

## Periodontal Health Status of Tribal Population in Mananthavady Taluk (Wayanad District, Kerala, India)

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### Abstract:

**Background:** Periodontal disease has been established as the most common dental disease affecting mankind since pre-historical times. A sizable portion of India's population is economically backward and socially disadvantaged and often lives in geographically remote areas. The rural populations which contribute the majority of our countrymen are quite ignorant about oral and periodontal health maintenance. Beliefs based on ignorance, superstitions and taboos about dentistry still prevail in many groups of Indian population. Wayanad, a district situated in the north east Kerala is a mountainous plateau in the Western Ghats, is the homeland of various tribal communities which form 17.11% of total population of that district. 79% of tribes in Wayanad district reside in Mananthavady Taluk. They are unique with their social and cultural behaviour, habits and habitat. This study aims to find out the prevalence of periodontal disease in tribal community of Mananthavady Taluk (Wayanad district) and also the effect of various risk factors like alcohol, smoking, pan chewing on periodontal health status

**Materials and Methods:** This cross-sectional survey was conducted in tribal areas of Mananthavady Taluk in Wayanad district. Sample size of each community was selected on the basis of probability proportional to size of the total 475 subjects. Age groups of 5, 12, 15, 35-44 and 65-74 years were selected from each community as described by WHO survey criteria for the selection of the age group. The assessment of periodontal status was carried out using the Community Periodontal Index (1997)

**Results:** The prevalence of periodontal disease was 96.7% and 64.3% had loss of attachment. Gingival recession was present in 49.1% of population. It was also shown that the deleterious oral habits like pan chewing was very prominent in this community. Aggravation of periodontal disease in this community may be due to habits along with faulty cleaning method.

**Conclusion:** Preventive programmes should be implemented to educate and motivate the tribal community to promote healthy life style by awareness campaigns as a first step followed by secondary preventive programs involving professional prophylaxis.

**Key Words:** Gingival Recession, CPI scores, Periodontium, Tobacco, Pan Chewing.

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### I. Introduction

Oral health forms an inseparable part of overall health of an individual. Periodontal disease contributes a significant global burden in terms of oral health.<sup>1</sup> Periodontal disease has been established as the most common dental disease affecting mankind since pre-historical times. Archaeological studies have shown that there was a high prevalence of periodontal disease among ancient civilization. Epidemiological studies indicate that the periodontal disease burden in India is increasing with the prevalence of about 95-100%.<sup>2</sup>

Tribes constitute an important segment of Indian society. In Kerala 1.1% of total population is constituted by tribes. Wayanad, a district situated in the north east Kerala is a mountainous plateau in the Western Ghats. It is the homeland of various tribal communities which form 17.11% of total population of that district. 79% of tribes in Wayanad district reside in Mananthavady Taluk.<sup>3</sup> They are unique with their social and cultural behaviour, habits and habitats. The prominent tribal communities like Paniya, Kattunayika, Kurichia, Adiya and Kuruma reside in this area. In order to establish community programs to prevent and treat periodontitis, it is mandatory to know the disease status and treatment needs of the target population.

Even though various indices are used to describe the periodontal health status of a population, Community Periodontal Index of Treatment Needs (CPITN) procedure put forward by WHO 1982 is accepted as an established method for assessment of periodontal condition in epidemiological studies.<sup>4</sup> WHO modified CPITN into Community Periodontal Index in 1997, which also takes into consideration of loss of attachment. The CPI has currently been widely used and accepted in periodontal epidemiology.<sup>5</sup> Several surveys have been conducted worldwide by using CPI system. So far only few studies have been conducted among the tribes in Wayanad district when it comes to periodontal health. Hence this study using CPI system has been conducted in the tribal population of Mananthavadytaluk, Wynad district of Kerala to assess the prevalence of periodontal disease.

## **II. Material And Methods**

The study was conducted in the MananthavadyTaluk in Wayanad district in Kerala State, based on the logistic consideration that 79% of the tribal population of the district resides in this area. The major tribal groups like Paniyar, Kurichiar, Kattunaikar, Kurumar, Adiyas and others form around 17.11% of the total tribal population of the district. The study group consisted of 454 subjects from various tribal communities, chosen by random sampling technique.

**Study Design :** Cross-sectional survey

**Study Location:** Tribal areas of MananthavadyTaluk in Wayanad district

**Study Duration:** Study was conducted over a period of 6 months starting from June 2006 to November 2006 with the approval of ethics committee medical college, Kozhikode.

**Sample size:** Sample size of each community was selected on the basis of probability proportional to size of the total 475 subjects.

**Subjects and Selection method:** Age group of 5, 12, 15, 35-44 and 65-74 years were selected from each community as described by WHO survey criteria for the selection of the age group. The assessment of periodontal status was carried out using the Community Periodontal Index (1997). CPI records the periodontal conditions namely; gingival bleeding, dental calculus, periodontal pockets and loss of attachment.

### **Methodology**

An interview cum oral examination with the help of a proforma, prepared for the study, was conducted for the collection of data. The recordings of data were based on the "WHO Oral Health Assessment Survey form." Information regarding their personal habits was recorded in the proforma. The assessment of periodontal status was carried out using the Community Periodontal Index (1997). CPI records the periodontal conditions namely; gingival bleeding, dental calculus, periodontal pockets and loss of attachment. The dentition was divided into six sextants by tooth numbers 18-14, 13-23, 24-28, 38-34, 33-43 and 44-48. A sextant was examined only if there are two or more teeth present which are not indicated for extraction. Where only one tooth remained in a sextant, it was excluded. For adults aged 20 years and above, only ten teeth known as index teeth were examined. They were tooth number 17:16 : 11 :26: 27 :47 :46 : 31 :36 and 37.

The molars were examined in pairs and only one score, the highest was recorded. Only one score was recorded for each sextant. If 11 or 31 (Index teeth) were not present, they were substituted by 21 and 41 respectively. If no index tooth was present in a sextant qualifying for examination, all the remaining teeth in that sextant were examined and worst score recorded. For subjects under the age of 20 years, 16, 11, 26, 36 and 46 were examined in order to avoid scoring the deepened sulci associated with eruption as periodontal pockets. For the same reason children under the age of 15 were examined only for bleeding and calculus.

For sensing gingival pockets and calculus, the probe was gently inserted into the sulcus or pocket with a probing force not more than 20 gm. to avoid pain during probing.

### **Examination and Recording**

Each subject was examined in an adequate natural or torch light and mouth mirror using WHO CPI probe<sup>5</sup>. The examination was performed in a systematic manner beginning from maxillary right sextant. The score was recorded in appropriate box. The tip of the probe was gently inserted between tooth and gingiva to the full depth of sulcus or pocket from the mesial, mid-line and distal on both facial and lingual/palatal surfaces. The probing depth was read by observation of the position of the black band.

**Statistical analysis:** The collected data of 454 subjects were analysed using the statistical package of SPSS version 13. The following tabulation were made on CPI and LA score. The data collected was subjected to statistical analysis. Descriptive data was represented as frequency and percentage. Qualitative data was analysed using Chi square test. The level of significance was set at 5%.

III. Results

Table 1. Percentage of person by their higher CPI score in different communities

Age group	0		1		2		3		4		X		9		Total N
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Paniya	2	1.3	0	0	51	33.1	81	52.6	20	13	0	0	0	0	154
Kattunaykka	1	2	1	2	21	42	11	22	16	32	0	0	0	0	50
Kurichiya	6	5.8	5	4.8	29	27.9	55	52.9	9	8.7	0	0	0	0	104
Adiya	5	6	3	3.6	17	20.5	22	26.5	36	43.4	0	0	0	0	83
Kuruma	1	1.6	2	3.2	26	41.3	16	25.4	18	28.6	0	0	0	0	63
	15	3.3	11	2.4	144	31.7	185	40.7	99	21.8	0	0	0	0	454

Total tribes consist of 5 communities like Paniya, Kattunaika, Kurichiya, Adiya and Kuruma. The tabulation results of Table 1 shows that among Paniya 1.3% had healthy periodontium, none had bleeding on probing or score of code 1, 33.1% had calculus, 52.6% had shallow pockets and 13% had deep pockets. In Kattunaika 2% had healthy periodontium, 2% had bleeding on probing (code 1), 42% had calculus, 22% had shallow pockets and 32% had deep pockets. In Kurichiya 5.8% were healthy, 4.8% had bleeding on probing, 27.9% had calculus, 52.9% had shallow pockets, 8.7% had deep pockets. In Adiya community 6% were healthy, 3.6% had bleeding on probing, 20.5% had calculus, 26.5% had shallow pockets and 43.4% had deep pockets.

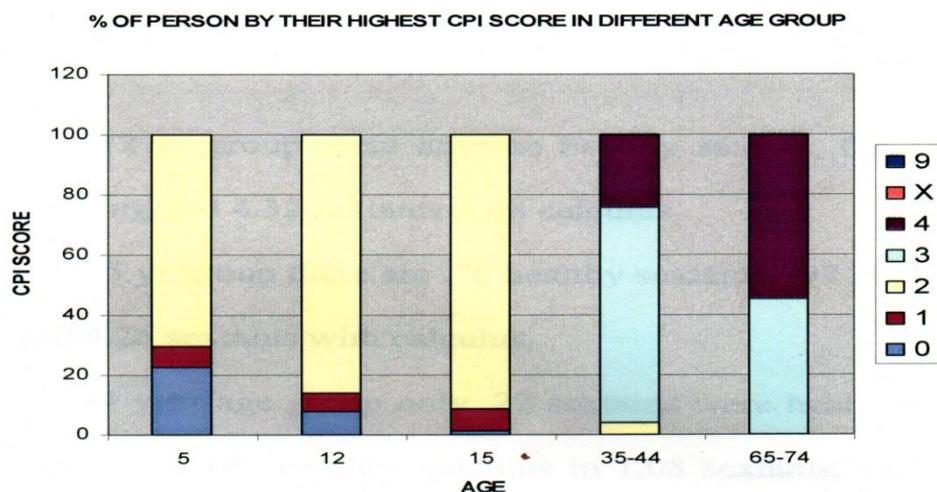
Among kuruma 1.6% was healthy, 3.2% had bleeding on probing, 41.3% had calculus and 25.4% had shallow pockets 28.6% had deep pockets. Among the community no significant difference were observed regarding their highest CPI score.

Table 2: Highest CPI Score recorded with respect to sex and Education

Sex		Count %	00	1.00	2.00	3.00	4.00	Total	p value
			Count %	Count %	Count %	Count %	Count %		
Sex	Male	Count %	10 4.3%	5 2.2%	81 35.1%	80 34.6%	55 23.8%	231 100.0%	0.076
	Female	Count %	5 2.2%	6 2.7%	63 28.3%	105 47.1%	44 19.7%	223 100.0%	
Education	Illiterate	Count %	6 3.4%	1 .6%	32 17.9%	73 40.8%	67 37.4%	179 100.0%	0.001
	Primary	Count %	5 3.7%	4 3.0%	21 15.6%	75 55.6%	30 22.2%	135 100.0%	
	Middle	Count %	3 3.1%	5 5.2%	63 65.6%	24 25.0%	1 1.0%	96 100.0%	
	High_school	Count %	1 2.3%	1 2.3%	28 63.6%	13 29.5%	1 2.3%	44 100.0%	

The results of Table 2 shows that the highest CPI score was seen in illiterate group which was statistical significance as p value was less than 0.05

Diagram 1



According to the findings in Diagram 1 it was seen that as age increases no. of healthy subjects decreased to nil in 35 -44 and 65-74 groups. In the 35- 44 age group score 3 and score 4 was the frequent finding. In age group 65-74 score 3 was only 45% whereas score 4 was 55% Hence it was inferred that the rate of progression of periodontal disease is very high as age advance or it get doubled in the older age group.

The breakdown in Table3 shows that statistically significant the highest CPI scores were observed in subjects consuming alcohol, male smokers and also in subjects who had the habit of chewing tobacco alone or in combination with pan.

**Table 3: Highest CPI scores with respect to Alcohol consumption, Smoking and Tobacco chewing**

				Highest CPI					Total	p value
				00	1.00	2.00	3.00	4.00		
Alcohol	Yes	Count %		0 0%	0 0%	0 0%	31 43.1%	41 56.9%	72 100.0%	0.001
	No	Count %		10 6.3%	5 3.1%	81 50.9%	49 30.8%	14 8.8%	159 100.0%	
				Highest CPI					Total	
				00	1.00	2.00	3.00	4.00		
Male	Smoking	Yes	Count %	0 .0%	0 .0%	7 6.5 %	56 52.3%	44 41.1%	107 100.0%	0.001
		No	Count %	10 8.1 %	5 4.0%	74 59.7 %	24 19.4 %	11 8.9%	124 100.0%	
Female	Smoking	Yes	Count %	0 .0%	0 .0%	0 .0%	2 100.0 %	0 .0%	2 100.0%	.687
		No	Count %	5 2.3%	6 2.7%	63 28.5 %	103 46.6 %	44 19.9%	221 100.0%	
				Highest CPI Score					Total	p value
				00	1.00	2.00	3.00	4.00		
Pan_with_tobacco	Yes	Count %		1 .4%	2 7.0%	46 16.4%	142 50.7 %	89 31.8 %	280 100.0%	0.001
	No	Count %		14 8.0%	9 5.2 %	98 56.3 %	43 24.7 %	10 5.7 %	174 100.0%	
				Highest CPI Score					Total	p value
				00	1.00	2.00	3.00	4.00		
Tobacco_chewing	Yes	Count %		2 .6 %	3 1.0%	54 17.3%	158 50 %	96 30.7 %	313 100.0%	0.001
	No	Count %		13 9.2%	8 5.7 %	90 63.8 %	27 19 %	3 2.1 %	141 100.0%	

**Table 4: Gingival Recession with respect to Age , Teeth cleaning method , Materials used for cleaning and smoking**

			Recession		Total	p value
			Yes	No		
Age group	5 years	Count %	0 0%	44 100.0%	44 100.0%	0.001
	12 years	Count %	0 0%	50 100.0%	50 100.0%	
	15 years	Count %	0 0%	68 100%	68 100%	
	34-44	Count %	137 68.2%	64 31.8%	201 100.0%	
	65-74	Count %	86 94.5%	5 5.5%	91 100.0%	
Total		Count %	223 49.1%	231 50.9%	454 100.0%	
			Recession		Total	P value
			Yes	No		
Teeth_cleaning Method	Fingers	Count % within teeth_cleaning	198 62.9%	117 37.1%	315 100.0%	0.001
	Brush	Count % within teeth_cleaning	25 18.0%	114 82.0%	139 100.0%	
		% of Total	49.1%	50.9%	100.0%	
			Recession		Total	p value
			Yes	No		
Material_for cleaning	Tooth paste	Count %	9 10.0%	81 90.0%	90 100.0%	0.001

	Tooth powder	Count %	55 44.7%	68 55.3%	123 100.0%
	Others	Count %	159 66.0%	82 34.0%	241 100.0%

			Recession		Total	P value
			Yes	No		
Smoking	Yes	Count %	84 77.1%	25 22.9%	109 100.0%	<b>0.001</b>
	No	Count %	139 40.3 %	206 59.7 %	345 100.0%	

The tabulation results of Table 4 shows that Gingival Recession was high in older age group, subjects using fingers for brushing and in those who had the habit of smoking.

**Table 5: Frequency of persons with CPI score**  
(N=Total number: NS= number of sextants examined)

	0	1	2	3	4	X	9	Total N	0	1	2	3	4	X	9	Total NS
CPI SCORE	0	1	2	3	4	X	9	454	.57	.36	1.89	2.37	.75	.05	0	2724
% Person	3.3	2.4	31.7	40.8	21.8	0.000	0									

Table 5 shows that among the total tribes examined (454) 3.3% were periodontally healthy ( score -0) , 2.4 % had bleeding, 31.7% had calculus (score -2) , 40.8% had mild pocket with 4-5mm probing depth ( score 3), 2 1.8% had deep pockets with pocket depth 6mm or more (score -4) , None had x or 9 as their highest score

#### IV. Discussion

The prevalence of periodontal disease in India is comparable to that of the rest of the world. Although the etiological factors are the same, the various risk factors both attributable and relative that are prevalent in India can account for the exaggerated periodontal destruction (Bhasker 1996)<sup>6</sup>. Periodontal disease has an insidious onset and a chronic course, and commonly results due to behavioural and other socio environmental factors (Shah N 2003)<sup>7</sup>

In assessing risk for periodontitis some members or sub groups of the population have characteristics that make them more susceptible to disease. In addition to poor oral hygiene the risk factors like tobacco use, malnutrition, excessive alcohol consumption, diet and risk determinants such as genetic makeup, gender and socio economic status can alter the host response and gives a multifaceted presentation of periodontal disease (Papapanou et al)<sup>8</sup>. The distribution of periodontal disease within the country also differs according to race or ethnic group (Paul Erick Peterson, 2005)<sup>9</sup>. Most tribal population inhabits under-developed areas which are remote, having low density of population and lacking adequate access to basic amenities, education and affordable health care. The life style of tribal people is conditioned by the ecosystem. They are unique with their food habits, cultural behavior, customs and beliefs<sup>10</sup>.

This descriptive study on the prevalence of periodontal disease and associated risk factors was conducted among tribal population of Manathavady Taluk, Wayanad district. In this study an attempt has been made to find out the effect of various tooth cleaning practices, smoking, and pan chewing and alcohol consumption on periodontal health. This study was conducted on a sample of 454 individuals consisting of 231 males and 223 females. From this study, it is seen that the prevalence of periodontal disease among this tribal population is 96.7%. This data resembles to the data obtained from other parts of India. GPI Singh (2005)<sup>11</sup> conducted a study to find out the prevalence of periodontal disease in urban and rural areas of Ludhiana, Punjab and he reported that the prevalence of periodontal disease was 96.8% in urban and 97.2% in rural population.. From this study it was clear that 3.3% of tribal population were periodontally healthy (score 0), 2.4% had bleeding, 31.7% had calculus, 40.8% had shallow pockets and 21.8% had deep pockets. CPI MNS score is 0.57 for code 0, 0.36 for code 1, 1.89 for code 2, 2.37 for code 3 and 0.75 for code 4. A highest score of 2.37 for code 3 indicates that severity of periodontal disease is more among tribal population. Although etiological factors are the same, there are various risk factors that accounts for the exaggerated periodontal destruction especially in under privileged groups.

Among the population examined the prevalence of periodontal disease was slightly higher in females, but the difference was not statistically significant. In the study of Jacob Kaimenyi and GururajRao (1991)<sup>12</sup> females to male periodontal disease prevalence ratio was slightly higher. This difference in observation may be attributed to child birth, poor nutrition and hormonal imbalance.

In the studied population 22.7% children in the age group of 5 were periodontally healthy. This data is parallel to that of the result of National Oral health Survey, Kerala, 2002-03 by DCI. In their study, they reported that there was a very low prevalence of periodontal disease in the 5 year.

It was interesting to note healthy periodontium were virtually absent in 35-44 and 65-74 age group. This is similar to the findings of study conducted in Japan (Miyazaki et al, 1989)<sup>13</sup> which stated that as the age increases, prevalence of periodontal disease also increases. Study of Anil et al (1990)<sup>14</sup> in selected population of Trivandrum district also showed progression of periodontal disease with advancing age.

In our study population, 40% of them were illiterate and others had only a basic education .There were only 9.6% with a maximum of high school education and CPI score of code 4 was higher among illiterates. It was observed that as the educational status of the people increases there is a decrease in number of persons affected from soft deposit, calculus and periodontal disease (Dinesh Jain et al 1980)<sup>15</sup>. Among the population studied, 69.4% of them are using fingers to clean their teeth and 30.6% were using tooth brush. This difference was statistically significant (P value 001). It has also been shown that 19.8% were using tooth paste, 0.27% tooth powder and 53% were using other materials like chewing stick, charcoal, mango leaf, cashew leaf, salt and rice husks for cleaning their teeth. The more severe periodontal disease prevalence in this population may be attributed to this exceptionally inefficient oral hygiene measures. Faulty teeth cleaning methods and use of abrasive powders etc; can manifest as gingival recession and abrasion defects (Shah et al)<sup>16</sup>. Research on these indigenous methods suggests that the prevalence and severity of periodontal disease is increased when charcoal and ash are used for oral hygiene purpose (Gunnar Holm, 1994).<sup>17</sup>Jagadeesan et al (2001)<sup>18</sup> reported that teeth cleaning with fingers and sticks were significantly associated with severe form of periodontal disease.

In our study, 31% of men consumed alcohol and the prevalence of shallow and deep pockets were high among them .Research indicate that excessive alcohol consumption is associated with increased severity of periodontal disease. Nishida et al (2004)<sup>19</sup> in a study reported that acetaldehyde, a substrate of ALDH<sub>2</sub> (Alcohol metabolizing enzyme) induces cytotoxicity, DNA damage and immunosuppression. Association of this ALDH<sub>2</sub> genotype among alcoholics affects the severity of periodontal disease. Smoking is an established risk factor for periodontal disease. It is found that components of tobacco smoke could modify host response in periodontitis. In our study, only 24% of subjects had smoking habit. The low prevalence of smoking in the community may be due to the inability to afford the high prices of cigarettes and beedi. But among the smokers, none of them were periodontally healthy, bleeding was absent among them. The absence of bleeding score may be due to the vasoconstrictive effect of tobacco. In contrast to this, Fatin et al (1999)<sup>20</sup> suggest that periodontal condition do not differ in smokers and non-smokers when measured by CPITN.

But the habit of tobacco chewing is more prevalent in this population. 69% of population have pan chewing habit and 89% chewers used pan or arecanut along with tobacco .The high prevalence of pan chewing may be due to the local availability of betel leaves, arecanut and other raw materials from the premises. Pan chewing shown to have many adverse effects on the periodontal tissues of the studied population.

## **V. Summary And Conclusion**

The prevalence of periodontal disease in the tribal population studied in Mananthavadytaluk of Wyanad district was 96.7% and 64.3% had loss of attachment. Gingival recession was present in 49.1% of population. It was also showed that the deleterious oral habits like pan chewing was very prominent in this community. Aggravation of periodontal disease in this community may be due to habits along with faulty cleaning method.

Identifying the behavioral and environmental risk factors is instrumental in the prevention of periodontal disease.This population needs to be motivated and educated towards prevention of periodontal disease Primary prevention of periodontal disease should be focused to modify their teeth cleaning methods , to stop deleterious habits and to promote healthy life style in the tribal population.

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