve our healthcare sector since independence, every government had their fair share of contribution, that's the reason why we are this stage. Now it's time to increase efforts with targeted interventions to solve this problem and complete our commitment towards the SDGs.

Keywords: Under Five Mortality Rate, factors affecting child mortality, NFHS 4 findings, literacy rate amongst women, child mortality trends India, Under five global

ARTICLE INFO

Financial Support: None declared

Conflict of Interest: None declared

Received: 01-10-2022, **Accepted:** 30-01-2023, **Published:** 28-02-2023

***Correspondence:** Dr. Sidharth Sekhar Mishra (Email: sidjpk@gmail.com)

How to cite this article:

Gaur N, Singh T, Singhal A, Dabas A, Batra S, Mishra SS. Factors Affecting Under-Five Mortality Rate (U5MR) in India- National Family Health Survey (NFHS) 5 Factsheet What It Speaks?. Natl J Community Med 2023;14(2):107-113. DOI: 10.55489/njcm.140220232492

Copy Right: The Authors retain the copyrights of this article, with first publication rights granted to Medsci Publications.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Share Alike (CC BY-SA) 4.0 License, which allows others to remix, adapt, and build upon the work commercially, as long as appropriate credit is given, and the new creations are licensed under the identical terms.

www.njcmindia.com | pISSN09763325 | eISSN22296816 | Published by Medsci Publications

Abbreviation

U5M- Under-five mortality

SDG- Sustainable Development Goals

MDG- Millennium development Goals

CAPI- Computer Assisted Personal Interviewing

U5MR- Under-five mortality rate

DHS- Demographic health survey

INTRODUCTION

Under-five mortality is defined as “the probability of dying after birth till the age of five per 1000 live births and is used as an indicator of socioeconomic development in a developing country”. Under five mortality rates as defined here is strictly speaking not a rate (i.e. the number of deaths divided by the number of populations at risk during a certain period of time) but a probability of death derived from a life table and expressed as rate per 1000 live births.¹

In last three decades, U5M has declined dramatically, from 12.5 million fatalities in 1990 to 5.9 million in 2019.² The U5MR has decreased by 59% from 93 deaths per 1,000 live births in 1990 to 38 deaths per 1,000 live births in 2019 universally. In 1990, 1 in 11 children died before reaching the age of 5, decreasing to the level of 1 in 27 in 2019.³ From 1992-1993 to 2015-16, India's U5MR dropped by 54 %.⁴

According to UNICEF, predominantly in lower- and middle-income countries there is a report of 5.6 million deaths of Under-five children each year globally. India has the loftiest number of children under the age of five (1-4 year), with 1.08 million deaths; India accounts for 19% of under-five mortality rate and 24% of new-born deaths on its own.⁵

Poor infant and maternal nutrition, preterm birth difficulties, intrapartum associated events, and infectious disease- related causes are the top causes of mortality amongst under-five years of children. Even though mortality among children beneath the age of five has attenuated. Overall, children's growth has improved, but there have been substantial geographical differences - in India, inequities persist.¹ Geographical and economic inequalities continue to have an impact on survival chances.

In order to set preferences for policymakers and health care providers, continuous surveillance is to be done to scale down the U5MR at the local level is required.⁶ The health of a child is a preliminary virtue, and therefore the degree of child mortality is a vital index of a society's growth. It is thus unstarting that the United Nations sustainable Goals Declaration, that aims to enhance the well-being, security and safety of the impoverished individuals globally which includes child Mortality united of the goals, that was antecedent diode by the Millennium development Goals (MDG).⁵ In 2015, the globe began working on a new global development agenda, with the goal of attaining the Sustainable Development Goals (SDGs) by 2030. The Projected SDG target for child mortality aims to eliminate preventable deaths of new-borns and under five children by 2030, with all nations planning to scale back U5M to 25 deaths per 1000 live births.⁷

The goal of this study is to provide an insight on state-level disparities and also the under-five death rate (U5MR), with a spotlight on sustainable Development Goal three (SDG3) on avertible demises among new-born and youngsters underneath the age of 5 from the recently released National Family health survey (NFHS 5) factsheets. However, there are regional variations within India, which are further exacerbated by distinctions between urban and rural areas. Overall, India has made significant reductions. The states with the highest U5MR in India are Uttar Pradesh (62.5), Madhya Pradesh (49.2), Chhattisgarh (50.4), Bihar (56.4), Assam (56), Jharkhand (45.4), Uttarakhand (45.6) and Orissa (41.1), while those with the lowest U5MR include Kerala (5.2), Puducherry (3.9), Goa (10.6). As of 2030, they have already met the Sustainable Development Goal (SDG) for U5MR.^{8,9,10}

The Ministry of Health and Family Welfare, Government of India, established the Empowered Action Group (EAG) of States in 2001 with a special focus on monitoring and assisting the poor performing states of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh, Uttarakhand, and Assam in achieving the national health goal.¹¹ India's population as a whole is made up of 45% EAG states, which are also responsible for 74% of the under-five mortality compared to 26% in non-EAG states.¹² The child survival programme needs to be concentrated on EAG states in order to fulfil SDG goals for U5MR in the year 2030, i.e. 25 per 1000 live births.¹³

METHODOLOGY

NFHS is a multi- phase, large-scale survey conducted in a representative sample of households throughout India. Each successive round of the NFHS has had two specific goals: to provide essential data on health and family welfare needed by the MOHFW and other agencies for policy and programme purposes, and to provide information on important emerging health and family welfare issues. The Ministry of Health and Family Welfare (MOHFW), Government of India (GoI) designated the International Institute for Population Sciences (IIPS), Mumbai, as the nodal agency, responsible for providing coordination and technical guidance for the survey. NFHS factsheets give us information regarding the trends on key indicators.

The fieldwork for NFHS-5 survey was done in 2 phases. The first phase was conducted from 17th June 2019 to 30th January 2020 and the second phase from 2nd January 2020 to 30th April 2021 by 17 field agencies who gathered information from 6,39,699 households and 7,24,115 women.⁸ Computer-assisted personal interviewing (CAPI) was used to

carry- out surveys in local languages on a mini- notebook. Scientific Sampling of households was done from the list of each cluster to be surveyed. Uniform sample-design, field procedures and questionnaires which were translated into 18 regional languages were used in the survey. All these surveys were cross-sectional in nature and were conducted in a selected sample of households throughout the country.

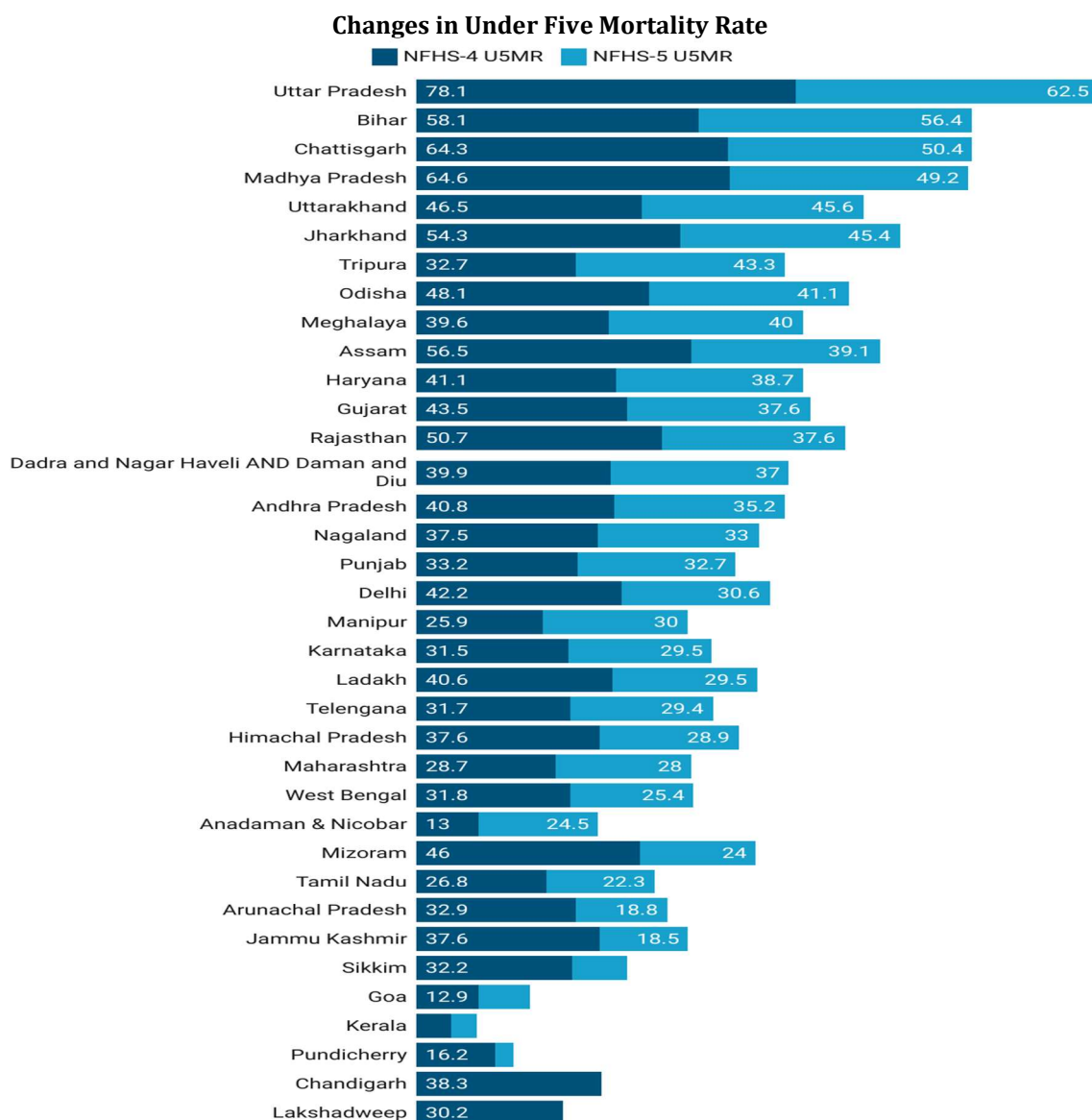
Data Analysis: The data was collected and gathered in the excel sheet from the NFHS 5 Factsheet. Further through the command “CORREL” the correlation was analysed between Dependent variable ‘under five mortality rates and independent variables ‘Births delivered by caesarean section, Mother who had 4ANC Visits at least, Mother who consumed IFA for 180 Days, Mother who consumed IFA for 100 Days, Breastfeeding children age 6-23 months receiving an adequate diet (%), Total children age 6-23 months receiving an adequate diet (%), Men who are literate

(%), Women who are literate (%).

Change in the trends of Under-five Mortality Rate is mentioned using the data of NFHS-4 and NFHS-5.

RESULTS

According to NFHS -5 data Andaman and Nicobar Islands has seen the greatest increase (11.5%) while Tripura (10.6%), and Manipur (4.1%) reported increases in Under-five mortality rate. States like Assam (17.4%), Arunachal Pradesh (14.1%), Chhattisgarh (13.9%), Delhi (11.6%), Jammu & Kashmir (19.1%), Ladakh (11.1%), Madhya Pradesh (15.4%), Mizoram (22%), Pondicherry (12.3%), Rajasthan (13.1%) and Sikkim (21%) had incurred a steep decline in the Under Five Mortality rate. Whereas, the child fatality rate of Maharashtra has remained unchanged i.e., (0.8%). (Refer figure 1)



Created with Datawrapper
Figure 1: Diagram representing the increase or decrease in the percentage of Under-five Mortality Rate between NFHS-4 and NFHS-5

Kerala still showed a decrease in child mortality in the recent survey. Considering best performers Goa, Sikkim and Jammu and Kashmir were performed best across all the categories.

A correlation was found between dependant variable that is U5MR which is a dependent variable and several independent variables which concluded that factors like Women literacy, Men literacy, Breastfeeding, Nutritional insufficiencies, Caesarean delivery,

ANC visits and IFA consumptions are negatively associated with U5MR.

Unlike in other states, urban areas in Maharashtra, Dadra and Nagar Haveli, and Daman and Diu have greater under-five mortality rates than rural areas. Tripura has the largest rural urban divide in U5MR, with 49 in the rural area and 24 in the urban counterpart.

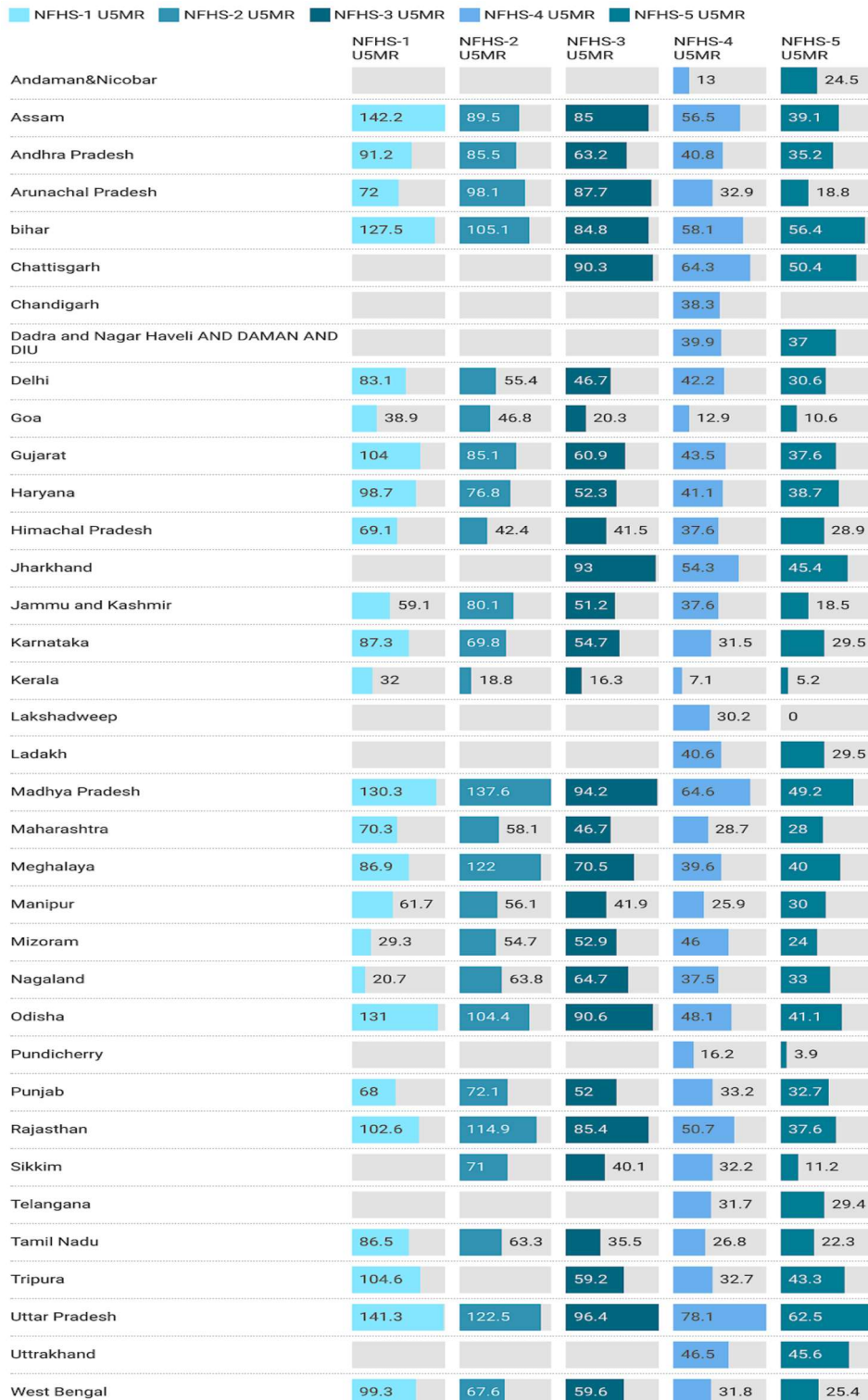


Figure 3: A split bar depicting the rate change or absolute values from NFHS-1 to NFHS -5

Table 1: A tabular representation of correlation of various factors associated with Under-Five mortality rate

Factors Affecting Under-Five Mortality Rate	Correlation with Under-Five Mortality Rate (r- value)
Births delivered by caesarean section	-0.55
Mothers who had 4 ANC visits at least	-0.56
Mothers who consumed IFA for 180 days	-0.56
Mothers who consumed IFA for 100 days	-0.57
Breastfeeding children age 6-23 months receiving an adequate diet (%) NFHS 5	-0.57
Total children age 6-23 months receiving an adequate diet (%) NFHS 5	-0.59
Men who are literate (%)	-0.7
Women who are literate (%)	-0.72

DISCUSSION

The findings in this report are based on estimates of U5MR obtained from NFHS 5 surveys completed between 2019 and 2021. In this study, the causes of under-five mortality in Indian states were investigated. The factors with the highest statistical significance were the number of caesarean deliveries, the number of ANC visits a mother had, the number of days she consumed IFA (180 days), the number of days she consumed IFA (100 days), the percentage of children aged 6 to 23 months who were breastfed, the percentage of children aged 6 to 23 months overall who received an adequate diet, the percentage of men and women who are literate, and the number of mothers who had at least four ANC visits. "The complex setting and the interaction of socio-economic, biological and demographic factors in developing countries often act as detriments to maternal, infant and child survival in the population".¹⁴

The level of education of the mother appears to directly influence how the child is raised. Mothers with more education are more equipped to provide a clean environment, wholesome food, and access to medical facilities for their children.^{15,16} In 'Empowered Action Group(EAG) states, it was found that, when the education level of mothers was taken into account, 28.5% of illiterate mothers experienced the loss of a child before they turned five.^{8,15,16} Children whose mothers had ANC check-ups had lower rates of under-five mortality than those born to mothers who either had no ANC check-ups at all or had fewer than they should have. Along with routine monitoring of weight, blood pressure, and growth evaluation, ANC services are associated with receiving tetanus toxoid (TT) injections, ingesting IFA pills or syrups, and using additional dietary supplements. The mother in India made far fewer ANC visits, which is a significant difference.

There was a decline in the under-five child mortality rate among states from the NFHS 4-NFHS 5 service periods forward. The death rate of children under the age of five has already decreased significantly in smaller states (Sikkim, Kerala, Pondicherry). Despite a number of legislative initiatives, there is still a lot of work to be done in densely populated states, where mortality drop has been slower than planned. Despite a lot of policy attempts, some states remain out-

liers (Andaman and Nicobar, Tripura, Manipur, Meghalaya).⁸ The use of maps or scatter diagrams to illustrate the correlation and current distribution of child mortality rates is useful.

One of the studies which was conducted in Bhutan to study the factors associated with under 5 mortalities, the most significant predictor varied with number of births, the household size, mothers age, safe sanitation and electricity. According to the findings of the study it was estimated that the Under 5 Mortality Rate in Bhutan was 36.2 per thousand live births. The study also found that the odds of UFM significantly decrease with the increase in the mother's age, the high parity of UFM can also be related to inadequate knowledge, availability of resources and use of family planning services. Consistent with the findings of others' study, the present study also found that UFM had a negative correlation with various factors like literacy, breastfeeding, C section delivery, consumption of IFA.¹⁷

The present study aims to estimate the effects of various factors on UFM. Several factors were studied during the study which had a significant association with UFM. It was also found that UFM was observed remarkably fewer in literate men and women, women who consume IFA for 100 and 180 days, etc. Some other studies have also reported a relationship between low motherly education with impoverished infant health consequences.^{15,16} A literate mother would ensure a regular health check-up, well timed immunization, nutrition of the child, which would result in low morbidity and mortality.²

Under five child mortality and its exposure in Bangladesh and Indian subcontinent: A Literature Review a study conducted in Bangladesh that demonstrated how the trends of U5MR in Bangladesh have decreased, but are still not at a satisfactory level. They talked about numerous factors that affect the mortality rate in Bangladesh, such as the age of the mother, women's employment, and contraceptive use. In comparison with our own findings on India's U5MR, as illustrated in the NFHS 5 Factsheet. The findings revealed that India's situation is similar to that of Bangladesh and other south Asian countries: it is improving, but not to a satisfactory level. Some factors are present, while others are being added, such as the level of exposure they have compared to their

urban counterparts. The literacy rate of both male and females has an impact on U5MR trends, as evidenced by both studies. For a period, Bangladesh's U5MR exhibited a hazardous increasing trend, while many states in India also showed an upward trend. While comparing a major country like India to a tiny country like Bangladesh is not justified, it successfully demonstrated the common elements that we should all embrace in order to minimise the U5MR, namely literacy.¹⁸

A study conducted on antecedent of Under-5 Mortality in High Mortality rate regions of Ethiopia: An Analysis of the 2011 Ethiopia Demographic and Health Survey Data confirmed that covariates like birth interval, family size, birth type, breastfeeding status, source of drinking water, parents training have been notably related to the below 5 mortality rate in univariable evaluation however in multivariate evaluation they received six elements i.e., birth interval, family size, type of birth, breastfeeding status, source of drinking water and earnings of mother which notably affected the survival of below 5 children and creating an assessment with the existing study there had been many comparable elements that had been notably related to the below 5 mortality rate of India.¹⁹

According to research done in Kenya, infants who have been nursed for more than 6 months had a considerably reduced risk of death than children who have been breastfed for less than 6 months. Kenya also found that maternal education levels differed considerably between children who have not been nursed have a greater risk of dying before reaching the age of five than rural and urban regions when it came to fatalities among children under the age of five. Other research found that women with a low educational level have higher child mortality rates, whereas those with a few years of schooling have reduced infant and child mortality rates.²⁰

Empowering women via education and expanding health education coverage, especially in rural and less accessible areas, will have a greater impact on child survival by improving socioeconomic status, health awareness, and health service utilisation. Breastfeeding and family planning services, as well as the use of health services and other healthy behaviours, should all be encouraged. In remote and less accessible areas, more efforts should be made to improve sanitation and hygiene, as well as access to maternal and child health care. Strategies aimed at promoting fair regional socioeconomic growth may have a significantly greater influence on child survival.

CONCLUSION

We conclude that this study was conducted to encourage India to implement comprehensive initiatives for lowering under-five mortality. For further

decreases in under-five mortality, a continuum of healthcare throughout pregnancy, parturition, and even during the under-five years should be provided. However, a priority in maternal and child health-related programmatic interventions and strategies should be to ensure uptake of antenatal check-ups during pregnancy and an adequate supply of iron and folic acid tablets during pregnancy. Our research shows a strong negative association between child mortality and illiterate women, that's the reason we must improve family planning and reproductive knowledge. Additionally, expanding access to receiving a sufficient nutrition for Breastfeeding children aged 6 to 23 months and for all children aged 6 to 23 months, starting institutional deliveries, and lowering caesarean sections can all help to further reduce under-five mortality in EAG states of India. In India, under-five mortality is a significant public health concern that is influenced by a variety of causes. In order to attain the SDGs by 2030, increased efforts and targeted interventions are needed to address these problems.

REFERENCES

1. Patel N, Olickal J. Maternal and child factors of under-five mortality in India. Findings from NFHS-4. *Clinical Epidemiology and Global Health* [Internet]. 2021 [cited 18 December 2021];12:100866. Available from: [https://cegh.net/article/S2213-3984\(21\)00174-3/fulltext](https://cegh.net/article/S2213-3984(21)00174-3/fulltext)
2. United Nations Millennium Development Goals [Internet]. Un.org. 2021 [cited 18 December 2021]. Available from: <https://www.un.org/millenniumgoals/childhealth.shtml>
3. Children: improving survival and well-being [Internet]. Who.int. 2021 [cited 18 December 2021]. Available from: <https://www.who.int/news-room/fact-sheets/detail/children-reducing-mortality>
4. Bora J. Factors explaining regional variation in under-five mortality in India: An evidence from NFHS-4. *Health & Place* [Internet]. 2020 [cited 18 December 2021];64:102363. Available from: <https://pubmed.ncbi.nlm.nih.gov/32838888/>
5. Bhatia M, Dwivedi L, Ranjan M, Dixit P, Putcha V. Trends, patterns and predictive factors of infant and child mortality in well-performing and underperforming states of India: a secondary analysis using National Family Health Surveys. *BMJ Open* [Internet]. 2019 [cited 16 December 2021];9(3):e023875. Available from: <https://bmjopen.bmj.com/content/9/3/e023875.info>
6. Bora J, Saikia N. Neonatal and under-five mortality rate in Indian districts with reference to Sustainable Development Goal 3: An analysis of the National Family Health Survey of India (NFHS), 2015–2016. *PLOS ONE* [Internet]. 2018 [cited 16 December 2021];13(7):e0201125. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6066210/>
7. Child Mortality - UNICEF DATA [Internet]. UNICEF DATA. 2021 [cited 18 December 2021]. Available from: <https://data.unicef.org/topic/child-survival/under-five-mortality/#status>
8. National Family Health Survey (NFHS-5) India and State Fact-sheet Compendium_Phase-IIpdf [Internet]. Available from: <http://rchiips.org/nfhs/nfhs5.shtml>
9. Kumar, C., Singh, P.K and Rai, R.K. (2012) Under-Five Mortality in High Focus States in India: A District Level Geospatial Anal-

- ysis. *PLoS ONE*, 7, e37515. Doi: <https://doi.org/10.1371/journal.pone.0037515>
10. Bora, J.K. and Saikia, N. (2018) Neonatal and Under-Five Mortality Rate in Indian Districts with Reference to Sustainable Development Goal 3: An Analysis of the National Family Health Survey of India (NFHS), 2015-2016. *PLoS ONE*, 13, e0201125. Doi: <https://doi.org/10.1371/journal.pone.0201125>
 11. (2011) Annual Report: 2010-11. Ministry of Health and Family Welfare, 1-2. Available from: <https://main.mohfw.gov.in/sites/default/files/26697288736.pdf>
 12. India, P. (2011) Census of India 2011 Provisional Population Totals. Available at: http://censusindia.gov.in/2011-prov-results/prov_results_paper1_india.html
 13. United Nations (2016) Goal 3: Ensure Healthy Lives and Promote Well-Being for all at all ages. Available from: <http://www.un.org/sustainabledevelopment/health>
 14. Govindasamy, P. (1997) Maternal Education and the Utilization of Maternal and Child Health Services in India. *Maternal Education and the Utilization of Maternal and Child Health Services in India*, 5, 1-28.
 15. Hossain, M.M., Mani, K.K.C. and Islam, M.R. (2015) Prevalence and Determinants of the Gender Differentials Risk Factors of Child Deaths in Bangladesh: Evidence from the Bangladesh Demographic and Health Survey, 2011. *PLoS Neglected Tropical Diseases*, 9, e0003616. Doi: <https://doi.org/10.1371/journal.pntd.0003616>
 16. Ezeh, O.K., Agho, K.E., Dibley, M.J., Hall, J.J. and Page, A.N. (2015) Risk Factors for Postneonatal, Infant, Child and Under-5 Mortality in Nigeria: A Pooled Cross-Sectional Analysis. *BMJ Open*, 5, e006779.
 17. Dendup T, Zhao Y, Dema D. Factors associated with under-five mortality in Bhutan: an analysis of the Bhutan National Health Survey 2012. *BMC Public Health* [Internet]. 2018 [cited 19 December 2021];18(1). Available from: <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-018-6308-6>
 18. Rahman N, Kabir M, Halima O, Alam M, Al Mamun M. Under Five Child Mortality & Its Risk Factors in Bangladesh and other South Asian Countries: A Literature Review. *Indian Journal of Public Health Research & Development* [Internet]. 2020 [cited]
 19. Gebretsadik S, Gabreyohannes E. Determinants of Under-Five Mortality in High Mortality Regions of Ethiopia: An Analysis of the 2011 Ethiopia Demographic and Health Survey Data. *International Journal of Population Research*. 2016;2016:1602761.
 20. Idele, P. Breastfeeding and Infant and Child Mortality in Kenya. 2015. DOI: <https://doi.org/10.13140/RG.2.1.3700.7523>