

# A COMPARATIVE STUDY ON NUTRITIONAL ASPECT OF TRIBAL AND NON-TRIBAL PRESCHOOL CHILDREN RESIDING IN URBAN AREAS OF ODISHA

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## ABSTRACT

**Background:** A socioeconomically disadvantaged group is the tribal population. It is crucial to be aware of the nutritional condition of different tribal populations since doing so helps to spot under nutrition, a major cause of morbidity and mortality.

**Objective of the study:** The present study aims to assess and compare anthropometric indices and food consumption pattern among tribal and non-tribal preschool children.

**Materials and Methods:** A community based cross-sectional study was carried out to compare tribal (n=30) and non-tribal (n=30) preschool children aged 3-6 years residing in Khordha district of Odisha. The nutritional status of children was assessed using anthropometric indices such as weight-for-height (WHZ), weight-for-age (WAZ), height-for-age (HAZ), and mid-upper-arm circumference.

**Results and Discussion:** Tribal children had a greater prevalence of moderate wasting (WHZ < 2 SD), severe stunting (HAZ < 3 SD), and severe underweight (WAZ < 3 SD), whereas severe wasting (WHZ < 3 SD) was identical across both populations. A study demonstrated that 60.8% of tribal children were extremely malnourished (MUAC < 115mm), while non-tribal children were not. Additionally, the percentage of children at risk of malnutrition was higher in the tribal children. Dietary evaluation found no significant difference in cereals, legumes, and bakery products consumption between tribal and non-tribal preschool children. However, the non-tribal children consumed more processed foods, sweets (chocolate/candies), and tea.

**Keywords:** Nutrition Status, Preschool Children, Tribal, Non-Tribal, Anthropometric.

## INTRODUCTION

Preschoolers require proper nutrition for optimal growth and development. Children's growth depends on their nutritional status, which is determined by their food consumption [1]. India has 40 million stunted and 17 million wasted children [2]. Children from tribal community often have inadequate nutritional consumption, leading to low micronutrient levels. Micronutrient deficiencies, such as vitamin A, iron, vitamin D, and zinc, are the leading cause of poor child growth and development [3, 4]. Poor food intake is a primary cause of malnutrition. Chronic malnutrition can negatively impact cognitive development, memory, and health, ultimately lowering quality of life [5]. According to the National Family Health Survey (NFHS-5), about 48% of children under the age of five are stunted, with 43% underweight. The Global Nutrition Report (2014) shows that stunting rates among under-five children in India decreased from 48% to 38% between 2006 and 2014. However, the child undernutrition rate remains high [6]. Diet has a direct impact on a child's growth and health, but other factors such as food security, socio-economic status, environmental factors, and accessible resources also play a significant role [7]. Unlike non-tribal communities, tribal communities often face social, economic, and political marginalization, which can lead to disparities in health, education, and access to resources compared to mainstream society. These factors can impact food choices in both tribal and non-tribal communities, thereby impacting children's nutritional status. India has several programs and strategies to prevent malnutrition, but their effectiveness and impact vary across the country. To address malnutrition, it is important to collect data on preschool children's nutritional status and eating patterns across diverse communities. This study aims to assess and compare anthropometric indices and food consumption pattern among tribal and non-tribal preschool children in Khordha district of Odisha.

## MATERIALS & METHODS

A community-based cross-sectional study was carried out from April to June 2023 in the Sundarpur urban area under Chandaka Panchayat in Bhubaneswar sub division of Khordha district in Odisha. A total of 60 preschool children aged 3-6 years from tribal community (n=30) and non-tribal community (n=30) were randomly selected. The data was assessed using a household survey, which included face-to-face interviews with the mothers who provided informed consent. A self-designed semi-structured questionnaire was used to gather socio-demographic information. The study population's socioeconomic index was computed using the Kupuswami scale [9].

Anthropometric measurement is a widely acceptable method to assess the nutritional status [10], that was used in this study. Children were measured wearing light clothing and without shoes. The digital weighing scale was used to measure body weight to the nearest 0.1kg, and the portable stadiometer was used to measure height to the nearest 0.1cm. The mid upper arm circumference (MUAC) was measured with a flexible, non-elastic MUAC tape to the closest 0.1cm. The MUAC was measured at the midway between the acromion and olecranon of the child's non-dominant arm. All measurements were conducted three times and averages were considered.

Children's nutritional status was assessed using three anthropometric indices: height for age, weight for age, and weight for height. The anthropometric parameters were represented in Z scores and compared to WHO growth standards cut-off points. According to WHO criteria, children with height for age (HAZ) below -2SD are deemed stunted, while those with HAZ below -3SD are termed severely stunted. Weight-for-height (WHZ) values below -2SD were regarded wasted, whereas those below -3SD were considered extremely wasted. Children with a weight for age (WAZ) below -2SD were termed as underweight, whereas those with a WAZ below -3SD were classified as severely underweight [11]. The Z scores for weight for age, height for age, and weight for height were calculated. MUAC cut-offs of 125mm (12.5cm) and 115mm (11.5cm) were chosen to characterise moderate and severe acute malnutrition, respectively [11].

A semi-quantitative questionnaire was used to analyse children's food consumption pattern through interviews with their mothers. Food items were classified as cereals, pulses and legumes, chicken and meat, milk and milk products, vegetables, fruits, drinks, confectioneries and bakery products, and savoury. Five frequency categories, including daily, weekly, fortnightly, monthly, and never were employed.

Data was analysed using SPSS software version 17.0. Descriptive Statistics were done for frequency and percentages. Statistical analysis was conducted using Paired t-test. P-values < 0.05 were deemed statistically significant.

## RESULTS

The majority of non-tribal children (50%) belonged to upper middle socio-economic group and majority of tribal children (53.33%) belonged to lower socio-economic group. 36.67 per cent of non-tribal children belonged to lower middle socio-economic whereas interestingly no one of tribal children belonged to this group. While, 46.67% tribal children and 13.33 % of non-tribal children belonged to upper lower socioeconomic class. The total study population consisted of 57.75% boys and 42.5% girls. It has been found that more illiterate mothers were found in the tribal community (20%) than in non-tribal community (17.5%). Almost 80% fathers from non-tribal community were engaged in unskilled occupations such as construction. (Table 1) depicts the socio-demographic information of study population.

**Table 1: Socio-Demographic Information**

Particulars	Tribal Children %	Non-tribal Children %
<b>Gender of the child</b>		
Male	73.33	43.33
Female	26.67	56.67
<b>Mother's Education</b>		
Illiterate	96.67	16.67
10 <sup>th</sup>	3.30	23.33
Intermediate	-	23.33
Graduate	-	36.67
<b>Father's Education</b>		
Illiterate	-	23.33

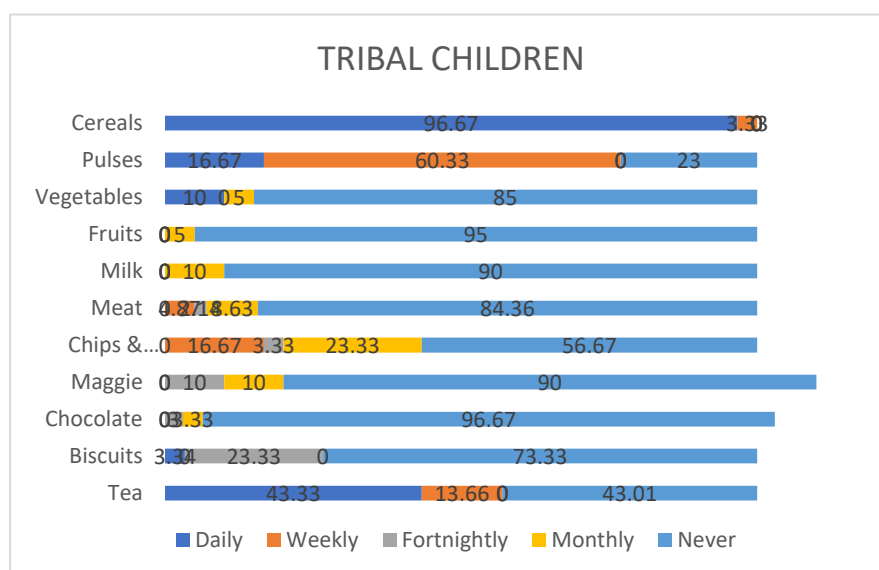
10 <sup>th</sup>	-	63.33
Intermediate	73.33	-
Graduate	26.67	14.33
<b>Father's Occupation</b>		
Govt. Employee	-	40.00
Private service	-	33.33
Labourer	90.00	26.66
Unemployed	10.00	-
<b>Religion</b>		
Hindu	80.00	100.00
Christian	20.00	-
<b>Caste</b>		
General	-	66.67
OBC	-	13.33
SC/ST	100.00	20.00
<b>Type of family</b>		
Joint	50.00	40.00
Nuclear	50.00	60.00
<b>Number of family members</b>		
3-6	50.00	63.33
6 to10	33.33	33.33
>10	16.67	3.33
<b>Socio-Economic Status</b>		
Upper Middle Class	-	50.00
Lower Middle Class	-	36.67
Upper Lower Class	46.67	13.33
Lower Class	53.33	-

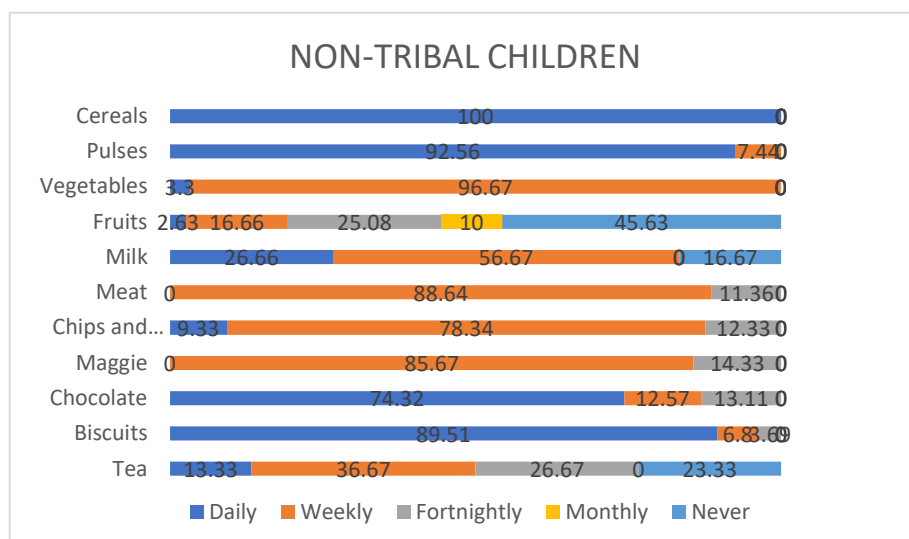
**Table 2: Comparison of Anthropometric Parameters among Tribal and Non-tribal Children**

Particulars	Tribal Children %	Non-tribal Children %
<b>Height For Age- HAZ</b>		
Severe Stunting	70.00	-
Moderate Stunting	30.00	40.00
Normal	-	60.00
<b>Weight for Height- WHZ</b>		
Severe Wasting	83.33	6.66
Moderate Wasting	16.66	23.33
Normal	-	70.00
<b>Weight for Age-WAZ</b>		
Severe Underweight	80.00	-

Moderate Underweight	20.00	16.66
Normal	-	83.33
<b>MUAC Criteria</b>		
Severe Malnutrition	33.33	-
Moderate Malnutrition	60.00	-
At Risk	6.66	30.00
Normal	-	70.00

The magnitude of severe stunting (HAZ <-3SD) was significantly more among tribal children (83.33%) as compared to non-tribal children (6.66%), (P value = 0.05). Stunting among tribal children (70%) was found significantly more in children belonging to lower socioeconomic group (P=0.0004). It was observed that stunting was significantly more amongst children of mothers who were illiterate or had only primary level education (P=0.005). Study also revealed that prevalence of stunting was more among boys as compared to girls; however, this observation was not statistically significant. Prevalence of severe underweight (WAZ<-3SD) amongst children belonging to tribal families was significantly higher (P value =0.005) (80%) as compared to non-tribal families and it was also significantly more among tribal children belonging to lower socioeconomic status (P value= 0.0001). Prevalence of moderate wasting (WHZ<-2SD) was found more among tribal children (16.66%) as compare to non-tribal children (23.33%). MUAC criteria revealed that 33.33% children in tribal community were severely malnourished (MUAC< 115mm) while this was not detected among non-tribal children. Majority of tribal children (60%) suffered from moderate malnutrition due lack of proper knowledge on health and nutrition as compared to non-tribal children. The percentage of children at risk of malnutrition was also found to be comparatively more in tribal population. Table 2 indicates the nutritional status of the respondents.





**Fig. 1: Frequency of Consumption Pattern among Preschool Children**

Fig.1 states the frequency of food consumption pattern among tribal and non-tribal children. Dietary assessment revealed that 74.32% non-tribal children consumed chocolates daily. The percentage of daily consumption of packaged foods like chips, kurkure was more among non-tribal children (9.33%) than tribal children. Percentage of tribal children who consume biscuits daily was 3.34 percent, 43.33% and 13.33% of tribal and non-tribal children respectively consumed tea almost on a daily basis. Results show that there was no difference in the consumption of cereals among tribal and non-tribal children while almost more than 90% population consumed cereals daily as cereals form a part of the staple diet. Daily consumption of pulses was found to be more among non-tribal children (92.56 %) as compared to tribal children (16.67%). However, daily consumption of vegetables and fruits was very low among the total population; 95% of tribal and 45.63% of non-tribal children never consumed fruits. There was not much difference in the percentage of children who consumed milk daily, moreover percentage of children who never consume milk is more among tribal children (90%) as compared to non-tribal children (16.67%). The study also found that weekly consumption of meat is more among non-tribal children (88.64%) as compared to tribal children (4.87%).

## DISCUSSION

According to NFHS-5 reports for Odisha state, the prevalence of stunting among children below five years of age is 29.3% and 38.4% in non-tribal and tribal areas respectively [12]. These findings are consistent with another study conducted in Central India, which reported 22% and 37% stunting among non-tribal and tribal children respectively [13]. However, the findings of the present study are in equivalent with the above two studies and shows that the proportion of stunted tribal children is more (70%) as compared to non-tribal children (40%). These findings are in line with the NFHS-4 fact sheet, which reported that 62.9% tribal children and 49.3% non-tribal children were stunted [14]. A study conducted by Bentley *et.al.*, (2015) in tribal areas of Mumbai found that stunting was 56% among children < 5 five-year-old [15].

Stunting is seen to be more prevalent in tribal communities; which may be because the lower socio-economic status and mother's lower educational status in tribal families as compared to non-tribal communities, resulting in lesser food buying capacity for tribal families. Moreover, majority of tribal population have less income which force them to live in food insecure conditions. (Varadharajan *et al.*, 2013).

Weight-for-age (WAZ), which indicates acute and chronic malnutrition is considered as a composite index of height for age (HAZ) and weight for height (WHAZ) [5]. The current study finds 80 % (67.33% boys and 12.67% girls) tribal were severely underweight whereas no non-tribal children were found in this category. Similar studies also reported high prevalence of under nutrition among boys as compared to girls [16]. The exact reason for the above is not known, however, it is possible that this may be due to higher susceptibility of boys to environmental stress as compared to girls (Wamini *et al.*, 2007). The present study reveals that the magnitude of moderate underweight is 16.66% and 20% among non-tribal and tribal children. These findings are consistent with the study conducted in Jabalpur [17].

A study conducted in Satara District showed that according to MUAC criteria, 3.2% girls & 6.3% boys were severely malnourished [18]. The present study however shows that, there is 54.34% severe malnutrition in boys and in case of girls only 45.66% have severe malnutrition. The present study also shows that while 70% of the non-tribal children population is normal, 30% children are at risk while 33.33% tribal children are severely malnourished, majority (60%) were moderately malnourished and only 6.66% were at risk. Another study in Bihar Singh and Mukherjee, 2015 however, reported that the rate of under nutrition among the tribal preschool children from Bihar was comparatively much higher (24.9%) than the present study (46.57%), which was conducted in Odisha [19]. These data indicate a possible improvement in nutrition status in tribal and non-tribal communities when compared to other parts in the country. With regards to WHZ, the NFHS 5, reported 6.8% and 8.3% severe wasting, and moderate wasting of 23.33% and 16.66% in non-tribal and tribal children respectively [5]. The present study reports severe wasting in both tribal and non-tribal children to be 83.33% and 6.66% respectively. According to a study conducted in West Bengal reported 2.7% severe wasting among preschool children and this result is similar to ours [20]. Moderate wasting in tribal and non-tribal children is 16.66% and 23.33% respectively. The present study states that overall prevalence of under nutrition is high in tribal children as compared to non-tribal children. The study finds that while there are no lower-class families in non-tribal community, and the number of lower-class families in tribal community is 23.8%. This can be one of the contributing factors to the high proportion of under nutrition in tribal children indicating that the economic status has a significant impact on the purchasing capacity of families.

The food consumption pattern revealed that both tribal and non-tribal children predominantly consumed cereals and daily frequency of consumption of other food groups such as vegetables; fruits, pulses, milk, and meat were found to be minimum. This may be because cereals are the staple food for all states and also the least expensive source of energy (Vecchio *et al.*, 2014). Daily consumption of packed food items such as chips and chocolates were higher among non-tribal children due to higher economic status. The study found that majority of tribal and non-tribal preschool children consumed tea almost daily and weekly. A study conducted by Bentley *et.al.*, in tribal areas reported that children commonly consumed sugary snacks and salted snack foods, which, predisposes children to malnutrition and its associated deficiencies [15].

Mother's education and socioeconomic status are the key factors, which have an impact on the child's nutritional status. An awareness of child feeding practices and health seeking behaviour of mother is very crucial for child development. Unfortunately, sound child feeding practices as well as health seeking behaviour is lacking in illiterate or poorly educated mothers which affects the nutritional status of children [21, 22]. Mother's illiteracy could be one of the reasons for children's under nutrition as well as for children's indulgence in chocolates, processed food items and bakery products like biscuits. Employment of mothers may contribute to poor childcare and may result in poor dietary habits. This relationship needs to be further explored in the future research.

## CONCLUSION

The study found that despite government efforts to reduce malnutrition, it remains pervasive in India. Data collection will assist identify gaps in existing programs especially for tribal families. The findings can help generate data for tailoring current programs to meet specific goals and aims. Improved tactics are needed to address hunger. To promote long-term improvements in nutrition, cultural practices, and diets, it is crucial to raise public knowledge of healthy eating habits among tribal communities. The study emphasises the need of awareness among mothers regarding health and nutrition for overall development of the family as well as society.

**Ethical Approval:** Not Required

**Source of funding:** Self

**Conflict of Interest:** Nil

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