

ASSESSMENT OF FACTORS INFLUENCING ORAL HEALTH STATUS AND TREATMENT NEEDS AMONG MALAYALI TRIBAL POPULATION AT JAVADHU HILLS, INDIA

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ABSTRACT: AIM: The purpose of the study was to assess the oral health Status, factors influencing them and treatment needs of Malayali tribes at Javadhu hills in Polur Taluk, Tamilnadu.

METHODOLOGY: A descriptive cross sectional study was conducted to assess the oral health status of totally 710 subjects in four different age groups of 12yrs, 15yrs, 35-44yrs, 65-74yrs old were using the W.H.O oral health assessment methodology 1997. Before the start of the study, an ethical clearance from the institutional review board (IRB) obtained. **RESULTS:** The periodontal status of the subjects according to the mean sextants showed that the healthy sextants were maximum in the younger age groups and gradually decreased with age. The mean number of healthy sextant was found to be 3.36 in the 12 years age group. The mean DMFT was 0.65 in 12 years and increased up to 9.9 in 65-74 years age group. **CONCLUSION:** The findings study survey highlights the dominance of untreated caries and a high prevalence of calculus in 12 & 15 year old Malayali tribe children.

KEYWORDS: Oral health, Malayali tribe, Periodontal health, Treatment needs, Dental caries, Tribal population.

INTRODUCTION: The modern society has adapted with time to the ever-changing environment in areas of industrialization, organization, etc. Despite remarkable worldwide progress in field of diagnostic, curative and preventive health, still a considerable fraction of mankind stay away from the mainstream, living in isolation in natural and unpopulated surrounding, and one such group of isolated population is known as tribals.¹

The tribal groups usually inhabit the isolated villages or hamlets in the under-developed areas of the country. They generally live in inhospitable terrain and their hamlets are found in the interior forest areas along the hill streams. There are no communication facilities available between the various isolated tribal groups, or between the tribal and the world at large.²⁻⁵

The tribal populations are socio-economically disadvantaged compared to other population groups. They have different health problems owing to the variability in their geographical, socio-economic development and cultural characteristics.⁶⁻⁹ The oral health of tribal communities differs in comparison to general population. It is well documented that primitive populations were vulnerable to caries in the least as isolated cases but after their exposure to civilization, they showed exaggerated proneness to caries development. Unlike periodontal diseases, dental caries has been proved to be a by-product of affluence and civilization.

Its evidence is amply exemplified in studies conducted among Eskimos of Greenland's, dwellers of Atlantic islands, Tristan da Cunha and islands of Pacific oceans. In these populations

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where dental caries was negligible earlier, owing to their primitive habits and isolated character, it became quite prevalent when civilization grew through trade and communication.^{1,2}

It is hard to implement health care programs for tribal populations because of their illiteracy, low income and isolated, inaccessible areas. Lack of medical and dental facilities may also contribute to the high prevalence of oral diseases among these populations.³ The World Health Organization (WHO) recommends that for planning dental services, surveys of oral health could be used to collect information about oral disease, oral health and treatment needs of a population.¹⁰

There is a need for information on disease prevalence and severity as well as treatment needs of the populations to monitor changes in levels and patterns of these variables over time³ and in order to judiciously allocate limited resources to oral health.^{6,11,12}

Malayali / Malayai (Malai = hills, alu= person) community at Javadhu hills in Thiruvannamalai district of Tamilnadu happens to be one such population secluded from the world outside. This tribal community continues to live in its centuries old lifestyle, uninfluenced by modern civilization, and placed in isolated areas in hilly forest with limited access to any means of transport.

Hence, the present study was conducted with an aim to provide baseline data about oral health of Malayali tribes at Javadhu hills in Polur Taluk and to determine the preventive and curative treatment needs of this population, which would yield valuable information for planning, implementation and monitoring of preventive and curative oral health services and help in improving the awareness and knowledge of this tribe about the preventive aspects of oral health.

MATERIALS AND METHODS: This study was a cross sectional, descriptive survey conducted on the tribal people of 'Malayali tribes' residing in the 'Javadhu hills block' in 'Polur taluk' of 'Thiruvannamalai district'. The study was carried out in 'Kannamalai Panchayat', which has 32 hamlets with the total Malayian population of 6950, spread over 1600 households.

Stratified random sampling procedure was used for sample selection, wherein stratification was done according to age. The subjects of age 12yrs, 15yrs, 35-44yrs and 65-74yrs were considered as Index Age Groups, in consistence with WHO Pathfinder methodology. The sample for 12yrs and 15yrs age groups was selected by school surveys in 7th and 10th class. Non-school going adolescents found in the selected households, in these age groups were also included in the study.

All the eligible persons from each of the households, in adult and geriatric population age groups i.e. 35-44yrs and 65-74yrs olds were included in the study. Only the natives or permanent residents of the Malayali hamlets, those willing to participate were included in the study sample. The migrants or individuals of other tribes were excluded from the sample.

The sample size was estimated after assuming that 50% of population had an oral health problem, as per the results of a pilot study conducted in this group. A confidence interval of 95% and a relative precision of 10% were accepted for this purpose. This gave a sample size of 384 subjects, which was allocated proportionally to different age groups.

Ethical approval for this study was provided by the Institutional Review Board. Permission to conduct the survey was obtained from the Deputy Director of Health Services, Thiruvannamalai district and president of each hamlet. Verbal consent was obtained from each subject prior to examination.

A specially designed survey proforma was prepared to record information on the factors affecting oral health including questions concerning socio-demographic, oral hygiene practices and

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dietary habits. The socio-demographic factors considered were occupational status, educational levels, annual income and family size. Oral hygiene practices registered included use of toothbrush, methods and times of cleaning teeth. Dietary habits included staple food and frequency of sugar consumption. The questionnaire was constructed in English and translated into the local language, Tamil. The questionnaire was pretested prior to the survey.

Accordingly, certain questions which were not applicable to children and adolescents were excluded from questionnaire. The information in the questionnaire was recorded after interview by trained social workers of local NGO. Followed by the questionnaire administration, clinical oral health examination was performed by a single, trained investigator, using WHO Oral Health Assessment methods 1997 proforma. The clinical examination was carried under the adequate natural light in open premises of houses and schools (Type III, ADA).

All the data was entered in Microsoft Excel (2003) for the purpose of data analysis. The χ^2 test with continuity correction was used to test the significant difference and comparing of proportions. Means were compared using Student's 't' test and One-way ANOVA. Calculated values of the test criteria were compared with the tabular value at 95% confidence level to ascertain the significance of the test. The p value of 0.05 or less was considered for statistical significance.

RESULTS: This was a descriptive cross sectional study, conducted among over 700 subjects of the Malayali tribes of Javadhu hills in Polur Taluk. The study sample consisted of about 58% male subjects (Table 1). About 70% sample was formed by 12 and 15 yrs. age groups according to the age group distribution in this population.

Table 2 shows the distribution of the study population according to socio-demographic characteristics, food habits and oral hygiene practices. The agriculture (94.1%) was major occupation followed by wage labor (5.9%). All the Malayali subjects consumed mixed diet. 70.5% study populations used datun to clean their teeth. The use of toothpaste (13.1%) and toothpowder (7.2%) was very low in comparison to other materials used for teeth cleaning (79%).

The distribution of the periodontal status of the subjects according to the mean sextants showed that the healthy sextants were maximum in the younger age groups and gradually decreased with age (Table 3). The mean number of sextants with 'healthy' and 'bleeding' status were found to be highest among adolescent age groups and reduced in adult age groups. However, the mean number of 'calculus' and 'shallow pocket' sextants showed an increase with age.

The distribution of the study population according to the highest CPI scores (Graph 1) showed that 78 (31.6%) subjects in the 12 years age group and 68 (26.9%) subjects in the 15 years age group had 'healthy' periodontal status. In the 35-44 years age group, 30 (17%) subjects showed 'bleeding on probing' as the highest score.

These results were found to be statistically significant ($p < 0.05$). Most of the population in all age groups showed 'presence of calculus' as 152 (61.6%), 155 (61.3%), 43 (24.5%) and 10 (29.4%) subjects among 12, 15, 35-44 and 65-74 years age groups had a highest CPI score of 2, respectively. The shallow pockets of the 4-5 mm were seen among a significantly larger section of the 35-44 years age group (42.7%) ($p < 0.05$).

None of the subjects showed deep periodontal pockets. The excluded category was highest in 65-74 years age group with 14 (41.2%) subjects falling under this category.

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Table 4 shows that the majority of 15 years adolescents (n=243, 96%) had no attachment loss (LOA = 0-3mm). A LOA of 4-5mm was found among 86 (48.9%) subjects in 35-44 years age group, while 18 (64%) subjects over 65 years had LOA>6mm. Excluded sextants were found only among the 65-74 years aged subjects (n=10, 35.7%).

Table 5 and Graph 2 show the distribution of the study population according to permanent tooth decay. The mean DMFT was 0.65 in 12 years and increased up to 9.9 in 65-74 years age group. The major contributing factor to DMFT among adolescent ages was Decayed component, while among adult age groups; it was the Missing component which formed the major factor. The number of caries-free subjects reduced from 77% among 12 years age group to 49% among 35-44 years age group.

The assessment of treatment needs of the population (Table 6) showed that the maximum need of the 'other treatments' was found to be in 35-44 years group with a mean of 1.7 teeth requiring treatment. The need for the one surface filling was found to be high among 15 years age group and for two surface fillings was high among 35-44 years age group. The maximum need for the 'pulp care' was among subjects of 12 and 15 years, with mean 0.1 tooth requiring pulp care.

DISCUSSION: This descriptive cross sectional study assessed the oral health status and treatment needs of Malayali tribes of Polur Taluk, in Thiruvannamalai district, Tamilnadu. Totally 710 subjects in age groups of 12yrs, 15yrs, 35-44yrs and 65-74yrs were examined using the WHO Oral Health assessment methodology 1997. The study subjects were selected using house to house survey as well school going children of required age were selected by school based survey. This was necessary to select a sample which was representative of the study population.

In this study, a majority of subjects reported using datun to clean their teeth, while the use of tooth paste and tooth powder was found to be low. The results of the present study were in accordance with the studies conducted on other tribal populations by Vaish et al⁵, Poul Erik Petersen et al,¹³ and Rahimah Abdul et al¹⁴ Bhowate RR et al¹⁵ indicating that aboriginals gave less importance to dental hygiene.

In the present study, the periodontal status of the subjects was examined as per CPI. It was seen that the maximum subjects with healthy status belonged to younger age group and the number gradually decreased with age. Philippus J¹⁶ showed a smaller section of 15 year olds in South Africa had healthy periodontium as compared to this population, while calculus presence dominated in all groups, which was similar in this population. Similarly, Benoit Varenne, Poul Erik Petersen, Seydou Ouattara¹⁷ also showed about 50% of their study population in different age groups having calculus. Bhowate RR, Borle SR, Chinchkhede DH, Gondhalekar RV¹⁵ in a study among 11-15 years old rural children showed that 59.35% had gingivitis where as in the present study, 7.9% in 15 years age group had gingivitis.

M.C.M. Wong, E.C.M. Lol, E. Schwarz, and H.G. Zhang¹⁸ demonstrated in their study only 2% of the 12-year-olds exhibited no calculus or gingival bleeding, while more than 70% had calculus. Less than 5% had highest CPI score of zero. These findings were not in conformity to our study as in 12 years age group, more that 30% subjects were scored healthy.

Galan D, Olvaodlum & M Brecx⁸ in their study on subjects of mean age 70±7 yrs revealed that 116 sextants of 86% dentate examined scored CPI 3 or 4. Sengul Unluer, Saadet Gokalp and Bahar Gciz Dogan¹⁹ in their study on the subject with mean age above 75.2 years revealed that only 4 of the

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193 subjects had 9 healthy sextants with a CPI score '0'. This was not in similarity to the present study, where no subject in 65-74 years age group had healthy sextants. Since our study consisted of subjects from the tribal hamlets with poor oral hygiene practices, perhaps they showed a higher degree of the periodontal disease.

Stjepanpalj, Darije PlanEak²⁰ in their study on subjects aged 15 years and above showed that a loss of attachment of 0-3 mm i.e. score 0 was found in almost 80% of adolescents in both populations, while more than 50% of the 35+ age group had loss of attachment >6mm. In our study in 15 years age group 96% subjects had the loss of attachment of 0-3 i.e. score 0. In 35-44 years age group 48.9% subjects had the loss of the attachment of 4-5mm. This is not in similarity to Stjepanpalj et al study.

In this study, the mean DMFT was found to be 0.65 and reached 9.9 in 65-74 years age group. In 15 year age group the mean DMFT was 0.9, with major decayed component of 0.8. R. Naidu I. Prevatt & D. Simeon⁶ in their study showed that in 12 year and 15 years old age group the mean DMFT was 0.61 and 1.06 respectively. These finding are in conformity with our study as dental caries prevalence is found to be almost similar value in similar age groups.

Benoit Varenne, Poul Erik Petersen, Seydou Ouattara¹⁷ in their study observed that in 12 years age group the mean DMFT was 0.7 and 6.3 in 35-44 year olds. In our study the caries prevalence of adult age groups was 4.5 and low compared to Poul Erik Petersen et al study.

R. Esa, I.A. Razak²¹ in a study on 12 years old subjects showed that the mean DMFT of the all subjects was 1.1 and filling component was major in number with mean filled score of 0.6. The finding of this study are not in similarity with the finding of our study as the subjects n our study showed a lower prevalence of dental caries and decay component was major in number. David. J. Wang, A. N. Astrom, S.Kuriakose²² in their study on the 12 year olds group showed substantially lower prevalence of dental caries in permanent dentition with mean DMFT of 0.5 in 27% of the subjects affected. In our study the caries prevalence was low in 12 years age group with mean dmft of 0.65 in 23% of the subjects affected and finding are in conformity to David et al study.

Sengul Unluer, Saadet Gokalp and Bahar Gciz Dogan¹⁹ in their study on the subject with mean age 75.2±8.3 in males, 79.1±7.9 in females; demonstrated of the total subjects 67.4% were edentulous and 32.6% were partially dentate; The mean number of teeth present among the dentate persons was 3.7±7.0. The mean DMFT was 29.3±5.8. In our study the dental caries prevalence in geriatric group was low with mean DMFT of 9.9 in compared to Sengul Unluer et al study. Galan D, Olvaodlum & M Brecx⁸ in the study on the subjects with mean age 70±7 yr. showed that three restore teeth were present in sample, therefore the mean filled teeth value 0.09±0.5 was extremely low. The DMFT value of 26±13 was very high because of large number of missing teeth (23±9). These finding are in similarity to the finding of our study as the mean filled teeth low. The mean DMFT in 65-74 years aged group low (9.9) as compared to Galan D et al study.

Philippus J. van Wyk and Candice van Wyk Pretoria¹⁶ in a report on the National Oral Health Survey observed that more than 80% caries in children was not treated based on the Unmet Treatment Need Index. The greatest need for the treatment of dental caries in South African children was for preventive services, restorations and extractions. The findings were similar to present study. Jalli V P, Sidhu S S, Khabanda²³ in their study conducted among 1016 tribal children 6-13 years of age, living in remote villages, showed that nearly 30% children needed conservative care. Only a negligible percentage of children needed extraction/s of primary or permanent teeth. The findings of

our study were in conformity to this study as negligible children in both age groups required extractions.

CONCLUSION: From the results of the present study, it can be concluded that the level of the caries experiences in the permanent dentition among the children studied was low but was high among adults. The decayed 'D' and missing component 'M' was major contributor to mean DMFT in adults and geriatric groups, while the filled component 'F' was negligible. The findings of the clinical examination and the questionnaire survey highlight the dominance of untreated caries, which may be attributed to passive oral health services, poor utilization, lack of awareness and prevalent poverty and illiteracy. This study reports a high prevalence of calculus in 12 & 15 years old Malayali tribe children. Pocket was the most prevalent condition, particularly among adults and geriatrics. Unmet treatment needs were found to be very high among the population.

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Age in Years	Number of the Study Participants (%)	Males (%)	Females (%)
12 Yrs	247 (34.7)	124 (50.2)	123 (49.8)
15 Yrs	253 (35.6)	203 (80.2)	50 (19.8)
35-44 Yrs	176 (24.7)	76 (43.2)	100 (56.8)
65-74 Yrs	34 (4.7)	12 (35.3)	22 (64.7)
Total	710 (100)	415 (58.4)	295 (41.5)

Table 1: Distribution of the participants according to their age groups and gender

Sl. No.	Variable	Options	Percentages
1	Occupation	Agriculturists	94.1
		Wage Labor	5.9
2	Level of the education attained	Illiterate	77.3
		Primary	12.4
		High school	10.3
3	Main / Staple food in house	Rice	50.1
		Wheat	4.6
		Maize	10.1
		Others	35.3
4	Family predominantly Veg/Mixed	Veg	100
		Mixed	0.00
5	Teeth cleaning device	Fingers	10.4
		Brush	19.6
		Datun	70.4

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6	Material used to clean teeth	Tooth powder	7.2
		Tooth paste	13.1
		Others	79.7

Table 2: Distribution of the study population according to socioeconomic characteristics, food habits, and oral hygiene practices

Age groups	No. of subjects	Healthy (0)	Bleeding (1)	Calculus (2)	Pockets 4-5mm (3)	Pockets 6mm or More (4)	Excluded Sextants (X)	Not Recorded (9)
12 Yrs	247	3.36	0.42	2	0	0.0	0.0	0.0
15 Yrs	253	2.81	0.2	2.07	0.04	0.0	0.0	0.0
35-44 Yrs	176	1.61	0.25	2.42	1.56	0.0	0.07	0.0
65-74 Yrs	34	0.0	0.12	1.59	1.88	0.0	1.47	0.0

TABLE 3: Distribution of Mean Sextant Showing Specific CPI Scores in Each Age Group

Age in Years	LOA 0-3mm (0)	LOA 4-5mm (1)	LOA 6-8mm (2)	LOA 9-11mm (3)	LOA 12-or-more (4)	Excluded Sextants (X)	Not Recorded (9)
15Yrs N=253	243 (96)	10 (4.0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
35-44 Yrs N=176	66 (37.5)	86 (48.9)	24 (13.6)	0 (0)	0 (0)	0 (0)	0 (0)
65-74 Yrs N=34	0 (0)	6 (21.4)	12 (42.9)	6 (21.4)	0 (0)	10 (35.7)	0 (0)

TABLE 4: Distribution of the Study Population Based on the Loss of Attachments(As Per Highest Scores Obtained)

Age Groups	Mean of Decayed Teeth (D)	Mean of Missing Teeth (M)	Mean of Filled Teeth (F)	Mean DMFT	Caries-free subjects
12 Yrs N=247	0.50	0.1	0.04	0.65	184 (77%)
15Yrs N=253	0.80	0.02	0.08	0.90	175 (69.2%)
35-44 Yrs N=176	1.48	2.87	0.14	4.5	86 (48.9%)
65-74 Yrs N=34	0.53	9.41	0.0	9.9	28 (82.4%)

Table 5: Distribution of Dental Caries Experience (DMFT) in Permanent Dentition of the Study Population

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Age Groups	Preventive Care	One Surface Filling	Two Surface Filling	Crown for Any Reason	Pulp Care	Extraction	Need of Other Treatment
12 Yrs N=247	0.06	0.27	0.31	0.00	0.11	0.04	0.00
15Yrs N=253	0.00	0.42	0.10	0.01	0.12	0.09	0.01
35-44 Yrs N=176	0.00	0.37	0.79	0.10	0.03	0.03	1.7
65-74 Yrs N=34	0.00	0.29	0.00	0.00	0.00	0.00	0.29
	P<0.05 S	P<0.05 S	P<0.05 S	P<0.05 S	P<0.05 S	P>0.05 NS	P<0.05 S

TABLE 6: Mean Distribution of the Teeth According to the Treatment Needs

(S=Significant: NS=Not Significant)

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