

Anthropometric Characteristics and Nutritional Status of Bauri Pre-School Children of Nituria Block, Purulia, West Bengal.

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Abstract

Preschool children are in the developmental stage (functional) of life any impairment in their growth can reduce physical, mental and intellectual potential. This study assesses the prevalence of undernutrition among 2-6 year old pre-school children of Bauri caste of Nituria Block, Purulia, West Bengal, India. The cross sectional study was conducted in five different villages of Nituria Block of Purulia district. A total of 219 pre-school children aged 2-6 years were randomly selected and measured from each village. Anthropometric measurements such as height and weight were made following standard techniques. The body mass index (BMI) was computed following standard techniques and equation, respectively. The new international classification cut-off points provided by scientists were utilized to identify undernutrition. The overall (age-combined) mean BMI among boys and girls were 14.22 kg/m² (sd = 1.5) and 13.67 kg/m² (sd = 1.3), respectively. Mean BMI decreased from 2 to 5 years in boys. Mean BMI increased from 2 to 4 years and then decreased in 5 & 6 years in girls. The overall (age-combined) prevalence of thinness among boys and girls was 61.5% and 70.8%, respectively. The root of nutritional bias in terms of food intake starts at early stages of life, perhaps from early childhood. The present study clearly indicated that the nutritional situation of these children was serious.

INTRODUCTION

Development is the functional advancement of different parts of the body and for proper function adequate amount of food is required. Undernutrition, type of malnutrition arises due to the intake of less food than what is required for proper growth, maintenance and development of the body. Child nutritional status is an essential component of a country's overall human development. There is a growing consensus that poor nutritional status during childhood (or even in utero) can have long-lasting scarring consequences into adulthood, both in terms of health and mortality, and in terms of other measures of human capital such as schooling and productivity¹².

Bauri, a cultivating, earth-working, and palanquin-bearing caste of Western Bengal, whose features and complexion stamp them as of non-Aryan descent, although evidence wants to affiliate them to any particular tribe now in existence. The Bauri are divided into the nine sub castes. Some of them may perhaps be nothing more than different local names for what was originally the same sub-caste, but this point is not really very material, by reason of the marked

reluctance of the lower castes to intermarry families living at a distance. Bauri admit into their caste members of any caste higher than themselves in social standing. Bauri profess to be Hindus of the Sakta sect, but in Western Bengal, at any rate, their connection with Hinduism is of the slenderest kind, and their favourite objects of worship are Manasa, Bhadu, Mansingh, barpahari, Dharmaraj, and Kudrasini. The social rank of Bauri is very low³.

Globally it is estimated that among preschool-age children in developing countries 183 million are underweight, 226 million are stunted and 67 million wasted⁴. India has the highest occurrence of childhood malnutrition in the world⁵. One out of every three children fewer than five in developing countries is malnourished. It is a major drain on developing countries' prospects for development because malnourished children require more intense care from their parents and are less physically and intellectually productive as adults.

There is absence of representative data on the nutritional status of Bauri preschool children. In view of this, the present investigation studies the prevalence of undernutrition

among 2-6 year old scheduled caste (Bauri) preschool children of Purulia District, West Bengal.

MATERIALS AND METHODS

The present study was cross-sectional and community based conducted in five different villages namely, Ramkanali, Raghudi, Garponchokot, Mekatala and Rampur of Nituria Block, Purulia district- that are situated about 250km from Kolkata city, the provincial capital of West Bengal. This study was carried out from January to April 2008. A total of 219 (130 boys and 89 girls) pre-school children aged 2-6 years were measured. Data are collecting after obtaining the necessary approval from the parents, villages and block authorities and parents were informed about the objectives before the commencement of measurement. The institutional ethical committee approved the data schedule.

Information on age, gender, weight and height was collected on a pre-tested questionnaire by house-to-house visit following interview and examination. Anthropometric measurements such as height and weight were made by a trained investigator (SD) following the internationally accepted standard techniques (WHO) ₆. Height and weight measurements were recorded to the nearest 0.1 kg cm and 0.5 kg respectively. The BMI was computed following the standard formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height}_2 (\text{m}_2)$$

The BMI was used to evaluate the nutritional status of the subjects ₇. BMI cut-off point was followed to define thinness. The cut-off values are present in Table 1.

Figure 1

Table 1 International cut off points of BMI (kg/m²) for thinness grade, I, II and III by age and sex

| Age (years) | Boys | | | Girls | | |
|----------------|-------|-------|-------|-------|-------|-------|
| | 16 | 17 | 18.5 | 16 | 17 | 18.5 |
| 2 | 13.37 | 14.12 | 15.14 | 13.24 | 13.90 | 14.83 |
| 3 | 13.09 | 13.79 | 14.74 | 12.98 | 13.60 | 14.47 |
| 4 | 12.86 | 13.52 | 14.43 | 12.73 | 13.34 | 14.19 |
| 5 | 12.66 | 13.31 | 14.21 | 12.50 | 13.09 | 13.94 |
| 6 | 12.50 | 13.15 | 14.07 | 12.32 | 12.93 | 13.82 |

Student's t-test were undertaken to test for sex difference in height, weight and BMI. Chi-square test was performed to test the prevalence of thinness by age and sex. All statistical

analysis was undertaken using the Statistical package for social sciences (SPSS).

RESULTS

The mean and standard deviations of height by age and sex are presented in Table 2.

Figure 2

Table 2 Mean height (sd) of the subjects by age and sex

| AGE (yrs) | BOYS | | GIRLS | | t |
|--------------|------|-----------------|-------|-----------------|--------|
| | n | Ht (cm) | n | Ht (cm) | |
| 2 | 22 | 82.89 (6.6) | 14 | 85.92 (10.5) | -1.068 |
| 3 | 19 | 87.78 (6.4) | 21 | 91.11 (8.6) | -1.374 |
| 4 | 30 | 95.26 (7.7) | 14 | 96.33 (10.1) | -0.388 |
| 5 | 38 | 104.74 (7.0) | 23 | 102.03 (7.2) | 1.449 |
| 6 | 21 | 107.52 (6.1) | 17 | 108.44 (7.5) | -0.416 |
| Total | 130 | 96.82 (11.3) | 89 | 97.25 (11.5) | -0.269 |

Standard deviations are presented in parentheses.

*Significant sex differences ($p < 0.05$)

There is no significant sex difference in boys and girls height. No significant sex difference was observed.

The mean and standard deviations of weight by age and sex are presented in Table 3.

Figure 3

Table 3 Mean weight (sd) of the subjects by age and sex.

| AGE (yrs) | BOYS | | GIRLS | | t |
|--------------|------|----------------|-------|----------------|--------|
| | n | Wt (kg) | N | Wt (kg) | |
| 2 | 22 | 10.07 (1.3) | 14 | 10.00 (1.9) | 0.125 |
| 3 | 19 | 11.11 (1.4) | 21 | 11.67 (1.8) | -1.091 |
| 4 | 30 | 13.03 (2.0) | 14 | 13.03 (2.5) | -0.157 |
| 5 | 38 | 15.23 (2.6) | 23 | 13.85 (2.1) | 2.173* |
| 6 | 21 | 16.26 (2.2) | 17 | 15.77 (2.1) | 0.704 |
| Total | 130 | 13.41 (3.0) | 89 | 12.98 (2.8) | 1.070 |

Standard deviations are presented in parentheses.

*Significant sex differences ($p < 0.05$)

Significant sex difference ($p < 0.05$) in weight was observed in age 5 years.

The mean and standard deviations of BMI by age and sex are presented in Table 4.

Figure 4

Table 4 Mean BMI (sd) of the subjects by age and sex

| AGE (Yrs) | BOYS | | GIRLS | | t |
|--------------|------|-----------------------------|-------|-----------------------------|---------|
| | n | BMI (kg/m ²) | n | BMI (Kg/m ²) | |
| 2 | 22 | 14.73 (1.7) | 14 | 13.61 (1.7) | 1.920 |
| 3 | 19 | 14.46 (1.6) | 21 | 14.06 (1.2) | 0.900 |
| 4 | 30 | 14.33 (1.2) | 14 | 14.17 (1.6) | 0.349 |
| 5 | 38 | 13.83 (1.5) | 23 | 13.25 (0.9) | 1.714 |
| 6 | 21 | 14.06 (1.5) | 17 | 13.39 (0.9) | 1.629 |
| Total | 130 | 14.22 (1.5) | 89 | 13.67 (1.3) | 2.866** |

Standard deviations are presented in parentheses.

*Significant sex differences ($p < 0.05$)

**Significant sex differences ($p < 0.01$)

It was observed from the table that there is marked decrease in BMI from age 2 to 5 years in boys and in case of girls sudden decrease in BMI was observed in age 5 and 6 years. It is clear from the table that there is marked significant difference ($p < 0.01$) in BMI in total sample of the population.

The prevalence of thinness by age and sex are presented in Table 5.

Figure 5

Table 5 Prevalence of thinness by age and sex among the 2-6 years children of Bauri caste of Nituria block of Purulia District.

| A G E (ye a- rs) | Boys | | | | | Girls | | | | | X ² |
|---------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
| | Thinness | | | | Nor- mal | Thinness | | | | Nor- mal | |
| | Gd.- I | Gd.- II | Gd.- III | Over- all | | Gd.- I | Gd.- II | Gd.- III | Over- all | | |
| 2 | 5 (22.7) | 2 (9.1) | 5 (22.7) | 12 (54.5) | 10 (45.5) | 4 (28.6) | 2 (14.3) | 5 (35.7) | 11 (78.6) | 3 (21.4) | 2.141 |
| 3 | 6 (31.6) | 2 (10.5) | 4 (21.2) | 12 (63.2) | 7 (36.8) | 6 (28.6) | 4 (19.0) | 5 (28.8) | 15 (71.4) | 6 (28.6) | 0.054 |
| 4 | 9 (30.0) | 2 (6.7) | 4 (13.3) | 15 (50.0) | 15 (50.0) | 2 (14.3) | 4 (28.6) | 1 (7.1) | 7 (50.0) | 7 (50.0) | 0.000 |
| 5 | 16 (42.1) | 5 (13.2) | 7 (18.4) | 28 (73.7) | 10 (26.3) | 8 (34.8) | 4 (17.4) | 6 (26.1) | 18 (78.3) | 5 (21.7) | 0.162 |
| 6 | 9 (42.9) | 2 (9.5) | 2 (9.5) | 13 (61.9) | 8 (38.1) | 6 (35.3) | 6 (35.3) | 0 (0.0) | 12 (70.6) | 5 (29.4) | 0.315 |
| Tot al | 45 (34.6) | 13 (10.0) | 22 (16.9) | 80 (61.5) | 50 (38.5) | 26 (29.2) | 20 (22.5) | 17 (19.1) | 63 (70.8) | 26 (29.2) | 1.530 |

Percentages are presented in parentheses.

*Significant sex differences ($p < 0.05$)

Results revealed that age-combined prevalence of undernutrition (Grades I, II and III combined) among boys and girls were 61.5 % and 70.8%, respectively. In general, the prevalence of Grade III thinness was less than the rate of Grade I thinness. The prevalence of Grade II thinness was intermediate, between Grade I and Grade III.

DISCUSSION

Undernutrition among children and adolescents is a serious public health problem internationally, especially in developing countries⁸⁹¹⁰. A recent study⁷ has stated that undernutrition is better assessed as thinness (low body mass index for age) than as wasting (low weight for height). Prior to this report there were no suitable thinness cut-offs for this age group. They have suggested that these new cut-off points should encourage direct comparison of trends in child and adolescent thinness worldwide. These cut-offs provide a classification of thinness for public health purposes.

The results of the present study clearly indicated that the nutritional situation of these children was serious with very high rates of thinness of 61.5 % and 70.8 % in boys and girls, respectively. A noteworthy point was that both sexes had similar rates of thinness.

We propose that future investigations in India should utilize

the cut-off points proposed by Cole et al ⁷ to determine that rates of thinness in children and adolescents. Such studies should provide data on prevalence of thinness that can be used for the formulation of effective public health policies. Moreover, they would also provide useful datasets for comparisons.

The present study revealed that the nutritional status of the pre-school children of Bauri community of these villages is in critical situation. To overcome this problem there is an immediate requirement for appropriate steps to be taken to improve nutritional status of this ethnic group in Purulia.

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