



Short Communication

Defecation Practices and Access of Safe Water and Sanitation Facilities : A Comparative Study Among Tribal and Nontribal Population in Purulia District of West Bengal

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Running title: Defecation Practices and Access of Safe Water

SUMMARY

Access to and utilization of safe water and sanitation facilities are closely related to health and socio-economic status of population who are economically backward in India in general and worse particularly among tribal population. The present cross sectional study was conducted among 112 tribal and 112 nontribal households, selected by multistage random sampling, in the Purulia district of West Bengal to identify defecation practices and access of safe water and sanitation facilities and their determinants in tribal households in comparison to their nontribal counterparts. Demographic, Socio-economic and Environmental characteristics of study units (households) were elicited by pre-designed, pre-tested structured interviewer administered questionnaire.

Though presence of sanitary latrine was more in tribal households no significant difference was observed in defecation practices between family members of both groups. This was because open field defecation is their traditional practice. Predominant source of drinking water was tube well in both groups, but in tribal households, distance of the source of drinking

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water from household was significantly more (p value=0.00). Access of safe water and

sanitation facilities were significantly worse among tribal households in univariate analysis [4.14 (1.53-12.44)] but this significance was lost when adjusted with other socio-economic co-variates [1.03 (0.46-2.08)].

The study revealed that defecation practice and access of safe water and sanitation facilities were worse among tribal households and it was found to be associated with socio-economic deprivation of tribal community

Key Words: Safe Water, Sanitation facilities, Defecation practices

Environmental sanitation comprises disposal and treatment of human excreta, solid waste and wastewater, personal hygiene, access and utilization of safe water. Access and utilization of safe water and sanitation facilities including sanitary disposal of waste and excreta of a community are very important determinants of health and nutritional status and it is closely related to various socioeconomic determinants as well as overall quality of life.

Unfortunately environmental sanitary practices are still not satisfactory in many parts of India. Lack of environmental sanitation facilities and safe water has significant negative health impact on people of India.^[1]

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. Along with widespread poverty, illiteracy, malnutrition, and poor health status the tribal population are also deprived from provision of safe drinking water and sanitary living conditions.^[2]

Several studies were reported on the environmental sanitation practices, both at national and different state level, but not much on tribal population particularly in West Bengal. So comprehensive data on environmental sanitation practices of tribal population compared to their nontribal counterpart is not available at present in West Bengal.

In this backdrop the present study aimed at

1. To study and compare the demographic, socioeconomic characteristics between households of tribal and non tribal population.

2. To elicit and compare defecation practices and access of safe water and sanitation facilities of tribal and nontribal population.

METHODOLOGY:

Community based observational cross-sectional study was conducted in Purulia district of West Bengal from May 2014 to October 2014 (6 months). Study unit was tribal (Schedule Tribes under Article 342 of the constitution) and nontribal (Schedule caste, other backward classes and others) households in the study areas. Head of each selected household was considered as respondent. In absence of him/her next senior most member was considered as respondent. Unwilling respondents were excluded.

Ministry of Tribal Affairs Statistics Division Government of India Report³ suggested that 74.7% of tribal population and 49.8% of total population practiced open field defecation.

Sample size was 59 in each arm of tribal and non-tribal by applying following formula

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

[p_1 =Prevalence of open field defecation among tribal population= 74.7%

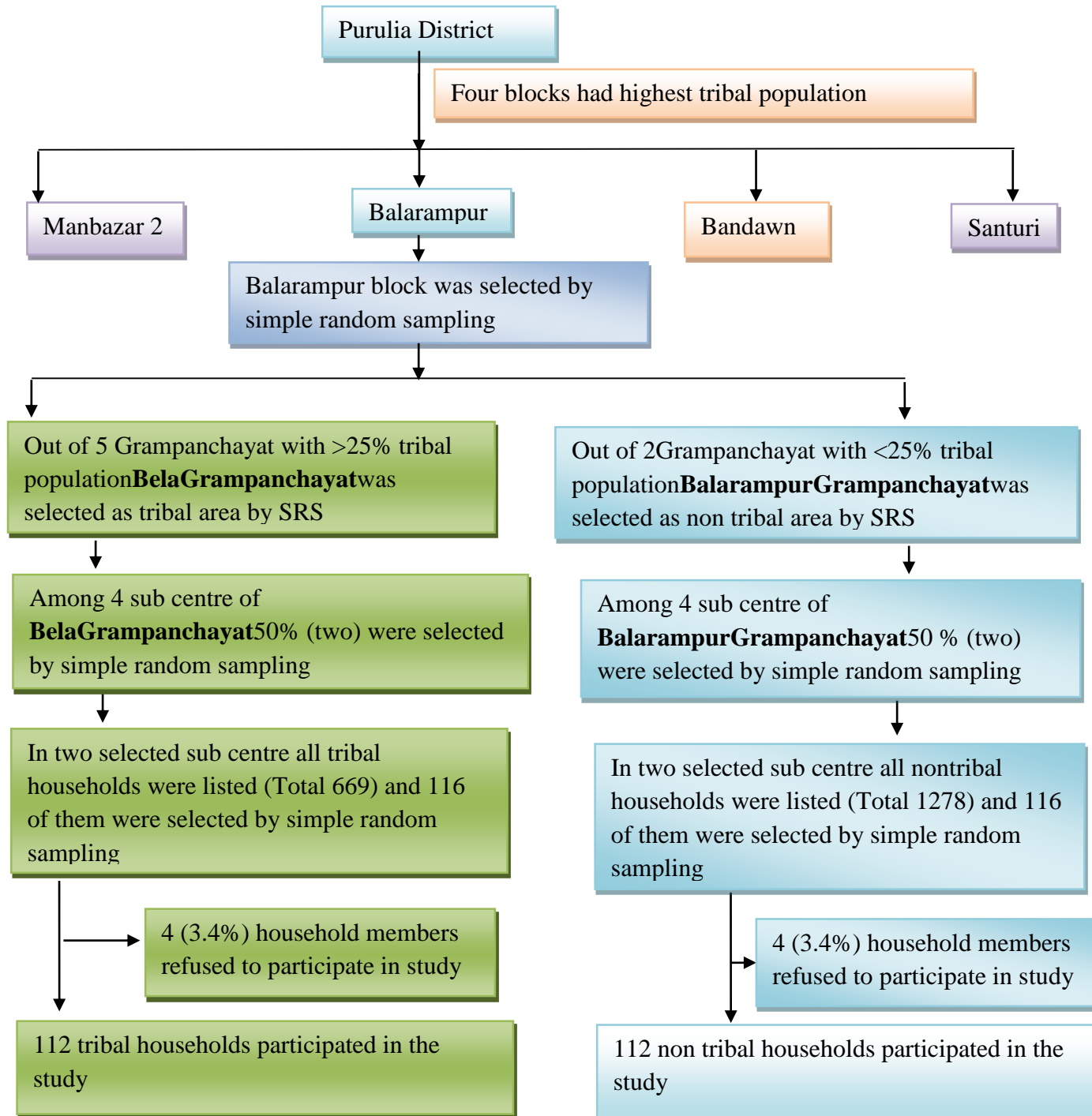
p_2 =Prevalence of open field defecation among non tribal population= 49.8%

$\bar{p} = (p_1 + p_2) / 2 = 62.25$, $Z_{\alpha} = 1.96$, $Z_{\beta} = 0.84$ (when power of study =80%, alpha error = 5%)]

Taking design effect 1.8; so sample size was estimated as 106 for each arm. After adding 10% attrition rate sample size became 116 for each tribal and non tribal households.

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 households in another but similar area (at Tentlow grampanchayet 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).

Independent variable:

Demographic: (Caste, Type of family)

Socio-Economic: (Education of Head of the family, Occupation of Head of the family, per capita monthly income)

Dependent variables:

Environmental: (Housing status, Presence of sanitary latrine, Defecation practice, Drainage system, Source of drinking water, Distance of drinking water source from house hold. All statistical analysis was done by using SPSS Version 20.

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 respondents were explained that the purpose of the study was 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 them in local language (Bengali).

RESULTS:

Table.1. Distribution of households according to their socio-demographic characteristics:

Variable	Number (%)		Chi-square value/ independent t test value (P value)
	Tribal (n ₁ =112)	Nontribal (n ₂ =112)	
Family type			
Nuclear	29 (25.9)	24 (21.4)	0.62 (0.43)
Joint	83 (74.1)	88 (78.6)	df =1
Average number of family members (SD)	6.9 (2)	7.7 (3.5)	1.95 (0.05)
Education of head of house hold			
Upto Middle (Class V-VIII)	72 (64.3)	47 (42.0)	24.67 (0.00)**
Upto secondary and higher secondary (Class IX-XII)	40 (35.7)	46 (41.0)	df =2
Higher (Graduate and above)	00 (0.0%)	19 (17.0)	
Occupation of head of house hold			
Unskilled worker	64 (57.2)	26 (23.3)	45.66 (0.00)**
Skilled worker	8 (7.1)	00 (00)	df =4
Business	10 (8.9)	39 (34.8)	
Cultivators	27 (24.1)	39 (34.8)	
Service	3 (2.7)	8 (7.1)	
Mean Per capita Income in rupees (SD)	505.4 (238.0)	1134.6 (584.6)	10.55 (0.00)**
Modified BG Prasad Scale (2014)			
Social class II (Rs.2786-5570)	00 (0.0)	5 (4.5)	78.19 (0.00)**
Social class III (Rs.1671-2785)	00 (0.0)	6 (5.4)	df=1
Social class IV (Rs.836-1670)	13 (11.6)	67 (59.7)	
Social class V (Rs. <836)	99 (88.4)	34 (30.4)	

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

25.9% of tribal households and 21.4% of nontribal households belonged to nuclear families. 64.3% of head of tribal households were middle school educated and rest were secondary and higher secondary educated. No tribal household heads were graduates or more. On the other hand in case heads of non tribal households 42% were middle school educated, 41% H.S. educated and rest 17% were graduates or more ($p = 0.00$).

Most of heads of tribal households were unskilled workers (57.2%) where as in nontribal population most of the household heads were businessmen and cultivators (34.8% each) ($p = 0.00$). There was a significant difference between average PCI of tribal households (505.4 ± 238) and nontribal households (1134.6 ± 584.6). Majority (88.4%) of tribal households belonged to lowest socioeconomic class (social class V according to modified B.G. Prasad scale 2014) where as only 30.4% of non tribal households belonged to same class. This difference was significant ($p = 0.00$).

Table.2. Distribution of households according to their defecation practice and access of safe water and sanitation facilities:

Variable	Number (%)		Chi-square value (P value)
	Tribal (n ₁ =112)	Nontribal (n ₂ =112)	
Water seal latrine			
Present	60 (53.6)	19 (17.0)	32.87 (0.00)** df =1
Absent	52 (46.4)	93 (83.0)	
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)	
Cause of open field defecation in spite of having water seal latrine (n₁= 43, n₂=0)			
Traditional practice	38 (90.5)	00 (0.0)	
Lack of water supply	5 (9.5)	00 (0.0)	
Drainage System			

Absent	87 (77.7)	93 (83.0)	11.30 (0.004)**
Kutcha	22 (19.6)	8 (7.1)	df =2
Open pukka	3 (2.7)	11 (9.9)	
Source of drinking water			
Tube well	106 (94.6)	112 (100.0)	4.28 (0.39)
Well	6 (5.4)	00 (0.0)	df =1
Distance of source of drinking water			
At home	9 (8)	5 (4.5)	16.79 (0.00)**
Within 1.6 K.m. from home	89 (79.5)	107 (95.5)	df =2
>1.6 K.m.from home	14 (12.5)	00 (0.0)	
Housing Status			
Kutcha house	67 (59.8)	6 (5.4)	96.80 (0.00)**
Semi pukka	30 (26.8)	25 (22.3)	df =1
Pukka	15 (13.4)	81 (72.3)	

**Significant at 99% confidence limit.

Though presence of sanitary latrine was more in tribal households (53.6%) in comparison to nontribal (17%) there was no significant difference in defecation practice between family members of both groups. This was because many tribal households preferred open field defecation in spite of having sanitary latrine in their houses. Predominant source of drinking water was tube well in both groups, but in all non-tribal households, the source of drinking water was present either at home or within 1.6 km from home, whereas 12.5% tribal households had to travel more than 1.6 km to fetch drinking water. Difference between two groups according to distance of source of drinking water was statistically significant (p value=0.00). More than half (59.8%) of the tribal houses were Kuccha house where as in non tribal group this proportion was significantly lower (5.4%) (p =0.00).

Table.3. Scoring of defecation practice and access of safe water and sanitation facilities:

Variable	Score
Defecation Practice of family members	
In water seal latrine	2
In open field	0
Drainage System	
Open pucca	2
Kutcha	1
Absent	0
Source of drinking water	
Tube well	2
Well	0
Distance of source of drinking water	
At home	2
Within 1.6 K.m. from home	1
>1.6 K.m.from home	0
Housing Status	
Pucca	2
Semi pukka	1
Kutcha	0

Total attainable maximum score= 10, Total attainable minimum score= 0

Maximum attained score= 10, Minimum attained score= 0 median attained score=4.5

Maximum attained score for tribal households= 9, Minimum attained score for tribal households= 0

Maximum attained score for nontribal households= 10, Minimum attained score for non tribal households= 3

households of both groups were dichotomized as satisfactory [Total score ≥ 4.5

(median score)] & unsatisfactory [Total score<4.5 (median score)] access and utilization of safe water and sanitation facilities.

Table 4. Univariate and multivariable logistic regression analysis for eliciting determinants of unsatisfactory defecation practices and access of safe water and sanitation facilities:

Variable	Unsatisfactory defecation practices and access of safe water and sanitation facilities	
	[OR(95% confidence interval)]	[AOR(95% confidence interval)]
Caste: Non Tribal Tribal	Ref 4.14 (1.53-12.44)*	Ref 1.03 (0.46-2.08)
Family Type: Joint Nuclear	Ref 2.88 (1.33-4.89)*	Ref 2.04 (1.13-4.14)*
Education of household head: Primary and above Below primary	Ref 2.56 (1.03-6.25)*	Ref 2.22 (1.02-4.76)*
Occupation of household head: Others Manual worker	Ref 4.00 (1.27-12.50)*	Ref 1.20 (0.55-2.56)
PCI: ≥714 (median) <714	Ref 6.67 (2.56-16.67)**	Ref 2.56 (1.03-6.25)*

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

Hosmer and Lameshow test non significant, Nagelkerke R square=0.42

Defecation practices and access of safe water and sanitation facilities were significantly worse among tribal households in Univariate analysis [4.14 (1.53-12.44)] but this significance was lost when adjusted with other socio-economic co variates [1.03 (0.46-2.08)].

Among other determinants family type, educational level of head of the household and PCI per month had significant effect in both Univariate analysis and multivariable logistic regression.

Occupation of head of the household had significant effect only in Univariate analysis.

Final model can explain 42% of data.

DISCUSSION:

Though presence of sanitary latrine was significantly more in tribal households (53.6%) in comparison to nontribal (17%), there was no significant difference in defecation practice between family members of both groups [Table.2]. This was because in some tribal villages sanitary latrines were prepared free of cost by 'Gram Panchayet'. These activities were not undertaken in nontribal villages. But this noble effort for promotion of sanitary disposal of night soil ultimately came into total failure as it was not supported by behavioural change communication (BCC) activities. When tribal family members were asked about the cause of not using sanitary latrine most of them (84.8%) replied that open field defecation practice was their traditional practice [Table.2]. This finding of present study clearly indicated that providing service without awareness and demand generation in community usually was not successful. In most of other studies it was seen that practice of sanitary disposal of night soil was unsatisfactory especially among tribal community. Ministry of Tribal Affairs Statistics Division Government of India Report³ suggested that 74.7% of tribal population and 49.8% of total population practiced open field defecation. Another GOI Report On Socio-Economic Conditions of Scheduled Tribes Workers In Kbk Belt – Orissa (2008-09)⁴ also revealed in most of the Scheduled Tribes households (91 per cent) latrine facility was not available.

Predominant source of drinking water was tube well in both groups, but in all non-tribal households, the source of drinking water was present either at home or within 1.6 km from home, whereas 12.5% tribal households had to travel more than 1.6 km to fetch drinking water. Difference between two groups according to distance of source of drinking water was statistically significant (p value=0.00) [Table.2]. According to Ministry of Tribal Affairs Statistics Division, Government of India Report³ 17.6% total population had drinking water source situated away from house where as in tribal population this proportion was as high as 33.6%. This report also revealed that 26.6% tribal population were deprived of a safe source of drinking water, compared to 12.92% in total population. In his study among tribal and non-

tribal pre-school children in backward districts of northern Kerala⁵ HariRaji showed that in tribal households main source of drinking water was river and pond (45.07%) where as in non tribal main source of drinking water was community bore well.

More than half (59.8%) of the tribal houses in current study were Kutcha houses whereas in non tribal group this proportion was significantly lower (5.4%) ($p = 0.00$) [Table.2]. HariRaji⁵ in his study revealed that only 1.4% of nontribal families lived in Kutcha houses where as in tribal this proportion was as high as 50.7%. This feature was almost consistent with the present study findings. Seraphinus Kispotta⁶ also showed that as high as 88% of tribal participants lived in Kutcha house.

Defecation practices and access of safe water and sanitation facilities were significantly worse among tribal households in univariate analysis [4.14 (1.53-12.44)] but this significance was lost when adjusted with other socio economic co variates [1.03 (0.46-2.08)] [Table.4]. This finding clearly indicated that difference of defecation practice and access of safe water and sanitation facilities between tribal and nontribal households was not due to their caste but due to difference in their socio-economic characteristics.

Among other determinants family type, educational level of head of the household and PCI per month had significant effect.

LIMITATION:

- Small Sample size
- As this is a cross-sectional we cannot confirm any cause effect relationship. So finding of present study should be confirmed by longitudinal study.

CONCLUSION& RECOMMENDATION:

The present study revealed that defecation practice and access of safe water and sanitation facilities were worse among tribal households and it was found to be associated with socio-economic deprivation of tribal community. So special emphasis have to be given for tribal area for improvement of socio-economic status as well as overall improvement of quality of life. Another interesting finding of this study was safe disposal of excreta was absent in both tribal and nontribal area. In some tribal villages in study area sanitary latrines were prepared free of cost by 'Gram Panchayet' but they were not used by population due to lack of awareness. So intensified BCC activity is required, so that utilization of sanitary latrine will

become the felt need of the population. Only after the BCC activity, preparation of sanitary latrine by Govt. is recommended either free of cost or at a minimum cost.

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