



**ORIGINAL RESEARCH PAPER**

**Community Medicine**

**DETERMINANTS OF NUTRITIONAL STATUS AMONG UNDER- FIVE CHILDREN IN THE POPULATION OF MUZAFFARPUR DISTRICT OF BIHAR- A CROSS-SECTIONAL STUDY.**

**KEY WORDS:** Wasting, under nutrition, Under-five children, urban area.

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**ABSTRACT**

**BACKGROUND:** Child malnutrition is an underlying cause of almost half (45%) of child deaths, particularly in low socioeconomic communities of developing countries. **AIMS AND OBJECTIVE:** The aim of this study was to examine the determinants of nutritional status among children under age 5 (0–59 months) in Muzaffarpur district of Bihar. **METHODS AND MATERIALS:** This community-based cross-sectional study was conducted between October 2021 to march 2022 among 471 under-five children in Muzaffarpur district of Bihar. The prevalence of underweight, stunting, and wasting was expressed as proportion. Data were collected through house to house survey by interviewing mothers of under five children. **RESULT:** A total of 471 children were included in the study, out of which 241 (51.16%) were males. The mean age of the participants was 2.4 years and 178 (37.79%) of them were 2 years or less. More than half (54.5%) of the participants were from joint families. The prevalence of underweight children was 1.19 times more for boys, 1.27 times more for those in the age group of 2–5 years, and 1.17 times more for a child with an illiterate father. **CONCLUSION:** Study results indicate that under nutrition is still an important health concern among under-five children. Under-nutrition in the form of underweight and stunting is more prevalent. Improvement of maternal education will improve the nutritional status of the child. Strategies are needed to improve the economic status of the community.

**INTRODUCTION:**

Under nutrition among under five children in India is a major public health problem [1]. Its prevalence is highest in the world and is almost double that of Sub-Saharan Africa [2, 3]. Out of the total world's undernourished children, 80 % lives in 20 countries. In India almost 60 million children are underweight [4]. Malnutrition during childhood is the outcome of insufficient food intake, diarrhea and other infections, lack of sanitation, and low parental education [5, 6]. Poor diets and disease are due to food insecurity, inadequate maternal and child care, and poor health services and environment [7]. These factors cause measurable adverse effects on body function and clinical outcome [8]. This problem leads to most of the anthropometric deficits found among children under age 5 in the world's least developed countries [9]. Despite existing interventions to address child malnutrition, it is still a major global public health problem [10]. Child malnutrition is an underlying cause for almost half (45%) of child deaths, particularly in low socioeconomic communities of developing countries [11]. Globally in 2018, an estimated 149 million children under age 5 were stunted and 49 million children were wasted [12]. The current rate of progress is not fast enough to reach the World Health Organization (WHO) global target of a 40% reduction in the number of stunted children by 2025 [13]. Some studies have linked low birth weight, maternal short stature, household wealth quintile, place of residence, region, mother's education, child's age and sex, and perceived birth size to children's nutritional status [14, 15]. However, other studies [16–18] have found consistent disparities in the prevalence of child malnutrition in terms of children's age, sex, and birth size. India's flagship program to tackle under nutrition – the Integrated Child Development Services (ICDS) – serves about 82 million children younger than 6 years. The utilization of ICDS centers has increased over the years, but studies show

that not all the groups have benefitted equally. After 45 years of ICDS, 36% of under-five children in India are underweight, 38% stunted, and 21 % wasted [19].

**AIMS AND OBJECTIVE:**

Our study objectives were to determine the prevalence of under-nutrition in the community, to explore the impact of ICDS services on nutritional status, and to investigate the role of other socioeconomic, biological, and educational determinants on the nutritional status of under-five children.

**MATERIAL AND METHODS:**

This community-based cross-sectional study was conducted between October 2021 to march 2022 among 471 under-five children in Muzaffarpur district of Bihar. The prevalence of underweight, stunting, and wasting was expressed as proportion. Data were collected through house to house survey by interviewing mothers of under five children. The study was approved by the institutional review board. Considering the prevalence of malnutrition among the under-five tribal children as 45% (National Family Health Survey 4), a relative precision of 10%, and a confidence level of 95%, the final sample size of 471 was calculated after considering 25% nonresponse. However, we stopped the survey at a sample size of 471 due to logistic reasons. In the first stage, purposive sampling was adopted to obtain a geographically representative list of all under-five children. In the second stage, stratified sampling technique was used from the list randomly, based on the population.

The data were collected and written informed consent was obtained from parents or guardians before the study. A semi-structured questionnaire was used to collect information on socio demographic characteristics and utilization of supplementary nutrition program of ICDS. The

recommended quantity of supplementary nutrition provided by the ICDS services in Bihar, Muzaffarpur district includes mid-day meals 6 days per week, 4 kg of take-home ration (THR), 4 kg of THR (nursing mothers), and added THR to undernourished children. The prevalence of underweight, stunting, and wasting was expressed as proportion with 95% confidence intervals (CIs). The factors associated with nutritional status were assessed using Chi-square tests, and unadjusted PRs with 95% CI were calculated. Adjusted PRs with 95% CI were calculated using log-binomial regression model.

**Inclusion and exclusion criteria:**

All households with under-five children in the selected and the children present during the first visit were included in the study and the entire child above the age of 60 months and above are excluded from the study.

**STATISTICAL ANALYSIS:**

The data were then entered into Microsoft Excel and exported to SPSS software version 20 (Statistical Package for the Social Sciences, 2011) for analysis.

**RESULT:**

A total of 471 children were included in the study, out of which 241 (51.16%) were males. The mean age of the participants was 2.4 years and 178 (37.79%) of them were 2 years or less. More than half (54.5%) of the participants were from joint families, and around three-fourths (74%) belonged to lower or lower- and middle-income families. Mothers of 28% and fathers of 32% of the participants were illiterate. The utilization of ICDS services was around 80%. More than one-fifth (20%) of the children availed the services regularly and as per the recommended guidelines. The prevalence of underweight, stunting, and wasting in children was 62% (95% CI 57–70), 61% (95% CI 54–70), and 30% (95% CI 24–38), respectively. Moreover, correspondingly, among them, severely underweight, stunted, and wasted children were 29%, 35%, and 10%, respectively. The likelihood of being underweight was significantly associated with the age of the child, gender, and educational status of the child's father. The prevalence of underweight children was 1.19 times more for boys, 1.27 times more for those in the age group of 2–5 years, and 1.17 times more for a child with an illiterate father.

A significant association was found between stunting and the age group of 2–5 years (1.63 times higher in children above 2 years), as well as between stunting and having an illiterate mother (1.15 times more than children of literate mothers). Being wasted was significantly associated with more among boys (1.47 times higher) and those belonging to a low-income category (1.58 times higher).

**DISCUSSION:**

In the study population we found 63%, 61%, and 31% of under-five children to be underweight, stunted, and wasted, respectively, as compared to 36%, 38%, and 21% in the Indian population [20]. The nationally representative data across studies in different geographical regions of India show a variation in the nutritional status of tribal under-five children. The Kada kurumba tribe of Mysore (60%, 55%, and 44%) [21] and Palghar tribe of Maharashtra (53%, 59%, and 20%), [22] reported a prevalence similar to our study population for underweight, stunting, and wasting while the tribes in the Jawadhu hills of Tamil Nadu (27%, 55%, and 10%)[23] recorded a lower prevalence of underweight but higher stunting. In the bordering district of Wayanad in Kerala, having a similar tribal population of Paniya, Kurumba, and Katunayakan, a much lower prevalence of underweight, stunting, and wasting (39%, 38%, and 20.5%) [24] was recorded. The impact of better public health policies in Kerala is shown in the lower prevalence of markers of under-nutrition there, as compared to our study's population. In this study, boys were more likely to be underweight and wasted compared to girls. This is in agreement with a few other

studies [23, 25] where boys showed higher prevalence of under nutrition and contrary to the higher prevalence observed in girl children universally. Children of the age group <2 years were protected from malnutrition. This is indicative of the protective benefit of continued breastfeeding for children under 2 years and of the poor weaning practices which is an observation supported through other research studies [25,26]. The under-five beneficiaries of the ICDS program are 79%, out of which only 38% utilize it as per the government specifications. Reasons observed for inadequate utilization were many; in hamlets without ICDS centers – difficulty in accessibility, in hamlets with ICDS centers – lack of motivation among parents to send their children to the center, and among the sathumavu users – sharing of sathumavu between multiple members of the family. In most families, sathumavu was the only source of nutrition for the children and not a supplementary source as intended. We found no significant difference between under-nutrition levels in children availing supplementary nutrition and children who were not availing the same. This shows that the supplementary nutrition has no significant impact on the reduction of under-nutrition. This is consistent with a similar observation made in a study done in Kerala [24] but contrary to evidence from multiple studies which suggested improved nutritional status in ICDS utilizers [27,28].

**CONCLUSION:**

Our data suggest an alarming rate of under nutrition among the community. Although the coverage of ICDS services has increased over the years, awareness creation and promotion of behavioral change in family-based feeding need to be on the forefront to overcome the socioeconomic inequities among vulnerable groups for better nutritional outcomes. Study results indicate that under nutrition is still an important health concern among under-five children. Under-nutrition in the form of underweight and stunting is more prevalent. Factors like sex of the child, birth order, exclusive breast feeding, economic status of the family, type of family, acute diarrhea and maternal education have influence on nutritional status of the child. Improvement of maternal education will improve the nutritional status of the child. Strategies are needed to improve the economic status of the community.

**REFERENCES:**

1. Qadri HA, et al. Under-nutrition more in male children: A new study. *Int J Res Med Sci.* 2015;3(11):3363–6.
2. Sahu SK, Ganesh Kumar S. Malnutrition among under five children in India and strategies for control. *J Nat Sci Biol Med.* 2015;6(1):18–23.
3. Sundari S, et al. A Study on the prevalence and pattern of malnutrition among children under five years in Chennai. *Int J Pharm Bio Sci.* 2017;8(3): (B): 135–9.
4. Bryce J, Coitinho D, Darnton H, Pinsturp I, Anderson P. Maternal and child undernutrition, effective action at national level. *Lancet.* 2008 Feb 9; 371(9611):510–26.
5. Tibilla MA. The nutritional impact of the world food programme supported supplementary feeding programme on children less than five years in rural tamale, Ghana 17–18;2007.
6. Birara MY, Amsalu BA. Prevalence and factors associated with stunting, underweight and wasting: a community based cross sectional study among children age 6–59 Months at Lalibela Town, Northern Ethiopia;2014.
7. UNAC. United Nations. Administrative committee on co-ordination. Subcommittee on Nutrition Third report on the world nutrition situation. United Nations: ACC/SCN Secretariat; 1997.
8. WHO. World Health Organization child growth standards and the identification of severe acute malnutrition in infants and children: joint statement by the World Health Organization and the United Nations Children's Fund. 2009.
9. WHO. World Health Organization, and UNICEF. Global prevalence of vitamin A deficiency. No. WHO/NUT/95, vol. 3. Geneva: World Health Organization; 1995.
10. Akombi BJ, Agho KE, Merom D, Renzaho AM, Hall JJ. Child malnutrition in sub-Saharan Africa: a meta-analysis of demographic and health surveys (2006–2016). *PLoS One.* 2017;12(5):e0177338.
11. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet.* 2013;382(9890):427–51.
12. UNICEF. Levels and trends in child malnutrition, United Nations Children's fund (UNICEF), World Health Organization, International Bank for Reconstruction and Development/The World Bank. Levels and trends in child malnutrition: key findings of the 2019 edition of the joint child malnutrition estimates. Geneva: World Health Organization; 2019 Licence: CC BY-NC-SA 3.0 IGO; 2019.
13. WHO. World Health Organization, Global nutrition targets 2025: Stunting policy brief. World Health Organization; 2014.

14. Mamabolo RL, Alberts M, Steyn NP, Delemarre-van de Waal HA, Levitt NS. Prevalence and determinants of stunting and overweight in 3-year-old black south African children residing in the central region of Limpopo Province, South Africa. *Public Health Nutr.* 2008;8(5):501-8.
15. Novignon J, Aboagye E, Agyemang OS, Aryeetey G. Socioeconomic-related inequalities in child malnutrition: evidence from the Ghana multiple indicator cluster survey. *Heal Econ Rev.* 2015;5(1):34.
16. Wamani H, Åström AN, Peterson S, Tumwine JK, Tylleskär T. Boys are more stunted than girls in sub-Saharan Africa: a meta-analysis of 16 demographic and health surveys. *BMC Pediatr.* 2007;7(1):17.
17. Uthman OA. Decomposing socio-economic inequality in childhood malnutrition in Nigeria. *Matern Child Nutr.* 2009;5(4):358-67.
18. Gayle HD, Dibley MJ, Marks JS, Trowbridge FL. Malnutrition in the first two years of life: the contribution of low birth weight to population estimates in the United States. *Am J Dis Child.* 1987;141(5):531-4.
19. Dey U, Bisai S. The prevalence of under-nutrition among the tribal children in India: A systematic review. *Anthropol Rev* 2019;82:203-17
20. National Family Health Survey (NFHS-4). *Int Inst Popul Sci* 2017;671. Available from: <http://rchiips.org/NFHS/NFHS-4Reports/India.pdf>. [Last accessed on 2020 Jun 10].
21. Manjunath R, Jagadish Kumar K, Kulkarni P, Begum K, Gangadhar MR. Malnutrition among under-five children of Kadukuruba tribe: Need to reach the unreached. *J Clin Diagnostic Res* 2014;8:2-5.
22. Meshram II, Arlappa N, Balakrishna N, Laxmaiah A, Mallikarjun Rao K, Gal Reddy Ch, et al. Prevalence and determinants of undernutrition and its trends among pre-school tribal children of Maharashtra State, India. *J Trop Pediatr* 2012;58:125-32.
23. Gopinath TT, Logaraj M, John KR. Assessment of nutritional status of children aged under five years in tribal population of Jawadhu hills in Tamil Nadu. *Int J Community Med Public Heal* 2018;5:1041-6.
24. Philip R, Vijayakumar K, Indu P, Shrinivasa B, Sreelal T, Balaji J. Prevalence of undernutrition among tribal preschool children in Wayanad district of Kerala. *Int J Adv Med Heal Res* 2015;2:33-8.
25. Islam S, Mahanta TG, Sarma R, Hiranya S. Nutritional Status of under 5 Children belonging to Tribal Population Living in Riverine (Char) Areas of Dibrugarh District, Assam. *Indian J Community Med* 2014;39:169-74.
26. Ghosh-Jerath S, Singh A, Bhattacharya A, Ray S, Yunus S, Zodpey SP. Dimensions of nutritional vulnerability: Assessment of women and children in Sahariya tribal community of Madhya Pradesh in India. *Indian J Public Health* 2013;57:260-7.
27. Vandana P, Shally A, Srivastava VK, Nigam AK, Srivastava PK. Study of nutritional status of children attending ICDS services in lucknow. *Indian J Prev Soc Med* 2011;42:142-5.
28. Patni M, Kavishvar A, Momin M. A study on quantitative effect of supplementary nutrition provided in Anganwadis in predicting physical growth of pre-schoolers. *Int J Med Sci Public Heal* 2013;2:1-6.