

Food Security and Anthropometric Failure Among Tribal Children in Bankura, West Bengal

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We conducted a cross-sectional study among 188 tribal children aged 6-59 months using two-stage sampling in Bankura-I Block of Bankura district, West Bengal, India, to assess their nutritional status and its relation with household food security. Weight and height/length were measured and analyzed as per new WHO Growth Standards. Mothers of the study children were interviewed to obtain relevant information. Prevalence of Composite Index of Anthropometric Failure was 69.1% and multiple anthropometric failures were more likely among tribal children aged 24-59 months with irregular utilization of supplementary nutrition and from households with severe grades of food security.

Key words: *Anthropometric failure, Children, Household food security, India, Tribal.*

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Research evidence from developing countries shows that household food insecurity is closely related to children's undernutrition [1,2]. In India, numerous nutritional and social assistance programs are operating with the objectives to ensure food security and reduce undernutrition, especially among vulnerable population like under-fives with special focus on scheduled tribes. Nationwide survey showed definite improvement in nutritional profile of Indian children, though the picture is still gloomy [3,4]. However, the nutritional status of tribal children by any indices of its measure is worse than other children [4].

An aggregate indicator like Composite Index of Anthropometric Failure (CIAF) might be used to depict a comprehensive picture of undernutrition instead of conventional indices e.g. stunting, wasting and underweight [5,6]. Household food security along with other socio-demographic factors and utilization status of nutritional programs need to be

studied to get a clearer picture of child undernutrition. We conducted this study to find out the nutritional status of tribal children and its relation with household food security and other socio-demographic variables in West Bengal.

METHODS

A community-based, cross-sectional study was undertaken among tribal children aged 6-59 months of Bankura-I Community Development Block in the month of August-September 2009. As per available data on prevalence of CIAF among pre-school children in West Bengal [7], with a 95% confidence level, 15% relative precision, design effect of 2 and 5% non-response rate, the sample size calculated was 188. Out of 25 villages in Bankura-I CD block with tribals comprising 25% of total population or more, 50% village i.e. 13 villages were selected randomly. A total of 15 households with study children were selected randomly through house to house visits. From each selected household, the youngest child was selected. In case of non-

availability of required number of children, the nearest village was surveyed.

After obtaining informed consent, the mother of the child was interviewed with a pilot-tested, semi-structured questionnaire regarding age and sex of the child, duration of mothers' schooling, employment status of mother and utilization of Supplementary Nutrition Program (SNP) under Integrated Child Development Scheme (ICDS) by the child.

Food security status of the household was assessed using Household Food Security Scale (HFSS) and households were classified as having high/ marginal food security, low food security and very low food security based on raw scores [8]. Household food security scale, developed by the United States Department of Agriculture was translated and back translated for validation in Bengali. The harmonized Bengali version was pilot-tested and found valid (Kappa for each item > 0.84), internally consistent (Cronbach's alpha=0.82) and uni-dimensional.

Weight and height of the child was measured as per guideline of World Health Organization [9]. The age of the child was ascertained from the available records and if not available, by local calendar method.

The study was cleared by Institutional Ethics Committee, BS Medical College, Bankura.

The height/length for age (HAZ/ LAZ), weight for age (WAZ) and weight for height/length (WHZ/ WLZ) were calculated with the help of WHO-Anthro-2005 software [10]. Descriptive statistics, chi-square for trend and binary logistic regression were done with the help of SPSS: version 15.

RESULTS

Final analysis was done with 188 children as 7 questionnaires were incomplete. Out of them, 53.7% were females, 9.6% were in age group of 6-11 months, 22.3% belonged to 12-23 months and rest belonged to 24-59 months. About one third (37.2%) mothers were illiterate and 23.9% were wage earners. 43.6% children utilized supplementary nutrition regularly (≥ 4 times/week).

Among study children, prevalence of stunting, wasting, underweight were 50.0%, 20.2%, 53.1% and the corresponding severe grades were 20.2%, 4.8%, 19.7%, respectively. **Table I** shows six subgroups of undernourished children as per CIAF with 23.4% having single anthropometric failure (Group B, F and Y) and 45.7% had multiple anthropometric failure (Group C, D and E). In total 69.1% of tribal children had some form of anthropometric failures.

It was observed that 88 (46.8%) of the surveyed household had high/ marginal food security, 54 (28.7%) had low food security and 46 (24.5%) were very low food secure. **Table II** shows that severe grades of undernourishment were more prevalent in households with lower grades of food security.

In binary logistic regression, it was found that multiple anthropometric failures were more likely in children living in low [AOR=5.48 (2.24-13.43)] and very low food secure households [AOR=14.19 (5.14-39.22)]. Similarly, irregular utilization (<4 times/week) of supplementary nutrition [AOR=3.25 (1.46-7.27)] and age group of 24-59 months [AOR=3.26 (1.26-8.47)] were more likely to be associated with multiple failures.

DISCUSSION

The present study showed that around two thirds children were undernourished similar to previous reports [6,7,11]. The findings of widespread prevalence of undernutrition among tribal children in India were also corroborated in this study [12,13].

TABLE I SUBGROUPS OF ANTHROPOMETRIC FAILURE AMONG TRIBAL CHILDREN AGED 6-59 MONTHS (N=188)

Subgroups	No. (%)
A (No failure)	58 (30.9)
B (Wasting only)	6 (3.2)
C (Wasting and underweight)	16 (8.5)
D (wasting, stunting and underweight)	16 (8.5)
E (Stunting and underweight)	54 (28.7)
F (Stunting only)	24 (12.8)
Y (Underweight only)	14 (7.4)

TABLE II ASSOCIATION BETWEEN DIFFERENT GRADES OF HOUSEHOLD FOOD SECURITY AND ANTHROPOMETRIC INDICES (N=188)

Indices	Household food security status			P value
	High/marginal (n = 88)	Low (n = 54)	Very Low (n = 46)	
Stunting	22 (25.0)	16 (29.6)	18 (39.1)	<0.001
Severe stunting	10 (11.4)	13 (24.1)	15 (32.6)	
Wasting	7 (8.0)	10 (18.5)	12 (26.1)	<0.001
Severe wasting	2 (2.3)	2 (3.7)	5 (10.9)	
Underweight	19 (21.6)	20 (37.0)	24 (52.2)	<0.001
Severe underweight	8 (9.1)	14 (25.9)	15 (32.6)	
Single failure	21 (47.7)	15 (34.1)	8 (18.2)	<0.001
Multiple failures	26 (30.2)	27 (31.4)	33 (38.4)	

* including the children with no failure in the respective groups.

The present study revealed that there was a dose-response relationship between multiple anthropometric failure and grades of food security as shown in other resource-constrained areas [1,2,14]. Higher prevalence of multiple failures in older age group could be explained by inadequacy of food, as previously reported in Bangladesh [1]. The findings of the present study further emphasized that regular utilization of supplementary nutrition was a protective factor against undernutrition.

Analysis in earlier studies showed that children with multiple anthropometric failures were more likely to experience ill-health and at more risk of dying than those having single anthropometric failure [6,7]. Present study showed that taking severe underweight as the sole criterion for prioritization in SNP under ICDS missed almost 25% children with multiple anthropometric failures without having severe underweight (45.7% vs 19.7%), which was corroborated by other researchers [7,11]. So, SNP under ICDS, set to ameliorate the effects of low household food security, should focus attention to all children from resource poor households rather than depend solely on the finding of severe underweight of the children.

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WHAT THIS STUDY ADDS?

- In the tribal population in Bankura, West Bengal, status of household food security had a significant relationship with multiple anthropometric failures.

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