

## Original Research Article

# Oral health status of the tribal population of Chamarajanagar district, Karnataka

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## ABSTRACT

**Background:** Regardless of the improvements in the field of healthcare, there is a section of people who live away from civilization known as indigenous people or tribals. Information regarding oral health status is instrumental in the planning and implementation of oral health policies and programmes related to promotion of oral health. The present study aimed to assess the oral health status of the tribal population of Chamarajanagar district.

**Methods:** A cross-sectional survey of 256 tribals of Chamarajanagar district was conducted. A modified WHO oral health assessment form 2013 was utilized and examined according to the WHO methodology 2013. The recorded data was statistically analysed using the statistical package for the social sciences version 24.

**Results:** Based on the age-category, majority of them belonged to the age group of 35-44 years. All the participants belonged to the sub-caste of Soligas. The total decayed missing filled teeth (DMFT) among the subjects was  $5.5 \pm 4.14$ , 114 (44.5%) of them had gingival bleeding, 76 (29.7%) of them had pockets of 4-5 mm depth, 14 (5.5%) of them had pockets of >6 mm depth, 74 (28.9%) had loss of attachment of 4-5 mm, 16 (6.3%) of them had loss of attachment of 6-8 mm, 3 (1.2%) had leukoplakia, 1 (0.4%) had lichen planus, 12 (4.7%) had ulceration and 12 (4.7%) had abscess.

**Conclusions:** This study showed that a majority of tribes used toothbrush and toothpaste to routinely clean their teeth. High prevalence of dental caries and periodontal diseases was observed among the participants.

**Keywords:** Oral health, Tribals, Dental caries, India

## INTRODUCTION

Oral health is a critical and indispensable aspect of general health. Despite significant progress in global oral health, difficulties exist in many communities around the world, especially among the poor. In emerging countries, urbanization and migration from rural regions result in changes in lifestyle and nutritional patterns, which have an impact on dental health.<sup>1</sup> Earlier, dental caries was a trivial problem in the societies which followed primitive habits and sequestered lifestyle. But it increased rapidly

when civilization progressed through trade and commerce.

Globally, advances in healthcare have considerably improved disease prevention and treatment. However, the perks of these advances have not been distributed throughout the society.<sup>2</sup> Indigenous or tribal people, in particular, usually have less access to health care facilities when compared to their non-indigenous counterparts. These tribal groups usually live in impoverished areas of the country which are known as hamlets. Owing to their

secluded geographic terrains, the communication facilities are often hindered amongst the tribal groups, which also impedes connections with the outer world.<sup>3,4</sup> Given the differences in the standard of living, geographic development, traditional values, beliefs and customs, health problems of the tribals vary significantly.<sup>5</sup> Considering the socio-economic, political and educational aspects, many communities in India remain underdeveloped. Tribal community is one among them which constitutes 8.6% of the total population of India, with 104 million populations (2011 census) they cover about 15% of the country's area. Karnataka state consists 42,48,987 tribal people. Among them, 50,870 belong to the primitive groups. Government of India has recognized 50 different tribes, living in Karnataka. Among them, 14 tribes are basically natives of this state.<sup>2</sup> Chamarajanagar district is a home to a number of tribal groups, namely Jenu Kuruba, Kadu Kuruba and Soligas. As per 2011 census more than 35,000 Soligas are residing in the district.<sup>6</sup> WHO has affirmed that, oral health surveys could be used to collect details regarding oral health status of a population for planning oral health policies and programmes.<sup>5</sup> Oral health problems have profound impact on general health and oral health is also effected by several systemic conditions.<sup>7</sup> Hence, oral health care requires a multi-disciplinary approach. There is a dire need to amalgamate it into comprehensive health-promotion strategies.

Information regarding oral health status played a significant role in planning and execution of dental health policies and programmes.<sup>4</sup> Statistics about the regional and socio-economic aspects of oral health related behaviors were also important from an oral health educational point of view.<sup>8</sup> There were only a handful of studies about indigenous people of Karnataka, especially regarding oral health and there was a scarcity of reliable data. Till date there had been no report related to dental health of tribes of Chamarajanagar district, Karnataka. Hence, the present study aimed to assess the oral health status among the tribal population of Chamarajanagar district of Karnataka, India.

### **Objective**

The objective was to assess the oral health status among the tribal population of Chamarajanagar district.

### **METHODS**

A cross-sectional study was conducted among the tribal colonies of Chamarajanagar district, Karnataka. The sample size was calculated according to a study by Kumar et al which was carried out among the Santhal tribes of Dhanbad district, Jharkhand, assuming the expected prevalence of the oral health conditions ranging from dental caries (82%), periodontitis (67%), loss of attachment (54.1%), edentulism (12.8%), potentially malignant lesions as at least 2.7% with an absolute

precision of 2% and confidence interval of 95%, the sample size was 252.<sup>9</sup>

There were 5 talukas in Chamarajanagar district (Chamarajanagar, Gundlupet, Hanur, Kollegal, Yelandur). Among these 5 talukas, 1 taluka, Chamarajanagar taluka was selected randomly. All the tribal colonies in that taluka were line-listed. 10 tribal colonies were selected by lottery method. They were Attagulipura, Srinivasapura colony, Hosapodu, Punajanuru, Banawadi, Kuntagudi colony, Shanivaramunti, Muratipalya, Bellattha and Kanneri colony. Probability proportionate to size (PPS) sampling was done to identify the number of subjects to be included in each tribal colony. Convenience sampling technique was used to select the study participants. Subjects aged above 18 years, who had resided for at least 1 year in the particular tribal colony and those willing to participate in the study were included in the study. People with intellectual, psychiatric and emotional disturbances that could affect the reliability of their responses and non-tribes were excluded from the study.

The ethical clearance was obtained from the institutional ethical committee at JSS academy of higher education and research, Mysuru. Permission was obtained from district tribal welfare officer, Chamarajanagar district, Karnataka. Written informed consent was taken from the selected study participants.

Data was collected by using WHO survey proforma (2013) which comprised of a questionnaire and clinical assessment form. A modified WHO oral health questionnaire for adults (2013) was used which included demographic data, questions to assess oral hygiene practices and tobacco habits. An intra-oral examination was carried out to assess the oral health status of the subjects using WHO oral health assessment form (2013) using the community periodontal index (CPI) probe and a plane mouth mirror. Type III clinical examination was carried out.

Data obtained was coded and entered in MS excel 2010 spreadsheet. SPSS version 24 software was used for statistical analysis. Descriptive statistical measures were expressed in numbers and as percentages, mean and standard deviation. Inferential statistics like Mann-Whitney U test and Kruskal-Wallis tests were used for finding association. Data was represented in tables as relevant.

### **RESULTS**

A total of 256 participants were examined in the study among which 142 (55.5%) were males and 114 (44.5%) were females with ages ranging from 20–78 years. All 256 study participants belonged to the sub-caste of Soligas. 109 (42.6%) belonged to the middle class, 134 (52.3%) belonged to the lower middle. 57 (22.3%) study participants were illiterate, followed by 77 (30.3%) study

participants who had completed their primary school, 55 (21.5%) participants had completed their middle school, 28 (10.9%) participants had completed their high school (Table 1).

When oral hygiene practices were assessed it was revealed that, 17 (6.6%) participants cleaned their teeth 2-6 times in a week, 236 (92.2%) of them cleaned their teeth once daily. Cleaning aids used by the study

participants were 102 (39.8%) used tooth brush, 82 (32.0%) of them used charcoal, 8 (3.1%) of them used wooden toothpicks, 64 (25%) of them used chewstick/miswak to clean their teeth. Tobacco products consumption assessment revealed that 89 (34.8%) of the study participants smoked cigarette/beedi, 111 (43.5%) of them had the habit of chewing tobacco and 25 (9.8%) of them used snuff. Out of 256 participants, 68 (26.5%) had the habit of consuming alcohol (Table 2).

**Table 1: Socio-demographic characteristics of the study participants.**

Category		Frequency (n=256)	Percentage
Age category (in years)	18-24	21	8.2
	25-34	47	18.4
	35-44	75	29.3
	45-54	50	19.5
	55-64	30	11.7
	65-74	26	10.2
	75 and above	7	2.7
Gender	Male	142	55.5
	Female	114	44.5
Sub-caste	Soliga	256	100.0
Socio-economic status	i	1	0.4
	ii	4	1.6
	iii	109	42.6
	iv	134	52.3
	v	8	3.1
Education	Uneducated	57	22.3
	Primary	77	30.1
	Secondary	55	21.5
	High school	28	10.9
	Pre-university	15	5.9
	Degree/diploma	23	9.0
	Post graduate	1	0.4

**Table 2: Description of oral hygiene practices and deleterious habits of the subjects.**

Practices	Categories	Frequency (n=256)	Percentage
Frequency of cleaning the teeth	2-6 times a week	17	6.6
	Once a day	236	92.2
	Twice or more a day	3	1.2
Oral hygiene aids	Tooth brush	102	39.8
	Charcoal	82	32.0
	Wooden toothpicks	8	3.1
	Chewstick/miswak	64	25
Tobacco consumption	Beedi	89	34.8
	Cigar	1	0.4
	Chewing tobacco	111	43.5
	Snuff	25	9.8
Alcohol consumption	Alcohol	68	26.5

**Table 3: Description of periodontal and prosthetic status of the subjects.**

Periodontal and prosthetic status	Categories	Frequency (n=256)	Percent
<b>Gingival status</b>	Healthy	119	46.5
	Gingival bleeding	114	44.5
	Excluded	23	9.0
<b>Periodontal pockets (in mm)</b>	Pocket absent	166	64.8
	4-5 pocket	76	29.7
	>6 pocket	14	5.5
	Excluded	23	9.0
<b>Loss of attachment (in mm)</b>	0-3	143	55.9
	4-5	74	28.9
	6-8	16	6.3
	Excluded sextant	23	9.0
<b>Oral mucosal conditions</b>	No abnormal condition	228	89.1
	Leukoplakia	3	1.2
	Lichen planus	1	0.4
	Ulceration	12	4.7
	Abscess	12	4.7
<b>Prosthetic status</b>	No denture	233	91.0
	Complete dentures	23	9.0

**Table 4: Association between usage of cleaning aids and DMFT scores.**

Cleaning aids	Usage	N=256	Median	Inter-quartile range	P value
<b>Toothbrush</b>	Yes	192	4	2-6	≤0.01
	No	64	8	7-13	
<b>Charcoal</b>	Yes	58	7	5-13	≤0.01
	No	198	4	2-7	
<b>Wooden toothpicks</b>	Yes	21	6	4.5-8.5	0.043
	No	235	5	3-7	
<b>Chewstick/miswak</b>	Yes	70	7	5-12	≤0.01
	No	186	4	2-6	

**Table 5: Association between frequency of cleaning teeth and DMFT scores.**

Variables	Categories	n=256	Median	Inter-quartile range	P value
<b>Frequency of cleaning teeth</b>	2-6 times a week	17	13	11-15.5	<0.01
	Once daily	236	5	3-7	
	Twice/more daily	3	1	-	

The mean decayed teeth, missing teeth, filled teeth score were  $4.08 \pm 3.57$ ,  $0.79 \pm 1.24$  and  $0.79 \pm 1.24$  respectively. Total DMFT was  $5.5 \pm 4.14$ . When the study group was examined for gingival status 114 (44.5%) of them were found to have gingival bleeding. When the participants were examined for periodontal pocket depths, 76 (29.7%) of them had pockets of 4-5 mm depth, 14 (5.5%) of them had pockets of >6 mm. When the study group was examined for the periodontal loss of attachment (LOA), 74 (28.9%) had LOA of 4-5 mm, 16 (6.3%) of them had LOA of 6-8 mm. When examined for oral mucosal lesions, it was found that 228 (89.1%) of them had no

abnormal condition, 3 (1.2%) had leukoplakia, 1 (0.4%) had lichen planus, 12 (4.7%) had ulceration and 12 (4.7%) had abscess. When the prosthetic status was assessed it was found that 23 (9.0%) were complete dentures wearers (Table 3).

A Mann-Whitney U test was conducted to determine if DMFT score was different for users and non-users of different cleaning aids like toothbrush, charcoal, wooden toothpicks and chewstick/miswak. Results showed that among 256 study participants, DMFT score was significantly higher among those who did not use

toothbrush than those who used toothbrush ( $U=1856$ ,  $p\leq 0.01$ ). DMFT score was significantly higher among those who used charcoal than non-users ( $U=2800$ ,  $p\leq 0.01$ ). DMFT score was significantly higher among those who used wooden toothpicks than non-users ( $U=1814$ ,  $p=0.043$ ). DMFT score was significantly higher among those who used chewstick/miswak than non-users ( $U=3249$ ,  $p\leq 0.01$ ) (Table 4).

Kruskal-Wallis test showed that there was a statistically significant difference in DMFT score between 3 different cleaning patterns of the study subjects,  $\chi^2(2)=28.279$ ,  $p\leq 0.01$  (Table 5).

## DISCUSSION

The present study was conducted on tribals living in Chamarajanagar taluk of Chamarajanagar district, Karnataka. The sample size calculated was 252 and a total of 256 (142 males and 114 females) participants were enrolled in the study. They were divided into seven age groups, that was, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74 and 75 and above years.

In the present study, 55.5% males 44.5% females had participated which was comparable with the findings of the study conducted by Bhat et al among the Iruliga tribal community of Ramanagar district, Karnataka where 59% were males and 41% were females.<sup>10</sup>

Majority of the participants (29%) belonged to the age-category of 35-44 years in the present study. A study carried out by Valsan et al among the Paniya tribes Kerala also reported that majority of the participants belonged to the age category of 35-44 years.<sup>11</sup>

In the current study, 52.3% of the participants belonged to lower middle class and 42.6% of them belonged to lower class. This finding was supported by the study conducted by Emerald et al among the Yanadi tribes of Gopnathpalli district, Andhra Pradesh where 61.8% and 38.2% of the subjects belonged to lower middle and lower classes respectively.<sup>12</sup>

22.2% of the subjects were illiterate and 30% of the subjects had completed primary education in the current study. Different results were obtained in a study by Dhanappa et al among the Malayali tribes of Javadhu hills, India where 77.3% of them were illiterate and 12.4% had primary education.<sup>5</sup>

In the present study, considering the oral hygiene practices, a majority of the subjects (39.8%) used tooth brush and paste for maintaining their oral hygiene, which was indicative of their change in attitude towards oral hygiene. This was in accordance with the studies conducted by Dey et al, Kadir et al and Emerald et al whose reports affirmed that toothbrush with toothpaste was used by majority of the population, followed by other indigenous methods. The remaining subjects continued to

use other of indigenous methods. They were 82 (32.0%) of them used charcoal, 8 (3.1%) of them used wooden toothpicks, 64 (25%) of them used chewstick/miswak. But according to a study carried out Naheeda among Konda Reddy tribal population in Bhadrachalam, Khammam district, a majority of 93.60% of them used twigs for cleaning their teeth and only 6.2% of the subjects used toothbrush, toothpaste and charcoal.<sup>12-14,16</sup>

Among 256 study participants, 236 (92.2%) of them brushed once daily, 3 (1.2%) participants cleaned their teeth twice or more in a day and 17 (6.6%) participants cleaned their teeth 2-6 times in a week. This can be attributed to lack of awareness about oral health care among the subjects. This finding was supported by the study done by Dey et al among the Koraga tribes of Mangalore Taluk, Karnataka where 81% of the people cleaned their teeth once daily, 18% cleaned twice daily and 1% cleaned more than twice. But these observations were in discordance with the study done by Vivek et al on the Paniyan tribes of Wayanad district, Kerala in which 57.2 % of the tribes cleaned their teeth twice daily, 33.9% of the subjects cleaned once daily and 8.9% of the subjects cleaned once in a week. All 256 study participants belonged to the sub-caste of Soligas.<sup>16,17</sup>

In the current study, majority of the participants, 111 (43.5%) of them used smokeless form of tobacco. It was observed most commonly used products were betel leaves with arecanut powder. 89 (34.8%) of them smoked beedi and 25 (9.8%) of them used snuff. These findings were supported by the study conducted by Bhat et al in Kadukurubas where 38.50% used smokeless tobacco and 33.20% smoked tobacco.<sup>18</sup>

DMFT index was used to assess the dentition status. Among the study participants, the mean DMFT score of was high,  $5.5\pm 4.14$  which was in accordance with the studies carried out Vijayakumar et al among the Sugali tribes in Telangana region where the mean DMFT for males was  $6.03\pm 2.35$  and for  $5.78\pm 2.55$  females and also in the study conducted by Kumar et al among the Santhal tribes of Jharkhand where the mean DMFT was  $5.21\pm 2.34$ . This was also supported by the observations of the study carried out by Kumar et al among the Bhil adult tribes of Rajasthan, where the DMT (no filled component among the subjects) mean score was  $5.34\pm 7.68$ .<sup>9,19,20</sup>

Modified CPI was used for assessing periodontal status. 114 (44.5%) suffered from gingival bleeding on probing. This was supported by the study done by Dey et al among Koraga tribes of Mangalore Taluk, Dakshina Kannada where the gingival bleeding was observed in 40.3% of the individuals.<sup>16</sup>

76 (29.7%) of them had pockets of 4-5 mm depth, 14 (5.5%) of them had pockets of >6 mm depth which was in concordance with the study conducted by Bhat et al among the Iruliga tribes of Ramanagar district, Karnataka where pockets of 4-5 mm were 22.0% and subjects with



>6 mm were 3.67%. But in a study conducted by Emerald et al among Yanadi tribes inhabiting Gonepalli village, Nellore district of Andhra Pradesh, 32.9% participants of the study had of pockets of 4-5 mm depth and 38.6% of them had >6 mm pockets. This was higher when compared to the present study.<sup>10,12</sup>

Among the study participants, 74 (28.9%) had LOA of 4-5 mm, 16 (6.3%) of them had LOA of 6-8 mm. This finding was supported by the study done by Dey et al where results showed that LOA of 4-5 mm and 6-8 mm was present among 21% and 12.5% of the study subjects respectively. This was also supported by the findings of Bhat et al on Iruliga tribes where 22.03% and 3.8% of the study subjects had LOA of 4-5 mm and 6-8 mm respectively. The findings were also similar in the study carried out by Dhanappa et al among Malayali tribes of Javadhu hills, where LOA of 4-5 mm was 24.76% which was same as present study but LOA of 6-8 mm was 28.25% which was higher in the former study compared to the present study. But, according to Philip et al the prevalence of 4-5 mm LOA was 18.5% among the tribal population of Nilgiris which comprises of Paniyas, Mullakurumbas, Bettakurumbas, Irulas and Kattunayakans. This LOA score was less when compared to the current study.<sup>5,10,16,21</sup>

When examined for oro-mucosal lesions, 228 (89.1%) of them did not have any abnormal condition, 3 (1.2%) had leukoplakia, 12 (4.7%) had ulceration and 12 (4.7%) had abscess. This was similar to the findings of the study conducted by Kumar et al among the Santhal tribes of Jharkhand where it was found that 784 (85.1%) participants were apparently healthy with no abnormal conditions. Approximately 25 (2.7%) subjects had leukoplakia, 48 (5.2%) suffered from ulceration and 51 (5.5%) had abscesses. But in the study conducted by Khanna et al among Baiga tribals of Central India reported that oro-mucosal lesions were more prevalent among the study subjects, leukoplakia (10.7%), OSMF (6.3%) and burning mouth syndrome (11.4%). This was in discordance with the current study.<sup>9,22</sup>

When prosthetic status was assessed, among 256 study participants, 23 (9.0%) wore complete dentures which is contrasting to the observations of the study carried out by Kannan et al among Paliyan and Pulayan tribes of Tamil Nadu, where out of the 1014 subjects studied, only 1 (0.09%) subject had a mandibular prosthesis. The findings were different in the studies conducted by Emerald et al among Yanadi tribes and Kumar et al among Iruliga tribes where only 1 (0.4%) person had a removable partial denture, only 2 (0.08%) had partial dentures respectively.<sup>10,12,23</sup>

### Limitations

As the study was cross-sectional in nature, it was hard to draw inferences on causal relationships. A larger sample size must be drawn from across the district and

longitudinal studies must be undertaken to overcome this limitation.

### CONCLUSION

The tribals are characterized by high prevalence of dental problems, high treatment needs and poor accessibility to dental care services. It is evident from the observations of the current study, that the dental caries prevalence is high among the tribal population of Chamarajanagar. The decayed D component was a major contributor to mean DMFT score compared to the missing M and filled F components. Gingival disease (44.5%) and periodontal diseases (35%) were also quite high among the study population which can be ascribed to limited utilization of oral health care. Periodontal status and oral health status deteriorated with age and loss of tooth increased with age. But, despite the significant amount of exposure to risk factors, majority (89%) of the subjects were healthy and only a few reported with oro-mucosal lesions. Assessment of the oral health status of the population plays a vital role in the process of planning and execution of appropriate oral health services. The results of the present study could provide baseline data for planning health services. This data would be useful to develop programmes in order to improve the oral health of the tribal population of Chamarajanagar.

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