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Morbidity profile of tribal and nontribal children (under 5) in Purulia district of West Bengal: a comparative study

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Abstract: Introduction: *Children are the backbone of any country. Childhood morbidity is a critical public health problem in India in general but among tribal population more particularly. The present study aimed at comparative assessment of morbidity 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 112 nontribal under 5 children. Demographic, socioeconomic, maternal and birth characteristics and morbidity profile in last 14 days were recorded in pre-designed, pre-tested structured interviewer administered questionnaire. Anthropometric and clinical examinations were performed following standard operating protocol.*
Results: *Prevalence of morbidity among tribal under 5 children (61.6%) was significantly more than non-tribal children (36.6%) [OR=2.78 (1.61-4.76)]. But this significant difference between tribal and non-tribal children in respect to morbidity profile was lost when adjusted with socio economic variables [AOR=1.02(0.43-2.38)]. In final model also where all covariates were adjusted, there was no significant difference in morbidity among tribal and non-tribal children [AOR=1.03(0.42-2.50)].*
Conclusion: *Increased prevalence of morbidity 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: *Morbidity, Acute respiratory infection, Diarrhoea, Tribal under-5 children, Non tribal under-5 children.*

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I. 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. Infant and childhood morbidity is considered not only one of the best indicators for overall health status of the population but also a good indicator of socioeconomic status and quality of life of the population as a whole.

Morbidities among children in general and tribal children in particular, have been emphasised. According to NFHS 3 report important morbidities of under 5 children in West Bengal were Fever followed by ARI and diarrhoea (Prevalence: 20 %, 13% and 6.5% respectively). However, among tribal under 5 children ARI was most prevalent (16.2%) followed by fever and diarrhoea (15.2% and 7.6% respectively) [1].

Several studies were reported on the morbidity of children, both at national and different state level, but not much on tribal children particularly in West Bengal. So comprehensive data on morbidity 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 morbidity profile with their determinants of tribal and nontribal under 5 children in Purulia district of West Bengal.

II. 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 May 2014 to April 2015, total period of one 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

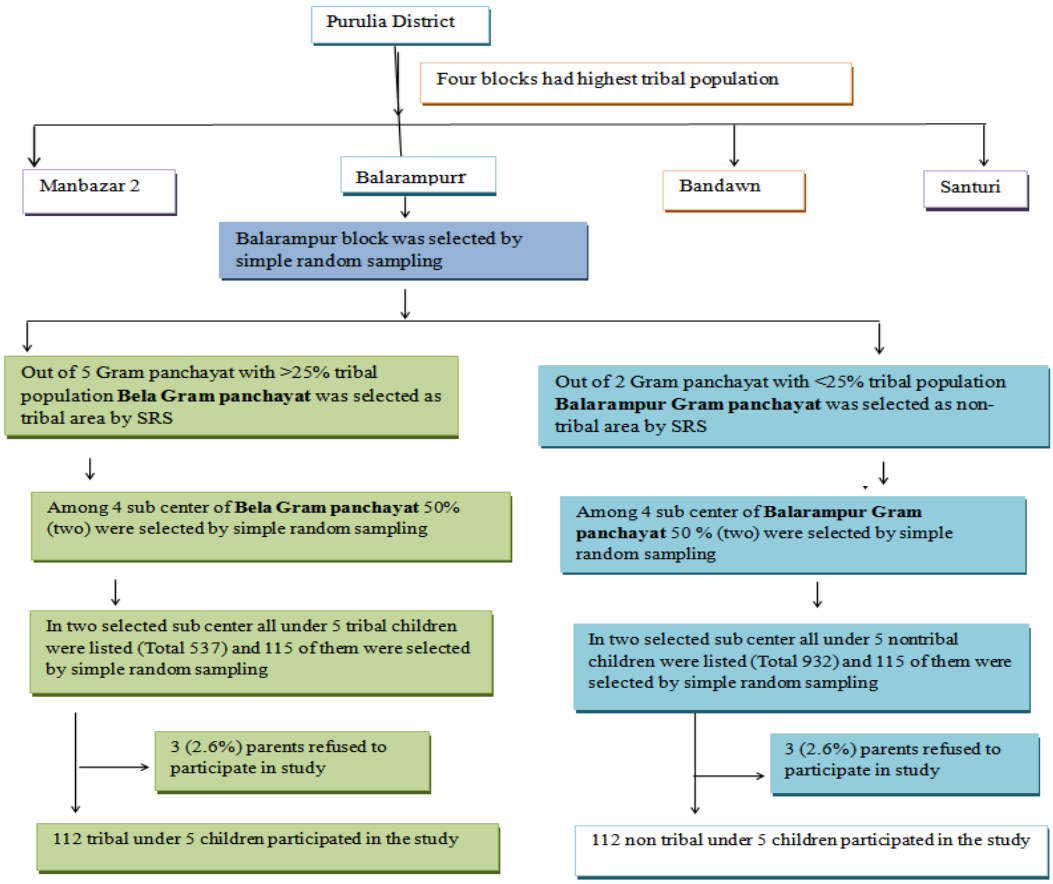
Sample size:

According to NFHS 3 Report prevalence of under nutrition (under wt for age) (which is one of most prevalent morbidity) 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

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

[p_1=Prevalence of under nutrition among ST or tribal children= 59.7%
p_2=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)
$p = (p_1+p_2)/2 = 46.5$, $Z\alpha = 1.96$, $Z_{\beta} = 0.84$ (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 AIIH&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:

Interview:	i. Demographic characteristics of family i. Socioeconomic characteristics of family i. Environmental characteristics of family v. Behavioural characteristics (Addiction) of parents v. Maternal and birth characteristics of study participants i. Personal and food hygiene related to child feeding i. Feeding practices of children i. Health care seeking behaviour related to illness of children. x. Morbidity profile of children in last 14 days: Any morbidity during the day of interview and also in last 14 days (from day of interview) was identified by history taking from mother (or care giver), and reviewing medical records.
Clinical examination:	i. Assessment of Morbidity profile of child at the day of interview.

2. Torch
3. Paediatric Stethoscope [Made: Leatman]

Study techniques-

1. Interview
2. Physical examination
3. Review of medical records

Statistical analysis:

Recorded data was analysed by SPSS Version 16.

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.

III. 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)
6-12 month	12 (10.7)	6 (5.4)	df = 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)
Female	55 (49.1)	57 (50.9)	df =1
Family type			
Nuclear	29 (25.9)	24 (21.4)	0.62 (0.43)
Joint	83 (74.1)	88 (78.6)	df =1
Education of mother			
Illiterate	17 (15.2)	10 (8.9)	15.59 (0.23)
Literate (non-formal)	27 (24.1)	18 (16.1)	df =4
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 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) **
Unskilled worker	24 (21.4)	00 (0.0)	df =1
Mean Per capita Income in rupees (SD)	505.4 (238.0)	1134.6 (584.6)	10.55 (0.00) **
Housing Status	67 (59.8)	6 (5.4)	96.80 (0.00) **
Kutcha house	30 (26.8)	25 (22.3)	df =1
Semi pukka	15 (13.4)	81 (72.3)	
Pukka			
Defecation Practice of family members	17 (15.2)	19 (17.0)	0.13 (0.72)
In water seal latrine	95 (84.8)	93 (83.0)	df =1
In open field			
Source of drinking water	106 (94.6)	112 (100.0)	4.28 (0.39)
Tube well	6 (5.4)	00 (0.0)	df =1
Well			
Addiction of mother (smokeless tobacco)	44 (39.3)	8 (7.1)	32.46 (0.00) ** df =1
Number of antenatal cheek up			
≥4	70 (62.5)	89 (79.5)	7.82 (0.005) ** df =1
<4	42 (37.5)	23 (20.5)	
#Birth Wt. (n_1=72, n_2=102)			32.67 (0.00) ** df =1
≥2500 gm	36 (50.0)	91 (89.3)	
<2500 gm	36 (50.0)	11 (10.7)	3.21 (0.07) df =1
##Gestational Age (n_1=63, n_2=96)			
Preterm	13 (20.5)	10 (10.7)	
Term	50 (79.5)	86 (89.3)	30.01 (0.00) ** df =1
Place of Birth (n_1=112, n_2=112)			
Home	54 (48.2)	16 (14.3)	0.06 (0.80) 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)	

*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 96non-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% and16.1% 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 (dominated by open field defecation) between family members of both groups though presence of sanitary latrine was more in tribal families due to free construction by Panchayet. But they did not use those as open field defecations was their traditional practice. Predominant source of drinking water was tube well in both groups. Difference of addiction pattern of mothers of both group of child 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±SD 1.5 vs 19.7 ±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 visit 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 only10.7% (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 favorable response	Score for each indicator in unfavorable 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:

$$Zij = \frac{Xij - \bar{X}j}{\sigma j}$$

Xij = Individual feeding score of ith individuals in jth subgroup, $\bar{X}j$= mean feeding score in jth subgroup. σj = standard deviation of feeding score within jth subgroup.

$$\bar{X}j = \frac{\sum Xij}{nj}$$ (where nj = the total number of people in jth 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	43 (38.4)	63 (56.2)	7.16 (0.01) **
Satisfactory feeding practices (Standardized feeding score ≥0):	69(61.6)	49 (43.8)	

Unsatisfactory feeding practices (Standardized feeding score <0):			

**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 3]

Table.4. Distribution of study subjects according to morbidity pattern:

Morbidity	**Number (%)**		**Chi-square value (P value) /independent t test value**
	Tribal (n_1=112)	Nontribal (n_2=112)	
Morbidity Present	69 (61.6)	41 (36.6)	14.00 (0.00) ** df=1
Prevalence of different types of morbidity (Multiple Response taken) ARI Diarrhoea Fever Jaundice Local infection Ear Problem Others#	 25 (22.3) 9 (8.0) 29 (25.9) 00 (0.0) 12 (10.7) 5 (4.5) 11 (9.8)	 16 (14.3) 8 (7.1) 12 (10.7) 01 (0.9) 10 (8.9) 00 (0.0) 5 (4.5)	 2.42 (0.12) df=1 0.06 (0.80) df=1 8.62 (0.003) ** df=1 0.20 (0.65) df=1
Distribution of ill children according to type of morbidity (n_1=69, n_2=41) (Multiple Response taken) ARI Diarrhoea Fever Jaundice Local infection Ear Problem Others#	 25 (36.2) 9 (13.1) 29 (42.0) 00 (0.0) 12 (17.4) 5 (7.2) 11 (15.9)	 16 (39.0) 8 (19.5) 12 (29.3) 01 (2.4) 10 (24.4) 00 (0.0) 5 (12.2)	
Mean episodes of morbidity (SD)/study subject	0.81(0.39)	0.46 (0.49)	5.84 (0.00) **
Prevalence of morbidity in Age Groups 0-12 month (n_1=35, n_2=28) 12-36 month (n_1=47, n_2=52) 36-50 month (n_1=30, n_2=32)	 24 (68.6) 32 (68.1) 13 (43.3)	 12 (42.9) 12 (23.1) 17 (53.1)	 4.20 (0.04) * df=1 20.25 (0.00) ** df=1 0.59 (0.44) df=1
Prevalence of Morbidity in Gender Groups Male (n_1=57, n_2=55) Female (n_1=55, n_2=57)	 36 (63.2) 33 (60)	 17 (30.9) 24 (42.1)	 11.68 (0.001) ** df=1 3.586 (0.06) df=1

*Significant at 95% confidence limit, **Significant at 99% confidence limit.
#Other morbidity included injury, warm infestation, and conjunctivitis

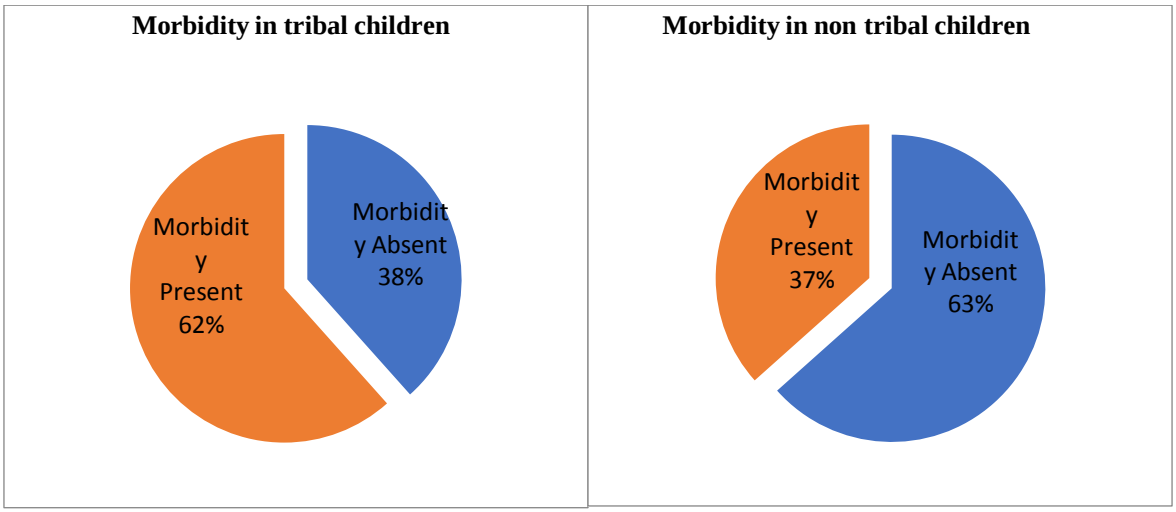


Fig. 1. Comparison of prevalence of morbidity among tribal and non-tribal children

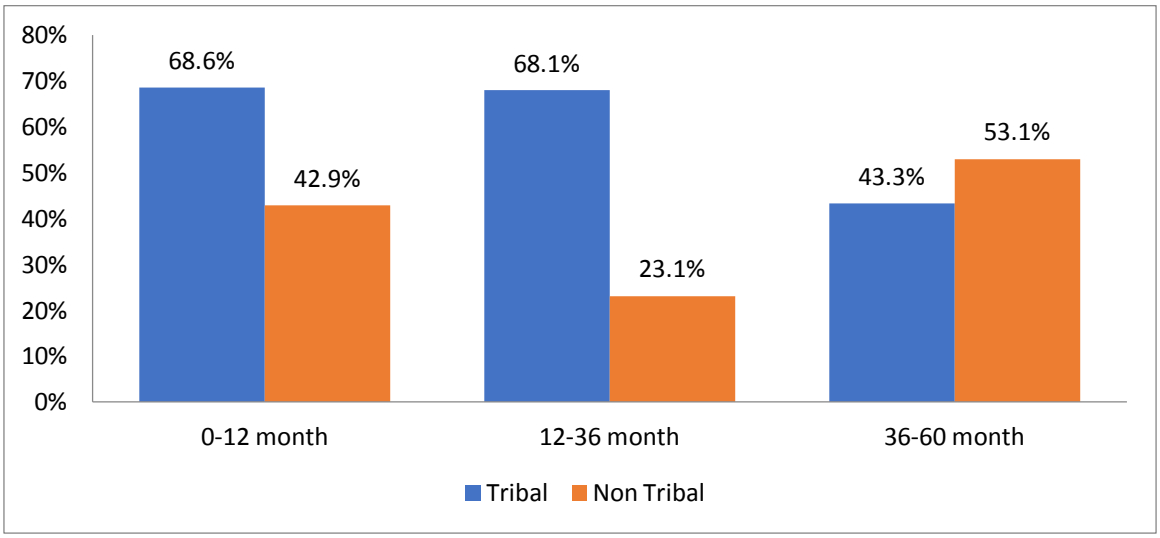


Fig. 2 Distribution of morbidity among tribal and non-tribal under 5 children in different age groups.

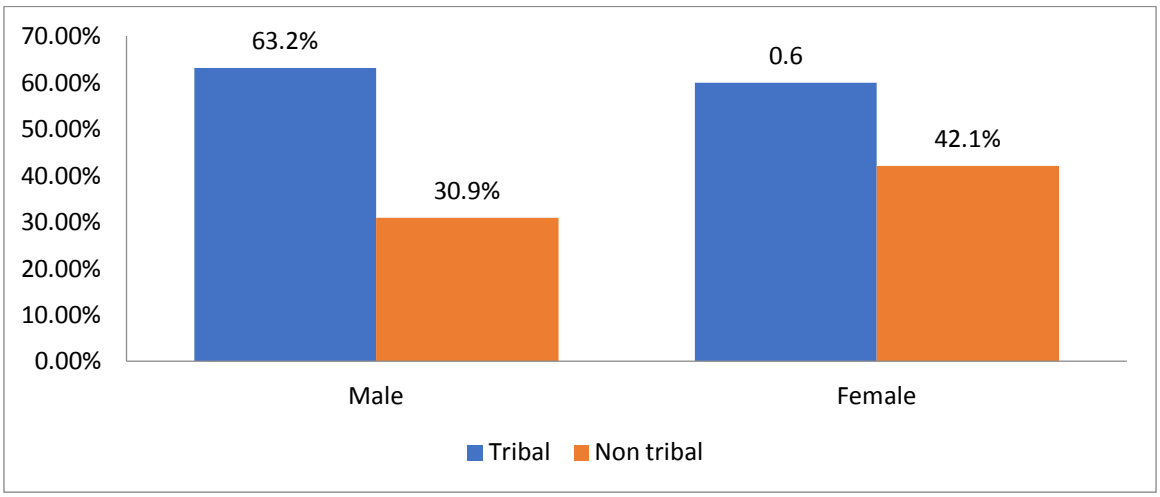


Fig. 3 Distribution of morbidity among tribal and non-tribal children in different gender groups.

Prevalence of morbidity among nontribal under 5 children was 36.6% where as it was as high as 61.6% among tribal under 5 children (p=0.00). Among tribal children predominant morbidity was fever (prevalence=25.9%) compared to only 10.7% prevalence in non-tribal children (p=0.003). In nontribal children most common morbidity was ARI (prevalence=14.3%). Though ARI was 2nd most common morbidity among

tribal children its prevalence was more (22.3%) in comparison to their nontribal counterpart. But this difference was not statistically significant (p=0.1). There was also no significant difference between prevalence of diarrhea among tribal and nontribal children. [Table4]

When age group wise distribution of morbidity was analyzed it was found that among infants and 12–36-month age group morbidity was significantly more in tribal. In 36–60-month, age groups there is no significant difference of prevalence of morbidity. Prevalence of morbidity was more among tribal children in both sexes. Among male children ethnic group wise difference of morbidity was significant but among female children this difference was not statistically significant. [Table4]

Within last 14 days from date of interview there was no history of hospital admission among tribal study participants, among non-tribal under 5 children only one (with history of severe jaundice) was admitted in hospital and was released 3 days prior to date of interview. [Table4]

Table.5. Effect of ethnicity (Tribal and non-tribal) and other covariates on Morbidity profile: (n=224)

Variable	Presence of morbidity				
	OR (95% CI)	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	2.78 (1.61-4.76) **	1.02(0.43-2.38)	0.53(0.16-1.72)	0.55(0.17-1.79)	1.03(0.42-2.50)

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

(Hosmer and Lameshow test Non-significant in all 4 models, Negelkerke R square=0.303 for Model 1, 0.486 for Model 2, 0.521 for Model 3, and 0.698 for Model 4).

In present study morbidity was significantly more in tribal under 5 children compared to their non-tribal counterpart [OR=2.78 (1.61-4.76)] [Table 5.]. Finally, 4 logistic regression model were prepared to assess effect of ethnicity (tribal and non-tribal) and other covariates on morbidity of under 5 children.

Model 1: Effect of ethnic groups on morbidity was adjusted with Demographic, Socioeconomic and Behavioural covariates like family type, education of mother, occupation of mother and per capita income of family, housing, and mother's addiction. In this model the significant effect of ethnic groups on morbidity (which was found in univariate logistic regression) was attenuated [AOR=1.02(0.43-2.38)] and this model could explain 30.3% of dependent variable [Table 5].

Model 2: Covariates related to maternal characteristics and birth characteristics of children (age of mother at first child birth, maternal morbidity during antenatal period, number of antenatal visit and birth place of children) were added.This model could explain 48.6% data of dependent variable. Here effect of ethnic groups was further attenuated, rather reversed (though not significant) [AOR=0.53(0.16-1.72)] [Table 5.].

Model 3: Covarite of Health care seeking behavior was added. This model could explain 52.1% data of dependent variable. Here adjusted odds ratio of morbidity for ethnic groups remained almost same [AOR=0.55(0.17-1.79)] as model 2 [Table 5].

Model 4: Feeding practices of under 5 children (according to standardized feeding score) was added and thus adjusted with all co variates.This final model could explain 69.8% data of dependent variable. Here adjusted odds ratio of morbidity for ethnic groups was slightly augmented but in this model also there was no significant effect of ethnicity on morbidity [AOR=1.03(0.42-2.50)] [Table 5].

IV. Discussion:

In current study prevalence of morbidity among nontribal under 5 children was 36.6% where as it was as high as 61.6% among tribal under 5 children (p=0.00) [Table. 4].

Among tribal children predominant morbidity was fever (prevalence=25.9%) compared to only 10.7% prevalence in non tribal children (p=0.003). This very high prevalence of fever among tribal under 5 children was due to high prevalence of malaria specially falciparum malaria among them which was an alarming situation. In nontribal children most common morbidity after under nutrition was ARI (prevalence=14.3%). Though ARI was 3rd most common morbidity among tribal children its prevalence was more (22.3%) in comparison to their nontribal counterpart. But this difference was not statistically significant (p=0.1). There was also no significant difference between prevalence of diarrhoea among tribal and nontribal children [Table.4].

According to study conducted by Divakar et.al. among tribal and nontribal under five children of Mysore [3], predominant morbidity among tribal were skin infections (31.33%), followed by (21.20%) dental caries; (19.20%) intestinal infections; (21.85%) respiratory infection while in non-tribal counterparts, skin

infections were (12.98%); (7.78%) dental caries; (17.98%) intestinal infections; (25.84%) respiratory infections; and (20.22%) vitamin deficiencies.

V. C. Giri et.al in their study among tribal 0–72-month children in PHC Salona of Chikhaldara Block, Amaravati District, and Maharashtra [4] showed that prevalence of of acute respiratory infections was the highest (25.5%) followed by acute diarrhoeal diseases (5.8%), conjunctivitis (1.5%) and skin infections (1.2%).
According to NFHS 3 West Bengal state report [1] prevalence of ARI among different castes were as follows: ST: 16.2%, SC: 10.4%, OBC: 16.5%, others: 13.5%. The same report stated that fever was most prevalent morbidity among under 5 children and its prevalence were 15.2% among tribal children, 17.2% among SC children, 20.7% and 21.4% among OBC and other caste children respectively. Prevalence of diarrhoea was more among tribal under 5 children (7.6%) compared to children belonged to schedule caste (5.4%), other backward class (6%) and other (6.8%).

Like most other studies and surveys, in the present study the morbidity profile was significantly affected by ethnicity of under 5 children. Prevalence of morbidity was more among tribal under 5 children compared to their non-tribal counterpart [OR=2.78 (1.61-4.76)] [Table 5.]. But most striking feature of the present study was than this significant effect of ethnicity was attenuated when adjusted with demographic, socioeconomic, and behavioural covariates (like family type, education of mother, occupation of mother and per capita income of family, housing, mother's addiction) [AOR=1.02(0.43-2.38)] [Table 5.]. Adjusted odds ratio for effect of ethnicity on morbidity of under 5 children were further attenuated, rather reversed when adjusted with covariates related to maternal and birth characteristics (like age of mother at first child birth, number of health cheek up during antenatal period, maternal morbidity during antennal period and birth place of children) in model 2 [AOR=0.53(0.16-1.72)] [Table 5.]. 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 morbidity [AOR=1.03(0.42-2.50)] [Table 5.].

The above finding of the present study clearly indicated that increased prevalence of morbidity 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 regarding morbidity profile of these two groups of children.

V. Conclusion and Recommendation

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.[5] 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 morbidity of tribal under 5 children, not the ethnicity itself.

So 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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