Understanding the Socio-Economic Vulnerability in Child Malnutrition Between Migrants and Non-Migrants Children (12–59 Months) in India: Evidence from a Cross-Sectional Study

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Abstract
India has witnessed increasing trends in internal migration over the last three decades. In India, migrant children are not a homogeneous group and their reasons for movement and vulnerabilities vary across socio-economic stratum. For some children, migration may open possibilities and is associated with expanding social and economic spheres, but for many others, it may bring serious risks. Therefore, the study has been carried out to understand socio-economic vulnerability in child nutrition with migration status and other contributing factors in India. This study used data from the National Family Health Survey, the fourth in the NFHS series which was conducted in 2015–2016 (NFHS-4). We were interested in looking at the children age 12–59 months for their nutritional indicators such as stunting and underweight across migrants and non-migrants children. This resulted in a sample of 199,448 children in selected age group and among them 33.1% children belongs to the migrant family as compared to 67% of non-migrant children. Overall, 44.2% of children were stunted and 39.5% were underweight among non-migrant children as compared to 37.4% & 32.8% of migrant children were stunted and underweight respectively. Further, the results showed that among the social groups, scheduled caste children were found a high variation in underweight (34% vs. 41.6%) and stunting (36% vs. 46%) between migrants and non-migrants children. Similar trend of malnourishment is found in the poor wealth quintile, for rural residents and low educated women with non-migrant status. Those children who were poor but non-migrant were more likely to be malnourished as underweight \[aOR; 1.15, CI: 1.11–1.18\] and stunted \[aOR; 1.17, CI:1.13–1.20\] as compared to migrant status children in the same category of the household. Similarly in reference to scheduled caste migrant group, the scheduled caste non-migrant were more likely to be underweight \[aOR; 1.15, CI: 1.09–1.20\] and stunted \[aOR; 1.18, CI: 1.12–1.23\] than the children with migrant status. There were huge differences between migrant and non-migrant children in nutritional statuses. Education, caste and wealth index are found to be an
important variables to explain the differential between migrants and non-migrants in child’s nutritional aspects. Children associated with poor socio-economic vulnerability and non-migrant category need to be taken care of more and a community targeted approach is required to understand the gaps. The programs such as ICDS, and Poshan Abhiyan need to be revamped adding the migration aspect of the families and children in terms of their health and nutritional aspects.

**Keywords**  
Migration · Child malnourishment · Socio-economic Vulnerability · Caste · India

**Abbreviations**

- NFHS: National Family Health Survey
- ICDS: Integrated Child Development Scheme
- NHM: National Health Mission
- PMMVY: Pradhan Mantri Matru Vandana Yojana
- ANC: Ante-natal care
- aOR: Adjusted Odds Ratio
- UNICEF: United Nations International Children’s Emergency Fund
- WHO: World Health Organization

**1 Introduction**

India has witnessed increasing trends in internal migration over the last three decades. The absolute number of internal migrants increased from 232.11 million in Census 1991, 314.54 million in 2001 to 455.78 million in 2011 (UNICEF, 2020). The total population of migrant children also increased from 44.35 to 92.95 million between Censuses 1991 to 2011. In 2011, one in every five internal migrants was a child (UNICEF, 2020). In India, migrant children are not a homogeneous group and their reasons for movement and vulnerabilities vary. For some children, migration may open possibilities and is associated with expanding social and economic spheres, but for many others, it may bring serious risks. Socio-economic vulnerability is much more severely impacted the child health than the migration status of the children (IIPS and ICF, 2017; Narayan & Singh, 2014; Rao et al., 2021; Mishra et al., 2021; Mishra et al., 2020; Roshania et al., n.d.). Therefore understanding the vast heterogeneity that exists amongst migrant and non-migrant households and their influence on children’s health and nutritional status in the community is of great importance. Young migrant children (0–5 years) are less likely to be stunted, underweight and less likely to suffer from diarrhea compared to non-migrant children in India (IIPS & ICF, 2017; Khan & Mohanty, 2018).

Migration plays a very crucial role in defining the health and nutrition status of the population and its very complex and dynamic phenomena (Mishra, 2016; Tang et al., 2016; UNICEF, 2020; Wild & Dawson, 2018). Migration can lead to influence
the migrants themselves’ health and well-being and, on those who left behind at origin (Rao et al., 2021; Adhikari et al., 2011; Verma & Dash, 2020). It’s a two-way relationship. Further, migrants with children may leave their children behind in several aspects such as health, nutrition, education and so on, while pursuing economic opportunities (Narayan & Singh, 2014; Cebotari et al., 2018; Matthew et al., 2002; Crocker-Buque et al., 2017; Bhatia et al., 2019; Hill, 2021; Smith-greenaway & Madhavan, 2015). Previous studies found that migrants families face several challenges in availing appropriate, efficient, comprehensive, and continuum of quality care services especially to younger children (Rao et al., 2021; Verma & Dash, 2020; Crocker-Buque et al., 2017; WHA, 2019; Antai, n.d.). However, very little consensus lies on those families who are not migrated and living in poor socio-economic conditions (Narayan & Singh, 2014; Mishra et al., 2020; Commission, n.d.; Ravindranath et al., 2019; Mishra & Syamala, 2020; Mishra & Chaurasia, 2021). No such study has tried to compare these two different phenomena with child health and nutritional aspects in India.

Migration is a disruptive process that interferes with women’s socio-economic well-being and social networks and ultimately led to affect their health-seeking behaviors in the community. In the previous studies, there have been found that migration has a negative impact on seeking child health and nutritional support. However, there is other research that found that socio-economic vulnerability plays a major role rather than migration in seeking child health care services (Mishra et al., 2020). Further, prior research has not been reached a consensus on the impacts of migration on a child’s nutritional health status, and moreover, very little is known about how socioeconomic vulnerability plays a significant role in the status of migrants and non-migrants. For example, the percentage of children aged 12–23 months who have received all basic vaccinations increased from 44 per cent in 2005–06 to 62 per cent in 2015–16 along with it, coverage of child immunization has also elevated. Though there are huge differences found in child vaccinations across different social gradients and regions (Mishra et al., 2020; Lei et al., 2020). The progress is largely attributed to the Integrated Child Development Services (ICDS) Scheme, one of the world’s largest programmes that provide an integrated package of services for the holistic development of children, and Mission Indradhanush, a focused initiative for universalizing immunization (IIPS & ICF, 2017; Pakhare et al., 2014; Saxena, 2006; Meshram et al., 2014). Undernutrition continues to play a major role in morbidity and pre-mature mortality among children of developing countries.

Therefore, this study is aimed to understand whether migration has any influence on those who are in socio-economically vulnerable groups. There is a dearth of knowledge found in the literature regarding migrant status and its impact on child nutritional statuses in India. Therefore, we examine the effects of migration on the health and nutritional status of children across different socio-economic groups. Hence, the objective of this study is to look at the children’s nutritional status (12–59 months) i.e., wasted, underweight and stunting, among migrants children in different socio-economic groups in comparison to non-migrants children in India.
2 Methods and Materials

This study used data from the National Family Health Survey, the fourth in the NFHS series which was conducted in 2015–2016 (NFHS-4). NFHS-4 is a cross-sectional household survey, which adopted a two-stage sample design in rural areas and a three-stage sample design in most urban areas. The Primary Sampling Unit (PSUs) were villages in rural areas and Census Enumeration Blocks (CEBs) in urban areas. In urban areas, wards were selected within each selected CEBs. A list of households was prepared for all selected villages and wards based on which the women were selected using systematic random sampling (IIPS & ICF, 2017). An in-depth explanation of survey methodology, objectives, and manuals are available on their website. The survey covers a nationally representative sample of about 6,99,686 women in the age group 15–49 years and resulted in 259,627 children aged under 5 years. We were interested in looking at the children age 12–59 months for their nutritional indicators across migrants and non-migrants. This resulted in a sample of 199,448 children aged 12–59 months.

2.1 Outcome Variable

There is only one question regarding migration that was asked in the survey “How long have you been living continuously in (name of the current place of residence)”. Unfortunately, the information regarding the previous place of the residence was not asked in this survey. The stream of migration (urban–rural, rural-rural, etc.) cannot be studied due to the unavailability of data and limitations. The respondents who reported residing less than 4 years in their current place of residence were categorized as migrants. Visitors who were visiting the place (not an actual residents) were excluded from the analysis. The information on child health and nutritional aspects was collected (aged 0–59 months). However, the study used the children’s age group of 12–59 months in the analysis. The information is collected on children’s nutritional health indicators related to stunting (low height for age), and underweight (low weight for age) (WHO, 2008).

Weight-for-age is a composite index of height-for-age and weight-for-height. It takes into account both acute and chronic undernutrition. Children whose weight-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are classified as underweight. Height-for-age is a measure of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted), or chronically undernourished. (WHO, 2008; WHO, 2006).

2.2 Predictor Variables

We used variables related to mother’s socioeconomic, demographic, and geographic characteristics such as mother age, birth order of the child, mother’s education,
wealth quintile (household characteristics of mother), caste (social groups), religion, and place of residence. Further, we have investigated whether gender differences are evident for the nutritional development indicators across migrant and non-migrant children. We explored literature to find out the predictor variables that influence to child nutritional indicators across migrant status (Narayan & Singh, 2014; Mishra et al., 2020; Antai, n.d.; Ali et al., 2018; Arat et al., 2018; Awoh & Plugge, 2016; Abubakar et al., 2018; Geddam et al., 2017; Fellmeth et al., 2018).

2.3 Statistical Analysis

Descriptive and bivariate analysis were carried out to calculate the prevalence of malnutrition among migrant and non-migrant children across different socio-economic groups. The VIF factor was estimated to check multicollinearity and no evidence of multicollinearity was found. Further, logistic regression was done to compare migrants and non-migrants by the selected background characteristics. Adjusted odds ratios are reported (AOR) with a 95% confidence interval (CI). We have also used the decomposition method to see the contributing factors in influencing the child malnutrition between migrants and non-migrants.

3 Results

The sample characteristics of the study population presents (Table 1) the distribution of migrant and non-migrant children aged 12–59 months across different background characteristics in India in 2015–16. Overall 33.1% of children belonged to the migrant family as compared to 67% of non-migrant children in India. It has been found that when mother’s age is fewer than 24 years, 56.6% of children are migrants compared to 23.6% non-migrant. Higher migrant children were seen among mothers with higher educational status. Almost 80% of children in the first order of birth found migrant among women. Among the social groups, 21.4% of children migrants belonged to scheduled caste compared to 22.9% non-migrants and 9.7% children migrants that belonged to the scheduled tribe as compared to 11.6% non-migrants. Socio-economic vulnerability played a very significant role in migration status of children in India. Children who belonged to the poor wealth quintiles were less migrated than their counterparts. According to a place of residence, 37 percent children are migrants and 23.6 percent children are non-migrant in urban areas.

Figure 1 shows that the prevalence of different types of child nutritional indicators between migrant and non-migrant aged 12–59 months. Overall 44.19% of children are stunted among non-migrant children compared to 37.4% of migrant children. Similarly in the underweight children, 39.5% of children were underweight among non-migrant children than the migrant children (32.8%). There was no much difference found in the wasted children between migrants and non-migrants children in India. It is clearly showed that compare to migrant children non-migrant children are more vulnerable in terms of child health and nutritional outcomes in India.
Table 1 Percentage distribution of the sample characteristics of children aged 12–59 months India, 2015–16

| Variables                     | Migrant (N = 78,407) | Non-migrant (N = 172,733) |
|-------------------------------|----------------------|---------------------------|
| Mother’s age                  |                      |                           |
| less 24                       | 56.6                 | 23.6                      |
| 25–29                         | 31.6                 | 42.7                      |
| 30–34                         | 9.1                  | 22.0                      |
| 35 & above                    | 2.7                  | 11.7                      |
| Mother Education              |                      |                           |
| education                     | 17.7                 | 36.9                      |
| primary                       | 12.0                 | 15.0                      |
| secondary                     | 54.4                 | 40.7                      |
| higher                        | 15.9                 | 7.5                       |
| Birth Order                   |                      |                           |
| First order                   | 79.6                 | 71.0                      |
| Second order                  | 19.1                 | 25.4                      |
| 3 & more                      | 1.4                  | 3.7                       |
| Religion                      |                      |                           |
| Hindu                         | 77.9                 | 78.9                      |
| Muslim                        | 16.3                 | 16.8                      |
| Others                        | 5.8                  | 4.3                       |
| Social Groups                 |                      |                           |
| schedule caste                | 21.4                 | 22.9                      |
| schedule tribe                | 9.7                  | 11.6                      |
| Other Backward Classes        | 45.0                 | 46.1                      |
| Other                         | 22.9                 | 18.7                      |
| don’t know                    | 1.1                  | 0.8                       |
| Wealth Quintile               |                      |                           |
| poorest                       | 16.5                 | 30.2                      |
| poorer                        | 19.3                 | 23.2                      |
| middle                        | 21.4                 | 18.9                      |
| richer                        | 23.2                 | 15.5                      |
| richest                       | 19.7                 | 12.2                      |
| Sex of child                  |                      |                           |
| male                          | 51.9                 | 52.4                      |
| female                        | 48.1                 | 47.6                      |
| India Region                  |                      |                           |
| north                         | 13.5                 | 12.9                      |
| central                       | 23.0                 | 28.7                      |
| east                          | 23.8                 | 30.8                      |
| west                          | 14.6                 | 11.5                      |
| south                         | 24.0                 | 15.0                      |
| northeast                     | 1.1                  | 1.1                       |
| Place of Residence            |                      |                           |
| urban                         | 37.2                 | 23.6                      |
| rural                         | 62.8                 | 76.4                      |
| Total                         | 33.0                 | 67.0                      |

Source: NFHS-4, 2015–16
Table 2 shows the prevalence of child nutritional indicators between migrants and non-migrants children across different background characteristics in India, 2015–16. The results showed that among the social groups, scheduled caste children were found a high variation in underweight (34% vs. 41.6%) and stunting (36% vs. 46%) between migrants and non-migrants children. Among scheduled tribes, the difference between migrants and non-migrants in child nutritional statuses was found as underweight (42% vs. 46.5%) and stunting (38.9% vs. 46.4%). A similar pattern can be seen among other backward classes and other social groups. In the religious group, children belonged to the Hindu community the difference found between migrant and non-migrant in underweight (31.4% vs. 38.8%), stunting (32.6% vs. 41.6%) are tremendous whereas in the Muslim community the difference between migrant and non-migrant children in nutritional statuses were for underweight (31% vs. 36.9%) and stunting (35% vs. 42.2%) respectively. Similarly in the poor group of women, the higher malnutrition among children was concentrated among non-migrant than migrant children. Among the mother education, increasing the mother education has decreased the child malnutrition difference between migrant and non-migrant. Further, the place of residence also plays a significant role in child nutritional statuses. Compare to urban, the rural children found a higher difference between migrant and non-migrant in nutritional indicators for instance, underweight (33.2% vs. 40.5%), and stunted (35% vs. 44%). In the context of India’s region, the central region has higher malnutrition compared to other regions, however, the difference between migrant and non-migrant is higher among the central region only followed by the eastern region, and north region.
| Variables | Migrants/non-migrants | Underweight | Stunted | Variables | Migrants/non-migrants | Underweight | Stunted |
|-----------|-----------------------|-------------|---------|-----------|-----------------------|-------------|---------|
| **Social group** | | | | | | | |
| Scheduled Caste | | | | | | | |
| Migrant | 34.0 | 36.1 | | Migrant | 44.1 | 46.6 | |
| Non-migrant | 41.6 | 46.0 | | Non-migrant | 47.5 | 51.8 | |
| Scheduled Tribe | | | | | | | |
| Migrant | 42.0 | 38.9 | | Migrant | 36.9 | 39.1 | |
| Non-migrant | 46.5 | 46.4 | | Non-migrant | 41.2 | 45.2 | |
| Other Backward Classes | | | | | | | |
| Migrant | 30.5 | 32.9 | | Migrant | 29.3 | 30.6 | |
| Non-migrant | 38.2 | 41.7 | | Non-migrant | 32.3 | 34.4 | |
| **Religion status** | | | | | | | |
| Hindu | | | | | | | |
| Migrant | 31.4 | 32.6 | | Migrant | 28.8 | 27.4 | |
| Non-migrant | 38.8 | 41.6 | | Non-migrant | 32.9 | 30.7 | |
| Muslim | | | | | | | |
| Migrant | 31.2 | 35.1 | | Migrant | 33.2 | 35.0 | |
| Non-migrant | 36.9 | 42.2 | | Non-migrant | 40.5 | 44.0 | |
| Other | | | | | | | |
| Migrant | 26.9 | 28.3 | | Migrant | 41.0 | 42.9 | |
| Non-migrant | 31.3 | 34.3 | | Non-migrant | 46.4 | 51.0 | |
| **Wealth quintile** | | | | | | | |
| Poor | | | | | | | |
| Migrant | 41.0 | 42.4 | | Migrant | 28.0 | 29.6 | |
| Non-migrant | 46.2 | 49.7 | | Non-migrant | 33.0 | 35.5 | |
| Non-poor | | | | | | | |
| Migrant | 25.6 | 27.4 | | Migrant | 32.5 | 34.3 | |
| Non-migrant | 29.0 | 31.9 | | Non-migrant | 38.0 | 41.4 | |
**Table 2 (continued)**

| Variables                  | Migrants/non-migrants | Underweight | Stunted | Variables                  | Migrants/non-migrants | Underweight | Stunted |
|----------------------------|-----------------------|-------------|---------|----------------------------|-----------------------|-------------|---------|
| **Child Birth order**      |                       |             |         | **Female child**            |                       |             |         |
| 1st Birth Order            |                       |             |         | Migrant                    |                       |             |         |
| Migrant                    | 30.1                  | 30.9        |         | Non-migrant                |                       |             |         |
| Non-migrant                | 36.6                  | 39.2        |         |                            |                       |             |         |
| 2nd Birth Order            |                       |             |         | **India’s region**         |                       |             |         |
| Migrant                    | 34.7                  | 40.6        |         | Migrant                    |                       |             |         |
| Non-migrant                | 42.2                  | 47.6        |         | Non-migrant                |                       |             |         |
| 3 & more Birth Order       |                       |             |         | **Central region**         |                       |             |         |
| Migrant                    | 39.8                  | 40.6        |         | Migrant                    |                       |             |         |
| Non-migrant                | 41.2                  | 44.8        |         | Non-migrant                |                       |             |         |
| **Mother’s age**           |                       |             |         |                            |                       |             |         |
| <= 24 years                |                       |             |         | **East region**            |                       |             |         |
| Migrant                    | 32.9                  | 33.9        |         | Migrant                    | 33.0                  | 34.8        |         |
| Non-migrant                | 38.3                  | 41.3        |         | Non-migrant                | 41.3                  | 44.2        |         |
| 25–29 years                |                       |             |         | **West region**            |                       |             |         |
| Migrant                    | 28.7                  | 31.2        |         | Migrant                    | 34.2                  | 32.4        |         |
| Non-migrant                | 37.7                  | 40.7        |         | Non-migrant                | 39.1                  | 37.6        |         |
| 30–34 years                |                       |             |         | **South region**           |                       |             |         |
| Migrant                    | 27.1                  | 28.9        |         | Migrant                    | 25.5                  | 27.1        |         |
| Non-migrant                | 37.7                  | 41.0        |         | Non-migrant                | 29.8                  | 31.4        |         |
| >= 35 years                |                       |             |         | **Northeast region**       |                       |             |         |
| Migrant                    | 34.5                  | 37.7        |         | Migrant                    | 17.7                  | 26.8        |         |
| Non-migrant                | 40.7                  | 45.1        |         | Non-migrant                | 22.7                  | 34.6        |         |

Chi-square test for the categorical variable is done at $<0.05$ (level of Significance)
| Background variables | Underweight (AOR) | Stunted (AOR) |
|----------------------|-------------------|---------------|
| Place of residence   |                   |               |
| Urban residence      |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.16 (1.10–1.20)  | 1.14 (1.09–1.18) |
| Rural residence      |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.23 (1.19–1.25)  | 1.24 (1.20–1.26) |
| Religion             |                   |               |
| Hindu                |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.14 (1.10–1.16)  | 1.17 (1.13–1.19) |
| Muslims              |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.12 (1.05–1.18)  | 1.10 (1.19–1.27) |
| Others               |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.22 (1.13–1.29)  | 1.21 (1.13–1.27) |
| Mother education     |                   |               |
| Educated mother      |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 0.83 (0.78–0.89)  | 0.78 (0.74–0.83) |
| Not educated         |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.14 (1.08–1.85)  | 1.17 (1.11–1.21) |
| Poor                 |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrants         | 1.13 (1.09–1.16)  | 1.15 (1.11–1.18) |
| Non-poor             |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrants         | 1.15 (1.11–1.18)  | 1.17 (1.13–1.20) |
| Social Group         |                   |               |
| Scheduled Caste      |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.15 (1.09–1.20)  | 1.18 (1.12–1.23) |
| Scheduled Tribe      |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.16 (1.09–1.21)  | 1.16 (1.10–1.21) |
| Others               |                   |               |
| Migrant              | 1.0               | 1.0           |
| Non-migrant          | 1.14 (1.10–1.16)  | 1.15 (1.12–1.19) |

*AOR*, Adjusted odds ratio, **if p-value is less than <0.05(level of Significance) CI, confidence interval
Table 3 shows the probability of child malnutrition such as underweight and stunting by the migrant status with different predictor variables. As bivariate analysis clearly showed that migrant children were more likely to be not malnourished as compared to non-migrant children in India. Compare to urban areas with the migrant status of children, the rural non-migrant children were more likely to be malnourished. In reference to urban migrant children, the non-migrant children were [aOR; 1.16, CI: 1.10–1.20] more likely to be underweight, and [aOR; 1.14, CI: 1.09–1.18] more likely to be stunted. Whereas in the case of rural migrant children, the non-migrant rural children were [aOR; 1.23, CI: 1.19–1.25] more likely to be underweight, [aOR; 1.24, CI: 1.20–1.26] more likely to be stunted. In the religion category, compared to others, the Hindu and Muslim children with non-migrant status were less likely to be malnourished in different nutritional indicators. However, the odds of being malnourished among other religions with non-migrant status which were shown as [aOR; 1.22, CI: 1.13–1.29] more likely to be underweight, and [aOR; 1.21, CI: 1.13–1.27] more likely to be stunted. In reference to mother education, the educated non-migrant mother’s children were less likely to be malnourished as compared to non-educated non-migrant mother’s children. It is shown in the non-educated non-migrant mother’s children as compared to migrant mothers’ children as more likely to be malnourished in underweight [aOR; 1.14, CI: 1.08–1.85], and [aOR; 1.17, CI: 1.11–1.21] stunted.

There were huge differences between migrant and non-migrant children in nutritional statuses. Those who were poor but non-migrant children were more likely to be malnourished as compared to migrant children in the same category of the household. Compare to the poor, the non-poor children with non-migrant status were more likely to be malnourished as [aOR; 1.15, CI: 1.11–1.18] more likely to be underweight and [aOR; 1.17, CI: 1.13–1.20] more likely to be stunted. Similarly in the reference of SCs migrant group, the SCs non-migrant were more likely to be undernourished [aOR; 1.15, CI: 1.09–1.20] more likely to be underweight and [aOR; 1.18, CI: 1.12–1.23] more likely to be stunted. Similar patterns were also seen in the STs and other groups. Comparatively other groups with non-migrant status children, SCs/STs children with non-migrant status were more likely to be malnourished in India.

Table 4 represents the decomposition analysis of the nutritional health status of children that is estimated for the contribution of various explanatory variables between migrants and non-migrants in India. For underweight children, due to endowment variables, the factors influence to become underweight among children with a migrant status that is explained by nearly 46%. The remaining unexplained 52% indicates that there is a difference between migrant and non-migrant children’s status in underweight. Within the explained variables, the highest contributing effect is seen by wealth (43%) followed by education (39%), mass media (14.7%), and childbirth order (7.5%). Further, the decomposition analysis estimated for the child stunting shows the contribution effect of each endowment factor as 34% by wealth and 33.7% by education. Mass media has also contributed to both child stunting and being underweight. However, the difference between migrant and non-migrant children in child stunting was explained by 48.4% and the unexplained was 51.6% respectively. The positive signs indicate the gap between the migrant and
4 Discussion

Migration status can influence the health and nutrition of children. Our study has exhibited that stunting and underweight were significantly high among children of non-migrant women compared with migrant women. Migration has been observed to exert a positive impact on the health of young-aged children. It might be the result of conscious care given by mothers in the absence of extended family support as well as improved access to health care services due to migration. Contrary to that non-migrant children are suffering through the nutritional issues probably due to inaccessible healthcare services compared to migrant children. The regression analysis suggests that migrant children of educated mothers have lower odds of underweight, but the opposite is true when looking at uneducated mothers. Migration has turned out as a positive coping strategy for children of poor households to fight the undernutrition. Because poor migrant children are found less likely to be stunted.

Table 4 Results of decomposition analysis in nutritional health status indicators of migrants and non-migrants children aged 12–59 months, India, 2015–16

| Predictor variables | Underweight children | | | | | | Stunted children | | | |
|---------------------|----------------------|----------|----------|-------|--------|----------------|----------|----------|--------|--------|----------|----------|
|                     | Contribution %       | p-value  | Contribution % | p-value |       |                |          |          |        |        |          |          |
| Migrants            | 29.0                 | 0.000    | 32.5                  | 0.000   |       |                |          |          |        |        |          |          |
| non-migrants        | 35.7                 | 0.000    | 40.6                  | 0.000   |       |                |          |          |        |        |          |          |
| difference          | -6.7                 | 0.000    | -8.1                  | 0.000   |       |                |          |          |        |        |          |          |
| explained           | -3.1                 | 45.8     | -3.9                  | 48.4    | 0.000 |                |          |          |        |        |          |          |
| unexplained         | -3.6                 | 54.2     | -4.2                  | 51.6    | 0.000 |                |          |          |        |        |          |          |
| Explained variables |                      |          |                      |         |       |                |          |          |        |        |          |          |
| Mother education    | -1.20                | 39.1     | -1.32                 | 33.7    | 0.000 |                |          |          |        |        |          |          |
| Child Birth Order   | -0.23                | 7.5      | -0.56                 | 14.4    | 0.000 |                |          |          |        |        |          |          |
| Sex of child        | -0.01                | 0.2      | 0.134                 | 0.2     | 0.129 |                |          |          |        |        |          |          |
| Mother age          | 0.15                 | -4.9     | -0.03                 | 0.7     | 0.718 |                |          |          |        |        |          |          |
| Wealth quintile     | -1.33                | 43.2     | -1.34                 | 34.2    | 0.000 |                |          |          |        |        |          |          |
| Social groups       | -0.06                | 1.9      | -0.08                 | 1.9     | 0.000 |                |          |          |        |        |          |          |
| Place of residence  | 0.19                 | -6.2     | 0.01                  | -0.3    | 0.698 |                |          |          |        |        |          |          |
| Religion            | -0.03                | 0.9      | -0.01                 | 0.2     | 0.051 |                |          |          |        |        |          |          |
| India Region        | -0.15                | 4.8      | -0.08                 | 2.0     | 0.000 |                |          |          |        |        |          |          |
| Mass media          | -0.45                | 14.7     | -0.56                 | 14.2    | 0.000 |                |          |          |        |        |          |          |
| Mother’s BMI        | 0.02                 | -0.5     | 0.515                 | 0.01    | 0.515 |                |          |          |        |        |          |          |
| Child Full-immunization | 0.02            | -0.6     | 0.04                  | -1.0    | 0.000 |                |          |          |        |        |          |          |

* AOR, Adjusted odds ratio, ** if p-value is less than <0.05(level of Significance) CI, Confidence interval

non-migrant children in malnourishment is widened and concentrated among the non-migrant children more as compared to migrant children.
or underweight as compared to non-migrant children. Socio-economic vulnerability with non-migrant children was more prone that influenced a high chance to become malnourished among children as compared to migrant status even with poor socio-economic status. The results of present study are contributing to the most recent debates in literature on migration.

Migration is a prominent tool widely used as a livelihood strategy by people around the world. The assessment of mobility over the years has explored the different dimensions of migration beyond push–pull factors, income poverty, employment, and as the parameter of economic development such as how migration impacts the morbidity and transition in nutritional status of migrants (Sen 1981, 1990; Mukherji, 2001, 2006; Stephenson et al., 2003).

The approach of the present study; to explore the effects of migration status of children on their nutritional condition is a less-discussed approach in academia. The traditional approaches have well established the fact that the low levels of education, poor income and marginalized castes of people are among the predominant factors of under-nutrition (Bank et al., 2020; Panda et al., 2020; Chellan et al., 2007). Our study found that children of SC community are still in worse off condition in stunting and underweight even after migration when compare with non-migrant upper caste children for same nutritional challenges. It proves that people belong to marginalized communities have failed to overcome the adverse impact of caste on their child’s nutritional status even after migration, probably it is because the same people are also carrying their marginalized social identities while migrating. The findings also highlighted the importance of education. It is indicating the inverse relationship between mother’s education level and nutritional deficiencies in children reflected through stunting and underweight for both migrant and non-migrants. The educated mothers usually are aware of children’s health issues, required nutritious food and immunization practices that will save the children from malnutrition. The southern region consist of states like Kerala, Karnataka, Tamil Nadu, Andhra Pradesh and Telangana has the healthy children compare to other parts of India all because of higher literacy rates and good health infrastructure. The North East region is also as good as south region and have lesser number of malnourished children (Mukhopadhyay & Chakraborty, 2020; Mohanty, 2011).

The study further reveals that the non-migrated children have higher probability to be malnourished compare to non-migrant urban children. The situation can be explained as the urban children usually have a better access to household amenities, sanitation practices and immediate healthcare compare to rural children. Narayan and Singh (Narayan & Singh, 2014) have highlighted the negative externalities of poor sanitation practices on nutritional status of children. The poor if not migrating have higher probability that their children will be malnourished. The migration has been usually observed to bring a positive impact in migrant’s economic condition. With money people can afford the nutritious food, healthcare, housing amenities, education etc. therefore the economically well off parents can possibly avoid the malnutrition in their children.

Migration also have both the positive and negative externalities reflecting on child health. If migration is a result of ubiquitous and sustainable development it will provide the decent living and improved health for children, but on the other
hand the forced migrations due to war, evictions and natural calamities induced migration can further deteriorate the health and wellbeing of children. The best fitted example here is livelihood crisis forced due to COVID 19, it is a health emergency. Dreaze and Somanchi (Drèze et al., 2021) found in review of different surveys analyzing the situation during first wave of pandemic in India; that during the COVID pandemic both the quality and quantity of food intake is dipped drastically and obviously it has negative impact on nutritional status of people. The children and women are among the severely affected. They further opined that governments have failed to handle the crisis. The relief provided was patchy and its effective reach was uncertain, but still government is expecting the V-shaped recovery through ongoing livelihood crisis in lack of strong policy measures.

In present times, while India is slipping on hunger index year by year, more focused interventions are needed in woman and child development programmes. But as Sharma (2021) indicated the central government have allocated insufficient funds for crucial schemes such as Integrated Child Development Services (ICDS) and Pradhan Mantri Matru Vandana Yojana (PMMVY). The policies and programs should be focused on health and nutrition in the disadvantaged regions and fringe areas and migration centers. The poor nutritional status among the different socio-economic groups demand the greater attention. Economic development must also improve health infrastructure and positioning skilled health personnel in the slums and other disadvantaged regions (Mishra & Syamala, 2020; Awoh & Plugge, 2016; Agarwal et al., 2020). Better understanding of the different migrant areas and requirement of ensuring their wellbeing should also be part of the development strategies.

Factors such as agricultural, environmental, climate changes might influence the pattern and progress of migration and can strongly influence the health of children (Bhatia et al., 2019; Abubakar et al., 2018; Geddam et al., 2017). On the other hand, ubiquitous and sustainable development might influence migration to positively improve economic condition and health of children (Rao et al., 2021; Kanjilal et al., 2010). In current pandemic of corona virus, the migrants in lower economic groups have faced livelihood hardships and their children may become nutritionally deprived. The policies and programs should focused on health nutrition in the disadvantaged regions and fringe areas and migration centers. The poor nutritional status among the different socio-economically groups demands the greater attention. Economic development must also improve health infrastructure and positioning skilled health personnel in the slums and other disadvantaged regions. Better understanding of the different migrant areas and requirement of ensuring their well-being should also be part of the development strategies.

The analysis is based on cross-sectional survey and direction of relationships cannot be established. We would have also like to see the nutritional status by different streams of migration (rural to urban, rural to rural etc.) which was not collected in the survey. More community level studies are needed to identify the processes underlying the results shown in our study. However, the results are based on very large scale household survey, leading to high reliability/validity of the results.
5 Conclusion

The results suggest that non-migrant’s children with poor socio-economic status have significantly higher level of stunting and underweight compared to the children of migrant in the same socio-economic category. However, overall, socio-economic vulnerability made significant impact on nutritional status of the children, further migration aspect has contributed significantly in the same. Education, caste and wealth index is found to be an important variable to explain the differential between migrants and non-migrants in child nutritional aspects. Children associated with poor socio-economic status and non-migrant category need to be taken care of more and a community targeted approach is required to understand the gaps. The programs such as ICDS, Poshan Abhiyan and National Health Mission need to be revamped adding the migration aspect of the families and children to deliver decent healthcare services and required nutrition.

Author’s Contribution The concept was drafted by PSM; PSM, & AA, contributed to the analysis design, PSM, MJ, AT & AA advised on the paper and assisted in paper conceptualization; PSM, MJ, AT & AA contributed in the comprehensive writing of the article. All authors read and approved the final manuscript.

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Data Availability The study utilises secondary source of data which is freely available in public domain through http://iipsindia.org.

Declarations

Ethics Approval and Consent to Participate The data is freely available in public domain and survey agencies that conducted the field survey for the data collection have collected a prior consent from the respondent. Local ethics committee of International Institute for Population Sciences (IIPS), Mumbai, ruled that no formal ethics approval was required to carry out research from this data source.

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