

Nutritional Status of Tribal and Non-Tribal Children (Under 5) in Purulia District of West Bengal: A Comparative Study

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ABSTRACT

Introduction: Nutrition is the cornerstone of socioeconomic development of a country. Childhood under nutrition is a critical public health problem in India in general but among tribal population more particularly. The present study aimed at comparative assessment of nutritional status among tribal and nontribal under 5 children.

Method: Community based cross-sectional study was conducted in Purulia district of West Bengal among 112 tribal and nontribal under 5 children. Demographic, socioeconomic, maternal and birth characteristics were recorded in pre-designed, pre-tested structured interviewer administered questionnaire. Anthropometric examinations were performed following standard operating protocol.

Results: Prevalence of under nutrition among tribal under 5 children was 69.6% whereas among non-tribal children it was 50.9%. Under nutrition was significantly more in tribal under 5 children compared to their non-tribal counterpart [OR= 2.22 (1.28-3.85)]. But this significant difference between tribal and non-tribal children in respect to nutritional status was lost when adjusted with socio economic variables [AOR=0.52(0.21-1.28)]. In final model also where all covariates were adjusted, there was no significant difference in nutritional status among tribal and non-tribal children [AOR=0.56(0.15-2.17)].

Conclusion: Increased prevalence of under nutrition among tribal children was not due to ethnicity but difference among both group in respect to socio-economic variables and access and utilization of MCH services played the key

role. An integrated multi-sectoral coordinated approach for overall improvement of standard of life of tribal population is required.

Key words: Under-weight, Wasting, Stunting, Tribal under-5 children, Non tribal under-5 children.

INTRODUCTION

Children are the backbone of any country. Childhood, especially the first five years of life, constitutes the most crucial period, when the foundations are laid for physical, social, cognitive, and emotional development. Childhood under nutrition is a critical public health problem and a challenge in many developing countries including India^[1]

Dietary inadequacies and childhood under nutrition among children in general and tribal children in particular, have been emphasised. According to NFHS 3 report under nutrition among under 5 children was highly prevalent in West Bengal (Weight for age <-2SD = 37.6%, Height for age <-2SD = 41.8%, Weight for height <-2SD = 19.2%) which was considerably higher in case of tribal children (Weight for age <-2SD = 59.7%, Height for age <-2SD = 58.6%, Weight for height <-2SD = 20.7%)^[2]

Several studies were reported on the nutritional status of children, both at national and different state level, but not much on tribal children particularly in West

Bengal. So comprehensive data on nutritional status of tribal children in comparison to their nontribal counterpart is not available. Information on these lines provides a better understanding of the problem which in turn would help to modify suitably the existing tribal child care services or even to design more appropriate strategies for their overall development.

In this backdrop the present study aimed in eliciting and comparing nutritional status with their determinants of tribal and nontribal under 5 children in Purulia district of West Bengal.

MATERIAL AND METHODS

TYPE OF STUDY:

Community based observational study.

STUDY DESIGN:

Cross-sectional study.

STUDY AREA:

The study was conducted in Purulia district of West Bengal.

STUDY PERIOD:

The study period of the present study was from October 2013 to October 2015, total period of two years.

STUDY POPULATION:

Tribal (Schedule Tribes under Article 342 of the constitution) and nontribal (Schedule cast, other backward classes and others) under 5 children residing in the study areas.

INCLUSION CRITERIA:

- All (tribal and nontribal) under 5 tribal children residing in study area

EXCLUSION CRITERIA:

- Unwilling parents
- Moribund children

SAMPLE SIZE:

According to NFHS 3 Report prevalence of under nutrition (under wt. for age) among under 5 children in different caste in West Bengal was as follows: ST: 59.7%, SC: 40%, OBC: 22.7%, others: 37% [2].

Sample size was 52 in each arm of tribal and non-tribal by applying following formula

$$n = \frac{2 \times \bar{p} (100 - \bar{p}) \times (Z_{\alpha} + Z_{\beta})^2}{(p_1 - p_2)^2}$$

[p₁=Prevalence of under nutrition among ST or tribal children= 59.7%

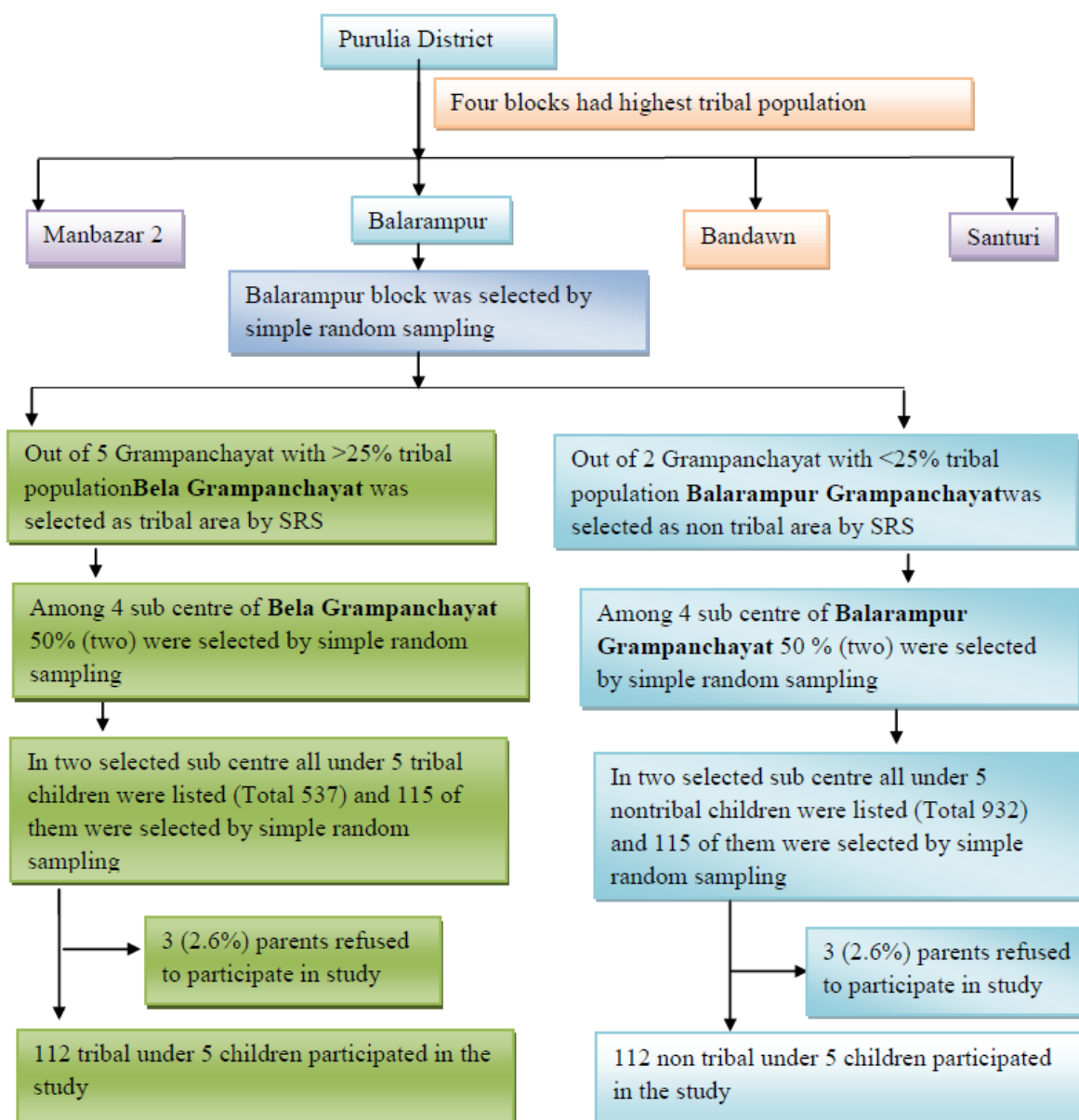
p₂=Prevalence of under nutrition among Non-tribal children= 33.23% (by taking average prevalence of under wt. for age among SC, OBC and others under 5 children)

$\bar{p} = (p_1 + p_2) / 2 = 46.5$, $Z_{\alpha} = 1.96$, $Z_{\beta} = 0.84$ (when power of study =80%, alpha error = 5%)]

Since here multistage random sampling was done, design effect was taken as 2; so sample size was 104 for each arm. After adding 10% attrition rate sample size became 115 for each tribal and non-tribal under 5 children.

SAMPLING DESIGN:

Community based cross-sectional study was conducted in Purulia district of West Bengal



STUDY TOOL:

1. A pre-designed, pre-tested structured interviewer administered questionnaire:

After initial preparation the questionnaire was judged by a group of experts in AIHH&PH, Kolkata who made necessary corrections. Face validity of each item and content validity of each domain were ascertained by them. Then the questionnaire (which was originally drawn up in English) was translated into Bengali (local language of the study area) keeping semantic equivalence and again back translated into English. The above procedure was done by two separate persons with expertise in both languages (English

and Bengali) and who made back translation into English was totally unaware about original English version of questionnaire. Back translated English version was compared with original English version and necessary correction was done. Then it was again translated into Bengali which was used for pretesting. Pretesting was done between 10 tribal and 10 nontribal under 5 children in another but similar area (at Tentlow gram panchayet of Balarampur block). During pretesting the questions which were found to be irrelevant, ambiguous, not comprehensive were omitted and those questions were required to be added for revealing necessary

information according to stated objectives were incorporated. Then the questionnaire was finalized in local language (Bengali).

The questionnaire had following parts as follows:

<p><u>Interview:</u></p>	<ol style="list-style-type: none"> i. Demographic characteristics of Child (Age, Sex, Caste, Religion, Type of family) ii. Socioeconomic characteristics of family (Education and occupation of mother, Per capita monthly income of family, Housing) iii. Environmental characteristics of family (Defecation practice, type of drinking water) iv. Behavioural characteristics (Addiction) of mother v. Maternal and birth characteristics of study participant (Age of mother at first child birth, Number of antenatal visit, Maternal morbidity, Birth place, Birth weight, Gestational age) vi. Feeding practices of children <ul style="list-style-type: none"> • For <2 yrs. old children: (IYCF standardized questionnaire was followed) (Early initiation of breastfeeding; Exclusive breastfeeding under 6 months; Continued breastfeeding at 1 year; Introduction of solid, semi-solid or soft foods; Minimum dietary diversity; Minimum meal frequency; Minimum acceptable diet; Consumption of iron-rich or iron-fortified foods; Children ever breastfed; Continued breastfeeding at 2 years; Age-appropriate breastfeeding; Predominant breastfeeding under 6 months; Bottle feeding.) • For 2-5 yrs. old children: (Timely initiation of breast feeding; Prolactal feed; Colostrum feed; Exclusive breast feeding up to 6 months; Timely introduction of solid, semi-solid or soft foods; ≥ 3 major meal in last 24 hour) vii. Health care seeking behaviour related to illness of children.
<p><u>Anthropometric Measurements:</u></p>	<ol style="list-style-type: none"> i. Weight ii. Height/Length iii. Mid upper arm circumference

2. Portable Weighing machine (Properly calibrated). (For measuring weight of 2-5 yr. children) [Made: Ramon surgical co]
3. Baby Weighing machine (Properly calibrated). (For measuring weight of 0-2 yr. children) [Made: Hardik Medi – Tech]
4. Infantometer (For measuring length of 0-2 yr. children) [Made: ATICO Medical Pvt. Ltd]
5. Stadiometer with a fixed vertical backboard and an adjustable head piece. (For measuring height of 2-5 yr. children) [Made: Galaxy Informatics India]
6. A non-stretchable measuring tape. (For measuring mid upper arm circumference)
7. Torch
8. Stethoscope [Made: Leatman]

an academic research in nature and all data provided by the respondents would be kept confidential and anonymous. After getting their approval regarding participation in this study the informed written consent was taken from parents in local language (Bengali).

Information was obtained regarding different demographic, socioeconomic, environmental characteristics of families of study subjects from the head of the family. Behavioural characteristics of mothers were elicited by interviewing them. Maternal and birth characteristics were obtained from medical records and by interviewing the mothers. Feeding history of study subjects were found out from mothers. History regarding health seeking behaviour for under 5 children was elicited from their mother. All information obtained was recorded in predesigned pre-tested structured questionnaire.

Anthropometric measurements were done following standard operation protocol.

STUDY TECHNIQUES-

1. Interview
2. Anthropometric measurement and physical examination
3. Review of medical records

STATISTICAL ANALYSIS:

Recorded data was analysed by SPSS Version 16.

METHOD OF DATA COLLECTION

All parents of children were explained that the purpose of the study was

ETHICAL ISSUES: -

The protocol of the research study was submitted to the institutional ethical committee (AIIH&PH, Kolkata) and the study was initiated after getting approval from institution's ethical committee. Permission was also obtained from Backward class welfare Dept. Govt. of West Bengal, CMOH Purulia, BMOH Bansgarh Rural hospital for conducting research work.

All parents of children were explained that the purpose of the study was an academic research in nature and all data provided by the participants would be kept

confidential and anonymous. The participants had every right either to participate or not in the study and also could refuse any time to participate in the middle of the study without giving any reason for it.

After getting their approval regarding participation in this study the informed written consent was taken from parents in local language (Bengali).

Any morbidity detected among the study population during the study period was managed by the researcher and if required referral to the nearest health centre was done.

RESULTS

Table.1 Distribution of study subjects according to their socio-demographic, environmental, maternal and birth characteristics:

Variable	Number (%)		Chi-square value/ independent t test value (P value)
	Tribal (n ₁ =112)	Nontribal (n ₂ =112)	
Mean Age in months (SD)	23.5 (17.8)	27.1 (18.4)	1.50 (0.13)
Age Group			
0-6 month	23 (20.5)	22 (19.6)	3.27 (0.66) df = 4
6-12 month	12 (10.7)	6 (5.4)	
1-2 yr	23 (20.6)	21 (18.8)	
2-3 yr	24 (21.4)	31 (27.7)	
3-5 yr	30 (26.8)	32 (28.5)	
Sex			
Male	57 (50.9)	55 (49.1)	0.07 (0.79) df = 1
Female	55 (49.1)	57 (50.9)	
Family type			
Nuclear	29 (25.9)	24 (21.4)	0.62 (0.43) df = 1
Joint	83 (74.1)	88 (78.6)	
Education of mother			
Illiterate	17 (15.2)	10 (8.9)	15.59 (0.23) df = 4
Literate (non-formal)	27 (24.1)	18 (16.1)	
Up to Primary (Class I-IV)	11 (9.8)	13 (11.6)	
Up to Middle (Class V-VIII)	36 (32.1)	48 (42.9)	
Up to secondary and higher secondary (Class IX-XII)	21 (18.8)	23 (20.5)	
Occupation of Mother			
Home maker	88 (78.6)	112 (100.0)	26.88 (0.00) ** df = 1
Unskilled worker	24 (21.4)	00 (0.0)	
Mean Per capita Income in rupees (SD)			
Housing Status	505.4 (238.0)	1134.6 (584.6)	10.55 (0.00) **
Kutcha house	67 (59.8)	6 (5.4)	96.80 (0.00) ** df = 1
Semi pukka	30 (26.8)	25 (22.3)	
Pukka	15 (13.4)	81 (72.3)	
Defecation Practice of family members			
In water seal latrine	17 (15.2)	19 (17.0)	0.13 (0.72) df = 1
In open field	95 (84.8)	93 (83.0)	
Source of drinking water			
Tube well	106 (94.6)	112 (100.0)	4.28 (0.39) df = 1
Well	6 (5.4)	00 (0.0)	
Addiction of mother (smokeless tobacco)	44 (39.3)	8 (7.1)	32.46 (0.00) ** df = 1
Number of antenatal check up			
≥4	70 (62.5)	89 (79.5)	7.82 (0.005) ** df = 1
<4	42 (37.5)	23 (20.5)	
#Birth Wt. (n₁=72, n₂=102)			
≥2500 gm	36 (50.0)	91 (89.3)	32.67 (0.00) ** df = 1
<2500 gm	36 (50.0)	11 (10.7)	
##Gestational Age (n₁=63, n₂=96)			
Preterm	13 (20.5)	10 (10.7)	3.21 (0.07) df = 1
Term	50 (79.5)	86 (89.3)	
Place of Birth (n₁=112, n₂=112)			
Home	54 (48.2)	16 (14.3)	30.01 (0.00) ** df = 1
Institution	58 (51.8)	96 (85.7)	
Skilled birth attendance in home deliveries (n ₁ =54, n ₂ =16)	13 (24.1)	5 (31.2)	0.06 (0.80) df = 1

*Significant at 95% confidence limit, **Significant at 99% confidence limit.

#Birth weight of 72 tribal and 102 non-tribal under 5 children was available from medical records

##Gestational age of 63 tribal and 96 non-tribal under 5 children was available from medical records

Mean age of participants was 23.5 month (± 17.8) in tribal group and 27.1 month (± 18.4) in nontribal group. There was no significant difference in both groups according to age and gender. 25.9% of tribal participants and 21.4% of nontribal participants belonged to nuclear families. 15.2% of mothers of tribal children were illiterate and 24.1% had only non-formal education compared to 8.9% and 16.1% of mothers of non-tribal group respectively. In tribal group, more than three fourths (78.6%) mothers were homemakers and the rest were unskilled workers (manual labour) where as in nontribal group all mothers were homemakers. There was a significant difference between average PCI of tribal families (505.4 ± 238) and nontribal families (1134.6 ± 584.6). More than half (59.8%) of the tribal children lived in Kutcha house where as in non-tribal group this proportion was significantly lower (5.4%) ($p = 0.00$) [Table 1].

There was no significant difference in defecation practice between family members of both groups. Predominant source of drinking water was tube well in both groups.

Difference of addiction pattern of mothers of both group of children was significant ($p = 0.00$) [Table 1].

Mean age of first childbirth was significantly higher in tribal mothers, in comparison to nontribal mothers ($20.9 \pm SD 1.5$ vs $19.7 \pm SD 1.4$). Predominant complications in pregnancy in both groups were anaemia followed by hypertension but were significantly more among tribal mothers than nontribal mothers [Prevalence of anaemia: 58.9% in tribal mothers and 16.1% in non-tribal mothers, ($p = 0.00$); Prevalence of hypertension: 17% in tribal mothers versus 5.4% in non-tribal mothers, ($p = 0.006$)]. More than one third (37.5%) tribal mothers gave history of < 4 antenatal visits where as in nontribal mothers this proportion was 20.5% and this difference was statistically significant ($p = 0.005$) [Table 1].

Proportion of low birth weight among tribal children was 50% where as in nontribal it was only 10.7% ($p = 0.00$). History of premature birth was 20.5% among tribal children and it was 10.7% among nontribal children ($p = 0.043$). Institutional delivery was also much more among nontribal children (85.7%) in comparison to tribal children (51.8%) ($p = 0.00$) [Table 1].

For purpose of analysis feeding score was calculated for each participant as follows:

Table 2. Calculation of feeding score of study subjects:

Age Category	Total indicators applicable	Score for each indicator in favourable response	Score for each indicator in unfavourable response	Maximum attainable score	Minimum attainable score
0-5.9 month	8	1	0	8	0
6-8.9 month	13	1	0	13	0
9-11.9 month	12	1	0	12	0
12-15.9 month	13	1	0	13	0
16-19.9 month	12	1	0	12	0
20-23.9 month	13	1	0	13	0
24-59.9 month	6	1	0	6	0

As indicators applicable for assessing feeding practices in different age groups were different, standardized feeding score for each participant had to be calculated.

For each age category (as mentioned above) mean and standard deviation of feeding scores were calculated. Z score was calculated as a measure of standardized feeding score for each individual as follows:

$$Z_{ij} = \frac{X_{ij} - \bar{X}_j}{\sigma_j}$$

X_{ij} = Individual feeding score of i th individuals in j th subgroup, \bar{X}_j = mean feeding score in j th subgroup. σ_j = standard deviation of feeding score within j th subgroup.

$$\bar{X}_j = \frac{\sum X_{ij}}{n_j} \text{ (where } n_j \text{ = the total number of people in } j\text{th subgroup).}$$

Participants with standardized score ≥ 0 were considered to have good feeding practices where as those with standardized score < 0 were considered to have bad feeding practices.

Table. 3. Standardized feeding score among study participants:

Variable	Number (%)		Chi-square /independent t test value (P value)
	Tribal (n ₁ =112)	Nontribal (n ₂ =112)	
Mean Standardized feeding score (SD)	-0.21 (0.98)	0.21 (0.95)	0.33 (0.001) **
Distribution of study subject according to standardized feeding score			
Satisfactory feeding practices(Standardized feeding score ≥ 0):	43 (38.4)	63 (56.2)	7.16 (0.01) **
Unsatisfactory feeding practices (Standardized feeding score < 0):	69(61.6)	49 (43.8)	

**Significant at 99% confidence limit

As indicators applicable for assessing feeding practices in different age groups were different standardized feeding score for each participant was calculated which was significantly more in non-tribal children [mean=0.21±0.95] in comparison to their tribal counterpart [mean=-0.21±(0.98)]. When children of both groups were

dichotomized as satisfactory [standardized feeding score ≥ 0 (mean score)] & unsatisfactory [standardized feeding score < 0 (mean score)] feeding practices, only 38.4% tribal children had satisfactory feeding score compared to 56.2% among nontribal under 5 children. This difference was statistically significant.

Table.4. Distribution of study subjects according to nutritional status (as per WHO 2006 reference standard):

Variable	Number (%)		Chi-square value (P value)
	Tribal (n ₁ =112)	Nontribal (n ₂ =112)	
Weight for age			0.88 (0.34) df=1
Normal	59 (52.7)	66 (58.9)	
Moderate underweight	28 (25.0)	29 (25.9)	
Severe underweight	25 (22.3)	17 (15.2)	
Height for age			0.08 (0.77) df=1
Normal	77 (68.8)	75 (67.0)	
Moderate stunting	13 (11.6)	37 (33.0)	
Severe stunting	22 (19.6)	00 (0.0)	
Weight for height			6.45 (0.01) * df=1
Normal	47 (42.0)	66 (59.0)	
Moderate wasting	55 (49.1)	36 (32.1)	
Severe wasting	10 (8.9)	10 (8.9)	
Mid Upper Arm Circumference (n₁=97, n₂=102)			10.96 (0.00) ** df=1
Normal	67 (69.1)	90 (88.2)	
Moderate under Nutrition	25 (25.7)	12 (11.8)	
Severe Under Nutrition	5 (5.2)	00 (0.0)	

*Significant at 95% confidence limit, **Significant at 99% confidence limit.

Proportion of severe underweight for age was more in tribal children (22.3%) in comparison to nontribal children (15.2%) but this was statistically not significant. Proportion of severe stunting was 19.6% in tribal under 5 children, while not a single non tribal child suffered from severe stunting. Prevalence of moderate wasting was again more (49.1%) in tribal under 5 children in comparison to 32.1% in nontribal children. Prevalence of moderate

under nutrition and severe under nutrition according to mid upper arm circumference (between 3 months to 5 year old children) was more among tribal group (25.7% and 5.2% respectively) in comparison to nontribal children of same age (11.8% and 0.00% respectively). Wasting and under nutrition according to mid upper arm circumference was significantly more among tribal children.

Table.5. Distribution of study subjects according to nutritional status (as per CIAF classification):

Variable	Number (%)		Chi-square value (P value)
	Tribal (n ₁ =112)	Nontribal (n ₂ =112)	
Group A: No failure	34 (30.3)	55 (49.1)	
Group B: Wasting only	24 (21.4)	00 (0.0)	
Group C: Wasting and under weight	19 (17.0)	20 (17.9)	
Group D: Wasting, Stunting and under weight	19 (17.0)	26 (23.2)	
Group E: Stunting and under weight	15 (13.4)	00 (0.0)	
Group F: Stunting only	1 (0.9)	11 (9.8)	
Prevalence of Under nutrition (All CIAF group except group A)	78 (69.6)	57 (50.9)	8.22 (0.004) **df=1
Prevalence of Under nutrition in different Age Groups			
0-12 month (n ₁ =35, n ₂ =28)	21 (60.0)	02 (7.1)	18.75 (0.00) **df=1
12-36 month (n ₁ =47, n ₂ =52)	37 (78.7)	33 (63.5)	2.78 (0.09) df=1
36-60 month (n ₁ =30, n ₂ =32)	20 (66.7)	22 (68.7)	0.03 (0.87) df=1
Prevalence of Under nutrition in different Gender Groups			
Male (n ₁ =57, n ₂ =55)	41 (71.9)	26 (47.3)	7.08 (0.008) ** df=1
Female (n ₁ =55, n ₂ =57)	37 (67.3)	31 (54.4)	1.949 (0.163) df=1

*Significant at 95% confidence limit, **Significant at 99% confidence limit

Prevalence of under nutrition according CIAF classification (All CIAF group except Gr.A i.e.no failure) among tribal under 5 children was significantly more (69.6%) in comparison to their non-tribal counterpart (50.9%) (p=0.004). When age group and gender wise distribution of under nutrition was concerned in age 0–12-month prevalence of under nutrition was significantly different among both group of

children (p=0.00). In other age groups significant relationship was not established. Among male gender tribal children were more under nourished than non-tribal children (prevalence 71.9% and 47.3% respectively) (p=0.008). Among female though prevalence of under nutrition was more in tribal group (67.3%) than non-tribal group (54.4%) significant relationship could not be established.

Table.6. Effect of ethnicity (Tribal and non-tribal) and other covariates on Nutritional Status: (n=224)

Variable	Presence of under nutrition				
	Unadjusted	Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)	Model 4 AOR (95% CI)
Ethnicity					
Non tribal	1	1	1	1	1
Tribal	2.22 (1.28-3.85) **	0.52(0.21-1.28)	0.47(0.17-1.32)	0.47(0.13-1.69)	0.56(0.15-2.17)

*Significant at 95% confidence limit, **Significant at 99% confidence limit.

In present study under nutrition was significantly more in tribal under 5 children compared to their non-tribal counterpart [OR= 2.22 (1.28-3.85)]. Finally, 4 logistic regression model were prepared to elicit effect of ethnicity (tribal and non-tribal) and other covariates on nutritional status of under 5 children as followed.

Model 1: Effect of ethnic groups on nutritional status was adjusted with Demographic, Socioeconomic and Behavioural covariates like family type, education of mother, per capita income of family, housing, mother's addiction. (Hosmer and Lemeshow test non-significant, Nagelkerke R square=0.466). In Bivariate logistic regression it was seen that among tribal children prevalence of under nutrition was significantly more than non-

tribal under 5s. When adjusted with socio economic covariates (in Model 1) this significant effect of ethnicity on nutritional status was completely attenuated, rather reversed [AOR=0.52(0.21-1.28)] and this model could explain 46.6% data of dependent variable.

Model 2: Covariates related to maternal characteristics and birth characteristics of children (age of mother at first child birth, number of health check up during antenatal period, maternal morbidity during antenatal period and birth place of children) were added. (Hosmer and Lemeshow test non-significant, Nagelkerke R square=0.555). This model could explain 55.5% data of dependent variable. Here effect of ethnicity was further reversed (though not significant) [AOR=0.47(0.17-1.32)].

Model 3: Covariates of Health care seeking behaviour was added. (Hosmer and Lemeshow test non-significant, Nagelkerke R square=0.559). Model 3 could explain 55.9% data of dependent variable (almost same as model 2) and adjusted odds ratio for ethnic groups remained also same [AOR=0.47(0.13-1.69)].

Model 4: Feeding practices of under 5 children (according to standardized feeding score) was added and thus adjusted with all covariates. (Hosmer and Lemeshow test Non significant, Nagelkerke R square=0.642). Finally model 4 could explain 64.2% data of dependent variable and in this model adjusted odds ratio for ethnic groups was slightly augmented but there was no significant effect of ethnicity on under nutrition [AOR=0.56(0.15-2.17)].

DISCUSSION

Present study showed that overall, 47.3 % tribal children were underweight. Of these, 25% and 22.3% children were found to be moderately and severely underweight. The result also revealed that the overall, 31.2 % tribal children were stunted. Of these, 11.6% and 19.6% children were found to be moderately and severely stunting, respectively. Overall prevalence of wasting was 58% in tribal community. Of these, 49.1% and 8.9% children were found to be moderately and severely wasted, respectively. Prevalence of malnutrition based on MUAC-for-age z-score was 30.9% among tribal children, out of whom, 25.7% and 5.2% children were found to moderately and severely malnourished [Table.4].

Bose Kaushik et.al. in their study among tribal preschool children in Paschim Medinipur District of West Bengal [3] showed that overall, 61.5 % tribal children were underweight. This prevalence was more than present study finding. Of these, 33.8% and 27.7% children were found to be moderately and severely underweight. The result also revealed that the overall, 38.5 % tribal children were stunted. Of these, 24.6% and 13.8% children were found to be moderately and severely stunting,

respectively. Though over all prevalence of stunting was slightly more, severe stunting was less in their study compared to present study. Overall prevalence of wasting was 55.4 %, of these, 32.3% and 13.1% children were found to be moderately and severely wasted, respectively in their study. Prevalence of malnutrition based on MUAC-for-age z-score was much more than present study (56.9%), out of whom, 44.6% and 12.3% children were found to moderately and severely malnourished.

Rao et. Al. [4] in their study also revealed that high prevalence of under nutrition (below 2SD) in terms of underweight (61.6%), stunting (51.6%) and wasting (32.9%) was observed among tribal preschool children. The study revealed severe degree (below -3SD) of underweight, stunting and wasting in 27.8, 30.3 and 6.5 per cent children, respectively.

In present study proportion of severe underweight for age was more in tribal children (22.3%) in comparison to nontribal children (15.2%) but this was statistically not significant. Proportion of severe stunting was 19.6% in tribal under 5 children, while not a single non tribal child suffered from severe stunting. Prevalence of moderate wasting was again more (49.1%) in tribal under 5 children in comparison to 32.1% in nontribal children. Prevalence of moderate under nutrition and severe under nutrition according to mid upper arm circumference (between 3 months to 5-year-old children) was more among tribal group (25.7% and 5.2% respectively) in comparison to nontribal children of same age (11.8% and 0.00% respectively). Wasting and under nutrition according to mid upper arm circumference was significantly more among tribal children [Table.4].

NFHS 3 West Bengal state report [5] revealed 59.7% tribal under 5 children were under weight for age and 22.6% were severe underweight for age. Proportion of under wt and severe under wt were 40% and 9.4% among SC, 22.7% and 8.2% among OBC and 37% and 10.5% among other caste children. Similarly, stunting and severe

stunting and wasting and severe wasting were relatively more prevalent among tribal under 5 children. Prevalence of stunting and severe stunting among children of different castes was as follows: SC: 44.7% and 18.5%, ST: 58.6% and 21.6%, OBC:31% and 14.4%, Others:43.5% and 16.9%. Similarly, prevalence of wasting and severe wasting among children of different castes: SC: 44.7% and 18.5%, ST:58.6% and 21.6%, OBC:31% and 14.4%, Others:43.5% and 16.9%.

Prevalence of under nutrition according CIAF classification (All CIAF group except Gr.A i.e.no failure) among tribal under 5 children was significantly more (69.6%) in comparison to their non-tribal counterpart (50.9%) ($p=0.004$) in present study [Table.5]. This finding was consistent with most of other study findings. Divakar et.al.^[6] also showed that prevalence of under nutrition was significantly more among tribal under 5 children.

When age group and gender wise distribution of under nutrition was concerned maximum prevalence of under nutrition was considered among 12–36-month age group (78.7%) followed by 36–60-month age group (66.7%) in tribal under 5 children. Prevalence of under nutrition was more in male (71.9%) among tribal compared to female (67.3%) [Table.5].

Islam Safikul et.al.in their study conducted in Dibrugarh district of Assam among tribal under 5 children^[7] stated that Prevalence of underweight and stunting was more common among the older age group. Prevalence of underweight was highest (63.8%) in the age group 48-60 months, followed by 43.5% in the age group 24-36months and 32.4% in 12-24 months of age. Stunting was also highest (58.6%) among the children aged 48-60months, followed by 57.3% in the age group 36-48 months. Wasting was found to be most prevalent (42.4%) in the age group 24-36 months, followed by 27.6% and 26.7% in the age group 48-60 months and 12-24 months, respectively. Prevalence of all

kinds of under nutrition was more common among the boys than the girls.

According to study by Rao et.al.^[8] prevalence of under nutrition in terms of underweight, stunting and wasting was found similar in both the sexes.

Like most other studies and surveys, in the present study nutritional status was significantly affected by ethnicity of under 5 children. Prevalence of under nutrition was also significantly more among tribal children [OR=2.22 (1.28-3.85)] [Table 6]. But most striking feature of the present study was that this significant effect of ethnicity was attenuated when adjusted with demographic, socioeconomic, and behavioural covariates [AOR= 0.52(0.21-1.28)]. Adjusted odds ratio for effect of ethnicity on nutritional status of under 5 children were further attenuated, rather reversed when adjusted with covariates related to maternal and birth characteristics in model 2 [AOR= 0.47(0.17-1.32)] [Table 6]. In final model also (where all the covariates were adjusted) there was no significant difference between tribal and non-tribal under 5 children in respect to prevalence of under nutrition [AOR= 0.56(0.15-2.17)] [Table 6].

The above finding of the present study clearly indicated that increased prevalence of under nutrition among tribal children (as found in univariate logistic regression) was not due to ethnicity, but other covariates which played key role. There was difference among tribal and non-tribal children in respect to different socio-economic variables and access and utilization of MCH services, which was actually responsible for difference in nutritional status of these two groups of children.

Though tribal people are primitive residents, it is a gloomy fact that even after six decades of independence the tribes of India are drowned in several problems. Widespread poverty, illiteracy, malnutrition, absence of safe drinking water and sanitary living conditions, poor maternal and child health services, ineffective coverage of

national health and nutritional services are the possible contributing factors for dismal health conditions prevailing among the tribal people.^[9] There is for instance, wide acknowledgment that excess morbidity and poor nutritional status in childhood for tribal is partly due to poverty and partly to poor access to healthcare services. The evidence from the grassroots highlighted the peculiar problems in tribal areas because of which poverty was higher, and health and education outcomes were lower ^[10]. World Bank report 2006 revealed how the health of children varied across population groups defined by mother's education, rural or urban residence, and parent's economic status ^[11]

In present study also tribal community were found to be in disadvantageous position in respect to different socio-economic parameters like education of mother, occupation of mother, per capita income of family, housing status. Tribal community had also poor access and coverage of MCH services (i.e. less number of antenatal visit, less proportion of institutional delivery). Tribal mothers also had increased morbidity during antenatal period. These factors were mainly responsible for increased under nutrition of tribal under 5 children, and not because of their ethnicity.

CONCLUSION

This study clearly shows the pathetic condition of the nutritional status of the tribal children. There is a widespread belief that ethnicity plays a major role in the backwardness of the tribal. But this research work shows that the tribal are the most marginalised, vulnerable and deprived community. This minority group is almost pushed into oblivion by the general mass who takes full advantage of these people. The tribal form such a group who take or rather get the least societal input like health, education and housing and yet are the ones who contribute the most to this society mostly through their cheap labour in the widespread development of infrastructure

like roads, buildings or even the unorganised sectors. They fare poorly in childhood morbidity and mortality which are considered as proxy indicators of overall health status, socioeconomic aspect and quality of life of a population. In concordance it is clearly observed that the tribal are worse off as far as poverty, illiteracy or deprivation of basic amenities are concerned.

As a result, in this research work the significant effect of ethnicity was attenuated when adjusted with demographic, socioeconomic and obstetrical covariates indicating that it is their regressive ambience and backward condition which play a very important role in their poor health disproving the strong widespread belief that it is their ethnicity which contribute to their pitiable, doleful and miserable condition. All should be convinced that the public health needs of the tribal require a different conceptual framework.

Since improvement of nutritional status and reduction of morbidity of tribal children are rooted in overall socio-economic development and up gradation of quality of life of tribal population, the isolated contribution of health sector will not play a wholesome role in the amelioration of their suffering. An integrated multi-sectoral coordinated approach involving all related sectors (including health, women and child development, agriculture, food, education, transport) is required. Emphasis also should be given for effective partnership building with private sector ensuring full community participation. If robust and durable efforts are made to eradicate their poverty and illiteracy, to alleviate their ill health and poor living conditions and to provide them with fruitful employment then it is assured that days are not far off when they will enlighten this nation into one of the foremost, strongest and the most resilient countries of the world.

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