Nutritional status among school going boys and girls (5-17 years) of Bharia Tribe (PVTG) of Patalkot – District Chhindwara (M. P.) India

A. K. Ahirwar[1]and R. K. Gautam[2]

[1]Ajay K. Ahirwar, Department of Anthropology, Dr. H.S. Gour Vishwavidyalaya (A Central University), Sagar (MP), India.

[2] Rajesh K. Gautam, Centre for Quantitative Obesity Research, Montclair State University, New Jersey, USA & Department of Anthropology, Montclair State University, New Jersey, USA
E-mail: goutamraj2006@gmail.com, ajayahi996@gmail.com.

Corresponding Author: Rajesh K. Gautam, International Visiting Scholar and Raman Post-Doctoral Fellow, Center for Quantitative Obesity Research, Montclair State University, New Jersey, USA. Email: goutamraj2006@gamil.com

ABSTRACT

Background: In India, children and adolescent are suffering from nutrition related problems, which obstruct their growth and development. The total population of tribal community in India is 8.08%. They are most deprived group. They have mass poverty, illiteracy, malnutrition and conventional health problems. Methodology: The present cross sectional study was conducted in a total of 446 individuals consisting of 207 boys and 239 girls of 5-17 years age. They were recruited for assessment of Nutritional status by z-score of weight for age, height for age and weight for height based on anthropometric measurements. Result: The findings of this study revealed that there were undernutrition, as more than one third (35.9%) Bharia boys and girls were underweight, almost equal proportion were stunted (31%) and a total of 19.0% were wasted. Conclusion: Comparison of present finding with other tribal children of India, indicates that the nutritional status of Bharia children is comparatively better than other tribes, but at the same time, they are lagging behind from international standards of WHO. Elimination of poverty and illiteracy as well as quality eeducation to tribal children will certainly change the scenario.

Keyword: Stunting, Wasting, undernutrition, Z-score, Tribes.

INTRODUCTION

In India, undernutrition among children and adolescents is one of the major health problems. Further, rural and tribal children are more susceptible, which lead to growth retardation and hindered development. According to Gaiha (1997) approximately 800 million individuals were reported undernourished worldwide, around one-third (258 million individuals) of them were concentrated in South Asia. It is reported that Undernutrition is one of the principal determinant of ill-health which lead to premature mortality among children (Pelletier 1998; Nandy et al. 2005; Uthman and Aremu 2008). It has been estimated that approximately 70% of the world's malnourished children live in Asia, giving that region the highest concentration of worldwide childhood malnutrition (UN 2012).

India, being a most populous and developing country, there is wide spread poverty, therefore, a vast majority of individuals are undernourished and underprivileged (Ramachandran 2007; Antony and Laxmaiah 2008). The National Family Health Survey (NFHS-3) of India has reported that about 60% of tribal children under five years of age were underweight, 59% were stunted and 21% children were wasted. About 50% were moderately or severely malnourished these rates are higher in those communities which are socially and economically underprivileged. India has several socially disadvantaged communities among which scheduled tribe are the most deprived ones. The tribal's constitute 8.08 % of total population of India and characterized by widespread poverty, illiteracy malnutrition lack of safe drinking water and hygienic condition (Tiwari et al., 2007). Central India is demographically lagging behind, there is wide spread poverty and illiteracy; which lead to many health problems among different sections of population. The problem of undernutrition is more pronouncing in Central India (Adak et al. 2006, Gautam et al. 2006, Gautam 2008, Gautam and Thakur 2009, Thakur and Gautam 2015) and among the Tribes (Gautam et al. 2016). Undernutrition among children is one of such problem which has given least attention (Mitra et al., 2007). Therefore, present study was aimed to assess the nutritional status among the children of a tribe known as Bharia of Patalkot, district Chhindwara of Madhya Pradesh State of Indian Union. Bharia being a particularly vulnerable tribal group (PVTG), they are more vulnerable (Ahirwar and Gautam 2015). Hence, the purpose of this cross-sectional study was to find out the prevalence of undernutrition among the Bharia children of Patalkot (Chindwara, MP).

MATERIALS AND METHODS

This cross sectional study was conducted during December 2012 to January 2013 among the Bharia (PVTGs) tribe of Patalkot region of district Chhindwara. It is one of the most secluded land-locked regions. There is a group of 12 villages, which include 24 settlements. These settlements are located in a deep gorge at origination of river Dudhi and Gayan. This gorge is spread in an area of 79 sq km. In between 22.24° to 22.29° of latitude at the north of equator and 78.43° to 78.50 ° longitude at east of prime meridian, at an average height of 2750–3250 feet above from mean Sea level. This horse–shoe shaped valley is surrounded by giant hills. Bharias of Central India are one of the three identified PVTGs of Madhya Pradesh state of Indian Union. They are monogamous and observe clan exogamy. Bharias are dependent on agriculture and forest produce for their subsistence. Bharia people prefer *paze* (drink of maize) in breakfast and chapatti of maize and *bhallar dal* (beans) in lunch. The vast majority of the adult populations in the studied households were found to be engaged in unskilled manual labour and agriculture. A total of 446 individuals consisting of 207 boys and 239 girls aged 5-17 years were recruited from their home, *anganwadi*, schools and ashrams (hostels) of Patalkot region of Chhindwara district of Madhya Pradesh state of India. The children suffering from mental or physical abnormality were excluded and children looking apparently normal were recruited. Anthropometric indicators are used to assess nutritional status in children. These are underweight (low weight-for-age), stunting (low height-for-age), and wasting (low weight-for-height) (WHO, 1995).

It is accepted worldwide that the anthropometry is a non-invasive, sensitive and cost effective technique for nutritional assessment. For present investigation, body weight, stature were taken with all possible caution maintaining uniformity and accuracy in the techniques, after undergoing extensive training following the standard procedure as described by (Gibsion, 1990). Portable digital weighing machine and anthropometer rod were used to measure the subjects recruited. Before data collection, written consent were obtained from competent authorities of Bharia development agency, Principals/Head-master of schools, Gram Pradhan, Warden of Ashrams (Hostels) and Aganwadi workers. Due consideration were given for compliance of ethical guideline as per Helsinki declaration 2000. After collecting the data, SPSS (Statistical Packages for Social Sciences) and Microsoft-excel software were used for analysis and tabulation. For analysis of undernutrition 'ENA for SMART 2011' was used. The extent of different types of under-nutrition was assessed standard deviation (SD) classification based on Z-

scores for weight for age (under weight), height for age (stunting), and weight for height (wasting) were computed following Waterlow (1977). For further details of study technique Ahirwar and Gautam (2015) and Gautam et al. (2015) can be referred.

RESULTS

The age-wise means and standard deviations for Z-scores of body weight for age (WAZ), height for age (HAZ) and weight for height (WHZ) are presented in Table1 for boys and girls. It is evident that the mean of Z-score of body weight varies from 4.09 to 5.53, whereas standard deviation is <2; similarly mean of Z-score of height for age varies between 4 and 7 with standard deviation of <3. The distribution of subjects as per Z-scores for WAZ, HAZ and WHZ are presented in Table 2. It is apparent that most of the studied population is distributed between Z-score -4 to +1, which indicate departure from the normal status to the deficient categories.

Here, three types of departures were observed viz. underweight (bodyweight for age), stunting (height for age) and wasting (bodyweight for height). As evident from Table 3 that boys are more underweight (44.9%) as compared to girls (28%); Further, almost double of boys 6.8% were found severely underweight (<-3 Z-score) than the girls (3.3%). A total of approximately one third (30.9%) boys and girls were found moderately underweight.

The prevalence of stunting is displayed in Table 4. A total of 30.9% boys and 31.4% girls were found stunted (Z-score≤ -2). The severe stunting is slightly higher among boys (13.5%) as compared to girls (10%); although the moderate type of stunting was found higher among the girls (21.3%) as compared to boys (17.4%). Chronic malnutrition among children leads to stunting, whereas acute malnutrition resulted into wasting. Wasting means waste of muscles and fat tissues due to lack of proper nutrition. As evident from Table 5, a total of 19% Bharia children were suffering from wasting. The prevalence of wasting among boys were found more than double (29.6%) than girls (12.9%). The prevalence of severe wasting was found 11.7% and the boys were found more severely wasted (8.6%) than the girls (3.6%).

Table 1. Age and sex-wise means and standard deviations for Z-scores of weight for age, height for age and weight for height among Bharia (PVGT) boys and girls of Patalkot, District Chhindwara (MP).

Age in years	Sex	No.	Weight for age		Height for age		Weight for height	
			Mean	SD	Mean	SD	Mean	SD

5	Girls	10	5.30	1.25	5.40	1.58	5.80	1.14
	Boys	9	5.44	1.24	7.00	1.41	4.78	1.64
6	Girls	32	5.22	1.36	5.63	1.50	5.50	1.27
	Boys	13	4.31	1.11	5.08	2.60	4.92	1.38
7	Girls	15	5.53	0.92	6.07	1.58	5.53	1.85
	Boys	16	4.81	1.94	5.63	2.55	4.75	1.61
8	Girls	22	5.36	1.18	5.32	1.29	5.86	1.55
	Boys	19	4.58	1.12	5.21	1.51	5.11	0.74
9	Girls	21	5.43	1.12	5.24	1.26	6.33	1.11
	Boys	11	4.91	1.04	5.55	1.51	5.00	0.45
10	Girls	40	5.18	0.90	4.88	0.82	6.20	1.54
	Boys	13	4.15	0.55	4.62	0.77	4.69	0.85
11	Girls	17	4.76	0.75	4.35	1.46		
	Boys	18	5.33	1.19	5.78	1.73		
12	Girls	20	5.30	1.45	4.95	1.36		
	Boys	34	5.09	1.16	5.24	1.07		
13	Girls	8	4.88	0.99	4.13	1.81		
	Boys	18	4.78	1.00	4.83	1.25		
14	Girls	27	4.89	0.80	4.30	1.14		
	Boys	9	5.00	0.71	5.22	1.09		
15	Girls	12	4.83	0.83	4.92	0.51		
	Boys	18	4.72	1.07	5.11	0.76		
16	Girls	5	4.40	0.55	4.40	0.55		
	Boys	18	4.50	0.71	4.33	1.50		
17	Girls	10	4.60	0.70	4.50	0.53		
	Boys	11	4.09	0.54	4.00	0.89		

Table 2: Distribution of boys and girls according to Z-score for Weight for age, Height for age and Weight for height among Bharia (PVGT) boys and girls of Patalkot, District Chhindwara(MP).

Z-Score	Weight for age				Height for age				Weight for height			
	Girls		Boys		Girls		Boys		Girls		Boys	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
-6	0	0	1	0.5	0	0	1	0.5	1	0.7	1	1.2
-5	0	0	2	1	5	2.1	7	3.4	1	0.7	3	3.7
-4	8	3.3	14	6.8	23	9.6	19	9.2	4	2.9	3	3.7
-3	59	24.7	77	37.2	51	21.3	37	17.9	13	9.3	17	21
-2	102	42.7	65	31.4	89	37.2	63	30.4	37	26.4	34	42
-1	38	15.9	34	16.4	44	18.4	52	25.1	41	29.3	19	23.5
0	28	11.7	11	5.3	17	7.1	14	6.8	21	15	4	4.9
1	4	1.7	2	1	6	2.5	7	3.4	18	12.9	0	0
2	0	0	1	0.5	4	1.7	5	2.4	3	2.1	0	0
3	0	0	1	0.5	0	0	1	0.5	1	0.7	0	0
4	0	0	0	0	0	0	1	0.5	0	0	0	0
5	0	0	0	0	0	0	1	0.5	0	0	0	0
Total	239	100	207	100	239	100	207	100	140	100	81	100

Table 3. Prevalence of underweight (Weight for Age) among Bharia (PVGT) boys and girls of Patalkot, District Chhindwara (MP).

Classification of Underweight	All n = 446			Boys n = 207			Girls n = 239		
	No.	%	95% CI	No.	%	95% CI	No.	%	95% CI
Underweight (<-2 z-score)	160	35.9	31.6 - 40.4	93	44.9	38.3 - 51.7	67	28	22.7 - 34.0
moderate underweight (<-2 z-score and >=-3 z-score)	138	30.9	26.8 - 35.4	79	38.2	31.8 - 44.9	59	24.7	19.6 - 30.5
severe underweight (<-3 z-score)	22	4.9	3.3 - 7.4	14	6.8	4.1 - 11.0	8	3.3	1.7 - 6.5

Table 4. Prevalence of stunting (Height for Age) among Bharia (PVGT) boys and girls of Patalkot, District Chhindwara (MP).

Classification of Stunting	All N=446			Boys N=207			Girls N=239		
	No.	%	95% CI	No.	%	95% CI	No.	%	95% CI
Stunting (<-2 z-score)	139	31.2	27.0 - 35.6	64	30.9	25.0 -37.5	75	31.4	25.8 - 37.5
Moderate stunting (<-2 z-score and >=-3 z-score)	87	19.5	16.1 - 23.4	36	17.4	12.8 -23.1	51	21.3	16.6 - 27.0
Severe stunting (<-3 z-score)	52	11.7	9.0 - 15.0	28	13.5	9.5 - 18.9	24	10	6.8 - 14.5

Table 5. Prevalence of stunting (Height for Age) among Bharia (PVGT) boys and girls of Patalkot, District Chhindwara (MP).

Classification of Wasting	All N=221			Boys N=81			Girls N=140		
	No.	%	95% CI	No.	%	95% CI	No.	%	95% CI
Wasting (<-2 z-score)	42	19	14.4 - 24.7	24	29.6	20.8 - 40.3	18	12.9	8.3 - 19.4
Moderate Wasting (<-2 z-score and >=-3 z-score)	30	13.6	9.7 - 18.7	17	21	13.5 - 31.1	13	9.3	5.5 - 15.2
Severe Wasting (<-3 z-score)	12	5.4	3.1 - 9.2	7	8.6	4.2 - 16.8	5	3.6	1.5 - 8.1

Table 6: The prevalence of undernutrition in school going different studies conducted in tribal children compared with Bharia Tribal children of Patalkot chhindwara District.

Tribe	District	State	Age group	Sample size	Underweight (%)	Stunting (%)	Wasting (%)
Kamar[1]	Raipur, Dhamtary	Chattisgarh	7-12	177	48.0	60.5	45.2
Jenukuruba[2]	Mysore	Karnataka	6-10	135	60.0	46.0	30.4
Lodha[3]	Paschim Medinipur	West Bengal	6-14	91	23.1	18.7	18.9
Santal[4]	Paschim Medinipur	West Bengal	5-12	442	33.7	17.9	29.4
Koramudi[5]	Paschim Medinipur	West Bengal	6-13	72	47.2	48.6	19.4
Bharia (present study)	Chhindwara (Patalkot)	Madhya Pradesh	5-17	446	35.9	31.2	19.0*
* Wasting was computed for boys and girls of 5-10 years of age (N=221)							
Source: (Mitra et. al., 2007)[1], (Jai Prabhakar & Gangadhar, 2009)[2], (Bisai et al., 2008)[3], (Bisai, 2014)[4], (Bisai & Mallick, 2002)[5].							

DISCUSSION AND CONCLUSION

It is a matter of great concern that a vast majority of children are undernourished. According to an estimate of United Nations a total of 52 million children of under 5 year of age were wasted in 2011; 70% of these children live in Asia, mostly in south-central Asia (UN 2012).

A significant proportion of Indian population is young, and a total of 38% were below 18 years of age (Census, 2011). This proportion is further higher among rural and tribal population because of higher fertility. Among tribal's the 'particularly vulnerable tribal groups' (PVTG) are mostly lagging behind not only in demographic indicators but also in various parameters of development viz. economic, education, subsistence, health (undernutrition/mortality), technology etc. The Bharia of Patalkot of district Chhildwara of Madhya Pradesh are still miles away from modern way of life. They are still depriving from basic civil amenities of safe drinking water, moderate housing, health care facilities, roads and transport etc. Several programmes are being executed by Bharia development agency for upliftment of Bhariya tribe, but the real scenario is still pathetic. The findings of the present study clearly indicate that the problem of undernutrition is still prevalent as almost one third of boys and girls of 5-17 years of age were found underweight, stunted and wasted. The comparison of present finding with other tribal populations like Kamar of Chhattisgarh, Jenukuruba of Karnataka, Lodha, Santal and Koramudi of West Bengal clearly exhibits that undernutrition is wide spread among the Indian tribes (Table 6 and Figure1.).
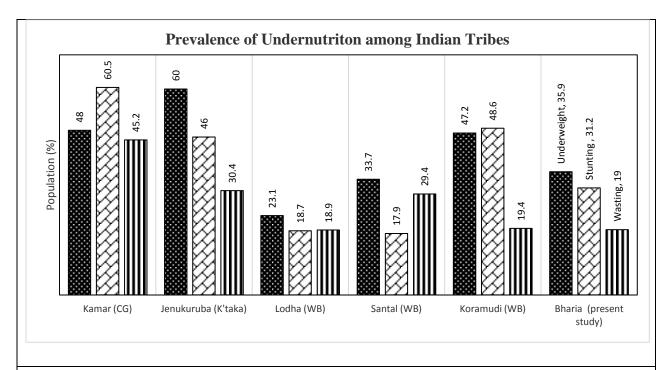
Figure 1. Prevalence of undernutrition among Indian Tribes.

It was found that the prevalence of undernutrition is higher among boys as compared to girls; which is contrary to non-tribal population of central India. Thakur and Gautam (2015) have reported that prevalence of under-nutrition was higher among the central Indian girls because of sex discrimination in nurturing the male and female kids. These findings indicate that among tribes, the girls were not discriminated alike the caste people of the region.

In the view of present findings, it can be suggested that there is an urgent need of independent evaluation and strict monitoring of supplementary nutritional and mid-day meal programme being run among the Bharia of Patalkot. Simultaneously alleviation of poverty and quality education to tribal children will certainly change the scenario of these people and the region. To achieve the goal of developed nation, it is essential.

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