

Prevalence of Undernutrition among Children and Adolescents of Three PVTGs in West Bengal

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ABSTRACT: Particularly Vulnerable Tribal Groups (PVTGs) are stagnant or declining indigenous community and their population is very small in India. In West Bengal, we have three such communities, viz. Birhor, Lodha, and Toto. The study intends to find out the nutritional status of children and adolescents, below 19 years, of the three PVTGs in West Bengal. Total 438 households, including 603 participants (boys and girls) aged from 6 months to 19 years has been selected. The WHO's guidelines were applied to determine nutritional status, i.e. wasting, stunting, underweight and thinness. Nutritional indicators are significantly (F-value, $p < 0.05$) different among PVTGs. Based on Composite index of Anthropometric Failure (CIAF), maximum undernourished boys-girls were found among Birhor and Lodha. Frequencies of nutritional status of CIAF categories are statistically significant (χ^2 -value, $p < 0.05$) within PVTGs. Comparatively highest acute undernutrition is found among Birhor, followed by Lodha and Toto.

INTRODUCTION

Undernutrition is a worldwide phenomenon, more than 820 million people are still fighting against hunger in 2018 (FAO/IFAD/UNICEF/WFP/WHO, 2019). In 2019, WHO estimated that 5.2 million children died before their fifth birthday (WHO, 2020). About half of these children left this world only for malnutrition (UNICEF, 2020). The World Economic Outlook in 2019 has estimated the economic position of India as the fifth largest in the world after United States, China,

Japan, and Germany. The size of the economy is estimated at US\$ 2.9 trillion in 2019 (DEA, 2020). Side by side, about 21.92% of the total population of this country lives 'Below Poverty Line' (BPL) as per the report of the Reserve Bank of India in 2011-12 (RBI, 2019).

One in five people in Africa is hungry, hunger in Western Asia is also increasing (FAO/IFAD/UNICEF/WFP/WHO, 2019). In 2018, about 37 out of every 1000 children (live births) in India died before the age of five years, according to UNICEF (UN IGME, 2019). According to the National Family Health Survey (NFHS) of India in 2015-16, 38.4% of children under the age of five are stunted, 21% percent are wasted

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and 35.7% are underweight (NFHS-4 India, 2017). Poor economic conditions and a lack of awareness have negative impact on people's nutritional status and health (Tanner, 1981; Cameron and Bogin, 2012). These facts are currently becoming an important issue for population-health research in India. In India many indigenous communities are still considered as 'vulnerable tribal community' (MoTA, 2013). Their existence is now in crisis. They still survive depending on their pre-agricultural level of technology and subsistence level of the economy.

India ranks 102 out of 117 countries as per the Global Hunger Index (GHI) in 2019, considered as a 'serious' level of hunger. The rate of wasting and stunting of children in India is steadily growing, as shown by the GHI report (Grebmer *et al.*, 2019). In West Bengal, among children under the age of 5 years, 32.5% are stunted, 20.3% are wasted and 31.5% are underweight. These percentages are higher among the scheduled tribes, as 37.3%, 27.8%, and 42% percent among the under 5 year's children in West Bengal are respectively stunted, wasted and underweight (NFHS-4 West Bengal, 2017).

Undernutrition related issues in children and adolescents can be recognized on an individual and population level. Undernutrition has a profoundly detrimental impact on the psychological, sexual, immune system and physical development at the individual level (Rytter *et al.*, 2014; Cameron and Bogin, 2012). In terms of population, it increases the rates of child mortality, morbidity and malnutrition in adults, which has a negative impact on the development of the overall population (Bogin, 2021). In this case, if the population size is small (like PVTGs) and the problem persists for a long time, it can be detrimental to that population.

Particularly Vulnerable Tribal Groups (PVTGs)

There are more than 370 million indigenous people exists in the world, with 70 percent (260 million) in Asia (DESA/UN, 2009; Errico, 2017). According to last census report (2011), more than 104.3 million indigenous people are living in India, comprising 705 communities (MoTA, 2013). In 1973, the Government of India created a separate division called the "Primitive Tribal Group" (PTG) based on four distinct characters: (i) pre-agriculture level of technology, (ii)

stagnant or declining population, (iii) extremely low literacy; and (iv) subsistence level of the economy. In 2006, the government replaced the name PTG specifically with the "Particularly Vulnerable Tribal Groups" (MoTA, 2013). At present there are a total of 75 PVTGs in India, with three PVTGs in West Bengal, namely Birhor, Lodha and Toto (MoTA, 2013). In West Bengal, they prefer to live in or near forest areas. The Birhors are traditionally nomadic or semi-nomadic, but now they have settled in the hill-forests of Purulia (Roy, 1925; Sahu, 1995; Debbarman, 2015). Lodha lives near the forest, but the majority of the people prefer to live in the countryside (Bhowmick, 1985; Chaudhari and Sen-Chaudhari, 2005). Toto lives in Totopara village, located at the foot of the Tading-hills and surrounded by mountain forests and rivers near the Indo-Bhutan border (Das, 1969; Majumdar, 1998).

At the turn of the century, there was a gap of research on the nutrition of West Bengal's PVTGs on a single forum. Socio-economic disparities exist among them, which has a direct impact on their nutrition (Bharati, 1989; Bisai *et al.*, 2008; Bose *et al.*, 2008). The nutrition of children and adolescents are key determinant for understanding the nutritional status of the population. Therefore, determining which PVTG is in serious nutritional condition is important, so that the government can work on their socioeconomic and nutritional needs. So, present study intends to find out the nutritional status of children and adolescents of 'Particularly Vulnerable Tribal Groups' in West Bengal.

MATERIALS AND METHODS

A field-based, cross-sectional study that was performed among aged 6 months to 19 years, boys and girls, during April to June 2017 and March to June 2018. It took a long time to collect data for this study due to their busy schedules throughout the year. Since they are mostly agricultural labour, so they are basically free at a certain time of the year i.e. after the time of harvesting till the time of monsoon (April to June), this time was chosen for data collection, that is why data collection took a little longer for this study.

Sampling: Population wise, Birhor is small at only 2241, Toto is 66627, and Lodha consists of 108707 people (MoTA, 2013). Here, Toto and Lodha

population looking large because they were counted with some other tribes. Lodha was considered with Kheria and Kharia (MoTA, 2013); whereas, Bhutia, Sherpa, Dukpa, Kagatay, Tibetan, and Yolmo considered in a common group with Toto (MoTA, 2013). According to Sengupta (2016), the total number of Totos in Totopara is 1387, male 737 and female 650 (Sengupta, 2016). Study areas were selected on the basis of their higher density of residential zone. Therefore, Birhor, Lodha and Toto were selected from Purulia, West Medinipur and Alipurduar district respectively. Their population size is very small, e.g. Birhor and Toto are less than 1500, and therefore complete enumeration (CE) of these populations has been applied. Lodha participants were selected through random sampling (RS) technique.

The study covered a total of 13 villages under 6 blocks. For Birhor, data were collected from 5 villages under 3 blocks, i.e. village Bhupatipally (Matiyala) and Barria under Bagmundi block, village Bersa under Balarampur block, village Dekai (Khamar) and Chhotobakad (Mohultanr) under Jhalda-I block of Purulia district. For Lodha, data were collected from 7 villages under 2 blocks, i.e. village Baghmari, Kunjami Galdihi, Barapatharkumkumi, and Pirchak under Salboni block, village Khorikashuli, Lohatikri, and Muchiberia under Medinipur Sadar block of West Medinipur district. For Toto, data was collected from village Totopara under Madarihat block of Alipurduar district. Totopara is a large village, and it has so many segments, locally this segment is called 'gaon'. This study has included all segments of the village, i.e. Dhumchi gaon, Mitrang gaon, Mondal gaon, Panchayat gaon, Par gaon, Puja gaon, and Subba gaon.

Participants: Data were collected from a total of 438 households, with 78 Birhor (CE), 198 Lodha (RS) and 162 Toto (CE) households. A total of 2018 data were collected, whereas 603 participants were under 19 years of age, out of which 289 were boys and 314 were girls. A total of 95 boys and 86 girls for upto 5 years, whereas 194 boys and 228 girls for above 5 to 19 years. The sample size has become small due to their smaller population size.

Data collection procedures: Data were collected through the household survey and participants were selected from each household. The anthropometric

measurements were taken based on the guideline of Weiner and Lourie (1981) and Frisancho (2011). Body height (in cm) measured by anthropometer (on nearest ± 0.1 cm), and body mass or weight (in kg) measured by a reliable portable weighing scale (on nearest ± 0.1 kg). In the matter of clothes during the anthropometric measurements, the researchers were always sensitive to the cultural beliefs, traditions, and social background of the participants. The age of the participant was determined on the basis of birth certificate. For those who do not have a birth certificate, their school certificate was carefully considered as a secondary source.

NUTRITIONAL INDICATORS

Wasting, Stunting, Underweight, Thinness, and Overweight

Low weight-for-height is considered as wasting, and according to WHO it applies under 5 years of age. Based on the WHO, the z-score of the wasting category is considered as weight-for-height (WHZ) less than " -2 SD. Low height-for-age is considered as stunting, and it is applicable up to the age of 19 years. Stunting is a form of growth retardation as a result of poor diets or recurrent infections. The z-score of stunting category is classified as height-for-age (HAZ) less than " -2 SD (WHO, 2006; WHO, 2009; WHO, 2011).

Low weight-for-age determines underweight up to the age of 10 years, but here it is used under 5 years. The z-score for underweight is considered as weight-for-age (WAZ) less than " -2 SD, and for overweight it is greater than $+2$ SD. Similarly, BMI-for-age can determine both thinness and overweight up to the age of 19 years, here it is used in above 5 to 19 years. The z-score of thinness is considered as BMI-for-age (BAZ) less than " -2 SD, and for overweight it is greater than $+SD$ (WHO, 2009; WHO, 2011).

The nutritional status of the population is determined on the basis of WHO (2010), wasting: acceptable $<5\%$, poor 5-9%, serious 10-14%, critical $\geq 15\%$; stunting: low prevalence $<20\%$, medium prevalence 20-29%, high prevalence 30-39%, very high prevalence $\geq 40\%$; underweight: low prevalence $<10\%$, medium prevalence 10-19%, high prevalence 20-29%, very high prevalence $\geq 30\%$ (WHO, 2010). This

classification is used to evaluate the public health significance of children and adolescents.

Statistical Analysis

Data were analyzed by using the Statistical Package for the Social Science (SPSS, version 25.0). The WHO-Anthro and WHO-AnthroPlus software were used to calculate the Z-score values of nutritional indicators (WHO, 2009; WHO, 2011). Descriptive and inferential statistical analysis has been applied in this study. Mean, standard deviation (SD) and percentages have been applied as descriptive statistics. In the inferential statistics, analysis of variance (ANOVA), and t-test were used as parametric test; and chi-square test (χ^2) was used as non-parametric test. Significant levels for F-value, t-value and χ^2 -value are considered as $p < 0.05$. The participants were divided into two age groups based on WHO guidelines, i.e. under 5 years and 5 to 19 years.

The composite index of anthropometric failure (CIAF) method has been applied to better assessment of nutritional status of the participants. Peter Svedberg's CIAF model applied here for under 5 years children (Svedberg, 2000). In this model, wasting, stunting, and underweight have been used for the assessment of CIAF. Similar model has been used for the assessment of 5 to 19 years, here stunting, and thinness were used to evaluate CIAF.

Ethical approval: Ethical approval was obtained from the Institutional ethics committee of the West Bengal State University, approval no. WBSU/IEC/09/05. Concerned authorities were properly informed about the purpose and objective of the study. The necessary information and anthropometric measurements of the boys and girls participating in this study were obtained with the consent and cooperation of their parents.

RESULTS

Disparity of nutritional indicators between boys and girls under 5 years is shown in Table 1. Z-scores of all nutritional indicators in the Toto children are classified into normal category ($-2SD$ to $+2SD$). Mean HAZ and WAZ of Birhor children (boys and girls) are classified as stunting and underweight respectively, while mean WAZ in Lodha boys is classified as underweight. Mean z-scores of all nutritional indicators differed between boys and girls, but it is not statistically significant (t-values, not $p < 0.05$). The ANOVA test has examined statistical differences of mean z-scores among the PVTGs. The differences in z-scores of boys and girls among the three PVTGs are statistically significant (F-values, $p < 0.05$). Nutritional status is found to be similar between boys and girls in the same community but varied amongst communities.

TABLE 1
Differences of intra and inter-group nutritional status based on Z-score among the under 5 years PVTGs

PVTGs	Nutritional indicators	Boys Mean (SD)	Girls Mean (SD)	t - value	p - value
Birhor	WHZ	-1.73 (1.31)	-1.64 (1.02)	0.29	0.775
	HAZ	-2.72 (1.91)	-2.00 (1.47)	1.73	0.089
	WAZ	-2.68 (1.23)	-2.35 (1.06)	1.18	0.242
Lodha	WHZ	-1.37 (1.54)	-1.15 (1.18)	0.61	0.547
	HAZ	-1.87 (1.48)	-1.89 (1.25)	0.06	0.950
	WAZ	-2.01 (1.26)	-1.90 (0.81)	0.37	0.710
Toto	WHZ	0.02 (1.34)	-0.44 (1.25)	1.33	0.189
	HAZ	-1.11 (1.25)	-0.85 (1.34)	0.74	0.465
	WAZ	-0.59 (0.82)	-0.83 (0.97)	0.99	0.329
ANOVA	<i>B-L-T</i>	F-value	p - value		
	WHZ	Boys	12.64	0.000	
		Girls	8.63	0.000	
	HAZ	Boys	7.74	0.001	
		Girls	5.98	0.004	
	WAZ	Boys	25.85	0.000	
Girls		19.31	0.000		

Note: B- Birhor, L- Lodha, T- Toto

Among under 5 years children, maximum undernourished children are found in Birhor, followed

by Lodha, and relatively good nutritional status is found in Toto (Table 2). In Birhor, total 31% of boys

and 38.9% of girls are wasting, 65.5% of boys and 50% of girls are stunting, 69% of boys and 69.4% of girls are underweight. In the case of Lodha, total 29.7% of boys and 21.7% of girls are wasting, 43.2% of boys and 52.2% of girls are stunting, 45.9% of boys and

47.8% of girls are underweight. Percentage of these undernourished criteria is comparatively lower among Toto, total 6.9% of boys and 7.4% of girls are wasting, 17.2% of boys and 7.4% of girls are stunting, and 7.4% of girls are underweight.

TABLE 2
Distribution of percentage based on Z-score of under 5 years PVTGs

Nutritional indicators	Birhor		Lodha		Toto	
	Boys (n=29)	Girls (n= 36)	Boys (n= 37)	Girls (n= 23)	Boys (n= 29)	Girls (n= 27)
WHZ Category						
< -3SD, Severe Wasting (%)	17.2	11.1	18.9	4.3	0.0	0.0
< -2SD, Wasting (%)	13.8	27.8	10.8	17.4	6.9	7.4
-2SD to +2SD, Normal (%)	69.0	61.1	70.3	78.3	93.1	92.6
HAZ Category						
< -3SD, Severe Stunting (%)	41.4	27.8	21.6	17.4	6.9	7.4
< -2SD, Stunting (%)	24.1	22.2	21.6	34.8	10.3	0.0
-2SD to +2SD, Normal (%)	34.5	50.0	56.8	47.8	82.8	92.6
WAZ Category						
< -3SD, Severe underweight (%)	44.8	25.0	24.3	8.7	0.0	3.7
< -2SD, Underweight (%)	24.2	44.4	21.6	39.1	0.0	3.7
-2SD to +2SD, Normal (%)	31.0	30.6	54.1	52.2	100.0	92.6

The Table 3 shows differences in nutritional indicators of 5 to 19 year boys and girls. Mean z-scores can be classified into normal category (“-2SD to +2SD). Statistically significant differences of mean BAZ are found between boys and girls in the case of

Lodha and Toto (t-values, p<0.05). The differences in z-scores among PVTGs are statistically significant for boys and girls separately (F-values, p <0.05). As it turns out, the nutritional status varies between communities among 5 to 19 years PVTGs.

TABLE 3
Differences of intra and inter-group nutritional status based on Z-score among 5 to 19 years PSTGs

PVTGs	Nutritional indicators	Boys Mean (SD)	Girls Mean (SD)	t - value	p - value
Birhor	HAZ	“1.92 (1.14)	“1.51 (1.26)	1.58	0.118
	BAZ	“1.32 (1.08)	“1.15 (0.94)	0.77	0.442
Lodha	HAZ	“1.41 (0.97)	“1.53 (1.06)	0.75	0.452
	BAZ	“1.66 (1.00)	“1.34 (1.01)	2.17	0.031
Toto	HAZ	“1.19 (0.92)	“1.12 (0.87)	0.43	0.670
	BAZ	“0.84 (0.92)	“0.37 (0.81)	3.40	0.001
ANOVA	B-L-T	F-value	p - value		
	HAZ	Boys	7.109	0.001	
		Girls	3.906	0.022	
	BAZ	Boys	12.843	0.000	
	Girls	26.115	0.000		

Note: B- Birhor, L- Lodha, T- Toto

Nutritional status of 5 to 19 years have discussed in Table 4. The maximum stunting boys and girls are found in Birhor, followed by Lodha, and Toto; In Lodha, by contrast, contrariwise maximum thin boys and girls are found, followed by Birhor and Toto. Among the Birhor 48.8% of boys and 40% of girls are stunting, 31.7% of boys and 13.3% of girls are thin. In

the case of Lodha, 26.2% of boys and 32% of girls are stunting, 38.1% of boys and 24% of girls are thin. Among the Toto, undernutrition is comparatively low, 14.5% boys and 13.2% girls are stunting, 7.2% of boys and 2.4% of girls are thin. The results indicate that 5 to 19 years of Birhor and Lodha are suffering from long-term growth retardation than Toto.

TABLE 4
Distribution of percentage based on Z-score of 5 to 19 years PVTGs

Nutritional indicators	Birhor		Lodha		Toto	
	Boys (n= 41)	Girls (n= 45)	Boys (n= 84)	Girls (n= 100)	Boys (n= 69)	Girls (n= 83)
HAZ Category						
< -3SD, Severe Stunting (%)	19.5	13.3	7.2	6.0	5.8	2.4
< -2SD, Stunting (%)	29.3	26.7	19.0	26.0	8.7	10.8
-2SD to +2SD, Normal (%)	51.2	60.0	73.8	68.0	85.5	86.8
BAZ category						
< -3SD, Severe thinness (%)	4.9	2.2	9.5	5.0	2.9	0.0
< -2SD, Thinness (%)	26.8	11.1	28.6	19.0	4.3	2.4
-2SD to +2SD, Normal (%)	68.3	86.7	61.9	76.0	92.8	97.6

Nutritional status based on CIAF for children under 5 years (Table 5) shows that, undernutrition is high among Birhor children (boys 79.3% and girls 72.2%), followed by Lodha (boys 59.5% and girls 69.6%) and Toto (boys 24.1% and girls 14.8%). Out of five undernourished subgroups, group-E has the highest percentage in Birhor and Lodha children. On the other hand, Toto boys have the prevalence of group-F. By applying the Chi-Square test to boys and girls separately, it is found that there is an intrinsic difference between the PVTGs in the case of no-failure (group-A) and CIAF. The percentage at which group-A and CIAF are found in boys and girls has differed significantly (c^2 -values, $p < 0.01$). Therefore, in terms

of frequency, the nutritional status of children under the age of 5 years is different among the PVTGs.

The CIAF distribution of 5 to 19 years (Table 6) shows that, the percentage of undernutrition is higher among Birhor boys (63.4%) and Lodha girls (50%). Nutritional status of both Birhor and Lodha is more or less the same. For both boys and girls, group-O (stunting) has contained the highest percentage except of Lodha boys. Maximum Lodha boys (25.0%) belong to the group-P (thinness). The frequency of no-failure (group-M) and CIAF of boys and girls are significantly different (c^2 values, $p < 0.01$). Thus, considering the frequency, nutritional status of 5 to 19 years is different among the PVTGs.

TABLE 5
Composite index of anthropometric failure (CIAF) of under 5 years PVTGs

Group	Description	Birhor		Lodha		Toto	
		Boys (n= 29)	Girls (n= 36)	Boys (n= 37)	Girls (n= 23)	Boys (n= 29)	Girls (n= 27)
A	No failure (%)	20.7	27.8	40.6	30.4	75.9	85.2
B	WT only (%)	3.5	2.8	2.7	0.0	6.9	3.7
C	WT & UNW (%)	10.3	19.4	13.5	17.4	0.0	3.7
D	WT, ST & UNW (%)	13.8	16.7	13.5	4.4	0.0	0.0
E	ST & UNW (%)	44.8	33.3	18.9	26.1	0.0	3.7
F	ST only (%)	6.9	0.0	10.8	21.7	17.2	3.7
CIAF: B to F (%)		79.3	72.2	59.5	69.6	24.1	14.8
Chi-square*		Boys, B-L-T		Girls, B-L-T			
		χ^2 -value		18.36		23.70	
		p - value		0.001		0.000	

Note: WT- Wasting, ST- Stunting, UNW- Underweight, B- Birhor, L- Lodha, T- Toto
* Between two groups' frequency (n): 1. No failure, 2. CIAF (B to Y)

TABLE 6
Composite index of anthropometric failure (CIAF) of 5 to 19 years PVTGs

Group	Description	Birhor	Lodha	Toto		Boys	Girls
		Boys (n= 41)	Girls (n= 45)	Boys (n= 84)	Girls (n= 100)		
M	No failure (%)	36.6	51.1	48.8	50.0	79.7	84.3
N	ST and TN (%)	17.1	4.4	13.1	6.0	1.5	0.0
O	ST only (%)	31.7	35.6	13.1	26.0	13.0	13.3
P	TN only (%)	14.6	8.9	25.0	18.0	5.8	2.4
CIAF: N to P (%)		63.4	48.9	51.2	50.0	20.3	15.7
Chi-square*		Boys, B-L-T		Girls, B-L-T			
		χ ² -value		26.10			
		p - value		0.000			

Note: ST- Stunting, TN- Thinness, B- Birhor, L- Lodha, T- Toto
* Between two groups' frequency (n): 1. No failure, 2. CIAF (N to P)

DISCUSSION

The studied tribal groups (Birhor, Lodha, and Toto) have their own socio-cultural identity, norms and beliefs, rituals, all these aspects have set them apart from the mainstream culture. They have a lack of formal education and mostly they depend on subsistence economic practices (Chaudhari and Sen-Chaudhari 2005). Most of them traditionally collect food and other essential items of daily life from the forests. But at present due to various legal complications they are not able to use the forest as before, it has a direct impact on their food source and is deteriorating their economic condition (Bhowmick 1985; Sahu 1995). This has a negative effect on their daily supply of essential nutrients.

The nutritional status of boys and girls are more or less similar within the community, no statistically significant difference has been observed. It is found in children under 5 years that the percentage of undernutrition is highest in Birhor, followed by Lodha; and even the propensity to undernutrition is comparatively higher among these two tribes than the total tribal children in West Bengal (NFHS-4 West Bengal 2017). In addition, stunting and underweight are the most frequent problems in both Birhor and Lodha. In Birhor 44.8% of boys and 33.3% of girls, as well as in Lodha 18.9% of boys and 26.1% of girls are suffering from both stunting and underweight based on CIAF classification. It has a great impact on public health, and according to the classification of Public Health Significance (PHS) based on WHO (2010), Birhor and Lodha children are under the 'critical condition' of wasting category; while among the Toto children it is in the 'poor category'. In the case of

stunting and underweight, Birhor and Lodha children are under 'very high prevalence' category; while among the Toto children it is in the 'low prevalence' category. However, undernutrition is more common in the ages of 5 to 19 years. According to CIAF, stunting is more prevalent in all PVTGs except Lodha boys; Lodha boys are thin. Undernutrition rates are higher in Birhor, followed by Lodha and Toto. In terms of the PHS, Birhor is under 'very high prevalence' of stunting category, Lodha is also under 'high prevalence' of stunting category, while Toto is in 'low prevalence' of stunting category.

Stunting reflect the cumulative effects of undernutrition and infections since and even before birth. This measure can therefore be interpreted as an indicator of poor environmental conditions or long-term restriction of a child's growth potential. The children, who have wasting can indicate acute weight loss. Underweight and Thinness are a composite indicator and it also indicates weight loss (WHO 2010). Among the vulnerable tribals, Birhor and Lodha are more undernourished in West Bengal. Their future generations are more susceptible to wasting, stunting, underweight, and thinness. This is mainly due to inadequate diet or chronic effective infection. Totos are mainly suffering from stunting, but their nutritional condition is comparatively better than the other two vulnerable tribes.

India has made significant progress in a number of sectors as a fast-developing country, the most important of which are the economy, health, and education. Despite the country's overall improvement in health, its impact on these marginalized indigenous peoples is far from satisfactory. The undernourished

children and adolescents will become a major obstacle to the overall progress of these vulnerable indigenous communities in near future. Therefore, it is necessary to identify the causes of undernutrition by state as well as central governments and take proper actions in order to prevent further calamities.

CONCLUSION

This study demonstrates the nutritional status of under 19 years' children and adolescents of PVTGs in West Bengal. They are very small in number and live in distant location. The prevalence of severe undernutrition among children and adolescents was found to be predominantly associated with the PVTGs of Birhor and Lodha in West Bengal. These findings are very significant in terms of public health, particularly for policymakers seeking to reduce undernutrition in pediatric population. Often, emphasize the importance of the government in developing preventive strategies and implementing appropriate interventions.

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