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Evaluating Decadal Changes in Determinants of Early Childhood Stunting and Assessing their Contribution to Socio-Economic Disparity in Child Nutritional Status Across India

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Abstract:

Various efforts have been made over the years to bring about reduction in child malnutrition; the latest among them involves Goal 2 of the SDGs. The SDG Target 2.2 recognizes the global dimension of the nutrition issue and aims to end all forms of malnutrition by 2030, including achieving, by 2025, (WHO, 2015). The present evidence on childhood malnutrition suggests that while improvement in maternal and child covariates have resulted in decline of childhood stunting over time. The present study aims to investigate how the effect of maternal and child covariates on early childhood malnutrition have changed over the last decade and examining the socio-economic disparity in the nutritional status of children across India. The present study utilizes data from the last two rounds of the National Family Health Survey, NFHS-3 in 2005-06 and NFHS-4 in 2015-16 of children in the age group 6-23 months for whom data on height-for-age was available from the last two rounds of the National Family Health Survey (NFHS-3 and NFHS-4). After dropping the missing and flagged cases, the total sample size was 12,507 and 68,246 children from NFHS-3 (2005-06) and NFHS-4 (2015-16), respectively. The selected indicator of childhood under nutrition for this study is stunting. The exposure variables selected for the study were child factors such as sex, age, birth order, size at birth, place of delivery, diet diversity, meal frequency and early initiation of breastfeeding. Maternal factors such as maternal education, media exposure, and mother's BMI were taken into account. For healthcare service utilization we considered the variable of complete antenatal care. Other background characteristics like religion, caste, wealth index, place of residence and geographical region were also considered. We utilized chi-square test to test for the association of various factors with early childhood stunting followed by t-test to assess the changes in prevalence by each factor. We also carried out bivariate and multivariate logistic analysis to effect of various factors on childhood stunting. Lastly, we carried out Oaxaca decomposition to examine the contribution of the determinants of childhood stunting towards the changes in its prevalence over the last ten years. Concentration Index was calculated to examine the disparity in early childhood stunting across India for both rounds of the National Family Health Survey. The predictive probabilities were calculated for each category of the wealth index after fitting a logistic model to control for other determinants of early childhood stunting to assess the change in prevalence of stunting across each socio-economic group in the last ten years. The study reveals an overall decline in prevalence of early childhood stunting across India over the last ten years from 2005-16. However, high levels of variation continue to exist across all the states in India. The study reveals institutional delivery as the highest contributing factor for this decline.

Maternal education, body mass index and complete antenatal care during pregnancy also contribute significantly to the improvement in childhood stunting

Keywords: Early Childhood Stunting, Socio-Economic Disparity, maternal and child covariates, Antenatal care, Concentration Index

Introduction

Malnutrition in all its forms continues to affect every country on the planet and is a major impediment to achieving both global food security and adequate nutrition, and sustainable development (HLPE, 2017). Globally, 156 million children under five years of age are stunted, 93 million are underweight and 50 million are wasted (Khan & Mohanty, 2018). However, this burdenis not distributed evenly around the world and nearly 80 percent of the world's stunted children residing in just 14 countries (UNICEF, 2013). Various efforts have been made over the years to bringabout reduction in child malnutrition; the latest among them involves Goal 2 of the SDGs. The SDG Target 2.2 recognizes the global dimension of the nutrition issue and aims to end all forms of malnutrition by 2030, including achieving, by 2025, the internationally agreed targets on stuntingand wasting in children under 5 years of age, as part of the goal to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture" (WHO, 2015). But despite all efforts at various levels, the prevalence of malnutrition continues to remain high in the developing countries, especially in sub-Saharan Africa and South Asia.

Malnutrition contributes to impairment in physical and cognitive human development, reduced productivity, susceptibility to infectious and chronic diseases and premature death (Qaim, 2017). It prevents children from reaching their full physical and mental potential; consequences of prolonged malnourishment among children include lower intellectual quotient (IQ), greater behavioural problems and deficient social skills (Kandala, Madungu, Emina, Nzita, & Cappuccio, 2011).

During the last two decades, India has experienced sustained economic growth (over 5 per cent growth in GDP) and reduced the poverty level by half (from 50 per cent in 1991-94 to 22 per cent by 2011-12) but reduction in stunting, underweight and wasting has not been observed in the same scale(Khan & Mohanty, 2018).

The present evidence on childhood malnutrition suggests that while improvement in maternal and child covariates have resulted in decline of childhood stunting over time; however, the decline has not been uniformly distributed across India. Studies show existence of high levels of variation in levels of childhood stunting across India, a recent study on the spatial heterogeneity of malnutrition shows that a substantial number of districts with high prevalence of under nutrition belong to the poorer states of India (Khan & Mohanty, 2018).

The present health status in India indicates that significant advancement has been made in improving the nutritional status of the population but it is still a long way from achieving good health for all in terms of nutrition.

The period of early childhood (below two years of age) is the most crucial for the proper growth and development of a child. Moreover, it is the period where a child has the highest nutritional requirements, is most susceptible to infections and is completely dependent on others for nutrition, care and social interactions (UNICEF 2013).

The high level of variation in the prevalence of stunting across India in terms of both economic group and geographical region indicates a need for further investigation into the determinants of early childhood

nutrition and their contribution to the changes in prevalence of early childhood malnutrition over the last decade. This study also examines the disparity in the prevalence of early childhood stunting across socio-economic groups and its variation across India over the last decade.

The present study aims to investigate how the effect of maternal and child covariates on early childhood malnutrition have changed over the last decade and examining the socio-economic disparity in the nutritional status of children across India.

Data source and methodology

Data *source*

The present study utilises data from the last two rounds of the National Family Health Survey, NFHS-3 in 2005-06 and NFHS-4 in 2015-16. The National Family Health Survey is conducted underthe state ownership of the Ministry of Health and Family Welfare (MoHFW), Government of India co-ordinated by International Institute for Population Sciences (IIPS). It is a large-scale, multi-stage survey conducted in a nationally representative sample throughout India. The NFHS is an Indian version of the Demographic and Health Survey (DHS) that provides consistent and reliable estimatesof fertility, mortality family planning, utilisation of maternal and child health care services and other related indicators at the national, state and regional level (Singh, et al. 2011).

Sample *size*

To address the present study objectives, we selected children in the age group 6-23 months for whomdata on height-for-age was available from the last two rounds of the National Family Health Survey (NFHS-3 and NFHS-4). After dropping the missing and flagged cases, the total sample size was 12,507 and 68,246 children from NFHS-3 (2005-06) and NFHS-4 (2015-16), respectively. To examine the determinants of childhood stunting, we selected a sample of the youngest child in the household in the age group 6-23 months who was currently breastfed to make the data comparable across both rounds of the NFHS. The final sample size came out to be 10,153 children for NFHS-3 (2005-06) and 55,896 children for NFHS-4 (2015-16).

Discription of variables

Outcome Variable: The selected indicator of childhood under nutrition for this study is stunting. The summary index for child stunting is the height-for-age z-score which is expressed in standard deviation units from the mean for the International reference population. Children whose height-for- age z-score is below minus 2 standard deviation (-2 SD) below the mean of on the WHO Child Growth Standards are classified as stunted.

Exposure Variable: The exposure variables selected for the study were child factors such as sex, age, birth order, size at birth, place of delivery, diet diversity, meal frequency and early initiation of breastfeeding. Maternal factors such as maternal education, media exposure, daily consumption of green leafy vegetables and protein-rich food and mother's BMI were taken into account. For healthcare service utilisation we considered the variable of complete antenatal care. Other background characteristics like religion, caste, wealth index, place of residence and geographical region were also considered. Diet diversity of child was defined as children consuming at least 4 food groups; the minimum meal frequency of a child in defined as 2 times for breastfed infants aged 6-8 months and 3 times for breastfed children aged 9-23 months. Child's acceptable diet is defined as those children receiving both the minimum diet diversity as well as the minimum meal frequency, mother's education is classified as attended or not

attended school with those with no education being classified as not attended and those with primary education and higher being classified as attended school. Complete antenatal care is defined as ANC care in the first trimester, at least 4 antenatal visits, at least 1tetanus toxoid (TT) injection, iron folic acid tablets or syrup taken for at least 100 days.

Ethical statement

The study is based on data available in the public domain with no identifiers on the survey participants; hence no ethical statement is required for this work.

Methodology

For the purpose of achieving the objectives of the study STATA 14.0 was used.

The state-wise prevalence of stunting and severe stunting among children in the age group 6-23 months was calculated using the STATA 14.0.

To achieve the second objective of the study we utilised chi-square test to test for the association of various factors with early childhood stunting followed by t-test to assess the changesin prevalence by each factor. We also carried out bivariate and multivariate logistic analysis to effect of various factors on childhood stunting. Lastly, we carried out Oaxaca decomposition to examinethe contribution of the determinants of childhood stunting towards the changes in its prevalence over the last ten years.

Concentration Index was calculated to examine the disparity in early childhood stunting across India for both rounds of the National Family Health Survey. The predictive probabilities were calculated for each category of the wealth index after fitting a logistic model to control for other determinants of early childhood stunting to assess the change in prevalence of stunting across each socio-economic group in the last ten years.

Result

Table 1.1: This table shows the prevalence of severe stunting and stunting among children in the agegroup 6-23 months for the last two rounds of the NFHS across India. The highest level of severe stunting in 2015-16 was observed in the states of Jharkhand and Bihar at nearly 21 percent. The highest level of improvement in severe stunting is seen in Delhi, declining from 26 percent to 7 percent in the last decade. It indicates that the level of stunting declined by about 8 points from 44 to 36 percent in the last ten years. The highest prevalence of early childhood stunting was observed in the state of Bihar at 44 percent and the lowest was observed in Tripura at about 18 percent in 2015-

16. The largest improvement in the last ten years is observed in the state of Chhattisgarh with a decrease of about 17 percent over the last decade.

Table 2.1: The table describes the distribution of the sample selected for the analysis by each of the selected factors for both rounds, NFHS-3 (2005-06) and NFHS-4 (2015-16). It indicates substantial increase in institutional deliveries, early initiation of breastfeeding, mother's school attendance, mother's media exposure and complete antenatal care during 2005-16. While diet diversity among children shows an increase, the consumption of minimum acceptable diet seems to have reduced; also, mother's daily consumption of green leafy vegetables and protein rich diet also seems to have decreased during 2005-16.

Table 2.2: This table shows the prevalence of stunting among youngest breastfeeding children aged 6-23 months by selected maternal and child factors from 2005-16. It also shows the change in association of each factor with early childhood stunting and indicates the changes that have taken place in the level of

stunting by each factor during 2005-06 and 2015-16. The table indicates significant association of early childhood stunting with sex of child, child's age, size at birth, place of delivery, early initiation of breastfeeding, mother's school attendance, mother's media exposure, mother's daily consumption of green leafy vegetables and protein rich diet; mother's BMI and complete antenatal care for both the time periods. Prevalence of stunting also comes out to be associated with caste, wealth index, place of residence and geographical regions. The table indicates significant association of child's diet diversity and minimum acceptable diet for 2005-06. Significantdecline in prevalence of stunting is observed for all factors from 2005-16.

Table 2.3: This table indicates the unadjusted odds ratio for each of the selected maternal and child characteristics for 2005-06 and 2015-16. The table indicates that girls are less likely to be stunted as compared to boys. Children are more likely to be stunted at older ages as and at higher birth orders. Children having average or large size at birth, having institutional delivery, early initiation of breastfeeding are less likely to be stunted. Child's diet comes out to be significantly associated with stunting during 2005-06. It indicates children having the minimum diet diversity, consuming the minimum meal frequency and having the minimum acceptable diet are less likely to be stunted as compared to their counterparts. Mothers who attended school and have media exposure are lesslikely to have children who are stunted. Mother's daily consumption of iron and protein rich food, maternal BMI and complete antenatal care comes out to be significantly associated with early childhood stunting. We observe substantial change in odds of stunting among children having institutional deliveries, having early initiation of breastfeeding and those whose mothers received complete ANC during pregnancy over the last ten years.

Table 2.4: The table displays the adjusted odds ratio of early childhood stunting by selected maternaland child characteristics for 2005-06 and 2015-16. The table indicates children with higher diet diversity and meal frequency are less likely to be stunted in comparison to their counterparts. Surprisingly, the results show that a higher likelihood of stunting among children consuming the minimum acceptable diet during 2015-16. The adjusted odds of stunting by mother's consumption ofiron and protein rich diet does not come out to be significant. While mother's media exposure does not show significant association with stunting during 2005-06, the tables indicate that mothers with media exposure are 9 percent less likely to have stunted children in 2015-16. The geographical distribution of early childhood stunting indicates higher levels of stunting among children in the Central, Eastern and Western regions of India during 2015-16.

Table 2.5: The table describes the result of Oaxaca decomposition of the change in levels of early childhood stunting between 2005-06 and 2015-16. It shows the contribution of various maternal and child characteristics to the changes in the last ten years. The maternal and child characteristics explained 56 percent of the difference in early childhood stunting during the last ten years. The increase in institutional delivery, maternal education and improvement in maternal BMI were responsible for the maximum decline in prevalence of early childhood stunting. On the other hand, child's diet diversity, caste and place of residence contributed negatively to the decline in stunting.

Table 3.1: This table shows the concentration indices of depicting the economic inequality with respect to child malnutrition across states of India. It indicates that the overall economic inequality with respect to early childhood stunting has not changed over the last ten years. The table indicates that the level of disparity in India continue to remain high across all the states. The concentration index value varies between 0 and -1; values closer to -1 indicate greater level of inequality between socio-economic groups.

Table 3.2: This table displays the predictive probabilities of stunting after controlling for maternal and child characteristics associated with early childhood stunting for each category of the wealth index. The predictive probabilities indicate a gap of nearly 20-point percent between the richest and the poorest wealth quintiles. Not much change is in disparity is observed in the last ten years by socio-economic groups.

Discussion

The following are the salient findings from the study. Firstly, it analyses the changes in the determinants of early childhood stunting across the last two rounds of the NFHS survey and the contribution of these factors towards changes in nutritional status of children aged 6- 23 months over the last decade. Lastly, it examines the levels of disparity in the prevalence of stunting among children by various economic groups in society and the changes in their levels over the last decade.

The study reveals an overall decline in prevalence of early childhood stunting across India over the last ten years from 2005-16. However, high levels of variation continue to exist across all the statesin India. The study reveals institutional delivery as the highest contributing factor for this decline. Maternal education, body mass index and complete antenatal care during pregnancy also contribute significantly to the improvement in childhood stunting. Child factors such as birth order and size of child during birth are also significant contributors to the improvement in nutritional status over time. The study also indicates a negative effect of the change in complementary feeding practices among children over the last ten year. This could be due to the decline in the percentage of children receiving minimum number of meals and the minimum acceptable diet over the last decade. The deterioration in complementary feeding practices over time calls for an action promoting the importance of child feeding practices for children aged less than two years.

While the prevalence of stunting across India has decreased the disparity in socio-economic groups with respect to prevalence of stunting does not show much change over the last decade. Thenutritional gap between the richest and the poorest section of the society remains almost unchanged. The sluggish change in the nutritional status of children belonging to poorer sections of the society call for strengthening existing programs and launching new ones focused on meeting the nutritional needs of mothers and children belonging to the economically disadvantaged groups.

Previous studies for the developing countries proved that poverty is a major contributor to the burden of child malnutrition [Duncan T, 2001]. Similar to those studies this study also found the poverty, malnutrition linkages and identified districts with high incidence of stunting and poverty. Prioritizing these districts to reduce malnutrition would be helpful to the overall burden of malnutrition in India. The pattern was similar with improved sanitation of the households but of lesser degree. Districts where more proportion of households were availing the facility of improved sanitation showed a lower prevalence of malnutrition across those districts of India. As we know that lack of improved sanitation in the households may lead to childhood diseases such as diarrhea and other infectious diseases [Rah JH et.al, 2016 and Spears D et.al, 2014]. Parallel to the sanitation argument of child nutrition, it could be mentioned here that Government of India had started a cleanliness program through “Swachh Bharat Abhiyan” to improve sanitation condition and waste management across India [Dasgupta S et.al,2016]. Third, women’s BMI and educational status were found to have positive and strong association with all three nutritional indicators. Districts with higher percentage of women with a BMI less than 18.5 kg/m2 were significantly more likely to have higher prevalence of malnutrition among the children and findings were consistent with previous studies. It is well established that maternal nutrition is an important risk factor of poor

intrauterine growth and low birth weight during pregnancy and undernourished mothers cannot breast-feed their children adequately causing poor nutrition to their children [Black RE et.al,2013, Rahman M et.al,2005 and Rahman A et.al,2007]. Hence, improving maternal health is a prerequisite to reduction of malnutrition among children. In this direction, districts where children were breastfed and received adequate diet were found to be less likely to be burdened with stunting. Breastfeeding pattern and initiation of complementary feeding and quality of the complementary food could be the possible reason which helped the prevalence of child malnutrition to reduce in those districts [Zhou H, Wang X-L,2012 and Tiwari R, et.al, 2014].

Similarly, malnutrition was found to be negatively and significantly associated with women's educational attainment. Our findings also support the positive linkage between women's educational attainment and child's nutrition. This finding is also consistent with the previous studies which establish the impact of mother's education on child's nutritional status [Abuya BA, et.al.2012 and Mishra VK, et.al,2000].

In this context, the National Health Mission (NHM) initiative by Govt. of India is working towards child and maternal health across India to improve over the situation prevailing. In another public health intervention to fight against malnutrition, Govt of India has set up the National Nutrition Mission (NNM) for programmatic intervention with a three-year budget of Rs.9046.17 crore which was commenced in 2017 in the high priority districts [Falcao VL, et.al,2015 Murray SF, et.al, 2014].

Limitations

To maintain comparability the study has been done on the youngest currently breastfeeding child in the household aged 6-23 months as NFHS-3 does not provide data on the meal frequency of children of non-breastfed children.

Conclusion

The study illustrates the changes in prevalence of stunting among children aged 6-23 months and brings out the socio-economic disparity in distribution of early childhood stunting across India. The study identifies the major contributors of change in the prevalence of childhood stunting over the lastdecade. The findings of the study suggest a need for programs focused on promoting complementary feeding practices among children aged 6-23 months and reducing the gap in nutritional status of children by socio-economic groups.

References

1. Aheto, J. M. K., Keegan, T. J., Taylor, B. M., & Diggle, P. J. (2015). Childhood Malnutrition and Its Determinants among Under-Five Children in G hana. Paediatric and perinatal epidemiology, 29(6), 552-561.
2. Abuya BA, Ciera J, Kimani-Murage E. Effect of mother's education on child's nutritional status in the slums of Nairobi. BMC Pediatr. 2012;12:80.
3. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M, Ezzati M, Grantham-McGregor S, Katz J, Martorell R. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet. 2013;382(9890):427–51.
4. Dhami, M. V., Ogbo, F. A., Osuagwu, U. L., & Agho, K. E. (2019). Prevalence and factors associated with complementary feeding practices among children aged 6–23 months in India: a regional analysis. BMC public health, 19(1), 1034.

5. Di Cesare, M., Bhatti, Z., Soofi, S. B., Fortunato, L., Ezzati, M., & Bhutta, Z. A. (2015). Geographical and socioeconomic inequalities in women and children's nutritional status in Pakistan in 2011: an analysis of data from a nationally representative survey. The Lancet Global Health, 3(4), e229-e239.
6. Dasgupta S, Ramaswamy D, Noronha KM, Rao S, George N, Singh A, Singh T, Dhiman S, Bhol A: Swachh Bharat: Industry engagement-scope & examples. 2016.
7. Duncan T: Commission on Macroeconomics and Health. Health, nutrition and economic prosperity: a microeconomic perspective. 2001.
8. Falcao VL, Khanuja J, Matharu S, Nehra S, Sinha D. Report on the Study of the Indira Gandhi Matritva Sahyog Yojana. New Delhi: Centre for Equity Studies; 2015.
9. HLPE. 2017. "Nutrition and food systems."
10. Howell, E. M., Holla, N., & Waidmann, T. (2016). Being the younger child in a large African Family: a study of birth order as a risk factor for poor health using the demographic and health surveys for 18 countries. BMC Nutrition, 2(1), 61.
11. Kandala, N. B., Madungu, T. P., Emina, J. B., Nzita, K. P., & Cappuccio, F. P. (2011). Malnutrition among children under the age of five in the Democratic Republic of Congo (DRC): does geographic location matter?. BMC public health, 11(1), 261.
12. Khan, J., & Mohanty, S. K. (2018). Spatial heterogeneity and correlates of child malnutrition in districts of India. BMC public health, 18(1), 1027.
13. Murray SF, Hunter BM, Bisht R, Ensor T, Bick D. Effects of demand-side financing on utilisation, experiences and outcomes of maternity care in low-and middle-income countries: a systematic review. BMC Pregnancy and Childbirth. 2014;14(1):30.
14. Mishra VK, Retherford RD: Women's education can improve child nutrition in India. 2000.
15. Menon, P., Headey, D., Avula, R., & Nguyen, P. H. (2018). Understanding the geographical burden of stunting in India: A regression-decomposition analysis of district-level data from 2015–
16. Maternal & child nutrition, 14(4), e12620.
17. Nutrition, I. C. (2013). The achievable imperative for global progress. New York, NY: UNICEF. Parra, D. C., Iannotti, L., Gomez, L. F., Pachón, H., Haire-Joshu, D., Sarmiento, O. L., ... &
18. Brownson, R. C. (2015). The nutrition transition in Colombia over a decade: a novel household classification system of anthropometric measures. Archives of Public Health, 73(1), 12.
19. Pathak, P. K., & Singh, A. (2011). Trends in malnutrition among children in India: growing inequalities across different economic groups. Social science & medicine, 73(4), 576-585.
20. Qaim, M. (2017). Globalisation of agrifood systems and sustainable nutrition. Proceedings of the Nutrition Society, 76(1), 12-21.
21. Rahman M, Roy S, Ali M, Mitra A, Alam A, Akbar M. Maternal nutritional status as a determinant of child health. J Trop Pediatr. 1993;39(2):86–8.
22. Rahman A, Chowdhury S. Determinants of chronic malnutrition among preschool children in Bangladesh. J Biosoc Sci. 2007;39(2):161–73.
23. Rah JH, Cronin AA, Badgaiyan B, Aguayo VM, Coates S, Ahmed S. Household sanitation and personal hygiene practices are associated with child stunting in rural India: a cross-sectional analysis of surveys. BMJ Open. 2015;5(2):e005180.
24. Spears D, Ghosh A, Cumming O. Open defecation and childhood stunting in India: an ecological analysis of new data from 112 districts. PLoS One. 2013;8(9):e73784.
25. Tiwari R, Ausman LM, Agho KE. Determinants of stunting and severe stunting among under-fives:

evidence from the 2011 Nepal demographic and health survey. BMC Pediatr. 2014;14(1):239.
26. Zhou H, Wang X-L, Ye F, Zeng LX-P, Wang Y. Relationship between child feeding practices and malnutrition in 7 remote and poor counties, PR China. Asia Pac J Clin Nutr. 2012;21(2):234–40.

Tables

Table 1.1. Percentage of children aged 6-23 months classified as severely stunted and stunted accordingto state, India, 2005-16.

State	Severely stunted			Stunted		
	NFHS-3 (2005-06)	NFHS-4 (2015-16)	hange[a](%)	NFHS-3 (2005-06)	NFHS-4 (2015-16)	hange[a](%)
Andhra Pradesh	14.90	12.04	-2.86	35.51	27.11	-8.40
Arunachal Pradesh	17.13	14.34	-2.79	37.54	32.18	-5.36
Assam	18.19	15.21	-2.98	38.98	35.71	-3.27
Bihar	23.80	20.65	-3.15	47.99	44.23	-3.76
Chhattisgarh	25.88	15.18	-10.70	52.23	34.78	-17.45
Goa	11.83	10.14	-1.69	24.39	21.18	-3.21
Gujarat	24.94	16.25	-8.69	50.42	34.89	-15.53
Haryana	21.81	17.19	-4.62	48.50	34.57	-13.93
Himachal Pradesh	13.44	8.79	-4.65	30.78	22.64	-8.14
Jammu and	12.99	11.27	-1.72	31.10	25.57	-5.53
Jharkhand	25.80	20.68	-5.12	48.91	43.73	-5.18
Karnataka	21.31	19.75	-1.56	38.58	38.22	-0.36
Kerala	8.96	10.04	1.08	28.56	24.26	-4.30
Madhya Pradesh	21.49	17.99	-3.50	45.24	38.07	-7.17
Maharashtra	16.16	13.81	-2.35	43.18	32.23	-10.95
Manipur	10.73	8.72	-2.01	27.71	26.64	-1.07
Meghalaya	25.73	15.93	-9.80	44.28	36.47	-7.81
Mizoram	14.43	6.20	-8.23	31.55	20.11	-11.44
Nagaland	14.28	10.15	-4.13	32.39	21.37	-11.02
Delhi	26.07	7.42	-18.65	46.58	30.16	-16.42
Odisha	20.62	13.66	-6.96	44.01	32.58	-11.43
Punjab	18.27	10.23	-8.04	37.07	25.92	-11.15
Rajasthan	19.95	17.94	-2.01	41.21	37.01	-4.20
Sikkim	12.77	12.14	-0.63	29.11	26.89	-2.22
Tamil Nadu	13.51	14.17	0.66	31.21	30.49	-0.72
Tripura	12.19	7.06	-5.13	31.61	17.77	-13.84
Uttar Pradesh	29.01	19.77	-9.24	53.14	41.96	-11.18
Uttarakhand	17.67	15.15	-2.52	38.45	34.22	-4.23
West Bengal	13.87	11.81	-2.06	39.43	31.55	-7.88

India	**21.20**	**16.30**	**-4.90**	**44.40**	**36.10**	**-8.30**

[a] NFHS-4 – NFHS-3.

Table 2.1: Sample distribution of youngest child in the household aged 6 to 23 months by selected background characteristics for NFHS 3 (2005-06) and NFHS 4 (2015-16), India.

Characteristics	NFHS 3 (2005-06) n= 10,153		NFHS 4 (2015-16) n= 55,896	
	Number (Unweighted)	Percentage (%)	Number (Unweighted)	Percentage (%)
Sex of child				
Male	5,318	52.8	29,350	52.4
Female	4,835	47.2	26,546	47.6
Age of child (in months)				
6-11	3,933	37.9	21,196	38.1
12-17	3,480	34.0	19,032	33.9
18-23	2,740	28.0	15,668	28.0
Birth order of child				
First	3,180	30.0	19,986	36.6
Second	2,938	28.0	17,940	33.5
Third	1,673	16.5	9,201	15.9
Fourth and above	2,362	25.4	8,769	14.0
Size of child				
small	2,137	21.5	6,603	11.8
average	5,718	54.7	39,670	68.8
large	2,298	23.8	9,623	19.4
Place of delivery				
Non-Institutional	5,631	62.0	11,845	18.4
Institutional	4,522	38.0	44,051	81.6
Child's diet diversity				
Consumed less than 4 food groups	8,436	86.8	44,971	80.7
Consumed 4 or more food groups	1,717	13.2	10,925	19.3
Child's meal frequency[a]				
Did not consume minimum number of meals	5,241	55.3	37,171	68.5
Consumed minimum number of meals	4,912	44.7	18,725	31.5
Child's minimum acceptable diet[b]				
Did not consume minimum acceptable diet	8,951	91.0	50,931	91.6
Consumed minimum acceptable diet	1,202	9.0	4,965	8.4
Early initiation of breastfeeding				

Not initiated	6,897	76.2	30,785	56.4
Initiated within 1 hour	3,256	23.8	25,111	43.6
Mother's school attendance				
Not attended	4,030	48.8	16,133	28.2
Attended	6,123	51.2	39,763	71.8
Mother's media exposure				
Not exposed	2,501	32.2	15,382	27.0
Exposed	7,652	67.8	40,514	73.0
Mother's daily consumption of green leafy vegetables				
No	3,879	38.3	29,156	53.4
Yes	6,274	61.7	26,740	46.6
Mother's daily consumption of protein rich food				
No	4,424	43.4	26,578	45.9
Yes	5,729	56.6	29,318	54.1
Mother's BMI				
Low	3,894	45.1	16,168	30.6
Normal	5,543	50.4	33,831	58.3
Overweight	716	4.6	5,897	11.1
Complete antenatal care[c]				
Did not receive complete ANC	9,010	91.0	47,655	83.7
Received complete ANC	1,143	9.0	8,241	16.3
Religion				
Hindu	7,105	78.8	40,882	79.2
Others	3,048	21.2	15,014	20.8
Caste				
SC/ST	3,475	31.3	22,032	33.2
OBC	3,288	39.7	21,923	43.5
Others	3,390	29.0	11,941	23.2
Wealth Index				
Poorest	1,899	26.1	14,838	26.1
Poorer	1,992	23.7	13,355	22.8
Middle	2,113	20.0	11,390	20.5
Richer	2,246	17.6	9,140	17.4
Richest	1,903	12.6	7,173	13.1
Place of Residence				
Urban	3,374	21.8	12,463	25.4
Rural	6,779	78.2	43,433	74.6
Geographical regions				
North	1,789	12.7	10,294	12.7
Central	2,237	28.0	16,111	27.2
East	1,860	29.5	12,785	28.4
Northeast	1,925	3.9	8,137	3.8
West	1,056	12.1	3,714	12.0
South	1,286	13.7	4,855	15.8

[a] Minimum meal frequency for children is defined as 2 times for breastfed infants aged 6-8 months and 3 times forbreastfed children aged 9-23 months.
[b] Child's acceptable diet is defined as those children aged 6-23 months receiving minimum diet diversity (4 or more food groups) and minimum diet frequency.
[c] ANC in the first trimester, at least 4 antenatal visits, at least 1 tetanus toxoid (TT) injection, and iron-folic acid tablets orsyrup is taken for 100 days or more.

Table 2.2: Descriptive statistics of stunting among children aged 6 to 23 months by selected background characteristics during NFHS-3 (2005-06) and NFHS-4 (2015-16), India.

	NFHS 3 (2005-06) n=10,153 (Unweighted)		NFHS 4 (2015-16) n=55,896 (Unweighted)		
Characteristics	**Percentage (%)**	**95% CI**	**Percentage (%)**	**95% CI**	**Difference[a]**
Sex of child [e, j]					
Male	44.8	[43.0-46.6]	37.8	[37.0-38.7]	-7.0***
Female	42.7	[40.7-44.6]	33.4	[32.6-34.3]	-9.3***
Age of child (in months) [g, j]					
6-11	28.3	[26.4-30.2]	22.9	[22.1-23.7]	-5.4**
12-17	47.7	[45.5-49.8]	38.9	[37.9-39.9]	-8.8***
18-23	60.1	[57.6-62.4]	49.4	[48.2-50.6]	-10.7***
Birth order of child [g, j]					
First	38.6	[36.3-40.9]	31.1	[30.2-32.1]	-7.5***
Second	41.2	[38.8-43.6]	34.5	[33.5-35.6]	-6.6***
Third	46.2	[43.0-49.3]	39.4	[38.1-40.9]	-6.7**
Fourth and above	51.3	[48.6-53.9]	46.5	[45.1-47.9]	-4.8***
Size of child [g, j]					
small	51.1	[48.4-53.8]	44.4	[42.7-46.0]	-6.7***
average	42.2	[40.4-44.0]	35.3	[34.7-36.1]	-6.9***
large	40.9	[38.1-43.7]	31.9	[30.4-33.3]	-9.0**
Place of Delivery [g, j]					
Non-Institutional	50.0	[48.2-51.7]	45.0	[43.7-46.3]	-4.9***
Institutional	33.8	[31.8-35.7]	33.6	[33.0-34.3]	-0.1***
Child's diet diversity [g]					
Consumed less than 4 food groups	44.5	[43.1-46.0]	35.6	[34.9-36.3]	-8.9***
Consumed 4 or more food groups	38.9	[35.7-42.3]	36.2	[34.7-37.8]	-2.7
Child's meal frequency[b]					
Did not consume minimum number of meals	44.0	[42.3-45.8]	35.7	[35.0-36.4]	-8.4***
Consumed minimum number of meals	43.5	[41.5-45.5]	35.8	[34.8-36.9]	-7.7***
Child's minimum acceptable diet[c, e]					

Did not consume minimum acceptable diet	44.2	[42.7-45.6]	35.6	[35.0-36.2]	-8.6***
Consumed minimum acceptable diet	40.0	[36.0-44.1]	37.3	[35.1-39.5]	-2.7
Early initiation of breastfeeding [g, j]					
Not initiated	44.8	[43.2-46.4]	36.6	[35.8-37.4]	-8.2***
Initiated within 1 hour	40.6	[38.2-43.1]	34.6	[33.7-35.6]	-6.0***
Mother's school attendance [g, j]					
Not attended	52.6	[50.6-54.5]	46.4	[45.4-47.5]	-6.1***
Attended	35.4	[33.8-37.1]	31.5	[30.8-32.2]	-3.9**
Mother's media exposure [g, j]					
Not exposed	52.6	[50.2-54.9]	45.5	[44.4-46.5]	-7.1***
Exposed	39.6	[38.1-41.2]	32.1	[31.4-32.9]	-7.5***
Mother's daily consumption of green leafy vegetables [g, i]					
Not consumed	46.1	[44.0-48.3]	36.4	[35.6-37.3]	-9.7***
Consumed	42.3	[40.7-44.0]	34.9	[34.1-35.8]	-7.4***
Mother's daily consumption of protein rich food [g, j]					
Not consumed	46.5	[44.5-48.5]	36.8	[35.9-37.7]	-9.7***
Consumed	41.7	[39.9-43.5]	34.8	[34.0-35.7]	-6.9***
Mother's BMI [g, j]					
Low	49.1	[47.1-51.1]	41.1	[40.0-42.1]	-8.1***
Normal	40.8	[39.0-42.7]	34.8	[34.1-35.6]	-6.0***
Overweight	24.2	[20.2-28.8]	25.9	[24.1-2.7]	1.6
Complete antenatal care [d, g, j]					
No	45.3	[43.8-46.8]	37.2	[36.6-37.9]	-8.1***
Yes	28.5	[25.1-32.3]	28.1	[26.6-29.6]	-0.5*
Religion [g]					
Hindu	44.7	[43.1-46.3]	35.8	[35.1-36.5]	-8.9***
Others	40.4	[37.7-43.1]	35.5	[34.2-36.9]	-4.9***
Caste [g, j]					
SC/ST	51.1	[48.8-53.4]	40.1	[39.0-41.1]	-11.0***
OBC	44.4	[42.1-46.7]	36.1	[35.3-37.0]	-8.3***
Others	35.1	[32.9-37.4]	28.8	[27.4-30.2]	-6.3***
Wealth Index [g, j]					
Poorest	55.8	[53.0-58.5]	46.6	[45.5-47.7]	-9.2***
Poorer	48.7	[46.0-51.4]	39.5	[38.3-40.6]	-9.3***
Middle	43.3	[40.6-46.0]	33.2	[32.0-34.6]	-10.0***
Richer	35.0	[32.3-37.8]	27.8	[26.4-29.3]	-7.2***
Richest	22.9	[20.4-25.6]	22.1	[20.5-23.7]	-0.8
Place of Residence [g, j]					
Urban	35.9	[33.4-38.4]	30.3	[28.9-31.8]	-5.6***
Rural	46.0	[44.4-47.6]	37.6	[36.9-38.3]	-8.4***
Geographical regions [g, j]					
North	39.5	[36.3-42.8]	32.6	[31.3-34.0]	-6.9***

Central	48.8	[46.3-51.3]	39.5	[38.5-40.4]	-9.3***
East	45.4	[42.4-48.5]	39.1	[37.9-40.3]	-6.4**
Northeast	36.5	[32.1-41.1]	32.6	[31.0-34.3]	-3.9**
West	46.0	[42.2-49.8]	32.8	[30.4-35.3]	-13.2***
South	34.2	[31.0-37.6]	28.8	[27.1-30.5]	-5.4
Total	**43.8**	**[42.4-45.2]**	**35.7**	**[35.1-36.4]**	**-8.1*** **

[a] NFHS-4 – NFHS-3.
[b] Minimum meal frequency for children is defined as 2 times for breastfed infants aged 6-8 months and 3 timesfor breastfed children aged 9-23 months.
[c] Child's minimum acceptable diet is defined as those children aged 6-23 months receiving minimum diet diversity (4 or more food groups) and minimum diet frequency.
[d] ANC in the first trimester, at least 4 antenatal visits, at least 1 tetanus toxoid (TT) injection, and iron-folic acidtablets or syrup is taken for 100 days or more.
[e-g] Significant at 10%, 5% aand 1% level respectively (χ^2 value)for 2005-06.
[h-j] Significant at 10%, 5% aand 1% level respectively (χ^2 value)for 2015-16.
*Significant at 10% level (*t* test).
**Significant at 5% level (*t* test).
***Significant at 1% level (*t* test).

Table 2.3: Results of bivariate logistic regression of stunting among youngest children aged 6 to 23months by selected background characteristics for NFHS 3 and NFHS 4, India.

Characteristics	NFHS 3 (2005-06) n=10,153 (Unweighted)		NFHS 4 (2015-16) n=55,896 (Unweighted)	
	OR	**95% CI**	**OR**	**95% CI**
Sex of child				
Male®				
Female	0.89***	[0.82-0.96]	0.80***	[0.77-0.83]
Age of child (in months)				
6-11®				
12-17	2.30***	[2.08-2.54]	2.06***	[1.97-2.15]
18-23	3.62***	[3.26-4.02]	3.00***	[2.87-3.14]
Birth order of child				
First®				
Second	1.10*	[0.99-1.23]	1.17***	[1.12-1.22]
Third	1.35***	[1.20-1.53]	1.43***	[1.36-1.50]
Fourth and above	1.74***	[1.56-1.94]	1.77***	[1.68-1.86]
Size of child				
Small®				
Average	0.70***	[0.64-0.78]	0.71***	[0.67-0.74]
Large	0.60***	[0.53-0.68]	0.62***	[0.58-0.66]
Place of delivery				

Non-Institutional®				
Institutional	0.51***	[0.47-0.55]	0.67***	[0.65-0.70]
Child's diet diversity				
Consumed less than 4 food groups®				
Consumed 4 or more food groups	0.80***	[0.71-0.89]	1.00	[0.95-1.04]
Child's meal frequency[a]				
Did not consume minimum numberof meals®				
Consumed minimum number of meals	0.91**	[0.84-0.98]	0.97	[0.94-1.01]
Child's minimum acceptable diet[b]				
Did not consume minimum acceptable diet®				
Consumed minimum acceptable diet	0.79***	[0.70-0.90]	1.00	[0.94-1.06]
Early initiation of breastfeeding				
Not initiated®				
Initiated within 1 hour	0.87***	[0.80-0.95]	0.93***	[0.89-0.96]
Mother's school attendance				
Not attended®				
Attended	0.49***	[0.45-0.53]	0.55***	[0.53-0.57]
Mother's media exposure				
Not exposed®				
Exposed	0.55***	[0.50-0.60]	0.57***	[0.55-0.59]
Mother's daily consumption of green leafy vegetables				
Not consumed®				
Consumed	0.87**	[0.80-0.94]	0.89***	[0.85-0.92]
Mother's daily consumption of protein-rich food				
Not consumed®				
Consumed	0.80***	[0.74-0.87]	0.88***	[0.88-0.95]
Mother's BMI				
Low®				
Normal	0.69***	[0.63-0.75]	0.72***	[0.69-0.74]
Overweight	0.36***	[0.30-0.43]	0.46***	[0.43-0.50]
Complete antenatal care[c]				
No®				
Yes	0.49***	[0.42-0.56]	0.68***	[0.64-0.71]
Religion				
Hindu®				

Others	0.83***	[0.76-0.90]	0.85***	[0.82-0.88]
Caste				
SC/ST®				
OBC	0.90**	[0.82-0.99]	0.94***	[0.90-0.98]
Others	0.58***	[0.53-0.65]	0.66***	[0.63-0.69]
Wealth Index				
Poorest®				
Poorer	0.79***	[0.70-0.89]	0.72***	[0.69-0.76]
Middle	0.59***	[0.52-0.67]	0.56***	[0.53-0.59]
Richer	0.42***	[0.37-0.48]	0.43***	[0.41-0.46]
Richest	0.25***	[0.22-0.29]	0.32***	[0.30-0.34]
Place of Residence				
Urban®				
Rural	1.51***	[1.38-1.64]	1.42***	[1.36-1.49]
Geographical regions				
North®				
Central	1.43***	[1.26-1.62]	1.39***	[1.32-1.47]
East	1.24***	[1.09-1.42]	1.49***	[1.42-1.58]
Northeast	0.77***	[0.67-0.88]	0.91***.	[0.85-0.97]
West	1.15*	[0.99-1.35]	1.13***	[1.04-1.22]
South	0.78***	[0.67-0.91]	0.94*	[0.87-1.01]

Abbreviations: OR,odds ratio; CI, confidence interval; ®, Reference category.

[a] Minimum meal frequency for children is defined as 2 times for breastfed infants aged 6-8 months and 3 times forbreastfed children aged 9-23 months.

[b] Child's minimum acceptable diet is defined as those children aged 6-23 months receiving minimum diet diversity (4 ormore food groups) and minimum diet frequency

[c] ANC in the first trimester, at least 4 antenatal visits, at least 1 tetanus toxoid (TT) injection, and iron-folic acid tablets orsyrup is taken for 100 days or more.

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.

Table 2.4: Determinants of stunting among children aged 6 to 23 months in NFHS-3 (2005-06) and NFHS-4(2015-16).

Characteristics	**Model 1: NFHS 3 n=10,153 (Unweighted)**		**Model 2: NFHS 4 n=55,896 (Unweighted)**	
	AOR	**95% CI**	**AOR**	**95% CI**
Sex of child				
Male®				
Female	0.84***	[0.77-0.92]	0.78***	[0.75-0.81]
Age of child (in months)				

6-11®				
12-17	2.40***	[2.17-2.67]	2.12***	[2.03-2.22]
18-23	4.03***	[3.60-4.51]	3.16***	[3.02-3.32]
Birth order of child				
First®				
Second	1.02	[0.91-1.15]	1.01***	[1.05-1.15]
Third	1.03	[0.90-1.18]	1.18***	[1.12-1.25]
Fourth and above	1.14**	[1.01-1.30]	1.28***	[1.21-1.36]
Size of child				
small®				
average	0.73***	[0.65-0.81]	0.73***	[0.69-0.77]
large	0.65***	[0.57-0.74]	0.67***	[0.62-0.71]
Place of delivery				
Non-Institutional®				
Institutional	0.80***	[0.72-0.89]	0.90***	[0.86-95]
Child's diet diversity				
Consumed less than 4 food groups®				
Consumed 4 or more food groups	0.76***	[0.62-0.93]	0.89***	[0.83-0.95]
Child's meal frequency[a]				
Did not consume minimum number of meals®				
Consumed minimum number of meals	0.92*	[0.83-1.01]	0.92***	[0.88-0.96]
Child's minimum acceptable diet[b]				
Did not consume minimum acceptable diet®				
Consumed minimum acceptable diet	1.11	[0.87-1.43]	1.12**	[1.02-1.23]
Early initiation of breastfeeding				
Not initiated®				
Initiated within 1 hour	1.06	[0.96-1.17]	0.99	[0.96-1.03]
Mother's school attendance				
Not attended®				
Attended	0.84***	[0.75-0.93]	0.82***	[0.78-0.86]
Mother's media exposure				
Not exposed®				
Exposed	0.95	[0.85-1.06]	0.91***	[0.87-0.96]
Mother's daily consumption of green leafy vegetables				
Not consumed®				
Consumed	0.99	[0.91-1.09]	1.00	[0.96-1.04]
Mother's daily consumption of protein-rich food				
Not consumed®				
Consumed	1.01	[0.92-1.11]	0.99	[0.95-1.03]
Mother's BMI				

Low®				
Normal	0.84***	[0.77-0.92]	0.82***	[0.78-0.85]
Overweight	0.75***	[0.61-0.92]	0.68***	[0.63-0.73]
Complete antenatal care[c]				
No®				
Yes	0.85*	[0.72-1.00]	0.94**	[0.89-0.99]
Religion				
Hindu®				
Others	1.00	[0.90-1.11]	1.00	[0.95-1.05]
Caste				
SC/ST®				
OBC	0.94	[0.84-1.04]	0.97	[0.93-1.01]
Others	0.74***	[0.67-0.83]	0.81***	[0.77-0.85]
Wealth Index				
Poorest®				
Poorer	0.93	[0.81-1.06]	0.87***	[0.82-0.92]
Middle	0.77***	[0.66-0.89]	0.73***	[0.68-0.77]
Richer	0.61***	[0.51-0.72]	0.59***	[0.55-0.64]
Richest	0.40***	[0.33-0.49]	0.48***	[0.44-0.52]
Place of Residence				
Urban®				
Rural	0.89**	[0.80-0.99]	0.96	[0.92-1.01]
Geographical regions				
North®				
Central	1.06	[0.92-1.22]	1.06**	[1.00-1.13]
East	0.92	[0.79-1.07]	1.01	[0.94-1.07]
Northeast	0.68***	[0.58-0.80]	0.76***	[0.71-0.82]
West	1.35***	[1.13-1.60]	1.13***	[1.04-1.23]
South	0.97	[0.81-1.15]	1.08*	[1.00-1.18]

Abbreviations: AOR, odds ratio; CI, confidence interval; ®, Reference category.

[a] Minimum meal frequency for children is defined as 2 times for breastfed infants aged 6-8 months and 3 times forbreastfed children aged 9-23 months.

[b] Child's minimum acceptable diet is defined as those children aged 6-23 months receiving minimum diet diversity (4 ormore food groups) and minimum diet frequency.

[c] ANC in the first trimester, at least 4 antenatal visits, at least 1 tetanus toxoid (TT) injection, and iron-folic acid tabletsor syrup is taken for 100 days or more.

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.

Table 2.5. Contribution of select background characteristics towards changes in prevalence of

early childhood stunting across India from 2005-16.			
	Difference due to characteristics (E)		
Characteristics	Coefficient	Percentage (%)[a]	p-value
Birth order of child	0.00520	6.45033	0.00000
Size of child	0.00633	7.85272	0.00000
Place of delivery	0.01533	19.02478	0.00000
Child's diet diversity[b]	-0.00188	-2.32991	0.00700
Child's meal frequency[c]	-0.00004	-0.05360	0.95900
Child's minimum acceptable diet[d]	0.00009	0.11664	0.41600
Mother's school attendance	0.01204	14.93563	0.00000
Mother's media exposure	0.00107	1.32558	0.00900
Mother's BMI	0.00840	10.42149	0.00000
Complete antenatal care[e]	0.00179	2.22034	0.01000
Caste	-0.00316	-3.91556	0.00000
Wealth Index	0.00074	0.92417	0.58000
Place of residence	-0.00097	-1.20050	0.02400
Geographical regions	0.00034	0.42250	0.51000
Constant			
Total	**0.04529**	**56.19485**	**0.00000**

[a] Precent out of the total gap between NFHS-3 and NFHS-4.

[b] Child's minimum diet diversity is defined as those children aged 6-23 months receiving 4 or more food groups.

[c] Minimum meal frequency for children is defined as 2 times for breastfed infants aged 6-8 months and 3 times forbreastfed children aged 9-23 months.

[d] Child's minimum acceptable diet is defined as those children aged 6-23 months receiving minimum diet diversity(4 or more food groups) and minimum diet frequency

[e] ANC in the first trimester, at least 4 antenatal visits, at least 1 tetanus toxoid (TT) injection, and iron-folic acidtablets or syrup is taken for 100 days or more.

Table 3.1. Concentration index depicting economic inequality with respect to early childhood malnutrition (weight-for-age <-2 S.D.) across states, India, 2005-16.

State	NFHS-3 (2005-06)		NFHS-4 (2015-16)	
	Concentration Index	StandardError	Concentration Index	StandardError
Andhra Pradesh	-0.141***	0.041	-0.188***	0.033
Arunachal Pradesh	-0.147***	0.051	-0.111***	0.032
Assam	-0.116***	0.041	-0.178***	0.015
Bihar	-0.126***	0.025	-0.087***	0.009
Chhattisgarh	-0.067*	0.029	-0.104***	0.020
Goa	-0.278***	0.063	-0.305***	0.095

Gujarat	-0.146***	0.027	-0.132***	0.021
Haryana	-0.142***	0.035	-0.104***	0.021
Himachal Pradesh	-0.139**	0.066	-0.123***	0.044
Jammu and Kashmir	-0.172***	0.045	-0.117***	0.025
Jharkhand	-0.090***	0.027	-0.100***	0.012
Karnataka	-0.127***	0.031	-0.089***	0.025
Kerala	-0.167***	0.055	-0.050	0.042
Madhya Pradesh	-0.064**	0.027	-0.109***	0.010
Maharashtra	-0.187***	0.025	-0.120***	0.026
Manipur	-0.198***	0.044	-0.134***	0.027
Meghalaya	0.012	0.055	-0.091***	0.023
Mizoram	-0.161***	0.048	-0.242***	0.041
Nagaland	-0.162***	0.039	-0.162***	0.036
Delhi	-0.133***	0.046	-0.264***	0.075
Odisha	-0.204***	0.029	-0.162***	0.017
Punjab	-0.248***	0.364	-0.157***	0.029
Rajasthan	-0.143***	0.034	-0.123***	0.013
Sikkim	-0.102	0.069	-0.110*	0.058
Tamil Nadu	-0.118**	0.050	-0.095***	0.024
Tripura	-0.152**	0.071	-0.253***	0.069
Uttar Pradesh	-0.095***	0.014	-0.122***	0.007
Uttarakhand	-0.267***	0.033	-0.078***	0.025
West Bengal	-0.169***	0.030	-0.121***	0.025
India	**-0.139*** **	**0.007**	**-0.140*** **	**0.004**

*Significant at 10% level.
**Significant at 5% level.
***Significant at 1% level.

Table 3.2. Predicted probability of being stunted from logistic regression analysis for different categories of wealth quintile, India, 2005-2016.

Wealth status and time	Predicted probability [a, b]	95% C.I.
2005- 2006		
Poorest	0.450	[0.427- 0.473]
Poorer	0.433	[0.412- 0.455]
Middle	0.393	[0.373- 0.414]
Richer	0.344	[0.325- 0.364]
Richest	0.265	[0.244- 0.286]
2015- 2016		
Poorest	0.416	[0.407- 0.425]

Poorer	0.384	[0.376- 0.393]
Middle	0.346	[0.337- 0.354]
Richer	0.304	[0.294- 0.314]
Richest	0.261	[0.250- 0.273]
Change 2005- 2016		
Poorest	-0.034	
Poorer	-0.049	
Middle	-0.047	
Richer	-0.04	
Richest	-0.004	

[a] Predicted probabilities adjusted for sex of child, age of child, birth order, size of child, place of delivery, diet diversity, meal frequency, minimum acceptable diet, early initiation of breastfeeding, mother's school attendance,mother's media exposure, mother's diet, mother's BMI, complete ANC, religion, caste, wealth index, place of residence, and geographical region.

[b] All the predicted probabilities were significantly different at $p < 0.01$.