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Original Research Article

Prevalence and determinants of malnutrition in children under five in rural Bareilly, India

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ABSTRACT

Background: Malnutrition remains a significant public health concern, especially in low-resource settings. This cross-sectional study investigates the prevalence and socio-demographic determinants of malnutrition among children under five years of age in Rural areas of Bareilly district. To assess the prevalence of malnutrition and identify its socio-demographic determinants among under five children in rural Bareilly, using WHO anthropometric indicators.
Methods: The study was conducted in rural areas of Bareilly under the Family Adoption Program initiated by Rohilkhand Medical College and Hospital. Data was collected over a six-month period from rural areas of Bareilly.
Results: Based on WHO Z-scores, the prevalence of wasting, underweight and stunting was 12.3%, 26% and 36.6%, respectively. These findings are consistent with the National Family Health Survey (NFHS-5) and underscore the urgent need for multi-sectoral interventions to combat both acute and chronic forms of malnutrition in vulnerable populations.
Conclusions: The results align with national and regional trends, reinforcing the need for comprehensive, community-based strategies to address childhood malnutrition.

Keywords: Bareilly, Children under five, Family adoption program, Malnutrition, Nutritional status

INTRODUCTION

Malnutrition remains one of the most critical global public health challenges, especially among children under the age of five. It manifests as stunting (chronic undernutrition), wasting (acute undernutrition), underweight (a combination of both) and micronutrient deficiencies. These conditions impede physical growth, cognitive development and immunity and are major contributors to child morbidity and mortality worldwide.[1]

As per the World Health Organization (WHO), an estimated 159 million children under five are stunted, 50 million are wasted and 41 million are overweight globally.[1] "End all forms of malnutrition and leave no one behind by 2030" gives a summary of the many interconnected nutrition goals that have been decided upon by intergovernmental entities, setting them in the framework of the UN decade of action on nutrition and the SDGs.[2] In low-income nations, stunting and wasting continue to be public health issues, with 4·7% of children experiencing both conditions at the same time. This condition is linked to a 4.8-fold increase in mortality.[3]

In India, despite considerable improvements in food security and healthcare, malnutrition continues to be a major concern. The National family health survey-5 (NFHS-5) reported that 35.5% of Indian children under five are stunted, 32.1% are underweight and 19.3% are wasted.[4] These numbers underline the deeply rooted nutritional disparities across the country, particularly in rural areas where healthcare and education access remain limited. The state of Uttar Pradesh reports even more concerning statistics, with both stunting and underweight

prevalence at 39.7% among the highest in the country.[4] These figures point to systemic issues such as poverty, inadequate maternal care, suboptimal infant feeding practices, food insecurity and poor sanitation as key drivers of child undernutrition.

Bareilly, a district in Uttar Pradesh, reflects these trends. Its rural communities are characterized by low maternal literacy, limited access to healthcare and socio-economic hardship, all of which contribute to the nutritional deficits observed among children. Studies from similar settings have highlighted the impact of these socio-demographic factors on child nutrition.[5,6]

Growth, cognitive function and general well-being are all greatly impacted by infant nutrition, making it a critical predictor of health and development. Addressing malnutrition and its effects is crucial for enhancing child health outcomes in rural India, where access to necessary resources and medical treatment may be restricted.[7] These issues are made worse by socioeconomic factors such as poverty, low maternal education and restricted access to nutrition and healthcare.[8]

While national surveys like NFHS provide important data, they often obscure local-level disparities. Understanding community-specific determinants of malnutrition is essential for designing effective interventions.

The Family Adoption Program (FAP) by Rohilkhand Medical College and Hospital provides a unique opportunity to work closely with rural populations and assess their health and nutrition indicators in a targeted manner.

This study was undertaken to determine the prevalence and socio-demographic correlates of malnutrition among children under five in rural Bareilly. Using WHO-standard anthropometric measurements, the study aims to identify high-risk groups and generate evidence for tailored, community-based nutritional interventions.

Aim

To assess the prevalence and identify socio-demographic determinants of malnutrition among children under five years of age in rural Bareilly, using WHO anthropometric standards.

Objectives

To determine the prevalence of wasting, stunting and underweight among children under five using WHO Z-scores.

To analyze the association between socio-demographic factors (e.g., maternal education, socio-economic status, healthcare access) and the nutritional status of children in the study area.

METHODS

Study design and area

This cross-sectional study was conducted in selected rural villages of Bareilly as part of the Family Adoption Program by Rohilkhand Medical College and Hospital.

Study duration

The study period was from 6 month from July 2024 December 2024.

Sampling technique

A community-based cross-sectional study was conducted in rural areas of Bareilly district, Uttar Pradesh. The sample size was determined using the standard formula for estimating a proportion in a population:

$n = 4pq \backslash l2$

Where, n=required sample size, p=estimated prevalence of malnutrition (from NFHS-5) (4) =35.5%=0.355

q=1−p=0.645

l=allowable error (precision), taken as 5% of p=5% of 35.5=1.775≈1.8

$n = 4\times0.355\times0.645) \backslash 0.018)2 \approx 2,827$

Since the calculated sample size was quite large for field feasibility, a relative precision of 15% of p was also considered for practical purposes:

l=15% of 35.5=5.325≈5.3

≈326.2

Thus, the final sample size was rounded to 405 children to account for potential non-responses, refusals and exclusions due to illness or incomplete data. Participants were selected from villages adopted under the Family Adoption Program (FAP) using simple random sampling. Eligible households with at least one child under the age of five were listed and children were randomly selected until the desired sample size was achieved. Only one child per household was included to avoid intra-household clustering bias. Eligibility required the presence of a caregiver. Children with severe illnesses were excluded.

Data collection

Anthropometric measurements (weight-for-height, height-for-age and weight-for-age) were obtained according to WHO Child Growth Standards. A structured questionnaire was used to collect socio-demographic data.

Data analysis

Data were analyzed using SPSS version 24. Prevalence rates were calculated and chi-square tests were employed to explore associations between malnutrition and socio-demographic variables. Before the research study started, ethical approval was obtained from the Rohilkhand Medical College ethical committee using letter no IEC/RMCH/05/2024/JUL.

RESULTS

Socio-demographic profile

Of the 405 children surveyed, 51% were male and 49% were female (Figure 1). Most participants (61%) were aged between 1-5 years.

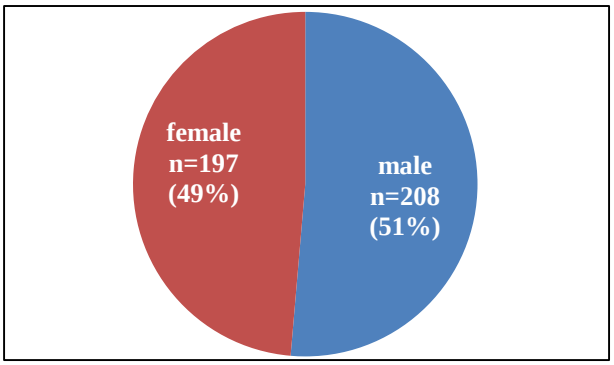

Figure 1: Male and female ratio in study participant.

Prevalence of malnutrition

Wasting (acute malnutrition): 2.3% (low weight-for-height).

Underweight: 26% (low weight-for-age).

Stunting (chronic malnutrition): 36.6% (low height-for-age) (Figure 2).

Maternal education

Higher rates of stunting were observed in children whose mothers lacked formal education ($p<0.05$).

Socioeconomic status

Children from low-income households had higher rates of underweight and wasting.

Socio-demographic determinants

Healthcare access

Limited access to immunization and basic healthcare services correlated with increased malnutrition rates. Nutritional assessment according to the WHO Z-scores. In this study, the prevalence of underweight, stunting and wasting was 26%, 36.6% and 12.3%, respectively (Figure 2).

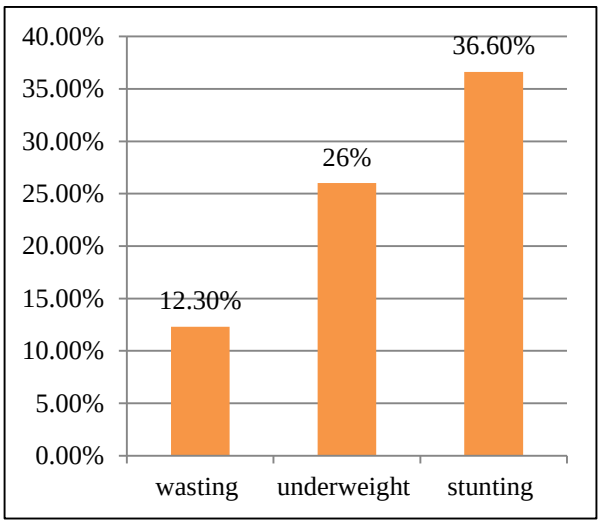

Figure 2: Prevalence of undernutrition among the study participants (n=405).

Table 1: Age and gender-wise distribution of children.

Age group (in years)	Male (%)	Female (%)	Total (%)
<1	28 (46)	32 (53)	60 (100)
1-5	182 (52.75)	163 (47.2)	345 (100)

DISCUSSION

The study underscores the persistent burden of malnutrition in rural Bareilly, with stunting (36.6%) being the most prevalent form, indicative of long-term nutritional deficits. This aligns with national (35.5%) and slightly below state-level data (39.7%). Underweight (26%) reflects both acute and chronic malnutrition.

Although lower than the national (32.1%) and state average (39.7%), it remains a serious concern. The comparatively lower prevalence of wasting (12.3%), versus national (19.3%) and state (20.5%) figures, may suggest better short-term food security or healthcare in the study areas.

Comparative analysis with other studies

High prevalence of stunting (89.6%) and underweight (73.2%) were reported in a study among under-five children in Uttar Pradesh, India.[9] Whereas another study had revealed a low prevalence of both underweight (19.9%) and stunting (17.1%) and reversed the ranking (10).

A study in rural Uttar Pradesh reported 38.9% stunting, 34.7% underweight and 17.5% wasting. Similar findings were reported in Bihar, with 37.8% stunting and 31.6%

underweight.[11] These regional comparisons highlight a consistent pattern of undernutrition across northern India and reinforce the urgency of targeted interventions.

Socio-demographic insights

The link between maternal education and child nutrition highlights the role of women's empowerment in improving child health. Similarly, economic and healthcare disparities contribute to varying levels of nutritional outcomes, suggesting the need for a multi-pronged approach to tackle malnutrition.

Factors associated with socioeconomic inequality such as poverty, illiteracy, lack of awareness regarding the quality of food items, large family and poor sanitary environment are associated with malnutrition.[11]

The study was limited to adopted communities under the Family Adoption Programme, which may not represent the broader rural population of Bareilly.

CONCLUSION

This study reveals a substantial burden of malnutrition among children under five in rural Bareilly, with stunting being the most prominent issue. The findings emphasize the need for integrated strategies targeting both acute and chronic malnutrition.

Efforts must include enhancing maternal education, strengthening healthcare infrastructure and implementing sustainable nutrition programs. Existing initiatives like the Integrated Child Development Services (ICDS) and POSHAN Abhiyaan (National Nutrition Mission) should be intensified and adapted to address the identified socio-demographic determinants. Community-driven awareness and support programs are crucial for long-term impact.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. World Health Organization. Levels and trends in child malnutrition: UNICEF/WHO/The World Bank Group joint child malnutrition estimates: key findings of the 2021 edition. InLevels and trends in child malnutrition: UNICEF/WHO/The World Bank Group joint child malnutrition estimates. 2021.
2. United Nations System Standing Committee on Nutrition. UNSCN Discussion Paper - By 2030, end all forms of malnutrition and leave no one behind. Avaialble at: https://www.unscn.org. Accessed on 21 January 2025.
3. Victora CG, Christian P, Vidaletti LP, Gatica-Domínguez G, Menon P, Black RE. Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda. Lancet. 2021;397:1388-99.
4. International Institute for Population Sciences (IIPS) and Ministry of Health and Family Welfare (MoHFW). National Family Health Survey. 2019;21:56-9.
5. Kumar A, Singh A, Roy R. Socio-demographic correlates of undernutrition among children in rural Uttar Pradesh. Indian J Public Health Res Dev. 2018;9(12):158–63.
6. Singh M, Yadav S, Srivastava A. Child nutrition and maternal health in rural northern India: A regional perspective. J Health Popul Nutr. 2020;39:1–9.
7. Gupta A, Chaudhary M, Sharma R. Nutritional status and its determinants among children under five years in rural India. J Rural Health. 2020;36(1):45-54.
8. Dewey KG, Begum K. Long-term consequences of stunting in early childhood for health and economic outcomes. Maternal & Child Nutr. 2011;7(3):5-18.
9. Awasthi S, Das R, Verma T, Vir S. Anemia and undernutrition among preschool children in Uttar Pradesh, India. Indian pediatrics. 2003;40:985-90.
10. Sundari S, Balakrishnan S, Suguna E, Manjula VD, Premalatha T, Nithya M. A Study on the prevalence and pattern of malnutrition among children under five years in Chennai. Int J Pharm Bio Sci. 2017;8(3):135-9.
11. Larson LM, Young MF, Ramakrishnan U, Webb Girard A, Verma P, Chaudhuri I, et al. A Cross-Sectional Survey in Rural Bihar, India, Indicates That Nutritional Status, Diet and Stimulation Are associated with motor and mental development in young children. J Nutr. 2017;147(8):1578-85.

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