PREVALENCE OF THINNESS AMONG THE SABARS SCHOOL GOING CHILDREN OF PURULIA DISTRICT, WEST BENGAL, INDIA

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Short running title: Thinness among Sabar children

ABSTRACT

The aim of the present study was to find out the prevalence of thinness among the school going Sabar children (6-13 years) of Purulia district of West Bengal. This cross-sectional study was undertaken at the different villages of Purulia district, West Bengal. A total of 226 (105 boys and 121 girls) aged 6 to 13 years were investigated. Anthropometric measurements were taken according the standard protocol. The age and sex specific thinness were estimated according to Cole et al., (2007). Significant age variations in all anthropometric variables including BMI were observed. There were significant sex differences observed in mean weight and mean BMI at the age of 6 and 7 year, respectively. The overall prevalence of thinness was 66.80 %. The present study reported a very high (critical situation) prevalence of thinness among the school going Sabar children. Maximum prevalence of thinness was noticed at the age of 6 year (91.3%). Minimum prevalence of thinness was found at the age of 12 year (48.30%). This study indicates that the status of undernutrition (thinness) of the school going children in the above studied area was very high. This study will be helpful to make policy to develop the health status including Sabar tribe in this area.

Keywords: Thinness, school going children, Sabar, India

Introduction:

Overall socioeconomic growth and development of any nation directly or indirectly depends on the health and nutritional status of the children (Pujar et al., 2016). It also links with the progress in human resources and economic development of a country (Amirthaveni et al., 2001). It is directly determined by economic and human resource development. Undernutrition is highly prevalent in the third world countries including India. Thinness is a state that occurs due to inadequate nutrients food and inner function of the organ of the body. Thinness is leading to a major critical problem of the developing countries like India (Das & Bose, 2011) and it is measured by body mass index.

The tribal population constituted about 8.6 % of total population of India (Census of India, 2011). The Sabar mainly live in the State of Bihar, Madhya Pradesh, Orissa and West Bengal. Major portion of Sabar/ Kharia concentrated in Bihar (Vidyarthi and Upadhyay, 1980). Nutritional status of the children remains very poor for most of the states, especially in the tribal populous regions and lower socioeconomic groups in India (Das et al., 2017). However, several types of nutritional programs are also being run in India, but the result of this programme has not satisfied to improve the nutrition status of the children (Shahnawaz and Singh, 2014). India accounts for about 40 % undernourished children in the world, which significantly associated with high rates of morbidity and mortality in the country (Levinson, 1988). 89% Children die due to malnutrition who are only or moderately malnourished (Mandal and Bose, 2014). Anthropometry is the most practical and easy to perform method for evaluating the prevalence of undernutrition among children and adolescent (Bisai et al., 2011). Good nutrition is the cornerstone for child in this growing period. Children are habituated in a certain diet pattern from this age, and their choice of food also starts to develop from this age.

Health status of the children depends on proper nutrition. A healthy adult will be the backbone of the society as well as the country. Primary school age is a dynamic period of physical growth and cognitive development of the child (Galgamuwa et al., 2017). Young children need high protein and energy food for proper growth and development, which improve their immune system and cognitive development and they are more susceptible to infections diseases than adults and are more prone to malnutrition (Endris, 2017 & Purohit et al., 2017). When adolescent girls become pregnancy with poor nutrient store are more likely to give birth to low birth weight or intrauterine growth obstruct baby that in later life, they face to be a metabolic disorder (Guilloteau et al., 2009). About half of all child deaths worldwide is a result of malnutrition (Priyanka et al., 2016). Despite enormous economic progress achieved in the past two to three decades, malnutrition among children and adolescents in both urban and rural India still persists. Inadequate access to health facilities and socioeconomic disparities are resulting malnutrition among children and adolescent (Pal et al., 2016) in India.

Usually, stunting (low height for age), wasting (low weight for height) and underweight (low weight for age) are used to assess childhood undernutrition (Waterlow et al., & WHO, 1995). BMI has also

been mostly used for assessing undernutrition (WHO, 1983) among children and adolescent. Cole at al. (2007) had developed a new cut-off for assessing thinness among children and adolescent from a multicentric data set and it is validated at a large by different data set throughout the globe. Nutritional status is the status of an individual with respect to their health is defined by their nutrition. Thus, the nutritional status of the population shows major variation between countries. However, poor nutritional health status contributes to an array of morbidities and mortality. With this brief review above, this paper tried to evaluate the thinness status of School going children of Purulia district of West Bengal using internationally accepted cut-offs of Body Mass Index (BMI) given by Cole et al. (2007)

MATERIAL AND METHODS

The setting and sample

The present cross-sectional was conducted from March, 2020 to December, 2020 among 6 to 13 years old school going children of Purulia district of West Bengal. A total of 226 (Boys: 105; Girls; 121) Sabar school going children were investigated. This study was carried out at three Sabars dominant villages i.e. Damodarpur and Bhutam from Puncha Block and Akarbaid village of Purulia-1 block in Purulia district, West Bengal. The Sabars are one of the Adivasi of Munda ethnic group tribe who live mainly in Jharkhand, Chhattisgarh, Madhya Pradesh, Odisha and West Bengal. According to the Census of India (2011) the total population of Sabar was 40,374 among them 20,064 were male and 20,310 were females in West Bengal. Majority of Sabars people are living in Paschim Medinipur, Purulia, Bankura districts. Literacy rate was not satisfactory among them, only 40.64 % Sabars were literate. Males (49.87 %) were more literate than females (31.52 %).

Method of sampling

The subjects were selected purposively from above mentioned villages. Those subject or parents (for lower aged children) were voluntarily agreed to participate, included in this study.

Estimation of age

Age of the subjects was ascertained from birth certificate, immunization card (polio card) and AADHAR card. Subsequently, age of the subjects was also confirmed by the parents of the children.

Data on Socio-economic and Socio-demography

A pre-tested questionnaire was used to record the data. Apart from anthropometric measurements, data on socio-economic aspect, socio-demography had also been collected.

Anthropometric measurements

Height and weight were measured using standard procedure as recommended by Lohman et al. (1988) Height and weight of the subjects were measured with an accuracy of 0.1 cm. and 500 gm, respectively. Height was measured in centimetre using Martin Anthropometer (GPM- Switzerland). Weight of the subjects was measured in kg using spring balance weighing machine (Libra, India). BMI was computed using the following standard equation: BMI = Weight (kg) / height (m2).

Assessment of thinness

Thinness of the subjects was evaluated using age and sex specific cut-off values of BMI according to Cole et al., (2007). The grades of thinness were categorised as grades III, II and I, refer to severe, moderate and mild thinness, respectively. Age and sex specific cut-off values are given in table 1.

Statistical analyses

Student's t test was undertaken to assess sex differences in height, weight and BMI. One-way ANOVA was employed to test age variations of height, weight and BMI. All statistical analyses were set at $p \leq 0.05$ level.

RESULTS

An anthropometric characteristic of the studied sample is presented in table 2. It is depicted that all anthropometric variables and derived variable showed significant age variation irrespective of sex. Mean weight of subject showed maximum age variations among boys (F = 42.81, $p < 0.001$) as well girls (F = 33.45, $p < 0.001$). Higher age variation in mean height was observed among boys (F = 26.91, $p < 0.001$) than their counterpart (F= 19.51, $p < 0.001$) But in case mean BMI, it was noticed that girls (F= 13.66, $p < 0.001$) were higher than boys (F=9.81, $p < 0.001$). Significant sex difference in mean BMI was observed at the age of 7 year (t = 2.33, $p < 0.05$). Boys at the age of 6 showed higher mean values of weight (t = 2.08, $p < 0.05$) than girls.

 Table 3 shows the prevalence of thinness among the Sabar school going children. Age and sex combined overall prevalence of thinness among the studied children was 66.80%. It was noticed that 91.3% children were thin at the age of 6 year. Sex specific overall rates of thinness were higher among boys ((71.43 %) than girls (62.81 %).

Younger girls up to age of 6 and 7 years showed higher prevalence of Grade-III (Severe) thinness than boys. This observation might be a replication of negligence on early girls child. It also might be an inequality of food sharing due to poverty. Overall, there is a decreasing tend in the rate of thinness with increasing of age up to 9 years.

However, the sex specific age combined prevalence of Grade-III (severe) thinness was higher among girls (18.18 %) than boys (11.43 %). The rate of grade-I and grade-II thinness were higher among boys (Gr- I: 38.10 %; Gr-II, 21.90 %) than girls (Gr-I: 31.40 %; Gr-II: 13.22 %). The above results indicate that the Sabar school going children (6 to 13 years) were suffering a severe nutritional deficiency in the form of thinness.

Table1. Age and sex specific cut-off values of thinness (Cole et al. 2007)

	Boys		Age	Girls		
CED-III	CED-II	CED-I	(years)	CED-III	CED-II	CED-I
12.50	13.15	14.07	6	12.32	12.93	13.82
12.42	13.08	14.04	7	12.26	12.91	13.86
12.42	13.11	14.15	8	12.31	13.00	14.02
12.50	13.24	14.35	9	12.44	13.18	14.28
12.66	13.45	14.64	10	12.64	13.43	14.43
12.89	13.72	14.97	11	12.95	13.79	15.05
13.18	14.05	15.35	12	13.39	14.28	15.62
13.59	14.48	15.84	13	13.92	14.85	16.26

DISCUSSION

There is a high impact of nutrients in foods on growth as well as nutritional status among the going children. Proper nutrition accelerates the human growth in early ages and normal growth of this age group reflects on the nutritional status. Whereas improper diet causes of malnutrition and it has an adverse effect on human health status. Worldwide studies have already been documented that rural school going children are still suffering from malnutrition syndrome, it might be stunting, wasting, underweight or thinness and it is also established that undernutrition among rural school going children is an important public health problem in third world countries including rural India.

Present study documented that prevalence of undernutrition in form of thinness among the studied children was very high (66.80 %). It is one of the major health problems in tribal society and Sabar is one of most under privilege the tribal community of West Bengal. Deficit of nutrition in this age effects on growth as well as mental cognitive (Gopalan et al., 1994). In the present study the prevalence of thinness among the subjects was decreased with age and it implies that children in early age were suffering more undernutrition stress. Undernutrition increases morbidity and mortality rate among children (Nandy et al., 2005 & UNICEF, 2006) including tribal children also. Earlier reports have revealed that in recent years malnutrition among the children has increased (UNICEF, 2006). Improvement of the level of child nutrition which leads to better growth and development of the children has been regarded as one of the universal humanitarian goals (WHO, 1999).

Table 2. Anthropometric characteristics of the Sabar school going children

Age (yrs)	N		Height (cm)				Weight (kg)				Body Mass Index (kg/m^2)			
	Boys	Girls	Boys (Mean ±SD)	Girls (Mean ±SD)	t-values	Overall t-value	Boys (Mean ±SD)	Girls (Mean ±SD)	t-values	Overall t-value	Boys (Mean ±SD)	Girls (Mean ±SD)	t-values	Overall t-value
6	12	11	107.61 (5.45)	106.45(5.09)	0.53	-0.87	15.39(1.56)	14.08(1.45)	2.08[*]	-0.93	13.29(0.93)	12.44(1.13)	1.97	-0.89
7	19	14	114.01 (6.52)	114.54(5.06)	-0.25		17.33(2.17)	16.61(2.61)	0.85		13.29(0.87)	12.58(0.88)	2.33[*]	
8	11	15	117.85 (5.86)	118.31(7.56)	-0.17		18.41(2.25)	18.64(4.04)	-0.17		13.21(0.56)	13.17(1.43)	0.09	
9	15	20	121.69 (5.50)	120.73(10.50)	0.32		20.43(3.77)	20.72(4.84)	-0.19		13.69(1.49)	13.99(1.33)	-0.63	
10	9	15	126.51(5.60)	128.39(10.81)	-0.48		23.14(2.14)	23.95(6.38)	-0.37		14.44(0.57)	14.27(2.16)	0.23	
11	9	16	131.49(14.57)	138.33(8.61)	-1.49		26.62(9.50)	30.94(7.71)	-1.24		14.94(1.54)	15.94(2.41)	-1.12	
12	14	15	137.78(15.14)	141.08(6.38)	-0.78		29.79(9.65)	33.00(5.82)	-1.09		15.20(1.70)	16.46(1.87)	-1.88	
13	16	15	146.73(11.25)	145.35(4.61)	0.44		35.09(8.28)	34.90(4.56)	0.48		16.05(1.72)	16.48(1.79)	-0.69	
F- Values			26.91[***]	19.51[***]			42.81[***]	33.45[***]			9.81[***]	13.66[***]		

*** $p < 0.001$; *$p < 0.05$

Table 3. Prevalence of thinness among the Sabar school children

Age (years)	Boys						Girls					Sex combined
	n	CED-I (%)	CED-II (%)	CED-III (%)	Overall (%)	n	CED-I (%)	CED-II (%)	CED-III (%)	Overall (%)		
6	12	58.33	16.67	16.67	91.67	11	18.18	27.27	45.45	90.91		91.30
7	19	31.58	31.58	15.79	78.95	14	28.57	21.43	42.86	92.86		84.80
8	11	45.45	36.36	9.09	90.91	15	33.33	13.33	26.67	73.33		80.80
9	15	46.67	6.67	26.67	80.00	20	40.00	20.00	5.00	65.00		71.40
10	9	55.56	11.11	0.00	66.67	15	13.33	6.67	26.67	46.67		54.20
11	9	33.33	22.22	0.00	55.56	16	56.25	0.00	0.00	56.25		56.00
12	14	14.29	35.71	7.14	57.14	15	26.67	6.67	6.67	40.00		48.30
13	16	31.25	12.50	6.25	50.00	15	26.67	13.33	6.67	46.67		48.40
Age combined	105	38.10	21.90	11.43	71.43	121	31.40	13.22	18.18	62.81		**66.80**

Figure 1. Comparison of prevalence of thinness (%) among the Indian children.
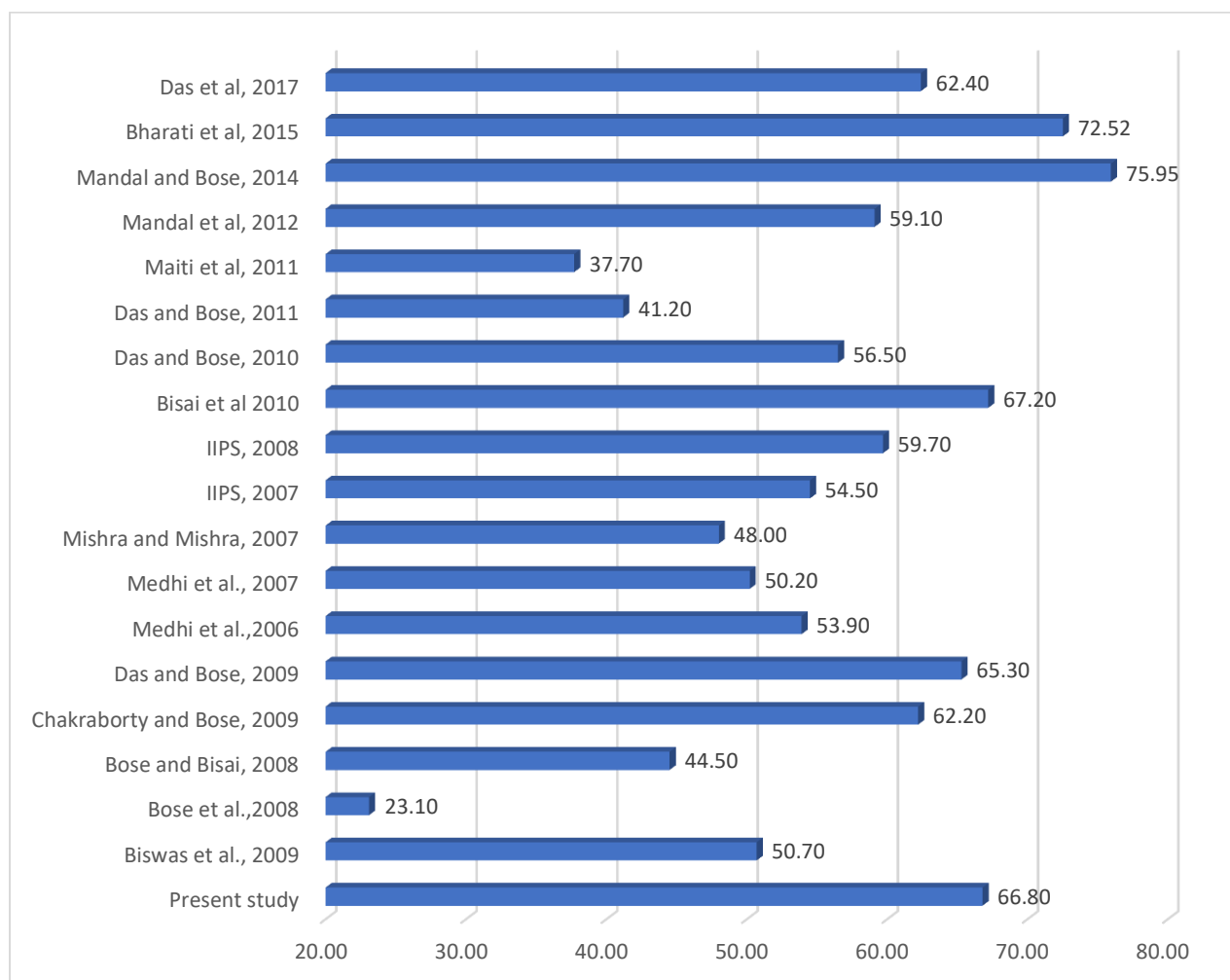
Nutritional status of the studied children was unsatisfactory (figure 1) compared to other previous studies (Biswas et al., 2009; Bose et al., 2009; Das and Bose 2010). The prevalence of thinness was higher (67.2%) among the Kora-Mudi tribal children aged 2–13 years of Paschim Medinipur, West Bengal, India (Bisai et al., 2010) than the present study. Mondal and Bose (2014) reported that the rate of thinness among the Santal migrated primary school children of Arambag was much higher (75.90 %) than the present study. Kolam preschool children of Telangana state showed very high rate of thinness compared to the present study (Bharati et al., 2015). The school going children aged 5–10 years from Purba Medinipur district, West Bengal, depicted lower prevalence of thinness (62.40%) than the present study. Chakraborty and Bose (2009) reported that the prevalence of thinness was lower (62.5 %) than present study. It was reported that much better situation of nutritional condition among the 6–14 years school children of Dibrugarh district, Assam, India where the overall rate of thinness was 53.2% (Medhi et al., 2006). The prevalence of preschool children (3-5 years) was 50.7%

which was also lower prevalence of thinness compared to the present study (Biswas et al., 2009). There were several studies for assessing undernutrition based on thinness was reported lower prevalence of undernutrition than the present study except three studies. The present study is significantly higher than the national prevalence of undernutrition (underweight) as assessed among tribal children. From the 'National Family Health Survey (NFHS-3), 2005–2006: India' it has been observed that, undernutrition among the tribal children was 54.5% in Indian perspective and 59.7% in the perspective of the state of West Bengal (IIPS, 2007).

CONCLUSION

From the present study, Nutritional status (in the form thinness /low BMI –for age) of the Sabar school going children is very high indicating critical situation. Considering the present situation, the policy makers should look on to the mater seriously for the development of nutritional status of the tribal children particularly Sabar ethnic group as well as the children of the other populations of India.

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