

Cultural and Contextual Drivers of Triple Burden of Malnutrition among Children in India: Macro and Micro Perspectives

Background

Malnutrition studies in Indian children are majorly focused on undernutrition or sparsely on the dual burden of undernutrition and over-nutrition. This paper focuses on the recent evidence on the embodiment of the triple burden of malnutrition among under-five children encompassing undernutrition represented by stunting and underweight, overweight, and anemia evident of iron deficiency. The study's objective is to analyze the childhood malnutrition indicators using various cultural and contextual drivers and juxtaposing them against macro-level and micro-level perspectives emerging in Indian ecological and contextual domains.

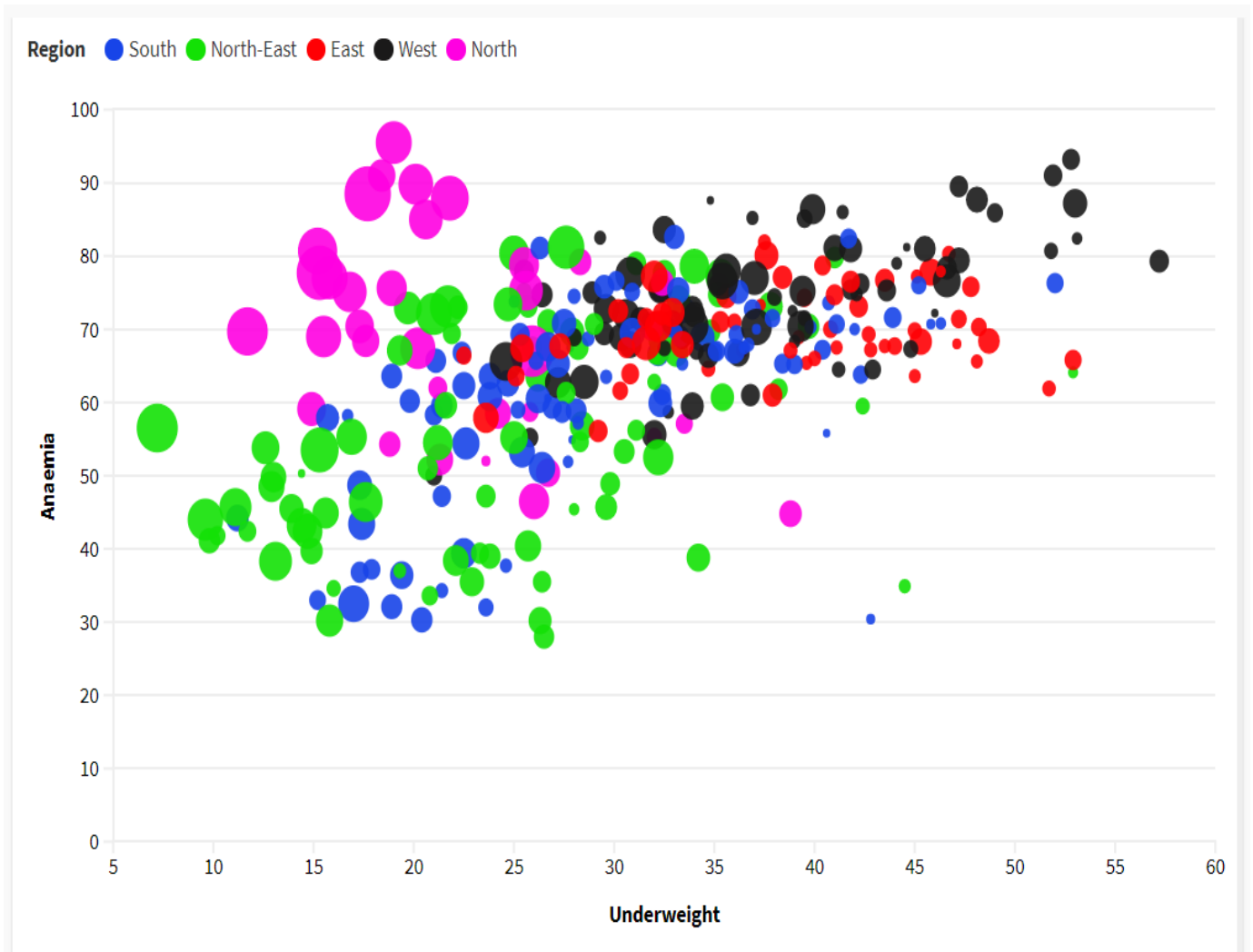
Data and Methods

Nationally representative data from the fourth and fifth rounds of India's National Family and Health Survey (NFHS)—consisting of a sample of 106,934 children under the age of six—is used in this analysis. NFHS is a district-level representative data containing information of women 15-49 years who were asked questions about their sociodemographic characteristics, reproduction histories, maternal and child health, breastfeeding, and nutrition. The four indicators of malnutrition among children under five as dependent variables, namely stunting (height-for-age), underweight (weight-for-age), overweight (weight-for-height), and anemia, are assessed using a quantile regression approach at the macro-level. In contrast, descriptive statistics are used to understand the frequency distributions at the micro-level.

Results and Discussion

The results depict—at the macro level—most districts have anemia prevalence above 40 percent; western and eastern districts have slid into a triple burden of malnutrition with a high prevalence of underweight, overweight, and anemia. Between 2015 and 2020, Bihar has shown significant improvement in stunting (48% to 43%) and underweight (44% to 41%), yet being the highest. Almost all states exhibit an increased prevalence of overweight and anemia compared to 2015-16 levels. The distribution of 342 districts by levels of underweight, overweight, and anemia presented in the Figure depicts the coexistence of more than two indicators in one region. Most districts exhibit a prevalence of 40 percent or above anemia. The Western (black) and Eastern (red) districts approaching more towards the top-right corner and a greater than average globule depict the coexistence of underweight, overweight, and anemia. More Northern districts (pink) are spread towards the top-left corner, evident of the very high prevalence of anemia, and the large globules confirm higher overweight prevalence. The North-eastern districts (green), positioned at bottom-left, are marked by higher overweight prevalence. Lastly, the Southern districts (blue) are spread sparsely across different areas, yet most exhibit a high majority of anemic children.

Figure. Presence of various forms of Malnutrition in 342 districts of India in 2020 where the size of the bubble's present prevalence of overweight among children under five years of age



Magnitude and intensity of the coefficients for different dimensions of the triple burden of malnutrition are utilized in the quintile regression to estimate the coefficients of those indicators at 25%, 50%, 75%, and 90% quantiles. There is a significant and positive association between illiterate women and underweight, overweight, and anemic children. Similarly, districts, where women had third or higher-order births in the five years preceding the survey are also positively associated with stunting and underweight among children across all the quantiles. Moreover, women whose BMI is below normal have statistically significant and positive associations across all quantiles for all malnutrition indicators. Districts with overweight or obese women negatively associate with all the malnutrition indicators; however, it is statistically significant only for stunting and underweight among children. Moving from the 80th percentile of districts having toilet

facility to 95th and above percentile of districts, the chances of stunting, underweight, and anemia reduces. Much of these beneficial effects were located at upper quantiles for stunting and underweight and at 50th and 75th quantiles for anemia among under-five children.

The burden of malnutrition at the micro-level has also been analyzed by background characteristics of children, their mothers, and family. The background characteristics included in the analysis can be divided into four main micro-level determinants, namely individual level, maternal, ecological, and program level predictors. Individual factors include the direct factors of each child. The prevalence of stunting and underweight is slightly higher among male children as compared to females however, every 3 in 10 female children are still underweight or stunted. Children of higher birth order have a higher prevalence of stunting, underweight, and anemia and a lower prevalence of overweight. Stunting among younger siblings (36%) was higher than stunting among firstborn children (32%), similarly with a gap of 10 percentage points, 38% children of fourth or higher birth order and 28% first-born children are underweight. Size at birth plays a vital role in determining the nutritional status of children. Prevalence of stunting (42%), underweight (40%), and even anemia (59%) among children born with a lower than average birth is higher than the children born above-average birth size; however, as expected, it is reverse when we consider the prevalence of overweight.

The maternal factors affecting a child's nutrition status include the education and nutrition of the mother. The prevalence of stunting is two times higher among children born to mothers with no education than mothers who have attained higher secondary or higher education. Similarly, the prevalence of anemia is 17 percentage points higher among children born to mothers with no education. Contrastingly, little more than 5 percent of children are overweight whose mothers have higher secondary and above education, while 3.6 percent of children born to mothers with no education become overweight. Predictably, undernourished mothers have children with higher stunting, underweight or anemia, and lower overweight.

The ecological factors like place of residence, caste, and religion also influence the nutritional status of children. With a minimum gap of 6 percentage points in the prevalence of underweight, stunting and anemia are also notably high among children residing in rural areas compared to the children in urban counterparts. Rural areas have 4 percent overweight children against 5 percent overweight children in urban areas. Children belonging to scheduled caste families have an alarmingly high prevalence of anemia (61%). They also top the charts of stunting and underweight. Whereas, overweight is highest among scheduled tribes (5.4%).

The bivariate analysis is also evidence of various programs and policies on children's nutritional status. There have been historical efforts to improve sanitation in India, especially rural India, where access to toilet facilities is a challenge. One of the recent most initiatives-Swachh Bharat Abhiyan, was launched in 2014. We found that the prevalence of underweight and stunting was lesser by ten percentage points among households having access to an improved toilet facility. The onset of Janani Suraksha Yojana is a centrally sponsored scheme aimed at reducing maternal and

child mortality in rural areas by bringing more women to visit antenatal care (ANC). A notable gap is visible in the prevalence of underweight among children whose mothers visited ANC four or more times (21%) compared to children whose mothers did not visit at all (34%). A similar divide is evident in the prevalence of stunting as well as anemia. However, it remains reverse for the prevalence of overweight among children

Conclusions

The burden of childhood malnutrition remarkably varies across various cultural and contextual factors with a wide range of drivers. The children belonging to mothers with higher secondary or above education, mothers with normal BMI, households with access to toilet facility showed a lower prevalence of multiple forms of malnutrition indicators. The coexistence of stunting, underweight, overweight, and anemia at the macro-level circumstantiate the triple burden of childhood malnutrition with tremendous spatial variation. A wide range of predictors heavily influences the nutritional status of children and hence demands multilevel interventions to address this heterogeneous set of coexisting drivers.