

Prevalence of undernutrition among Santal school children of East-Singhbhum District of Jharkhand, India

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Citation: Paul P and Mukhopadhyay A. 2021. Prevalence of undernutrition among Santal school children of East-Singhbhum district of Jharkhand, India. Human Biology Review, 10 (4), 317-332.

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ABSTRACT:

Undernutrition has become such a global burden on public health that affects the progress of nation by affecting the health of rural as well as urban children of the country. In Indian context, the children of tribal population are most unprivileged and undernourished having lower scope of earning, health facilities, education and other fundamental facilities. Among all the Indian tribes Santal is the largest one which is mostly found across the eastern region of India and it is also a representative community of Rural India. Therefore, it is also very important to know their nutritional condition with great attention. Several nutritional studies have been done among the children of Santals, still data on malnutrition as well as nutritional status of Santal children across India is very limited to understand the nutritional aspect of this particular community. So this study is another attempt to enrich the understanding in the same context. To collect empirical data a cross-sectional study was conducted on 118 school children (59 boys and 59 girls of below 18 years) in Kalimati mouza under Ghatshila block of East Singhbhum district of Jharkhand, India. To analyze the nutritional status of the Santal children three most reliable and widely used indicators (HAZ, WAZ and BAZ) have been employed here. In all the cases WHO recommended and internationally accepted age and sex specific cut off values have been followed to define nutritional condition of all the individuals. Student t-test found no significant difference in nutritional indicators of both sexes. Among all the study participants most of them are underweight (75.00%) and almost half of them are suffering from stunting (42.37%) and thinness (54.24%). In summation it is concluded that the Santal school children of Jharkhand have very poor nutritional condition and boys are in more vulnerable situation than girls.

Keywords: undernutrition, nutritional status, Santal school children, stunting, underweight, thinness.

INTRODUCTION:

According to 2001 census conducted by government of India, tribes of India possess almost 8% of the total Indian population; more than 84 million peoples are tribal. Most probably India has the largest number of Tribal communities in the whole world. In India, tribal people are the most unprivileged and undernourished people since they have poor scope of earning, education and other facilities (Topal and Samal, 2001). Among all the Indian tribal communities the Santal is the largest one which is mostly found in the states of West Bengal, Bihar, Orissa, Jharkhand and Assam. In number this community reaches up to two millions (Mukhopadhyay, 2009). Santals are also found in Bangladesh and Nepal. Santal has a traditional language named as “Santali” which is from Austro-Asiatic language group. The Santals has basically a patriarchal society. However, data on malnutrition as well as nutritional status of this tribal community across India is still very limited to understand the nutritional aspect of this particular community.

Undernutrition can harm the growth and development of children suffering from it and it also effects on their health and survival as well that indirectly slows down the progress of the nation towards development in health issues. A large portion of Indian children is nowadays suffering from undernutrition, especially, children of rural areas are much affected than the children of urban regions (Ghosh and Sarkar, 2013).

Although many studies have been carried out from different perspective with different hypothesis, data on nutritional status of Santal children is still very limited to understand the nutritional aspect of the children of the particular community. Such a kind of study was conducted by Mahapatra et al. (2019) on 311 children of 1-5 years old to determine the prevalence of undernutrition among them. Undernutrition was assessed by evaluating stunting, underweight and wasting of the children following standard guidelines (WHO, 1995). This study resulted in higher prevalence of stunting, underweight and wasting in boys (stunting- 52.0%, underweight- 26.3%, wasting- 15.8%) than girls (stunting- 44.0%, underweight- 20.8%, wasting- 10.7%). Overall prevalence of stunting, underweight and wasting was also found to be very high (47.9%, 23.5% and 13.2%, respectively). Another study carried out by Das and Bose (2011) in twelve villages of Santuri block, Purulia, West Bengal, India. 251 preschool children of 2-6 years of age were included in this study. Result of this study stated that 26.3 %, 38.2 % and 12.7 % of total participants were suffering from stunting, underweight and wasting relatively. Bose et al.

(2007) studied 533 rural children (254 boys and 279 girls of 3-5 years) of *Bengalee* ethnicity at 11 ICDS centers of Nadia district, West Bengal, India to understand their nutritional status through HAZ, WAZ and WHZ following NCHS guidelines. Mean HAZ, WAZ and WHZ were found to be lower than those of NCHS standard population in case of both the sexes at all ages. The age and sex combined rates of stunting, underweight and wasting were found to be 23.9%, 31.0% and 9.4% respectively. A similar study carried out by Chowdhury et al. (2008) among 442 Santal children (216 boys and 226 girls) of 5-12 years of Purulia district of West Bengal to determine the prevalence of undernutrition among them. Data was analyzed with reference of NCHS standard population. Results revealed that 17.9%, 33.7% and 29.4% of total participants were found to be suffering from stunting, under weight and wasting respectively. Severe HAZ, WAZ and WHZ were also estimated in this study and were found to have in good percentage. It was also found that prevalence of stunting (21.7%) and wasting (35.8%) were higher in girls in comparison to boys (13.8% and 22.7% respectively). Another study, conducted by Bisai S (2014) assessed the nutritional status of 299 (153 boys and 146 girls) Santal preschool children of 0-5 years of Paschim Medinipur district of west Bengal. This study was also done using NCHS reference standards. Result revealed the prevalence of underweight as 65.2% of total participants among them 11.0% were in severe risk of prevalence. 54.2% of the participants were found to have stunting whereas wasting showed 20.1% within the study population. Another study included 119 Santal-Munda children (59 boys and 60 girls) aged 1-10 years of Amdanga block, North 24 parganas, West Bengal. This study was conducted by Ghosh and Pati (2015) to analyze the nutritional status of the study population. Overall percentage of stunting, under weight and wasting found was 21.0%, 38.65% and 32.7% respectively. Severe prevalence of HAZ, WAZ and WHZ was also determined. This study concluded that the nutritional status of the studied Santal children was at high risk with high prevalence rate of undernutrition. In the year 2021, another recent study was carried out on the same issue from a different perspective among the slum dwellers of Dharavi, Mumbai, India. In this community based cross-sectional study, which was conducted by Chowdhury and Gupta (2021), only children having less than 5 years of age with their mothers were included. This study dealt with the nutritional status of the studied children and their associate risk factors. The result of the study found that 48.9% of the study population was suffering from wasting among them 25.0% showed severe wasting (Severe Acute Malnutrition) and 23.9% showed moderate severity in wasting (Moderate Acute

Malnutrition). On the other hand 39.7% of the study population exhibited stunting, of which 29.5% were moderately stunted and 10.2% were in severely stunted condition. This study also found a strong correlation of wasting with the age of the children as well as age of their mothers whereas stunting was found to have correlation additionally with the complementary feeding of the children. Sen et al. (2020) in their study on 4409 children (2113 girls and 2296 boys), aged between 0-59 months, of Dumki upazila of Patuakhali district in Bangladesh found that the study population had 27.10% of stunted children among them 7.80% were severely stunted. The study also revealed that 11.20% of the study population was suffering from wasting whereas 3% of them were severely wasted. Prevalence of WAZ also showed that 18.20% children of this study population were underweight where 4.1% were severely underweight. This study concluded that the study population had a very high prevalence of stunting among the under five children which needed a comprehensive effort to get them rid of it. On the contrary of the above study it was revealed through another study conducted by Bashar et al.(2020) on 706 under five children of Sreepur upazilla under Gazipur district in Bangladesh that almost half of the study participants (49.0%) were underweight whereas 39% children were stunted and only 10.5% were suffering from wasting. This study also recognized the significant association of several socio-economic factors with the nutritional status of the under five children. In the light of another study on the same issue conducted by Prabhakar et al. (2019) among 100 under five children of Malayali tribal population of Puthur village, Pachamalai Hills, Trichy, it was exhibited that maximum children (85.0%) under study were found to be undernourished as per CIAF criteria. The study also revealed the prevalence percentage of stunting, wasting, underweight and thinness which were found to be 24.0%, 19.0%, 9.0% and 22.0% respectively. The result of the study further revealed the severity for all the nutritional indicators which were also very high for all the cases. Another study was carried out on 217 study participants (under five children) of four selected *Anganwari* areas under urban Allahabad by Kumar et al. (2006) to assess the nutritional status of under five children and the association of infant feeding practices with undernutrition. The result of the study revealed that the study children population had 36.4% prevalence of underweight, 51.6% prevalence of stunting and 10.6% prevalence of wasting. In the year 2020, a cross-sectional study was done among 300 under-five children of different areas of Bangladesh; 100 *Rohingya* children from *Rohingya* camp, 100 Bangladeshi children from the surroundings of Cox's Bazar and rest 100 Bangladeshi children from Dumki were included in this study. Hasib et

al. (2020) in this study tried to draw a clear comparison between the nutritional status of *Rohingya* children and Bangladeshi children of surroundings of Cox's Bazar and Dumki area. From the result, stunting prevalence was found to have 41% in *Rohingya* children, 43% in Bangladeshi children of surroundings of Cox's Bazar and 46% in children of Dumki area. Similarly wasting prevalence showed 13%, 11% and 4% respectively for *Rohingya* children, children surroundings Cox's Bazar and children of Dumki area and in case of prevalence of underweight, it showed 18%, 15% and 10% respectively. Another similar study was done based on the extracted data from Bangladesh Demographic and Health Survey (BDHS)-2007 by Siddiqi et al. (2011) in the year 2011. This study included the anthropometric data of 5270 under five children of Bangladesh. It exhibited that 42% of the total children were stunted and 40% were underweight. Apart from that this study identified the significant influence of several socio-economic as well as bio-social determinants on the nutritional status of the children. Khobragade and Yadav (2020) conducted such kind of similar study among 354 *anganwadi* children within the age group of 0-5 years selected from an ICDS project area of rural India. This study found that prevalence of stunting, wasting and underweight among the participants were 35%, 6.4% and 15.8% respectively. Apart from that boys showed more vulnerability than girls in case of stunting (boys=38.4%, girls=30.8%) and underweight (boys=23.6%, girls=10.1%) whereas girls showed more frequency in prevalence of wasting (boys=4.3%, girls=9.1%). Moreover this study found a significant statistical association of malnutrition with socio-economic status, maternal literacy and exclusive breast feeding. Another study conducted by Otgonjargal et al. (2012) on a total of 706 under-five children selected from 400 sampled households from 21 provinces of 4 economic regions of Mongolia suggested that there were 15.6%, 1.7% and 4.7% prevalence percentage among the participants (under-five children) respectively for stunting, wasting and underweight. This study also revealed the age specific, sex specific, region and residence specific prevalence percentage for all the three nutritional indicators. Another study was conducted on under-five children with little different perspective by Ghosh and Sanni (2020) in the year of 2020. All the data on 132,231 participants (mother-child pairs) used in the study were extracted from Demographic and Health Surveys carried out in Bangladesh (2014), India (2015–16), Nepal (2016), Maldives (2016–17) and Pakistan (2017–18). Basically this study was to estimate the prevalence percentage of overweight and obesity among the participants (under-five children) of South Asian countries. It revealed that the overall

prevalence percentage of overweight among the participants was 1.91% and overall percentage of obesity was 0.89%. more significantly amongst all the countries Maldives showed highest prevalence percentages for both overweight and obesity (3.9% and 1.5% respectively) whereas Nepal exhibited the lowest prevalence (1.2% and 0.2%, respectively).

OBJECTIVES:

This study is to reveal the substantive scenario of the nutritional condition of the school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand, India. To depict the picture three most common indicators have been taken into account on the light of which the nutritional condition of the study population has been analyzed. More precisely the present study has been conducted-

- To establish age and sex specific prevalence percentage of stunting, underweight and thinness in the study population.
- To understand age and sex specific vulnerability and severity for stunting, underweight and thinness in the study population.

MATERIALS AND METHODS:

A cross-sectional study was undertaken among Santal children to understand their nutritional status by using stunting, underweight and thinness. The study was conducted during November of 2019. A total of 118 participants (less than 18 years of age) were included among them 59 participants are boys and the rest 59 participants are girls. Data was collected from a school having a large number of Santal children which is located in the Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand, India. Cluster sampling technique was done for data collection; all the Santal students, below 18 years of age, of the above mentioned school were included as participants. The ages of all the participants were verified through the students' register of the school. All the measurements and relevant data were collected during school hours. A formal consent was taken from all the concerned authorities before taking measurements.

Anthropometric measurements such as height (vertex to standing platform), MUAC (Mid Upper Arm Circumference) were recorded to the nearest 0.1 centimetre. Body mass of each individual was also recorded to the nearest 0.5 kg. All the measurements were taken following standard procedures recommended by Lohman et al. (1988).

Among all the collected anthropometric variables, some specific variables such as height and weight were used here to compute stunting (low Height-for-Age), underweight (low Weight-for-Age) and thinness (low BMI-for-Age).

There are several anthropometric indicators to analyse the nutritional status of children, however, the most reliable and widely used indicators such as HAZ, WAZ and BAZ were used here. For HAZ and BAZ assessment, all the children below 18 years of age have been selected but for WAZ assessment only children of 10 years or below have been selected automatically by Anthroplus software for lack of WHO reference values for WAZ above 10 years of age.

All the data was compiled on excel sheet and then transferred to WHO Anthroplus software (Version 1.0.4) to estimate the Z- scores of Height-for-Age, Weight-for-Age and BMI-for-Age. This software computes Z-score following the values of WHO reference standard population. All the estimated Z-scores then transferred to SPSS (16.0) for doing further statistical analysis.

Independent t-test has been performed to determine inter-sexual differences of height, weight, HAZ, WAZ and BAZ. WHO recommended and internationally accepted age and sex specific cut off values of Z-scores was followed to define the condition of stunting, underweight and thinness (WHO, 1995). It is recommended that children having <-2 Z-score to ≥-3 Z-score are suffering from moderate stunting, under weight and thinness whereas <-3 Z-score means severe condition of stunting, under weight and thinness .All the children were grouped according to 12 months interval of age. Age and sex specific analysis has been done here.

RESULTS:

In the result section, table 1 depicts sex specific mean values with standard deviation of all the anthropometric indicators (Ht, Wt, HAZ, WAZ and BAZ) which are very important for nutritional analysis. Between sexes t-test has also been performed here for all the indicators. Result of t-test suggests that there is no statistically significant difference between sexes in all cases which means nutritional profile of both the sexes is following more or less same trends. Another significant point revealed is that Mean of HAZ comes more than $-2Z$ for both sexes (-

1.78 \pm 0.95 for boys and -1.70 \pm 0.92 for girls), whereas, mean of WAZ for both (-2.44 \pm 1.16 for boys and -2.36 \pm 0.87 for girls) and mean of BAZ for boys (-2.18 \pm 1.23) show less than -2 Z-score although mean of BAZ shows greater than -2Z value for girls (-1.97 \pm 1.09). It indicates that HAZ of most of the children belong to normal ranges or very close to normal ranges unlike WAZ and BAZ.

Table 1: Sex specific descriptive statistics of all the anthropometric indicators of the Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

Anthropometric indicators	Boys		Girls		t-value	p-value
	n	Mean (\pm SD)	n	Mean(\pm SD)		
Height (cm)	59	126.27 (\pm 14.01)	59	126.74 (\pm 14.48)	-0.177	0.860
Weight (kg)	59	22.80 (\pm 7.28)	59	22.93 (\pm 7.54)	-0.099	0.921
HAZ	59	-1.78 (\pm 0.95)	59	-1.70 (\pm 0.92)	-0.396	0.693
WAZ	31	-2.44 (\pm 1.16)	33	-2.36 (\pm 0.87)	-0.315	0.754
BAZ	59	-2.18 (\pm 1.23)	59	-1.97 (\pm 1.09)	-0.987	0.326

*significant level at $p < 0.05$

Table 2: Age and sex specific prevalence percentage of low HAZ among the Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

Age group (months)	Sex	Total Stunting (%)	Moderate Stunting (%)	Severe Stunting (%)
49-60	Boy(0)	0.00	0.00	0.00
	Girl(1)	100.00	0.00	100.00
61-72	Boy(6)	100.00	66.67	33.33
	Girl(5)	0.00	0.00	0.00
73-84	Boy(8)	37.50	37.50	0.00
	Girl(7)	42.86	42.86	0.00
85-96	Boy(4)	25.00	25.00	0.00
	Girl(6)	33.33	33.33	0.00
97-108	Boy(6)	33.33	33.33	0.00
	Girl(4)	75.00	75.00	0.00
109-120	Boy(7)	0.00	0.00	0.00
	Girl(10)	40.00	40.00	0.00
121-132	Boy(7)	28.57	28.57	0.00
	Girl(3)	66.67	66.67	0.00
133-144	Boy(5)	40.00	20.00	20.00
	Girl(10)	50.00	30.00	20.00
145-156	Boy(9)	55.55	44.44	11.11
	Girl(8)	62.50	50.00	12.50
157-168	Boy(7)	57.14	28.57	28.57

	Girl(5)	0.00	0.00	0.00
Age combined	Boy(59)	42.37	32.20	10.17
	Girl(59)	42.37	35.59	6.78
Age and Sex combined (118)		42.37	33.90	8.47

Age and sex specific prevalence percentage depicts a clear picture of undernutrition from the perspective of stunting among the Santal school children (table 2). Prevalence of moderate stunting and severe stunting has also been seen here separately which further describes the actual condition of children suffering from stunting. Age combined prevalence percentage of stunting shows equal values for both the sexes (42.37%) which means children of both the sexes of this population are equally affected by low height-for-age. Moreover, almost same percentage of individuals from both the sexes is suffering from moderate stunting (32.20% boys and 35.59% girls) as well as severe stunting (10.17% boys and 6.78% girls). Age and sex combined prevalence of stunting also shows very high percentage (42.37%) but most of them belong to moderate condition (33.90%). And 8.47% of total population is suffering from severe condition of stunting which is also noticeable. Boys from the age group of 61-72 months show maximum prevalence (100.00%) of stunting, among them 33.33% are suffering from severe stunting. On the contrary, it has been seen that all the girls of this age group are free from low height-for-age condition. Apart from that, age groups of 145-156 months and 157-168 months also show higher prevalence of stunting in boys (55.55% and 57.14% respectively). On the other hand girls show higher prevalence of stunting ($\geq 50\%$) in the age group of 97-108 months, 121-132 months, 133-144 months and 145-156 months. Figure 1 depicts table 2 in graphical form. Age combined and age-sex combined stunting prevalence has been shown in this figure.

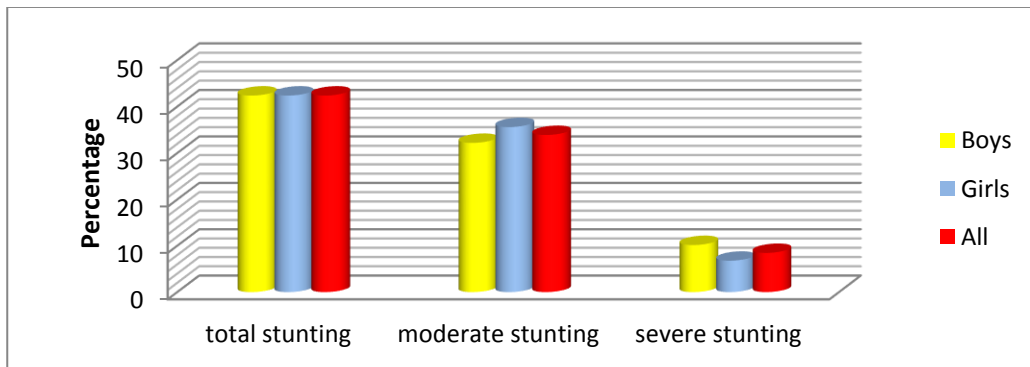


Figure 1 Sex specific prevalence of stunting among Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

Table 3: Age and sex specific prevalence percentage of low WAZ among the Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

Age group (months)	Sex	Total Underweight (%)	Moderate Underweight (%)	Severe Underweight (%)
49-60	Boy(0)	0.00	0.00	0.00
	Girl(1)	100.00	0.00	100.00
61-72	Boy(6)	100.00	16.66	83.33
	Girl(5)	80.00	80.00	0.00
73-84	Boy(8)	75.00	50.00	25.00
	Girl(7)	71.43	71.43	0.00
85-96	Boy(4)	50.00	25.00	25.00
	Girl(6)	66.66	50.00	16.66
97-108	Boy(6)	100.00	66.66	33.33
	Girl(4)	75.00	25.00	50.00
109-120	Boy(7)	71.43	71.43	0.00
	Girl(10)	60.00	30.00	30.00
Age combined	Boy(31)	80.64	48.38	32.26
	Girl(33)	69.70	48.48	21.21
Age and Sex combined (64)		75.00	48.43	26.56

In the next table (table 3) age and sex specific prevalence percentage of underweight has been exhibited. 80.64% of all the boys are suffering from underweight whereas 69.70% of girls are suffering from the same. A good percentage of boys (32.26%) as well as girls (21.21%) have severe underweight. All the boys of the age group of 61-72 months are underweight among them 83.33% are severely underweight which is quiet remarkable. Boys from other age groups also show very high prevalence percentages ($\geq 50\%$) as well. On the other hand, major percentages ($\geq 60\%$) of girls from all the age groups are showing low weight-for-age. Prevalence Percentage of severe underweight also shows relatively higher in all age groups. Figure 2 depicts the above table (table 3) graphically. Age combined and age-sex combined prevalence of underweight has been shown in this figure.

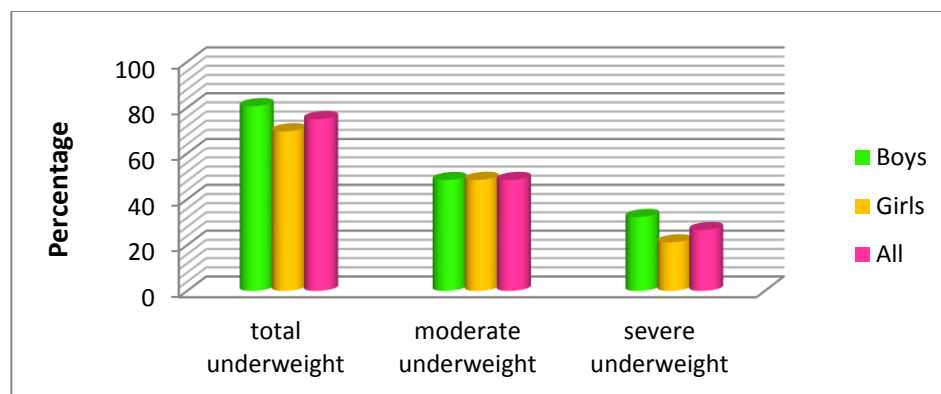


Figure 2 Sex specific prevalence of underweight among Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

Table 4: Age and sex specific prevalence percentage of low BAZ among the Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

Age group (months)	Sex	Total Thinness (%)	Moderate Thinness (%)	Severe Thinness (%)
49-60	Boy(0)	0.00	0.00	0.00
	Girl(1)	0.00	0.00	0.00
61-72	Boy(6)	66.66	33.33	33.33
	Girl(5)	60.00	20.00	40.00
73-84	Boy(8)	62.50	25.00	37.50
	Girl(7)	42.86	42.86	0.00
85-96	Boy(4)	75.00	75.00	0.00
	Girl(6)	50.00	33.33	16.66
97-108	Boy(6)	83.33	33.33	50.00
	Girl(4)	75.00	25.00	50.00
109-120	Boy(7)	28.57	14.28	14.28
	Girl(10)	40.00	30.00	10.00
121-132	Boy(7)	57.14	42.86	14.28
	Girl(3)	66.66	66.66	0.00
133-144	Boy(5)	80.00	60.00	20.00
	Girl(10)	30.00	10.00	20.00
145-156	Boy(9)	66.66	33.33	33.33
	Girl(8)	50.00	25.00	25.00
157-168	Boy(7)	42.86	28.57	14.28
	Girl(5)	60.00	40.00	20.00
Age combined	Boy(59)	61.01	35.59	25.42
	Girl(59)	47.46	28.81	18.64
Age and Sex combined (118)		54.24	32.20	22.03

Age and sex specific prevalence percentage of thinness has been shown in table 4. According to result, boys (61.01%) are much affected by low BMI-for-age than girls (47.46%) although both are in poor condition of thinness. Boys (25.42%) is much ahead than girls (18.64%) in case of severe thinness also. Age and sex combined prevalence (54.24%) shows much higher percentage which suggests that the Santal children population is in poor nutritional condition for thinness. More significantly 22.03% of children is suffering from severe thinness which is quiet high. Boys of almost all the age groups show high prevalence percentage ($\geq 50\%$) for thinness except age groups of 109-120 months (28.57%) and 157-168 months (42.86%). On the other hand, girls of only 3 age groups, viz. 73-84 months (42.86%), 109-120 months (40.00%) and 133-144 months (30.00%), show prevalence percentages below 50%. Figure 3 presents table 4 in graphical form where age combined and age-sex combined prevalence of thinness has been shown.

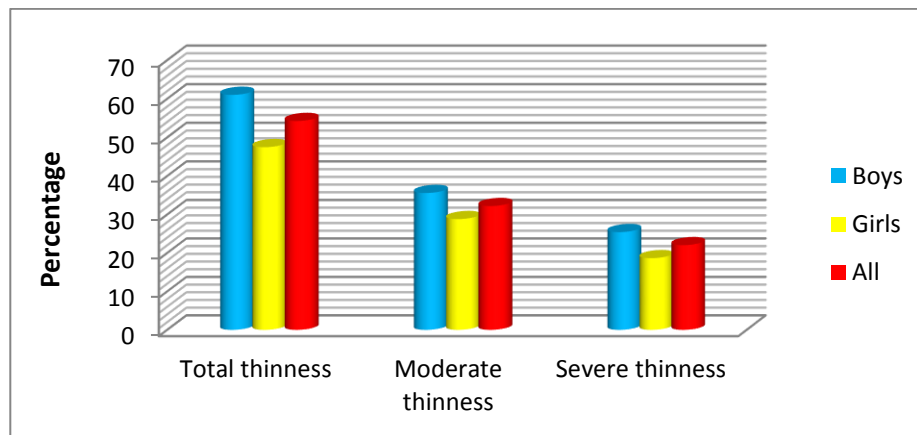


Figure 3 Sex specific prevalence of thinness among Santal school children of Kalimati mouza under Ghatshila block of East-Singhbhum district of Jharkhand

DISCUSSION:

The condition of the body influenced by those micro and macro nutrients that can maintain the normal metabolic integrity is called nutritional status. To maintain the required levels of those essential nutrients for the body, one must need to have adequate diet full of balanced micro and macro nutritional elements. Inadequacy in those essential nutrients is nowadays being seen in children and that has been a global burden; children of most of the developing and

underdeveloped countries of the world are suffering from undernutrition. This situation may arise directly for lack of adequate proper diet, inappropriate and unhealthy food habit and lifestyle and indirectly for economic condition, social beliefs and practices and for lack of education also. That is why this condition is mostly seen in tribal population.

This kind of health issues in children may harm the whole population of the world in future. So, it should be one of the areas of major concern to take immediate and necessary actions to get rid of this situation. It needs population based studies because of enormous variations between the populations of the whole world. The present study among the Santal school children of Jharkhand is also a little effort to do so. Present study exhibits that there is no significant difference between boys and girls in case of stature and body mass unlike the study of Mahapatra et al. (2019). It also shows age and sex combined high prevalence percentage for stunting (42.37%), underweight (75.00%) and thinness (54.24%). Similar result has been evident in various population of India by several studies (Ghosh and Sarkar, 2013; Mahapatra et al., 2019; Das and Bose, 2011; Bose et al., 2007; Bisai, 2014; Ghosh and Pati, 2015). But the prevalence percentages found in the present study in all cases are much higher than those evident from the earlier studies. Similar to other studies the present study also says that boys are suffering from underweight (80.64% boys and 69.70% girls) and thinness (61.01% boys and 47.46% girls) in higher frequency than girls. But Bose et al. (2007) showed a contradictory result in case of underweight; this study found higher rate of underweight among girls (35.10%) than that of boys (26.50%). On the other hand Choudhury et al. (2008) showed girls (21.7%) had higher prevalence of stunting than boys (13.8%). Similar to other studies prevalence of severe stunting shows moderate percentage in both the sexes (10.17% boys and 6.78% girls) but unlikely prevalence percentage of underweight (32.26% boys and 21.21% girls) and thinness (25.42% boys and 18.64% girls) evidences much higher values in both sexes.

By summing up all those studies it can be said that Santal children of different regions of India are nutritionally in poor condition; they mostly found to have undernutritional condition in case of stunting, wasting, underweight and thinness which can lead the population towards sever CED condition.

CONCLUSION:

It is concluded from the present study that the population of Santal school children of Jharkhand has very poor nutritional status as this study found much number of incidents of stunting, underweight and thinness among the children. Many of them have been found to have severe condition of stunting, underweight and thinness. Boys have been found to be in more vulnerable condition for almost all the cases since more incidents of low WAZ and low BAZ having been found in boys as compared to girls. However, further study is needed with a larger sample size to take necessary actions. And last of all, it is recommended that immediate nutritional intervention programs are needed in this population to get them out of this poor nutritional condition.

ACKNOWLEDGEMENT:

A drought of words is felt in acknowledging all the field investigators and the study participants, for their contribution in this work. I am personally really thankful to them, and express my sincere gratitude towards them. Over and above, I would like to pay my deep sense of gratitude to my co-author, Dr. Ashish Mukhopadhyay, for his elevating inspiration, guidance and kind contribution regarding this research work.

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