

Dietary Diversity and Stunting among Infants and Young Children: A Cross-sectional Study in Aligarh

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Abstract

Context: Child undernutrition is a public health problem in a developing country like India. Dietary diversity is an important immediate determinant of undernutrition. **Aims:** The aim of this study is to find the prevalence of stunting among infants and young children aged 6–23 months and its association with dietary diversity. **Settings and Design:** This study was community-based cross-sectional study. It was carried out in the registered families of the Urban Health Training Centre and Rural Health Training Centre, Department of Community Medicine, Jawaharlal Nehru Medical College, AMU, Aligarh. **Methods:** A total of 326 children aged 6–23 months were included in the study. Study tools were predesigned and pretested questionnaire, modified infant and young child feeding practices questionnaire, and infantometer. Systematic random sampling with probability proportionate to size technique was utilized to draw necessary sample size. **Statistical analysis:** Wald's statistics, Z-scores, and bivariate and multivariate logistic regression (LR) (stepwise backward LR) were used. **Results:** The prevalence of stunting in study population was 45.7% (95% CI - 40.1%, 51.1%); moderate stunting was 33.7% (95% CI - 28.8%, 39%); and severe stunting was 12% (95% CI - 8.8%, 16%). The prevalence of stunting was significantly associated with dietary diversity (OR - 0.17, 95% CI - 0.10–0.29) **Conclusions:** The study concludes that dietary diversity is a significant predictor of stunting. Therefore, interventions aimed at improving dietary diversity should be taken to reduce the burden of stunting among infants and young children.

Keywords: Dietary diversity, infant and young child, stunting

INTRODUCTION

“Childhood stunting is an outcome of maternal undernutrition and inadequate infant and young child feeding (IYCF), a correlate of impaired neurocognitive development, and a risk marker for noncommunicable diseases and reduced productivity in later life.”^[1] Child undernutrition is linked to immediate determinants such as IYCF practices, child health, nutritional status of women and adolescent girls, underlying determinants such as social status of women, water and sanitation, and status of nutrition relevant interventions. Although the prevalence of stunting has decreased in India from 48% to 39% during 2006–2014, the decline rate still lags behind other countries in the region. India also has massive interstate variability across different states with Uttar Pradesh having highest prevalence of stunting (50.4%). The decrease in prevalence of stunting also lags behind other child health indicators such as infant and child mortality giving rise to paradox called previously as “Indian enigma.” India ranks the 9th in the population of stunted children. Child undernutrition leads to reduction in school attendance, cognitive development

resulting in massive loss of human potential leading to economic loss to individual and nation. Even with recent decline in stunting rates, India still ranks the 1st in loss of human potential due to stunting.^[2] This study focuses on the effect of dietary diversity on stunting as it is an important immediate determinant of child undernutrition. The objective of the study was to find the prevalence of stunting among infants and young children aged 6–23 months and its association with dietary diversity.

METHODS

This study was a community-based cross-sectional study. It was carried out in the registered families of the Urban

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Health Training Centre (UHTC) and Rural Health Training Centre (RHTC), Department of Community Medicine, Jawaharlal Nehru Medical College, AMU, Aligarh. The study was carried out for a period of year from July 2014 to June 2015. The sociodemographic details were recorded using the predesigned and pretested questionnaire. The participants were included using systematic random sampling with probability proportionate to size (PPS). The modified IYCF questionnaire was used to record the IYCF practices.^[3] Length of child was taken using infantometer using standardized procedure with a precision of 0.5 cm.^[4]

Definition

Minimum dietary diversity is defined as proportion of children 6–23 months of age who receive foods from 4 or more food groups.^[5]

The children aged 6–23 months from registered families of UHTC and RHTC were included in the study after obtaining consent from their mothers. The children with chronic illness, congenital malformation, and aged 2 years and above were excluded from the study. Twins and children mothers of whom declined to be part of study were also excluded from the study. The sample was collected using systematic random sampling with PPS technique. If the household has more than one child of age 0–23 months, all the eligible children were included in the study. Sample size was determined by considering prevalence of at least 3 IYCF practices in Uttar Pradesh to be 17.4% and absolute precision (L) = 5%.^[6] Out of 510 children of age group 0–23 months, 326 children belonging to age group 6–23 months were included for data analysis. Informed verbal consent was obtained, and the nature and consequences of the study were explained to the patient's mother. Confidentiality was assured. The study was approved by Institutional Ethics Committee. Data were analyzed using SPSS 20. The prevalence of stunting with confidence interval was derived using Wald's statistics. Height for age distribution of study population was described in terms of Z-scores. Bivariate and multivariate logistic regression (LR) using stepwise backward LR method was used to test association between dietary diversity and stunting. $P < 0.05$ was considered as significant.

RESULTS

Sociodemographic profile of the study population

The study includes 326 children aged 6–23 months. One hundred and sixty-five (50.6%) of children were males and 161 (49.4%) were females. More than half, 179 (54.9%) of children belonged to urban areas and remaining 147 (45.1%) belonged to rural areas. Majority of children, i.e., 147 (45.1%) were of birth order three and above followed by birth order one and two. Two hundred and forty-four (74.8%) of mothers belonged to age group 21–30 years followed by age group 31–40 years. Just above half, 165 (50.6%) of mothers were illiterate and two-third of them, i.e., 204 (62.6%) belonged to Muslim community. Among the 326 mothers included in

the study, 321 (98.5%) were homemaker by occupation. Two hundred and sixty-four (81%) of mothers received antenatal care. Two hundred and twenty (67.5%) of mothers belonged to medium standard of living index.

Dietary diversity

Adequate dietary diversity (those fulfilling the criteria of minimum dietary diversity, i.e., receive foods from 4 or more food groups) was observed in 42.6% (95% CI - 37.4%, 48.1%) of the study participants.

Height for age distribution of study population

The mean Z-score for height for age was 1.49 ± 1.24 and it followed normal distribution pattern (skewness - 0.25).

Prevalence of stunting

The prevalence of stunting in study participants was 45.7% (95% CI - 40.1%, 51.1%). About 33.7% (95% CI - 28.8%, 39%) of children were moderately stunted and 12% (95% CI - 8.8%, 16%) of children severely stunted.

Association of stunting with dietary diversity

The prevalence of stunting was significantly associated with dietary diversity (OR - 0.17, 95% CI - 0.10–0.29), i.e., the children with adequate dietary diversity have 83% lower odds of having stunting as compared to children with inadequate dietary diversity. Minimum meal frequency (minimum number of times or more feeds served during the previous day) was adjusted in multivariable analysis.

DISCUSSION

The prevalence of stunting similar to the present study was noted by Rapid survey of Children (RSoC) in under-fives in Uttar Pradesh in 2014,^[2] Bentley *et al.* in Mumbai,^[7] and Sharifzadeh *et al.* in Iran.^[8] However, Mukhopadhyay *et al.* in urban slums of West Bengal,^[9] Tessema *et al.* in rural Sidama, South Ethiopia,^[10] Ara *et al.* in rural Bangladesh,^[11] Saaka *et al.* in rural Northern Ghana,^[12] and Zongrone *et al.* in Bangladesh^[13] found a lower prevalence of stunting. Contrary to above Lawan *et al.* in Nigeria showed higher prevalence of stunting than the current study.^[14]

The significant association of stunting with dietary diversity was also noted by RSoC in 2014 in Uttar Pradesh,^[2] Tessema *et al.*,^[10] Saaka *et al.*,^[13] Zongrone *et al.*,^[14] and Pauden *et al.*^[15] The study done by Jing-Qiu *et al.* in Shanghai, China, revealed the significant association of stunting with infant and child feeding index.^[16] However, Tessema *et al.*^[10] and Bentley *et al.*^[7] found the association of stunting with dietary diversity to be insignificant. Kumar *et al.* found no significant association between stunting and proper complementary feeding.^[17]

CONCLUSIONS

The study concluded that approximately half of the children were stunted, and inadequate dietary diversity was its significant predictor. This shows that provision of adequate

dietary diversity may help in overcoming the burden of stunting among children.

Limitations

First, the study cannot infer causal relationship between dietary diversity and stunting due to it being cross-sectional in nature. Further malnutrition cannot be solely dependent on food diversity as amount/quantity of food is equally important which was not addressed in the present study. Second, other IYCF indicators were not adjusted for calculation of odds of having stunting in spite of adjusting it for other sociodemographic factors that may affect the association of dietary diversity and stunting.

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Conflicts of interest

There are no conflicts of interest.

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