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NUTRITIONAL STATUS AMONG PRE-SCHOOL CHILDREN OF RAJBANSHI COMMUNITY OF UTTAR DINAJPUR DISTRICT, WEST BENGAL

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ABSTRACT

The present communiction investigates the nutritional status, using anthropometric measurements, of pre-school children (0-60 months of age) of Rajbanshi community in four villages (Tarangapur, Anaun, Singtore, Balarampur) of Bochadanga Gram Panchayat of Kaliyaganj Block, Uttar Dinajpur, West Bengal. A sample of 200 children, up to age of 5 years (0-60 months), was selected which included 101 boys and 99 girls. Standing height, weight, head circumference, mid-upper arm circumference were measured on the children and different indices of nutritional status, namely BMI-for-Age, head circumference-for-age and mid-upper arm circumference-for-age were computed. It was noticed that the majority of the studied children were normal, while there were a number of children who were facing severe under-nutrition, under-nutrition and over-nutrition. The girls were found to be more severely under-nourished than boys at 4 and 5years.

Keywords: *Nutritional Status, Anthropometry, Under five children, Rajbanshi, Uttar Dinajpur*

INTRODUCTION

Nutrition is one of the important determinants for good health. For healthy life in future it is necessary to maintain it from the childhood. Children between 0-5 years need more attention for access to good nutrition, which helps in growth and development of body and mind (Battalwar, 2014). Both under nutrition and over nutrition are dangerous for health (Vinod *et al.,* 2001; Ogunrinade, 2014). Lack of or excessive intake of nutrients can cause malnourishment (i.e. under-nutrition, over-nutrition), which is causing a double burden in the Indian context (Chakraborty and Bose, 2014). Anthropometry plays a vital role in assessing nutritional status. Malnutrition could be due to various causes, which may be due to life style issues, genetic causes or ecological reasons (Rao and Singh, 1970).

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According to World Health Organization (WHO), in India more than one third of the people suffer from malnutrition, which is causing more health problems and less life expectancy (Onis and Blçssner, 2003). WHO has well-defined nutrition, its causes and effects. It is particularly important to assess the nutritional status among children (Luthra and Parvan, 2010; Raman *et al.,* 2013).

People of Rajbanshi or Koch-Rajbanshi community mainly belong to Mongolo-Dravidian race and fall under the Scheduled Caste group, according to the Constitution of India order of 1950. The word Rajbanshi means the *'Royal Community'* (District Human Development Report Uttar Dinajpur, February, 2010). The people of this community call themselves as the descendants of the Koch dynasty of North Bengal. The Rajbanshi community has their own dialects, culture, and way of living. The Rajbanshi Language has its own complete grammar (Barman, 2013; Choudhury, 2013; Roy, 2013; Bhawal, 2015).

MATERIALS AND METHODS

The present cross-sectional study was carried out among the children of 0-5 years of age belonging to the Rajbanshi community. Data was collected in four villages (Tarangapur, Anaun, Singtore and Balarampur) of Bochadanga Gram Panchayat of Kaliyaganj Block of Raiganj Subdivision of Uttar Dinajpur District, West Bengal, India (District Census Handbook: Uttar Dinajour, 2011). The field-work was done by preparing schedule for a door-to-door household survey followed by collection of anthropometric measurements among pre-school children. 200 children (101 boys and 99 girls) were measured for the present study. Anthropometric measurements, namely standing height, weight, mid-upper arm circumference and head circumference were taken of each child to assess nutritional status following standard procedures (Mei et al., 2002; Cogill, 2003; Singh and Bhasin, 2006; Pandve and Singru, 2012; Singh *et al.,* 2013). Softwares like Microsoft Excel, Emergency Nutritional Assessment have been used for calculating and making tables, graphs and charts. Children under 6 months of age were excluded for calculation in Emergency Nutritional Assessment, which resulted in a total of 179 children, which were considered for calculating different derived indices for nutritional status.

RESULTS AND DISCUSSION

For the analysis in Emergency Nutritional Assessment (ENA) software, children less than 6 months old and more than 59 months were excluded, resulting in 179 children (90 boys and 89 girls). Among these 179 children, 50.3% are boys and 49.7% are girls. Table-1 show that the highest number of children (26.3%) are in the age range of 30-41 months while the lowest number (10.6%) are in the age range of 54-59 months.

Table-1: Sex ratio among the Boys and girls among the studied children

Age (months)	Boys No. (%)	Girls No. (%)	Total No. (%)	Ratio Boy : Girl
6-17	19 (50.0)	19 (50.0)	38 (21.2)	1.0
18-29	22 (57.9)	16 (42.1)	38 (21.2)	1.4
30-41	25 (53.2)	22 (46.8)	47 (26.3)	1.1
42-53	15 (40.5)	22 (59.5)	37 (20.7)	0.7
54-59	9 (47.4)	10 (52.6)	19 (10.6)	0.9
Total	90 (50.3)	89 (49.7)	179 (100.0)	1.0

BMI-for-Age

A total of 200 children (101 boys and 99 girls) were measured for their nutritional status on the basis of BMI-for-age (Table-2). 15.84% of the boys were suffering from severe under-nourishment, most of whom (28.57%) are in 5 years of age group. 21.78% boys were under-nourished, most of whom are in the age group of 4 years (45.00%). 55.45% boys were normal and most of them were 3 years of age (81.82%). 6.93% boys were over-nourished who were mostly of 1 year of age (23.53%). On the other hand, 15.15% girls were suffering from severely under-nourishment, and were mostly (32.00%) of 5 years of age. 19.19% girls were suffering from under-nourishment, most of whom were in the age group of 5 years (24.00%) and 65.66% of the girls were normal and were mostly found in 3 years age group (82.35%). It is clear from Table-2 that though some of the boys and girls were suffering from severe under-nourishment and under-nourishment but most of them were nutritionally normal.

Table-2: BMI-for-Age among the children

BMI for Age (in Years)	Boys					Girls				
	Severely Under-nourished	Under-nourished	Normal	Over nourished	Total	Severely Under-nourished	Under-nourished	Normal	Over nourished	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
1	2 (11.76)	2 (11.76)	9 (52.94)	4 (23.53)	17 (100)	2 (14.29)	1 (7.14)	11 (78.57)	0 (0.00)	14 (100.00)
2	5 (23.81)	5 (23.81)	9 (42.86)	2 (9.52)	21 (100)	1 (4.55)	4 (18.18)	17 (77.27)	0 (0.00)	22 (100.00)
3	2 (9.09)	1 (4.55)	18 (81.82)	1 (4.55)	22 (100)	0 (0.00)	3 (17.65)	14 (82.35)	0 (0.00)	17 (100.00)
4	1 (5.00)	9 (45.00)	10 (50.00)	0 (0.00)	20 (100)	4 (19.05)	5 (23.81)	12 (57.14)	0 (0.00)	21 (100.00)
5	6 (28.57)	5 (23.81)	10 (47.62)	0 (0.00)	21 (100)	8 (32.00)	6 (24.00)	11 (44.00)	0 (0.00)	25 (100.00)
Total	16 (15.84)	22 (21.78)	56 (55.45)	7 (6.93)	**101 (100)**	15 (15.15)	19 (19.19)	65 (65.66)	0 (0.00)	**99 (100.00)**

Head Circumference-for-age

Head circumference-for-Age is one of the important measurements for nutritional assessment. Table-3 shows that about 6.93% boys were severely under-nourished, mostly of 4 years of age (10.00%). 11.88% boys were under-nourished, many of whom were of 3 years (22.73%). 79.21% of the boys were

normal, highest number of whom were found in the age groups of 2 and 5years (85.71%). 1.98% boys were over-nourished, among whom 5.88% are found in the age group of 1 year. Among girls, 75.76% were normal, the highest number were of 3 years of age (88.24%). 7.70% girls were severely under nourished and girls of age 5 years (12.00%) were found highest in number. 15.15% girls were under nourished, the number of whom was highest at 4 years (28.57%). About 2.02% girls are found to be over nourished, which can be seen among the one year old (14.29%).

Table-3: Nutritional status in respect to the Head Circumference-for-Age among the studied children

Head Circumference-for-Age (in Years)	Boys					Girls				
	Severely Under-nourished	Under-nourished	Normal	Over nourished	Total	Severely Under-nourished	Under-nourished	Normal	Over nourished	Total
	N (%)	N (%)	N (%)	N (%)	No. (%)	N (%)	N (%)	N (%)	N (%)	N (%)
1	1 (5.88)	1 (5.88)	14 (82.35)	1 (5.88)	17 (100.00)	0 (0.00)	1 (7.14)	11 (78.57)	2 (14.29)	14 (100.00)
2	2 (9.52)	1 (4.76)	18 (85.71)	0 (0.00)	21 (100.00)	2 (9.09)	5 (22.73)	15 (68.18)	0 (0.00)	22 (100.00)
3	1 (4.55)	5 (22.73)	16 (72.73)	0 (0.00)	22 (100.00)	1 (5.88)	1 (5.88)	15 (88.24)	0 (0.00)	17 (100.00)
4	2 (10.00)	3 (15.00)	14 (70.00)	1 (5.00)	20 (100.00)	1 (4.76)	6 (28.57)	14 (66.67)	0 (0.00)	21 (100.00)
5	1 (4.76)	2 (9.52)	18 (85.71)	0 0.00)	21 (100.00)	3 (12.00)	2 (8.00)	20 (80.00)	0 (0.00)	25 (100.00)
Total	7 (6.93)	12 (11.88)	80 (79.21)	2 (1.98)	**101 (100.00)**	7 (7.70)	15 (15.15)	75 (75.76)	2 (2.02)	**99 (100.00)**

Mid-Upper Arm Circumference-for-Age

According to Mid-upper arm circumference-for-Age, 71.43% boys were normal among whom the boys of 2 and 5 years (85.71%) were highest in number (Table-4). 8.16% of boys are severely under-nourished, and highest number of such boys was in age group of 4 years (10.00%). 9.81% were under nourished, and most undernourished (22.73%) were found in age group of 3 years. 11.22% boys were over nourished, many of whom belonged to age group of 1 year (7.14%). Among girls, 81.44% were normal, and the highest number of these was in the age of 1 year (91.67%). Next, 9.28% of girls were severely under-nourished and highest number of these (20.00%) was in the age group of 5 years. 9.28% of girls were under-nourished, among which the highest number (19.05%) of girls were in the age of 4 years.

Table-4: The nutritional status of the studied boys according to the mid-upper arm circumference-for-age

Mid-upper Arm Circumference-for-Age (in Years)	Boys					Girls				
	Severely Under-nourished	Under-nourished	Normal	Over Nourished	Total	Severely Under-nourished	Under-nourished	Normal	Over nourished	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
1	1 (7.14)	1 (7.14)	11 (78.57)	1 (7.14)	14 (100.00)	0 (0.00)	1 (8.33)	11 (91.67)	0 (0.00)	12 (100.00)
2	1 (4.76)	2 (9.52)	18 (85.71)	0 (0.00)	21 (100.00)	0 (0.00)	2 (9.09)	20 (90.91)	0 (0.00)	22 (100.00)
3	2 (9.09)	5 (22.73)	15 (68.18)	0 (0.00)	22 (100.00)	3 (17.65)	0 (0.00)	14 (82.35)	0 (0.00)	17 (100.00)
4	2 (10.00)	2 (10.00)	16 (80.00)	0 (0.00)	20 (100.00)	1 (4.76)	4 (19.05)	16 (76.19)	0 (0.00)	21 (100.00)
5	2 (9.52)	1 (4.76)	18 (85.71)	0 (0.00)	21 (100.00)	5 (20.00)	2 (8.00)	18 (72.00)	0 (0.00)	25 (100.00)
Total	8 (8.16)	9 (9.18)	70 (71.43)	11 (11.22)	**98 (100.00)**	9 (9.28)	9 (9.28)	79 (81.44)	0 (0.00)	**97 (100.00)**

Table-5 shows the prevalence of acute malnutrition, based on mid-upper arm circumference cut off's and by sex.Considering upper arm circumference, the prevalence of severe malnutrition would be 100%. Similarly, using MUAC cut-offs of WHO (Table-6) all the children from different age groups of both the genders would be classified as suffering from severe wasting (<115 mm). None was found normal and with moderate wasting.

Table-5: Prevalence of acute malnutrition, based on MUAC cut off's and by sex

Nutritional Status	Sexes combined n = 179	Boys n = 90	Girls n = 89
Prevalence of total malnutrition (< 125 mm and/ or oedema)	(179) 100.0 %(97.9 - 100.0 95% C.I.)	(90) 100.0 %(95.9 - 100.0 95% C.I.)	(89)100.0 %(95.9 - 100.0 95% C.I.)
Prevalence of moderate malnutrition(< 125 mm ande" 115 mm, no oedema)	(0) 0.0 %(0.0 - 2.1 95% C.I.)	(0) 0.0 %(0.0 - 4.1 95% C.I.)	(0) 0.0 %(0.0 - 4.1 95% C.I.)
Prevalence of severe malnutrition(< 115 mm and/or oedema)	(179) 100.0 %(97.9 - 100.0 95% C.I.)	(90) 100.0 %(95.9 - 100.0 95% C.I.)	(89) 100.0 %(95.9 - 100.0 95% C.I.)

From the results of the present study, it can be stated that for BMI-for-age, head circumference-for-age and mid-upper arm circumference-for-age (Tables 2, 3, 4) children were mostly normal. But on the basis of MUAC, mostly the children would be considered as undernourished (Table-5 and Table-6) Nutritional status in different age groups shows different scenario. Children in the age of 5 and 4years were mostly severely under-nourished or moderate undernourished where mostly normal are in the age 3years, some were over-nourished in age 1year (Tables 2, 3 and 4). Among boys and girls of age 4 and 5 years, girls are more severely under-nourished and under-nourished (Table-2). However, in these two age groups, the number of normal children was almost

similar. Table-3 shows that among boys and girls, boys are more severely undernourished in the age 4 years but less severely under-nourished in age 5 years; normal children were almost similar for both boys and girls. At 5 and 3 years, girls are more severely under-nourished than boys, while at 4 years the number of boys with severe under-noutrition, was more.

Table-6: Prevalence of wasting by age, based on MUAC cut-off

	Severe wasting (< 115 mm)	**Moderate wasting (≥ 115 mm and < 125 mm)**	**Normal (≥ 125 mm)**	
Age (months)	N (%)	N (%)	N (%)	Total (%)
6-17	38 (100.0)	0 (0.0)	0 (0.0)	38 (100%)
18-29	38 (100.0)	0 (0.0)	0 (0.0)	38 (100%)
30-41	47 (100.0)	0 (0.0)	0 (0.0)	47 (100%)
42-53	37 (100.0)	0 (0.0)	0 (0.0)	37 (100%)
54-59	19 (100.0)	0 (0.0)	0 (0.0)	19 (100%)
Total	179 (100.0)	0 (0.0)	0 (0.0)	179 (100%)

CONCLUSIONS

Among the four villages (Tarangapur, Anaun, Singtore and Balarampur) a total of 200 children (101 are male and 99 are females)were studied and Z-score values of WHO were measured for different measurements. Emergency Nutritional Assessment (ENA) software could be used for assessment of nutritional status of only179 children, since ENA does not calculate children under 6 months of age.

According to all the nutritional indices used here, the highest number of the children were found to be normal. Children suffering from severe under-nourishment, moderate under-nourishment and over-nourishment were found to be less. In the present sample, the incidence of undernutrition was more in girls than boys of the same age group. Children in the age group of 4 and 5 years were more severely under-nourished and under-nourished than the children of other age groups. Over-nourished children mostly belonged to the 1 year age group. When the diets of the children was considered it was found that the dietary habits among children are mostly carbohydrates and different vitamins with minerals from vegetables and rice, but the intake of protein and fat rich foods was very less, which could be the reason of the observed under-nourishment.

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