

A cross-sectional study on oral hygiene among Santhal tribal adults in a rural area of West Bengal

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ABSTRACT

Context: Oral health is a key indicator of overall health and wellbeing. Despite adequate medical advancements in global oral health, problems still persist in many communities in India especially in the hard to reach areas of the vulnerable population. **Aims:** This study aimed to assess the oral hygiene status among adults of Santhal tribe in a rural area of West Bengal and to find out the factors associated with their oral hygiene status. **Materials and Methods:** A community-based, cross-sectional study was conducted among adults of Santhal tribe in a rural area of Paschim Bardhaman district, West Bengal. Data was collected from 103 participants by simple random sampling (without replacement) technique using a predesigned pretested structured schedule. Data analysis was done using Microsoft Excel 2010. **Results:** The mean age of the study participants was 32.17 ± 12.72 years. Half (50.5%) were female participants. The proportion of poor oral hygiene status was 38.8%. Significant predictors of poor oral hygiene status on univariate logistic regression were age group ($P = 0.011$), gender ($P = 0.013$), alcohol consumption ($P = 0.001$), use of "datun" ($P = 0.011$), smokeless tobacco (SLT) use ($P = 0.000$), and both smoking Tobacco (ST)-SLT use ($P = 0.000$). In multivariable model, "datun" use ($P = 0.013$), SLT use ($P = 0.001$), both ST-SLT use ($P = 0.004$) retained their significant association with poor oral hygiene status. **Conclusion:** The present study findings emphasize on necessity of awareness generation regarding oral hygiene and strategic implementation of essential oral care in tribal communities residing in this area of West Bengal.

Keywords: Oral hygiene, Santhal tribes, tribal community, West Bengal

Introduction

Oral health is the most crucial indicator of overall health, wellbeing, and quality of life. WHO defines oral health as "a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing."^[1] For attaining a good oral health, maintenance of proper oral hygiene should be considered of utmost importance.

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The indigenous people of the land are known as the tribal population groups of India (also known as Adivasis). India is home to 427 constitutionally recognized indigenous groups known by the name "ANUSUCHIT JAN JATI" or "Scheduled Tribes." The total population of scheduled tribes constitutes 8.6% of the total population of India.^[2,3]

Despite there is wide variation in race, language, belief, and culture among the different tribal groups, there are some striking similarities in ways of their living, culture, dialect, and unifying social organization.

The Santhals are the third largest tribe in India mainly inhabiting West Bengal, Bihar, Odisha, Jharkhand, and Assam. Number of Santhals in India are 7.4 million, and the total population of scheduled tribes in West Bengal is over 2.5 million, constituting around 6% of the total population of the state (Census 2011).^[4]

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The Santhals of India have a typical tribal lifestyle. Their basic needs are fulfilled by plants, animals, and cultivation. They possess various skills as well like making musical equipment and baskets out of the plants.

According to the report of multi-centric oral health survey by Ministry of Health and Family Welfare in collaboration with dental department AIIMS in 2007, prevalence of dental caries and periodontal disease in India was 45% and 90%, respectively. Indian government has envisaged National Oral Health Programme 2012–17 for an affordable, accessible, and equitable oral health care delivery to achieve “optimal oral health” by 2020.^[5,6]

The oral health of tribal communities is in great variance in contrast to general population. This is primarily because of the fact that the tribal people mainly reside in remote areas and remain isolated from other population groups. It has also been observed that tribal people practice unhealthy behaviors like tobacco and alcohol use which ultimately contributes to deterioration of their oral health and hygiene.

Despite many advancements in oral hygiene in India, there are problems which still persists in many communities, especially among vulnerable population in difficult-to-reach areas. Many studies have Reported poor oral health status and treatment needs of tribal population in India but very few studies have been done on Santhal tribes of eastern India. Hence, this study was carried out with objectives of assessing the oral hygiene status of Santhal tribal adults and to find out the risk factors associated with poor oral hygiene status in this tribal population.

Materials and Methods

A community-based cross-sectional study was carried out during June 2019 to August 2019, in a village of Paschim Bardhaman district, West Bengal.

Paschim Bardhaman district consists of eight community development blocks, out of which one was randomly selected (Faridpur- Durgapur). From the selected block, eight villages were listed which were densely populated with Santhal tribes according to 2011 census.^[2] A village was randomly selected having a total population of 1,478, among which 482 were tribal adults.

Adults aged 18 years and above, residing in the area for more than 1 year were included in the study. Those who did not give informed consent and were critically ill at the time of study were excluded.

Sample size was calculated based on a study of oral health status and practices of dentate Bhil adult tribes of Southern Rajasthan, India in 2009 by Kumar *et al.* which showed 57% tribal population had poor oral hygiene status.^[7] Taking $P = 0.57$, Confidence level-95%, Z value-1.96, and Absolute

error-10%. By formula, sample size = $(Z)^2 \times p \times (1-p)/L^2$ i.e., $\{1.96 \times 1.96 \times 0.57 \times 0.43 / (0.1 \times 0.1)\} = 94.15$, so taking it as 95 (the next higher integer). Taking 10% non-response rate, the sample size came to, $95 + (95 \times 10/100) = 104.5 \approx 105$.

In this study, simple random sampling (without replacement) technique was used for sample selection. Sampling frame was prepared from the electoral list representing 482 tribal adults among whom 105 were selected using random number table.

Data were collected from 103 subjects (as two subjects were absent on three consecutive house visits) using pre-designed, pre tested, structured schedule. The schedule consisted of sociodemographic information, deleterious habits of alcohol and tobacco consumption and oral hygiene practices. Face-to-face interview and general oral examination according to WHO methodology was conducted.^[8]

Clinical examination

All the subjects were examined under adequate natural light and clinical data was collected on periodontal status, dental caries as described by the World Health Organization (WHO) in addition to oral hygiene status. Plane mouth mirrors and wooden tongue depressor were used. The oral hygiene of each subject was assessed using the Simplified Oral Hygiene Index (OHI-S) of Greene and Vermillion (1964).^[9]

Study variable

Dependent variable for this study was oral hygiene status. It was measured by Oral Hygiene Index Simplified score with maximum and minimum attainable of 6 and 0 respectively.^[9]

Independent variables were:

- Sociodemographic: Age (in completed years), gender, education level, socioeconomic class (according to modified B.G. Prasad Scale 2019),^[10] type of house (kuccha, pucca)
- Current Substance use: Addiction of smoking, alcohol, smokeless tobacco
- Oral disease observed under general oral examination: Oral thrush (candidiasis), Ulceration, Gingivitis, Gum fibrosis, Gum bleeding, Caries, Erosion, Missing tooth
- Oral hygiene practices: Frequency of cleaning teeth, Material used to clean teeth, Pain in teeth or mouth in the last 7 days.

Operational definition

- Oral hygiene index simplified: A method for classifying oral hygiene status of population groups. For the Oral Hygiene Index Simplified, only six surfaces (from four posterior and two anterior teeth) were examined for debris and calculus. The average individual or group debris and calculus scores were combined to obtain the Simplified Oral Hygiene Index score.^[9]
- For analysis purpose, the OHI-S Score was dichotomised into two groups, on the basis of median score, that is, good

oral hygiene status (OHI-S score ≤ 3) and poor oral hygiene status (OHI-S score > 3)

3. Oral Debris—The soft foreign matter loosely attached to the teeth. It consisted of mucin, bacteria, and food, and varies in color from greyish white to green or orange
4. Oral Calculus—A deposit of inorganic salts composed primarily of calcium carbonate and phosphate mixed with food debris, bacteria, and desquamated epithelial cells.

Ethical approval

Confidentiality of the study participants was maintained throughout the process. The ethical approval has been obtained from Institutional Ethical Committee of All India Institute of Hygiene and Public Health, Kolkata, on 11/10/2018.

Data analysis

Data was analyzed using Microsoft excel 2010 and SPSS version 16 software. Descriptive statistics was performed to assess the background characteristics. Predictors of oral hygiene status were identified using Chi square and logistic regression analysis. For all statistical purposes, P value of < 0.05 had been considered to reject null hypothesis.

Results

Background characteristics

Mean age of the study participants was 32.2 ± 12.7 years with a range of 18–69 years. Out of the total participants, 50.5% were females. A total of 33.9% study participants were educated above the level of primary, whereas 24.2% of study participants were illiterate. According to B.G. Prasad socioeconomic scale 2019, most of them belonged to Class IV socioeconomic group (66.1%). Mean per capita income of the participants was 1314.1 ± 462.1 INR per month. Majority of the study participants lived in kuccha houses (94.2%). Smokeless tobacco products were used by 41.7% of the study participants, whereas 9.7% used both smoking as well as smokeless tobacco. Among the participants, 40.8% did not use any kind of tobacco. Approximately one third of the total participants consumed alcohol, that is, 32.03% [Table 1].

Oral hygiene status

Mean [SD] and median [IQR] of OHI-S score was 2.7 [1.1] and 3 [3.7-1.9], respectively. The range of attained OHI-S score was 0 to 5. Out of the total population, 61.2% were found to have good oral hygiene status and 38.8% subjects had poor oral hygiene status.

Majority of the population aged 50 years and above had poor oral hygiene status (75%), whereas most of the population below 36 years had good oral hygiene. Nearly half of the male population (51%) found to have poor oral hygiene; on the other hand, 73.1% female had good oral hygiene status. Poor oral hygiene status was mostly observed among participants using smoking tobacco (100%) and alcohol (63.6%) [Table 1].

All of participants who brushed their teeth twice a day were found to have good oral hygiene status and nearly half of the population who used datun for cleaning teeth had poor oral hygiene status (50.9%). Majority of those who were found to have gingivitis (61.4%) and erosion (60.4%) on oral examination also had poor oral hygiene status [Table 2].

Association of oral hygiene status

There was statistically significant association of oral hygiene status with age, gender, alcohol consumption, tobacco use, and substance used for cleaning teeth ($P < 0.05$). It was also found that there was statistically significant association of oral hygiene with gingivitis and erosion ($P < 0.05$) [Tables 1 and 2].

Predictors of poor oral hygiene status

Significant predictors of poor oral hygiene status on bivariate logistic regression were age 50 years and above [OR (95%CI) = 7.5 (1.49–37.65)], male gender [OR (95%CI) = 2.82 (1.24–6.47)], alcohol consumption [OR (95%CI) = 4.69 (1.94–11.36)], use of “datun” [OR (95%CI) = 2.95 (1.29–6.78)], SLT use [OR (95%CI) = 13.26 (4.04–43.56)], and both ST-SLT use [OR (95%CI) = 42.00 (6.55–269.3)]. In multivariable model, “datun” use [AOR (95%CI) = 4.74 (1.38–16.20)], SLT use [AOR (95%CI) = 9.90 (2.52–38.93)], both ST-SLT use [AOR (95%CI) = 32.91 (3.06–353.16)] retained their significant association with poor oral hygiene status [Table 3].

Discussion

Tribal people are mostly known for their heritage, love for freedom, self-identity, language, culture, unity, and this also holds a sacred space for the Santhal tribes of West Bengal. Hardly, few studies have been conducted on these tribal populations, hence no comprehensive data are available. This study will build on the existing knowledge about these tribes.

The information regarding the sociodemographic factors recorded showed that among the Santhal tribe majority (40.7%) were educated till the level of primary or below, this low literacy among tribes is considered to be a primary cause of their socioeconomic backwardness which is depicted in the study findings and is in accordance to other studies.^[11-13]

The present study evidently showed that a majority (51.4%) of Santhal tribes used “datun” of *neem trees (Azadirachta indica)* to clean their teeth. The results of this study are in agreement with the studies conducted by Kumar *et al.*, Mandal *et al.*, Varenne *et al.*^[14-16]

Our study pointed out that most of the Santhals had different types of periodontal disease. This study was highly comparable to the research carried out by Kumar *et al.* among Bhil adult tribes of southern Rajasthan and Shrivastav A, *et al.* among tribe of Patalkot of central India.^[7,17] Dental calculus and debris was commonly seen across all age groups. The finding of the present

Table 1: Association of oral hygiene status with sociodemographic characteristics and substance use (n=103)

Characteristics	Oral Hygiene Status		Total number (%)	χ^2 (df); <i>P</i>
	Good Number (%)	Poor Number (%)		
Age group				
<=20	16 (76.2)	5 (23.8)	21 (20.4)	13.14 (3); 0.004
21-35	33 (71.7)	13 (28.3)	46 (44.6)	
36-50	11 (45.8)	13 (54.2)	24 (23.3)	
>50	3 (25)	9 (75)	12 (11.7)	
Gender				
Male	25 (49)	26 (51)	51 (49.5)	6.27 (1);
Female	38 (73.1)	14 (26.9)	52 (50.5)	0.012
Education level				
Illiterate	15 (57.7)	11 (42.3)	26 (25.2)	0.18 (2);
Primary and below	26 (51.9)	16 (38.1)	42 (40.7)	0.912
Above primary	22 (62.9)	13 (37.1)	35 (34.1)	
Socioeconomic class				
III	4 (57.1)	3 (42.9)	7 (6.8)	2.23 (2);
IV	45 (66.2)	23 (33.8)	68 (66.0)	0.327
V	14 (50)	14 (50)	28 (27.2)	
Alcohol consumption				
Present	12 (36.4)	21 (63.6)	33 (32.0)	12.57 (1);
Absent	51 (72.9)	19 (27.1)	70 (68.0)	<0.001
Tobacco use				
Only ST*	0	4 (100)	4 (3.8)	36.24 (3);
Only SLT [#]	19 (44.2)	24 (55.8)	43 (41.7)	<0.001
SLT + ST	2 (20)	8 (80)	10 (9.7)	
No tobacco	42 (91.3)	4 (8.7)	46 (44.8)	

*Smoking tobacco, [#]Smokeless tobacco (khaini, gutka, gul)

study is in accordance with the findings of the study conducted by Varenne *et al.* and Loyola *et al.*^[16,18]

Janakiram *et al.* reported that 73.8% of the tribal populations of Kerala were addicted to tobacco in one form or the other, which is aptly reflected in the present study (55.4%). The present study also depicts a statistically significant association between alcohol consumption and poor oral hygiene.^[19]

Oral hygiene plays a key role to prevent dental problems and in attaining good dental health. In the present study, mean OHI-S score is 2.69 ± 1.10 , which is comparable with study by Kumar *et al.* where mean OHIS-S score was 2.56 ± 0.82 and 2.51 ± 0.93 , respectively, for Koya and Lambada group of tribes.^[20] In a study by Shrivastav A, *et al.*, 36.3% of the study subjects were reported to have poor oral hygiene, which is in accordance with present study where 38.8% had poor oral hygiene and this can be attributed to their minimal oral hygiene practices, low socioeconomic level, and low level of education.^[17]

The present study finding of dental caries was 30.1% which is unexpectedly high in comparison to a study by Kadanakuppe *et al.* where the prevalence of dental caries among tribals was reported to be 7.5%.^[21] It was also evident from this study that 87% participants stated that they visited quacks (ojhas or tantrik) for seeking treatment regarding dental problems which is in accordance to studies conducted by Kumar *et al.* and Gambhir RS, *et al.*^[7,22]

Our study findings showed significant association between poor oral hygiene status and tobacco use similar to the findings of Agarwal *et al.* study which was done on Baiga tribes. Agarwal *et al.* also found that the tribal people experienced a feeling of well-being with tobacco, relief from pain and tiredness, and hunger was also suppressed. Tobacco was also used by teenage girls during the menstrual cycle to relieve pain. Social acceptability, resulting in addiction, has been a common explanation for using tobacco in these forms.^[23] It was also found that poor oral hygiene status among tribal adults was significantly associated with gingivitis, tooth pain, and erosion. In the Kerala study, it was found that Periodontitis was more (92%) among those having bad oral hygiene practices as compared to those who had good oral hygiene practices. The association between oral hygiene habits and periodontal health was found to be statistically significant.^[24]

The tribal culture and traditions increase the exposure to tobacco and alcohol in this community, this leads to rising trends of poor oral health among tribal, which is a challenge to primary health care. Government of India addressed the tobacco epidemic on poor oral health and launched National Oral Health Programme and National Tobacco Control Programme. Further strengthening of service delivery system is ensured through comprehensive primary health care approach via health and wellness centres under Ayushman Bharat. However, it is evident that existing primary health care and IEC activities as per those programmes has less impact on oral health services especially among tribal people. Thus, it is very important for primary care

Table 2: Association of oral hygiene status with oral hygiene practices and clinical findings (n=103)

Characteristics	Oral Hygiene Status		Total Number (%)	χ^2 (df); P
	Good Number (%)	Poor Number (%)		
Substance used for cleaning teeth				
Toothpaste with toothbrush	37 (74)	13 (26)	50 (48.5)	6.73 (1);
Datun	26 (49.1)	27 (50.9)	53 (51.5)	0.009
Frequency of cleaning teeth per day				
Once	60 (60)	40 (40)	100 (97.0)	1.96 (1);
Twice	3 (100)	0	3 (3.0)	0.161
Pain in tooth (last 7 days)				
Present	33 (53.2)	29 (46.8)	62 (60.2)	4.13 (1);
Absent	30 (73.2)	11 (26.8)	41 (39.8)	0.042
Gingivitis				
Present	17 (38.6)	27 (61.4)	44 (22.7)	16.41 (1);
Absent	46 (78.0)	13 (22.0)	59 (57.3)	<0.001
Caries				
Present	19 (59.4)	13 (40.6)	32 (30.1)	0.063 (1);
Absent	44 (62.0)	27 (38.0)	71 (68.9)	0.802
Erosion				
Present	15 (39.5)	23 (60.5)	38 (36.9)	11.92 (1);
Absent	48 (73.8)	17 (26.2)	65 (63.1)	<0.001
Bleeding gum				
Present	16 (57.1)	12 (42.9)	28 (27.2)	0.262 (1);
Absent	47 (62.7)	28 (37.3)	75 (72.8)	0.609

Table 3: Bivariate and Multivariable logistic regression of poor oral hygiene status with its predictors, [n=103]

Characteristics	OR (95% CI)	P	AOR (95% CI)	P
Age (in years)				
≤20	1		1	
21-35	1.094 (0.35-3.41)	0.87	0.85 (0.20-3.66)	0.836
36-50	2.12 (0.61-7.32)	0.24	3.08 (0.54-17.30)	0.201
50 and above	7.5 (1.49-37.65)	0.01	6.84 (0.80-58.29)	0.078
Gender				
Female	1		1	
Male	2.82 (1.24-6.47)	0.013	0.39 (0.07-2.04)	0.266
Education				
Primary and below	1.11 (0.48-2.58)	0.800	-	-
Above primary	1			
Socioeconomic Status				
III	1			
IV	0.68 (0.14-3.30)	0.63		
V	1.33 (0.25-7.08)	0.73	-	-
Alcohol				
Present	4.69 (1.94-11.36)	0.001	1.42 (0.25-7.78)	0.686
Absent	1		1	
Tobacco use				
No tobacco	1		1	
ST	16962485	0.991	30324691118	0.999
SLT	13.26 (4.04-43.56)	0.000	9.90 (2.52-38.93)	0.001
Both	42.00 (6.55-269.3)	0.000	32.91 (3.06-353.16)	0.004
Substance used for cleaning teeth				
Toothbrush with toothpaste	1		1	
Datun	2.95 (1.29-6.78)	0.011	4.74 (1.38-16.20)	0.013

physicians to address this issue through successful community mobilization towards promotion of oral health among vulnerable population.

The main limitation of this study was small sample size. The study design was cross-sectional and therefore it was not possible to make causal inferences from the association found.

Conclusion

Present study revealed that prevalence of poor oral hygiene among tribal adults was unexpectedly high. The associated factors of poor oral hygiene status found in this study were mainly tobacco use and poor oral hygiene practices.

The present study findings emphasize the necessity of creating awareness and provide facilities for better oral care in the tribal community residing in this area of West Bengal. It can be provided by strategic development and implementation of oral care policy in these hard to reach areas. The final outcome of this study will provide a strong baseline data for the health administration for planning suitable programs for the improvement of oral health among Santhal tribes, as well as across other parts of West Bengal where these tribes reside.

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Conflicts of interest

There are no conflicts of interest.

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