Original Article

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Assessment of Oral Health Status among the Kutia Kandha Tribe – A Particularly Vulnerable Group Residing in Kandhamal District, Odisha

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Abstract:

Objective: In Odisha, the Kandha tribal group is numerically the most populous tribe. Among the several sections of the Kandha communities, two sub-sections, the Kutia Kandha and Dongria Kandha, have been identified as Particularly Vulnerable Tribal Groups (PVTGs). As a result, the study's aim was to assess the oral health status of the Kutia Kandha tribe.

Material and Methods: A cross-sectional survey was carried out among 850 Kutia Kandhas using a multistage randomised sampling method in the Tumudibandha Block of Kandhamal District. Data were collected using the World Health Organization (WHO) Oral Health Assessment Form, 2013. Numbers and percentages were analyzed using Microsoft Excel and Statistical Package for the Social Science (SPSS) package version 26.0. Comparisons between discrete and continuous data were done using the Chi-square test and ANOVA. A p-value of 0.05 was considered to be statistically significant.

Results: The study population consisted of 850 subjects stratified into seven different age groups. The mean DMFT (permanent) and dmft (deciduous) scores of were 4.06±3.55 and 0.12±0.56 respectively. One hundred fifty-one (16.0%) subjects had bleeding. Three hundred and sixty-two (42.6%) subjects had pockets 4-6 mm and 276 (32.5%) had pockets more than 6 mm. Four hundred and seventy-six (56%) of the study participants had 4-5 mm of loss of attachment followed by 303 (35.6%) with 6-8 mm loss of attachment.

Conclusion: The prevalence of caries and periodontal diseases was high. Due to a lack of knowledge about oral hygiene maintenance, proper health education should be provided to the Kutia Kandha tribals.

Keywords: child, dental caries, oral health, periodontal pocket, tribals

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Introduction

The overall general health is inextricably linked to oral health. Oral hygiene is a practice that is crucial to a person's quality of life and impacts the oral health Dental caries and periodontal disorders are some of the primary effects of poor oral hygiene. These conditions are frequently associated with health issues like cardiovascular disease, cerebrovascular accidents, diabetes mellitus, and pregnancy complications. Thus, oral hygiene is positively correlated with good health in general; many infectious diseases could be typically reduced by properly maintaining good oral health through proper oral hygiene practices[1,2].

India is a nation where many indigenous tribes and ethnic groups have originated[3]. According to the 2011 census, tribal communities make up a sizeable minority of India's population, accounting for 8.6% of the country's total population, or 104.2 million people[4].

The Dhebar Commission established a distinct category termed as Primitive Tribal Groups (PTGs) in 1973[5]. The Government of India began identifying the most vulnerable tribal tribes as included in these PTGs in 1975 and identified 52 such groups; 23 more groups were added in 1993, bringing the total to 75 PTGs. The PTGs were renamed as Particularly Vulnerable Tribal Groups (PVTGs) by the Indian government in 2006[5–7].

Odisha has the most PVTGs (13), followed by Andhra Pradesh (12), out of the 75 listed PVTGs. The Kandha tribal group makes up the majority of the population in Odisha. The name Kandha was given to them by non-tribal people, and through time, the tribesmen came to accept it. However, they refer to themselves as "Kui loku", "Kui enju", or "Kuinga" because they speak the Dravidian language "Kui" or "Kuvi". The Kandha can be divided into a number of subgroups based on their sociocultural traits, including the Desia Kandha, Dongria Kandha, Kutia Kandha, Sitha Kandha, Buda Kandha, Pengo Kandha, Malua Kandha, etc. Two of the Kandha sub-groups, namely the Kutia Kandha and Dongria Kandha, have been recognised as Particularly Vulnerable Tribal Groups (PVTGs)[8].

However, despite the fact that the Kutia Kandha tribe requires special attention and care, no studies on their oral health have been conducted to date.The aim of this study was to assess the oral health status among the Kutia Kandha, and the objectives were to collect baseline data, compare gender differences in the kutia kandha tribe's oral health status and to provide recommendations for various measures to improve oral health among the Kutia Kandha tribe.

Material and Methods

Study design and sample size

A cross-sectional household study of the Kutia Kandhas in the Kandhamal District was conducted from January to August 2021. Multistage random sampling was used to choose the sample. The district of Kandhamal consists of 12 blocks, and Tumudibandha is one of them. Tumudibandha consists of three Gram panchayats (village council) namely- Belghar, Gumma and Bilamal. Belghar was randomly choosen. Seven villages (Madalakuna, Pandamaska, Sanakumudi, Germeli, Dahabali, Targabali, and Girisasa) were arbitrarily chosen from these Gram panchayats (village council). The sample size was calculated using the formula: $n=z^2\ pq/d^2$, where n is sample size, p prevalence of disease, q free from disease, d allowable error, and z is point on the normal deviation. Upon doing this, n was found to be 751. A 10% increase was included to allow for non-respondents, resulting in the sample size of 826. However, as many tribal members as possible were included, and the final sample size was 850.

Inclusion and exclusion criteria

The study only included participants who provided informed consent after providing them with the study details and were present at the time of the investigation. The

study did not include participants who were younger than 5 years old, uncooperative, suffering from chronic systemic disorders, or in poor health.

Research ethics approval

The study was approved by the Kalinga Institute of Medical Sciences' ethics committee in Bhubaneswar under reference number KIIT/KIMS/IEC/185/2019.

Standardization and calibration

To avoid any diagnostic variability among the study participants, a single examiner was trained and the instrument was calibrated in the Department of Public Health Dentistry at KIDS, Bhubaneswar. All clinical examinations were carried out by the investigator herself. This was done to ensure homogeneous interpretation, agreement and application of the codes and criteria used to be determined and transcribed.

Data collection

A pilot study was conducted with 30 participants initially. The final sample size did not include the results of a pilot research. All participants gave written informed consent and were enthusiastic to take part in the study. The data were gathered using a modified version of the 2013 World Health Organization (WHO) Oral Health Assessment Form, the oral health information was gathered.

Clinical examinations

Each participant' dental health was examined using a plain mouth mirror and a Community Periodontal Index (CPI) probe in accordance with the WHO methodology. Under adequate natural light, a Type III dental clinical examination was performed. The study included every participant who showed up on the day of the exam.

Statistical analysis

Using Microsoft Excel and the Statistical Package for the Social Science (SPSS) programme version 26.0, numbers and percentages were calculated. The chi-square test was used to compare discrete data, and the ANOVA test was used to compare continuous data. A p-value of 0.05 was regarded as statistically significant.

Results

About 850 people, divided into seven different age groups, made up the study population. The largest number of participants were (30.7%) were between the ages of 16 and 34. The elderly group aged 75 and above provided the fewest subjects, only 8 (0.9%) in total. Gender distribution among the individuals was 438 (51.8%) males and 412 (48.5%) females. Three main ethnic groups were identified in the Belghar region: 640 Kutia Kandhas (75.3%), 193 Kandhas (22.7%), and 17 Gonds (2%). Seventy-eight percent of the population were engaged in shifting agriculture as their primary line of work. Only 2 (0.2%) of the sample population worked as teachers in the public sector, while 50 (5.78%) were involved in animal husbandry. Participants in the study came from nine different villages (Table 1).

The mean DMFT score of the study population was 4.06±3.55. The mean DMFT was highest (12.63 ±13.88) among the ≥75 age group and lowest (2.05±1.41) among 6-12 age group and this difference was statistically significant (p-value≤0.01*). The mean DMFT was higher among males (4.10±3.55) compared to females (4.02± 3.55) but this difference was not statistically significant (p-value=0.42) (Table 2).

The mean DT score of the study population was 2.66±1.58. The mean DT was highest (2.82±1.55) among the 45-64 age group and lowest (1.58±1.20) among the 6-12 age group and this difference was statistically significant (p-value=0.003*). The mean MT score of the study population was 1.40±3.13. The mean MT was highest

(10.6±14.86) among the ≥75 age group and lowest (1.58±1.20) among the 13–15 year age group and this difference was statistically significant (p–value≤0.01*). Both mean DT and mean MT were higher among males compared to females, but these differences were not statistically significant (Table 2).

The mean dmft (decayed, missing filling for deciduous teeth) score of the study population was 0.12±0.56 and this difference was statistically significant (p–value≤0.01*) (Table 3). The mean dmft was higher among females (1.21±1.44) compared to males (1.00±1.35) but this difference was not statistically significant (p–value=0.73) (Table 3).

Table 1 Distribution of demographic details among the study participants (n=850)

Sociodemographic variables	Kutia kandha n (%)	Kandha n (%)	Gond n (%)	Total n (%)
Age (years)				
6–12	30 (4.7)	10 (5.2)	0 (0.0)	40 (4.7)
13–15	10 (1.6)	9 (4.7)	0 (0.0)	19 (2.2)
16–34	192 (30.0)	64 (33.2)	5 (29.4)	261 (30.7)
35–44	176 (20.7)	49 (25.4)	7 (41.2)	232 (27.3)
45–64	160 (18.8)	37 (19.2)	3 (17.6)	200 (23.5)
65–74	64 (7.5)	24 (12.4)	2 (11.8)	90 (10.6)
≥75	8 (1.3)	0 (0.0)	0 (0.0)	8 (0.9)
Gender				
Male	350 (54.7)	74 (38.3)	14 (82.4)	438 (51.5)
Female	290 (45.3)	119 (61.7)	3 (17.6)	412 (48.5)
Occupation				
Shifting cultivation	394 (78.8)	101 (20.2)	5 (1.0)	500 (58.8)
Student	48 (68.6)	22 (31.4)	0 (0.0)	70 (8.2)
Housewife	35 (63.6)	17 (31.0)	3 (5.5)	55 (6.5)
Wage worker	78 (74.3)	26 (24.8)	1 (1.0)	105 (12.4)
Government job	2 (100)	0 (0.0)	0 (0.0)	2 (0.2)
Animal husbandry	45 (90.0)	2 (4.0)	3 (6.0)	50 (5.9)
Horticulture	38 (55.9)	25 (36.8)	5 (7.4)	68 (8.0)
Types of cleaning aids				
Sal twig	306 (47.7)	112 (58.2)	9 (52.9)	427 (50.2)
Khajuri twig	145 (22.7)	53 (27.5)	5 (29.4)	203 (23.9)
Neem twig	137 (21.4)	15 (7.8)	3 (17.6)	155 (18.3)
Toothbrush	52 (8.1)	13 (6.7)	0 (0.0)	65 (7.6)
Materials used for cleaning				
Fluoridated toothpaste	24 (3.8)	6 (3.1)	0 (0.0)	30 (3.5)
Herbal paste	28 (4.4)	7 (3.6)	0 (0.0)	35 (4.1)
None	588 (91.9)	180 (93.3)	17 (100)	785 (92.4)
Smokers				
No	500 (78.2)	166 (85.5)	10 (58.8)	676 (79.5)
Yes	140 (21.8)	27 (14.5)	7 (41.2)	174 (20.5)
Smokeless tobacco use				
No	166 (26.0)	55 (28.4)	4 (23.5)	225 (26.5)
Yes	474 (74.0)	138 (71.6)	13 (76.5)	625 (73.5)
Paan chewing				
No	526 (82.3)	135 (70.1)	14 (82.4)	677 (79.5)
Yes	114 (17.7)	58 (29.9)	3 (17.6)	174 (20.5)
Total	**640 (100)**	**193 (100)**	**17 (100)**	**850 (100)**

Table 2 Distribution of mean DMFT and dmft scores among the study population according to age group

Age group (years)	DT Mean±S.D.	MT Mean±S.D.	FT Mean±S.D.	DMFT Mean±S.D.	dt Mean±S.D.	mt Mean±S.D.	ft Mean±S.D.	dmft Mean±S.D.
6–12	1.58±1.20	0.48±0.51	0	2.05±1.41	1.73±1.13	0.43±0.59	0	2.15±1.37
13–15	1.79±1.32	0.32±0.48	0	2.11±1.52	0.47±0.51	0.16±0.37	0	0.53±0.70
16–34	2.66±1.59	0.8±0.99	0	3.46±1.95	0.004±0.06	0.004±0.06	0	0.008±0.12
35–44	2.77±1.57	1.05±0.51	0	3.82±2.37	0	0	0	0
45–64	2.82±1.55	1.76±3.23	0	4.58±3.60	0	0	0	0
65–74	2.78±1.63	3.03±5.58	0	5.81±5.88	0	0	0	0
≥75	2±1.69	10.6±14.86	0	12.63±13.88	0	0	0	0
Total	2.66±1.58	1.40±3.13	0	4.06±3.55	0.09±0.45	0.02±0.17	0	0.12±0.56
p-value	0.003*	≤0.01*	–	≤0.01*	≤0.01*	≤0.01*	–	≤0.01*

*significant

DT=Decayed teeth, MT=Missing Teeth, FT=Filled Teeth, DMFT=Decayed, Missing and Filled Teeth, dt=decayed teeth, mt=missing teeth, ft=filled teeth, dmft=decayed, missing and filled teeth

Table 3 Distribution of mean DMFT and dmft scores among the study population according to gender

Gender	DT Mean±S.D.	MT Mean±S.D.	FT Mean±S.D.	DMFT Mean±S.D.	dt Mean±S.D.	mt Mean±S.D.	ft Mean±S.D.	dmft Mean±S.D.
Male	2.69±1.59	1.41±3.22	0	4.10±3.55	0.78±1.10	0.22±0.51	0	1.00±1.35
Female	2.64±1.58	1.38±3.04	0	4.02±3.55	1.03±1.14	0.23±0.43	0	1.21±1.44
p-value	0.331	0.16	–	0.42	0.44	0.79	–	0.73

*significant

DT=Decayed teeth, MT=Missing Teeth, FT=Filled Teeth, DMFT=Decayed, Missing and Filled Teeth, dt=decayed teeth, mt=missing teeth, ft=filled teeth, dmft=decayed, missing and filled teeth

Table 4 Distribution of study population according to highest cpi scores by gender

Gender	Healthy n (%)	Bleeding n (%)	Pocket 4–6 mm n (%)	Pocket >6 mm n (%)	Tooth missing n (%)	p-value	Total n (%)
Male	39 (4.6)	75 (8.8)	260 (30.6)	62 (7.3)	2 (0.2)	0.034*	438 (51.5)
Female	20 (2.4)	76 (8.9)	102 (12.0)	214 (25.2)	0 (0.0)		412 (48.5)
Total	59 (7.0)	151 (17.7)	362 (42.6)	276 (32.5)	2 (0.2)		850 (100)

*significant

CPI Codes were calculated according to the highest score of an individual. Fifty-nine (6.9%) subjects had healthy periodontium. One hundred fifty-one (16.0%) subjects had bleeding. Three hundred and sixty-two (42.6%) subjects had periodontal pocket of 4–6 mm and 276 (32.5%) had periodontal pocket of more than 6 mm (Table 4).

Table 5 Distribution of study population according to highest loa scores by gender

Gender	LOA 4–5 mm n (%)	LOA >6 mm n (%)	LOA 9–11 mm n (%)	Tooth missing n (%)	p-value	Total n (%)
Male	236 (27.8)	163 (19.1)	3 (0.4)	36 (4.2)	0.023*	438 (51.5)
Female	240 (28.2)	140 (16.5)	7 (0.8)	25 (2.9)		412 (48.5)
Total	476 (56.0)	303 (35.6)	10 (1.2)	61 (7.1)		850 (100)

*significant
LOA=loss of attachment

Table 6 Distribution of intervention urgency among the study population based on age and gender

	Prompt treatment n (%)	Immediate treatment due to pain or infection of dental origin n (%)	Referral for comprehensive evaluation n (%)	p-value	Total
Age group (years)					
6–12	24 (2.8)	13 (32.5)	3 (7.5)	0.012*	40 (4.7)
13–15	6 (0.7)	10 (52.6)	3 (15.8)		19 (2.2)
16–34	85 (10.0)	132 (50.6)	44 (16.9)		261 (30.7)
35–44	65 (6.5)	130 (56.0)	37 (16.0)		232 (27.3)
45–64	55 (6.7)	111 (55.5)	34 (17.0)		200 (23.5)
65–74	37 (41.1)	41 (45.6)	12 (13.3)		90 (10.6)
≥75	5 (62.5)	3 (37.5)	0 (0.0)		8 (0.9)
Gender					
Male	140 (16.5)	228 (26.8)	70 (8.2)	0.910	438 (51.5)
Female	137 (16.1)	212 (24.9)	63 (7.4)		412 (48.5)

*significant

About 476 (56%) of the study participants had 4–5 mm of loss of attachment (LOA) which was almost the same in males and females followed by 303 (35.6%) with 6–8 mm loss of attachment. Only 10 (1.2%) subjects had 9–11 mm of LOA. Loss of attachment of 6–8 mm and 9–11 mm were found more in males (37.2%, 8.2%) than in females (Table 5).

Prompt treatment was required by 85 (32.6%) of the study participants aged 16–34 years of age followed by 65 (28.0%) subjects aged 35–44 years of age. Immediate treatment due to pain or infection of dental origin was required by 132 (50.6%) participants aged 16–34 years of age. 44 (16.9%) aged 16–34 years participants needed to be referred for comprehensive evaluation. Statistical significance was found when the intervention urgency was compared according to age (p-value=0.012) (Table 6).

Discussion

According to the 2011 census, the total population of the Kandha tribe at that time was 16,27,486, (male 7,90,559 & female 8,36,927), making it the most populous of Odisha's 62 tribes. Kandhas make up 17.1% of Odisha's total tribal population. Their male to female sex ratio is 1059, and their literacy rate is 47.0% (59.2% for males and 35.6% for

females). The low lying house floor of the "Kutia Kandha", also known as "Kutti dwellers", is roughly 2 feet below the level of the village road. Due to its method of site selection, the construction, architectural design, location of functional areas and home and settlement patterns demand special attention. Traditional Kutia Kandhas were single-clan tribes, but over time, additional clans and ethnic cultural groups began to be accepted. This population has had very limited access to both general and oral health services and effective implementation of an oral health program in the proper form of a comprehensive survey could bridge this apparent gap in accessibility.

The mean age of this group in the present study was 40.18 (±16.35) years, and age was similar to studies on other tribes carried out by Gopalankutty et al.[9] and Haque et al.[10]. A study conducted among Kaingang adults and children also reported a similar mean age[11]. The mean ages of subjects in the Koya and Lambada peoples were also similar at 40.52±14.69 and 39.34±13.77 years, respectively[12]. A dissimilar study was conducted by Priyadarsi et al.[13] where the mean age was 10.75 (±2.43) years.

In the present study, the majority of the study participants (51.5%) were males which is similar with the studies conducted by Kumar et al.[14] (60.9%), Jayashantha et al.[15] (94%), Humagain et al.[16] (58%), and Digumarthi et al.[17] (63%). However, contrasting results were found in studies carried out by Gopalankutty et al.[9], Haque et al[10], Soares et al.[11], Asif et al.[12], Ikhar et al.[18] and Agarwal et al.[19] where most of the participants were females.

The primary occupation of the tribal population (34.1%) was shifting cultivation, which was similar to the study conducted by Naheeda et al.[20], in which agriculture was the predominant occupation. The forest in the Kutia Kandha area is abundant in various types of bamboos, which are important forest products not only for house construction but also in all aspects of their daily lives. The Kutia Kandha create tobacco containers out of hollow bamboo shoots, mats, fishing traps, baskets, and a variety of other lovely and functional household items. They also make bamboo bows and arrow shafts. The majority of participants in the Koya group (69%) were farmers who primarily cultivated tobacco, while the remaining 23.4% were day labourers. The occupations of the Lambada group differed from the findings of our study where business (65%) followed by daily wage labor and farming were predominant[12].

The mean DMFT score in our study was high (4.06 ±3.55) among the study participants. This was similar to a study conducted among Kota adults[12], but different from a study by Jayashantha[15]. The consistent daily diet of rice or small millets may have contributed to the high number of caries in the village. They bring cooked food for the entire family to the farming location throughout the working season. Many of them construct impromptu huts and prepare meals. Families often have two cooking locations – one at home and the other out in the open. They eat more non-vegetarian food than vegetarian, including the flesh of buffalo, goats, dried fish, and other animals. After eating, any leftover food is saved for supper the next day. Another reason for high dental caries could be poor oral hygiene, as only 65 (7.6%) of the tribal people used a toothbrush with either herbal toothpaste (n=35, 4.1%) or fluoridated toothpaste (n=30, 3.5%), while 785 (92.4%) tribal people did not use any brushing materials.

In the present study, the mean DMFTs among males and females were 4.10±3.55 and 4.02±3.55, respectively. Vijayakumar et al.[21] reported that the mean DMFT for males was 6.03±2.35 and for females was 5.78±2.55. The mean DMFT Index scores for male and female Birhor were 1.05±2.59 and 1.02±2.17, respectively[22].

About 151 (26.0%) of the Kutia Kandhas had bleeding. Kumar et al.[22] found a similar prevalence of bleeding gums in Birhor tribals (26.8%). This could be due to the fact that the majority of participants 625 (73.5%)

used smokeless tobacco, also known as Nasa in their native language, which was also used by Baiga families, as recently reported by Agarwal et al.[32]. One hundred and seventy-four (20.5%) of the participants smoked and chewed paan (Betel leaf). Arantes et al.[25] and Gopalankutty et al.[9] also reported analogous findings, with prevalences of bleeding on probing of 70.3% and 73.3%,respectively. The prevalence of bleeding was also very high among the Santhals[14] (61.4%), Todas and Kotas (33.4%)[26], and in 12.2% of the Paniya population[27]. In the current study, a clear image of the gingival bleeding state of the study participants was found through utilising the CPI modified index in accordance with WHO proforma 2013.

In the present study, 456 (53.6%) subjects had pockets 4-6 mm and 276 (32.5%) had pockets more than 6 mm. The Paniya population likewise had shallow pockets that measured 4 to 5 mm deep among its (5.3%) members. Only 3.5% of the native Paniya population were found to have deep pockets[27].

According to Kumar et al.'s study on the Birhor tribes, 298 (74.5%) participants had periodontal loss of attachment (LOA) ranging from 0 to 3 millimetres[22]. They also reported 0-3 mm of loss of attachment among 58% of the study population[28]. But no such losses were found in our study. In our study, 476 (56%) of the study participants had 4-5mm of loss of attachment. Similar findings were found by Kumar et al.[22] where 54% of the study participants had a loss of attachment of 4-5 mm. Dissimilar findings were reported by Vijayakumar et al.[21] Kumar reported 13% and 19% of 4-5 mm LOA among Birhor[22] and Northern Bhubaneswar tribals, respectively[28]. In the Paniya population there was reported a loss of attachment of 4-5 mm in 5.3% of the participants, which was notably less than in our study[27]. Mukherjee et al.[29] reported 25% LOA of 4-5 mm among Toto tribal children.

This study's main drawback was that it was cross-sectional, making it impossible to infer a causal relationship from the associations that were discovered. Due to the significant differences in the socio-demographic characteristics, the findings also cannot be applied to the other blocks in the Kandhamal district. This can be avoided in future studies by using a broad district-wide sample size and conducting investigations over an extended period of time. Another significant limitation of this study was the language barrier that existed between the respondents and the examiner.

To the best of our knowledge, this represents the first evaluation of the condition of Kutia Kandha's oral health. Second, the sample size was greater than the required minimum. Thirdly, because the villages that were initially chosen at random were inaccessible, two additional Gram Panchayats (village councils), Gumma and Bilamal, were also included in the study during data collection.

Recommendations

For the purpose of developing strategies for oral health promotion, prevention, and treatment in this native tribal group, the data from this study could be used as a baseline by health authorities and oral health specialists. The strategy should be created with knowledge of the sociocultural realities in the area. By organising a preventive oral health care programme, oral care should be accessible right outside their front doors. A significant obstacle to providing oral health care to the tribal population of the Belghar region has been the lack of reliable data. The information gathered for this study might fill in some of these gaps and aid in determining what the community needs are.

Conclusion

The prevalences of caries and periodontal diseases were high. As there is a lack of knowledge about oral hygiene maintenance, proper health education should be provided. As oral healthcare professionals, it is our

duty to extend our services towards early detection of dental diseases in this highly vulnerable population in our community.

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Conflict of interest

Nil

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