

## Assessment of periodontal status of rural Nepalese population using the community periodontal index

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### Abstract

**Background:** Periodontal diseases are the most common and widespread chronic dental diseases worldwide. It is mandatory to know the disease status and treatment needs of the target population, in order to establish preventive community programmes and to treat periodontitis. Update information about the periodontal health status of adults in Nepal is limited.

**Aims and Objectives:** To assess periodontal status of rural Nepalese population aged 35-44 years using Community Periodontal Index (CPI) and to analyze oral hygiene status of the population according to methods used for maintaining oral hygiene.

**Materials and methods:** In 1998, 300 residents of appropriate age were examined to assess their periodontal status with Community Periodontal Index (CPI) and Loss of Attachment (LOA). Basic demographic information was also collected according to WHO (World Health Organization) proforma.

**Results:** Among 300 subjects of 35-44 years of age, 156 (52%) were males and 144 (48%) were females. None had healthy periodontium, only 0.3% had bleeding on probing (Code 1). Shallow pockets (Code 3) were most prevalent at 41.67%, followed by calculus (Code 2) 37.33% and deep pockets in 20.33% of the surveyed population. 36% had no loss of attachment (Code I), 29.67% had 4-5 mm attachment loss, 19.67% had 6-8 mm attachment loss, 11.33% had 9-11mm attachment loss and 3.33% had >12 mm loss of attachment.

**Conclusion:** The prevalence of periodontal disease in 35 – 44 year olds was high in this epidemiological study for periodontal disease with CPI and LOA. Poorer periodontal health was observed in males, smokers with some chewing habits and with poor plaque score.

**Key words:** CPI, Periodontal status, Smoking, Oral hygiene

### Introduction

Periodontal diseases are the most common and widespread chronic dental diseases worldwide. In developing countries, with acute shortages of trained dental manpower, high levels of unmet dental needs, and a scarcity of economic resources about 75 to 80 percent of the population live in rural areas<sup>1</sup>. In order to establish community programmes to prevent and treat periodontitis, it is mandatory to know the disease status and treatment needs of the target population. The community Periodontal Index of Treatment Needs (CPITN) was developed for this purpose by the Oral Health Unit of the World Health Organization in collaboration with the Federation Dentaire Internationale.

It is a simple, time-saving method of assessing the treatment needs of a specified population group, and has stood the test in a number of major epidemiological studies on the prevalence of marginal periodontal disease<sup>2,3,4</sup>. Simplifications to this index system have, however, entailed increasing criticism and a demand for more precise recording of periodontal parameters<sup>5,6</sup>. Use of the CPITN for epidemiological purposes that is to obtain estimates of the prevalence and severity of destructive periodontal disease in a population<sup>7</sup> must necessarily be based on the assumption that loss of periodontal support is accompanied by the formation of deepened periodontal pockets. However, the presence

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of deepened pockets is reported to overestimate the periodontal attachment loss in some populations<sup>8</sup> while in other populations the occurrence of deepened pockets is reported to underestimate loss of periodontal support<sup>9,10,11,12</sup>. It does not include any of the cumulative manifestations of periodontal tissue destruction such as attachment loss, alveolar bone loss and gingival recession but only the pocket depth. Pocket depth is indeed an important aspect since it directly influences the composition of the bacterial flora<sup>13,14</sup> even though it may not establish the extent of attachment loss. However, recent research has been increasingly interested in attachment loss which determines the remaining tooth support<sup>15,16</sup>. The loss of attachment in the furcation areas could be more important than pocket depth per sextant<sup>17</sup>. Some authors have therefore suggested that the inability of the CPITN to assess the degree of attachment loss is a serious handicap<sup>18</sup>; others have suggested that a measure of gingival recession or attachment loss measurement<sup>5,12,19,20</sup> should be incorporated in epidemiological studies involving the CPITN.

The Community Periodontal Index (CPI) recommended by WHO<sup>21</sup>, which also considers loss of attachment is taken into consideration in this study conducted in rural area of Nepal. Update information about the periodontal health status of adults in Nepal is limited. According to the data obtained from WHO Global Oral Data Bank, the periodontal health of Nepalese population is poor. Hence this study was undertaken in a rural Nepalese population with no access to preventive or therapeutic dental services.

The aims of the present study were to assess the periodontal status of Nepalese rural adult population using CPI and to analyze oral hygiene status of the population according to the method they use for maintenance of their oral hygiene. Furthermore, the intention was to correlate other possible variables which may have an influence on the periodontal status.

## **Materials and methods**

### **Study area and population**

Jhor Mahankal, a village situated in Kathmandu district of Nepal was selected for the study. The selection of this village was based on certain logistic considerations like it is situated on the outskirts of Kathmandu valley, about 16 Km from the main city and has population of 3360 with a favourable sex ratio of 1700 males for 1660 females. The population residing has limited tradition for oral hygiene and very limited access to dental health care facilities.

### **Study Design**

A total population of 300 subjects of 35-44 years were chosen by random sampling technique and were examined at their houses selected randomly.

An interview cum oral examination, with the help of a proforma prepared for the study was conducted for the collection of data. Personal data regarding each subject was recorded on the proforma. The recording of data was based on the "WHO Oral Health Assessment survey form (Proforma)". Since the information recorded was to be computerized, appropriate codes were assigned. The assessment of the periodontal status was carried out using the Community Periodontal Index<sup>21</sup>. Prior to CPI recording plaque score for all teeth was recorded using Silness and Loe Plaque Index.

This study was carried out in 1998 by single examiner (first author). Examination was based on the methods and diagnostic criteria recommended by WHO<sup>21</sup>. The examination was carried out using the standardized Community Periodontal Index (CPI) probe ('TSR 621' WHO Periodontal probe) for detection of signs of periodontal disease. This tool has a 0.5 mm diameter ball at its tip, a black band between 3.5 and 5.5 mm, and coloured rings at 8.5 and 11.5mm from the tip. The CPI scores applied on the index teeth were as follows: presence or absence of gingival bleeding (CPI 1), presence of calculus (CPI 2), periodontal pockets 4-5 mm (CPI 3) or periodontal pockets 6 mm + (CPI 4). In addition, loss of attachment (LOA) was recorded for the index teeth according to the following criteria: Loss of attachment was measured only if the CEJ (Cemento-Enamel Junction) was visible, Loss of attachment 0-3 mm(Code 0), Loss of attachment 4-5 mm(Code 1), Loss of attachment 6-8 mm(Code 2), Loss of attachment 9-11 mm(Code 3), Loss of attachment 12 mm or more( Code 4)<sup>21</sup>. The mouth was divided into six sextants: the right upper posterior teeth (teeth 18-14), the upper anterior teeth (teeth 13-23), the upper left posterior teeth (24-28), the left lower posterior teeth(38-34), the lower anterior teeth (33-43) and the right lower posterior teeth (44-48). Two molars in the posterior sextants and teeth 11 or 31 in the anterior sextants were selected for examination at six conventional sites: the mesiobuccal, mid-buccal, distobuccal, mesiolingual, mid-lingual and distolingual surfaces. The highest of the component scores for each sextant was taken to be the overall sextant score, and the highest of the sextant scores for each individual to be their overall assessment of periodontal disease.

Prior to analysis of the data collected, the subjects were assigned to various groups on the basis of their oral hygiene practices or teeth cleaning devices, smoking habits, chewing habits and plaque score.

### **Data analysis**

The collected data was analyzed using the statistical package SPSS/PC + and Chi Square test was applied for comparing the associations. A p value of less than 0.05 was considered as significant.

## Results

In the present study, out of total number of 300 subjects of 35-44 years of age, 156 (52%) were males and 144 (48%) were females. Among the total population examined none had healthy periodontium, only 0.3% had bleeding on probing (Code 1). Shallow pockets (Code 3) were most prevalent at 41.67%, followed by calculus (Code 2) 37.33% and deep pockets in 20.33% of the surveyed population. (Table 1) 36% had no loss of attachment (Code I), 29.67% had 4-5 mm attachment loss, 19.67% had 6-8 mm attachment loss, 11.33% had 9-11mm attachment loss and 3.33% had >12 mm loss of attachment (Table 2).

## Gender

It was observed that among the males none had healthy periodontium and bleeding on probing (Code 1), 29.49% had calculus (Code 2) as the highest score, 44.23% had shallow pockets (Code 3) also and 26.26% had deep pockets (Code 4). Among the females, none had healthy periodontium, 0.69% had only bleeding on probing, 45.83% had calculus as their highest score, 39.58% shallow pockets and 13.89% had deep periodontal pockets (Table 1).

In relation to the loss of attachment (gingival recession), it was observed that among males 30.77% had no loss of attachment, 32.05% had 4-5 mm loss of attachment, 17.95% had 6-8 mm loss of attachment, 12.82% had 9-11 mm loss of attachment and 6.41% had  $\geq 12$  mm loss of attachment while for the females, 41.67% had no loss of attachment, 27.08% had 4-5 mm loss of attachment, 22.15% had 6-8 mm loss of attachment, 9.72% had 9-11 mm loss of attachment and none had loss of attachment exceeding 12 mm or more. (Table 2) The above study suggests that the prevalence of periodontal disease was more in males in comparison to females.

## Teeth Cleaning Devices/ Oral Hygiene Practices

The population was divided into three groups according to the devices they use to clean their teeth, Group I who used tooth brush constituted 39.33%, Group II who used tooth powder with finger constituted 16.33% and Group III other methods like charcoal, ash and sand constituted 44.33%.

In the distribution of periodontal status it was observed that none had healthy periodontium and the groups who used other methods had more attachment loss. Among tooth brush users (Group I), it was observed that 0.85% had bleeding on probing (Code 1), 50.85% had calculus, 34.75% had shallow pockets and 13.56% had deep periodontal pockets (Table 1), 55.93% had no loss of attachment, 22.88% had 4-5mm loss of attachment, 46.61% had 6-8mm loss of attachment, 5.93% had 9-11 mm loss of attachment and 2.54% had loss of attachment  $\geq 12$  mm. Among tooth powder with finger users, 36.73%

had calculus, 42.86% had shallow pockets and 20.41% had deep pockets, 32.65% had no loss of attachment, 40.82% had 4-5 mm loss of attachment, 18.37% had 6-8 mm loss of attachment, 8.16% had 9-11mm loss of attachment and none had loss of attachment  $\geq 12$  mm. Among the subjects using other methods, 25.56% had calculus, 48.12% had shallow pockets and 26.32% had deep pockets, 19.55% had no loss of attachment, 31.58% had 4-5 mm loss of attachment, 26.32% had 6-8 mm loss of attachment, 17.56% had 9-11 mm loss of attachment and 5.26% had loss of attachment  $\geq 12$  mm. (Table 2)

The results suggest that the amount of periodontal destruction exhibited by the subjects using the toothbrush were less than the destruction observed in those using tooth powders, charcoal, ash and sand. This was demonstrated by the lesser percentages of deep pockets and higher percentages of subjects without loss of attachment among the subjects using tooth brush ( $p < 0.0001$ ). When plaque score was correlated with oral hygiene devices, it was observed that among tooth brush users, 71.43% had lesser plaque score and 28.31% had fair plaque score while 25% of the subjects had poor plaque score. Among tooth powder and finger users, 20.09% had fair plaque score and 6.49% lesser plaque score. Among those who used other devices, 75% had higher (poor) plaque score, 51.60% had fair plaque score and 22.08% with lower (good) plaque score (Table 3).

## Plaque score

Among the study sample, 25.67% had lower plaque score, 73% had fair plaque score and 1.33% had higher plaque score. Among the subjects who had lower plaque score, 1.30% had bleeding on probing (Code 1), 58.44% had calculus, 25.97% had shallow pockets and 14.29% had deep pockets (Table 1), 55.84% had no loss of attachment, 19.48% had 4-5 mm loss of attachment, 14.29% had 6-8 mm loss of attachment, 6.49% had 9-11 mm loss of attachment and 3.90% had  $\geq 12$  mm loss of attachment (Table 2). Among the subjects who had fair plaque score, 30.59% had calculus, 47.49% had shallow pockets and 21.92% had deep pockets, 29.68% had no loss of attachment, 33.33% had 4-5 mm loss of attachment, 21.46% had 6-8 mm loss of attachment, 12.79% had 9-11 mm loss of attachment and 2.74% had  $\geq 12$  mm loss of attachment. Among the subjects who had higher plaque score, 50% had shallow pockets and 50% had deep pockets, none had loss of attachment, 25% had 4-5 mm loss of attachment, 25% had 6-8 mm loss of attachment, 25% had 9-11 mm loss of attachment and 25% had  $\geq 12$ mm loss of attachment. It was observed that the subjects with lower plaque score had healthier periodontal tissues than the subjects with fair or higher plaque score. ( $p < 0.0001$ )

## Smoking

In the population studied, 31% were non smokers and 69% were smokers. Among smokers, 41.4% were light smokers (those smoking less than 10 cigarettes a day) and 27.3% were heavy smokers (those smoking 10 or more than 10 cigarettes a day). It was observed among non smokers, 1.06% had bleeding on probing (Code 1), 57.45% had calculus, 34.04% had shallow pockets and 7.45% had deep pockets (Table 1), 56.38% had no loss of attachment, 14.89% had 4-5 mm loss of attachment, 23.40% had 6-8 mm loss of attachment and 5.332% had 9-11 mm loss of attachment. None had loss of attachment  $\geq$  12 mm. (Table 2) Among light smokers, 29.03% had calculus, 50% had shallow pockets and 20.97% had deep pockets, 25% had no loss of attachment, 37.90% had 4-5 mm loss of attachment, 20.16% had 6-8 mm loss of attachment and 13.71% had 9-11 mm loss of attachment and 3.23% had loss of attachment  $\geq$  12 mm. Among heavy smokers, 26.83% had calculus, 39.02% had shallow pockets and 34.15% had deep pockets, 29.27% had no loss of attachment, 34.15% had 4-5 mm loss of attachment, 14.63% had 6-8 mm loss of attachment and 14.63% had 9-11 mm loss of attachment and 7.32% had  $\geq$  12 mm loss of attachment. It can thus be concluded that the non smokers had better periodontal status than smokers ( $p < 0.00001$ ).

A correlation of smoking with plaque score showed that, 44.48% of non-smokers, 20.16% of light smokers and 12.20% of heavy smokers had lower plaque score. Among those who had fair plaque score, 87.80% of heavy smokers, 77.42% of light smokers and 54.25% of non-smokers had fair plaque score. Among those who had higher plaque score, 2.42% were light smokers and 1.06% were non-smokers (Table 3) ( $p < 0.00001$ ).

## Chewing habits

Among the study sample 22% had oral habits like tobacco and betel nut chewing and 78% did not. It was observed that among non chewers, 0.43% had bleeding on probing (Code 1), 39.74% had calculus, 38.89% had shallow pockets and 20.94% had deep pockets. Among non chewers, 41.45% had no loss of attachment, 29.91% had 4-5 mm loss of attachment, 18.38% had 6-8 mm loss of attachment, 9.40% had 9-11 mm loss of attachment and 0.85% had  $\geq$  12 mm loss of attachment. Among chewers, 30.59% had calculus, 47.49% had shallow pockets and 21.92% had deep pockets, 16.67% had no loss of attachment, 28.79% had 4-5 mm loss

of attachment, 24.24% had 6-8 mm loss of attachment, 18.18% had 9-11 mm loss of attachment and 12.12% had  $\geq$  12 mm loss of attachment. (Table 1 and 2) The results indicate that the non chewers had better periodontal status than chewers. ( $p < 0.00001$ )

When chewing habit was correlated with plaque score, it was observed that among those who had lower plaque score, 28.79% were chewers and 24.79% were non chewers. Among those who had fair plaque score, 73.50% were non chewers and 71.21% were chewers. 1.71% of non chewers had higher plaque score (Table 3).

It was thus demonstrated that various factors like the oral hygiene practices, smoking, tobacco chewing influenced the state of the periodontal tissues. To study their effects in better detail smoking, chewing habits and plaque score were correlated with the oral hygiene practices. The results were as follows:

A correlation of smoking habits with oral hygiene practices revealed that the majority of non smokers (56.38%), 37.10% of light smokers and 23.17% of heavy smokers used tooth brush. 19.51% heavy smokers, 16.94% light smokers and 12.77% non smokers used tooth powder with finger. The majority of heavy smokers (57.32%), 45.97% light smokers and 30.85% of non smokers used other devices (Table 3) ( $p < 0.0001$ ).

A correlation of chewing habits with oral hygiene practices showed that relatively equal proportion of both chewers (39.74%) and non chewers (37.88%) used tooth brush. 31.82% of chewers and 11.97% of non chewers used tooth powder and finger. 48.29% of non chewers and 30.30% of chewers used other devices to clean their teeth (Table 3) ( $p < 0.00001$ ).

When smoking habits was correlated with different variables, the following results were observed:

A correlation of chewing habits with smoking habits revealed that 34.19% of non chewers and 21.21% of chewers were non smokers. Relatively equal proportion of non chewers (41.45%) and chewers (40.91%) were light smokers. Among heavy smokers, 37.88% were chewers and 24.36% were non chewers. (Table 3) ( $p < 0.02$ ).

**Table 1:** Periodontal status of the study population as per CPI score (%) according to different variables

Variables	(n)	CPI 0	CPI 1	CPI 2	CPI 3	CPI 4
<b>Gender</b>						
Male	156	0	0	29.49	44.23	26.28
Female	144	0	0.69	45.83	39.58	13.89
<b>Oral Hygiene Practices</b>						
Tooth brush and tooth paste	118	0	0.85	50.85	34.75	13.56
Tooth powder and finger	49	0	0	36.73	42.86	20.41
Charcoal, sand, ash etc	133	0	0	25.56	48.12	26.32
<b>Smoking habit</b>						
Non smokers	94	0	1.06	57.45	34.04	7.45
Light smokers (≤10 sticks/day)	124	0	0	29.03	50	20.97
Heavy smokers (>10 sticks /day)	82	0	0	26.83	39.02	34.15
<b>Chewing habits</b>						
Non chewers	234	0	0.43	39.74	38.89	20.94
Chewres	66	0	0	28.79	53.03	18.18
<b>Plaque score (Sillness and Loe)</b>						
Good(0-0.9)	77	0	1.3	58.44	25.97	14.29
Fair(1-1.9)	219	0	0	30.59	47.49	21.92
Poor (2-3)	4	0	0	0	50	50

**Table 2:** Periodontal status of the study population as per LOA score (%) according to different variables

Variables	(n)	LOA 0	LOA 1	LOA 2	LOA 3	LOA 4
<b>Gender</b>						
Male	156	30.77	32.05	17.95	12.82	6.41
Female	144	41.67	27.08	21.53	9.72	0
<b>Oral Hygiene Practices</b>						
Tooth brush and tooth paste	118	55.93	22.88	46.61	5.93	2.54
Tooth powder and finger	49	32.65	40.82	18.37	8.16	0
Charcoal, sand, ash etc	133	19.55	31.58	26.32	17.56	5.26
<b>Smoking habit</b>						
Non smokers	94	56.38	14.89	23.4	5.32	0
Light smokers (≤10 sticks/day)	124	25	37.9	20.16	13.71	3.23
Heavy smokers (>10 sticks /day)	82	29.27	34.15	14.63	14.63	7.32
<b>Chewing habits</b>						
Non chewers	234	41.45	29.91	18.38	9.4	0.85
Chewers	66	28.79	28.79	24.24	18.18	0
<b>Plaque score (Sillness and Loe)</b>						
Good(0-0.9)	77	55.84	19.48	14.29	6.49	3.9
Fair(1-1.9)	219	29.68	33.33	21.46	12.79	2.74
Poor (2-3)	4	0	25	25	25	25

**Table 3:** Relationship between various demographic factors in percentage (%)

Smoking	Plaque score			Oral hygiene			Chewing habits	
	good	Fair	poor	Tooth brush	Tooth powder	Others	Non chewers	chewers
Non smoker	44.68	54.26	1.06	56.38	12.77	30.85	34.19	21.21
Light smoker	20.16	77.42	2.42	37.10	16.94	45.97	41.45	40.91
Heavy smoker	12.20	87.80	0	23.17	19.51	57.32	24.36	37.88
Oral hygiene		Plaque score			Chewing habits			
		good	fair	poor	Non chewers		Chewers	
Tooth brush			71.43	28.31	25	39.74	37.88	
Tooth powder			6.49	20.09	0	11.97	31.82	
Others (charcoal, sand, ash)			22.08	51.60	75	48.29	30.30	

### Discussion

The age 35-44 years is a key age group acknowledged by the WHO because, in most populations, all signs of periodontal disease can be observed and various stages of periodontal disease can be investigated, though tooth loss is still not a phenomenon frequently encountered<sup>3,22,23,24</sup>.

About 90% of the Nepalese population live in rural areas with neither facility for any preventive nor therapeutic dental services. Jhor Mahankal village, in Kathmandu valley is one such village. A lack of reliable data on prevalence of periodontal status in Nepal prompted the survey. In the present study, the prevalence of periodontal disease was found to be 100% in the subjects, i.e., none of the subjects had a completely healthy periodontium (Code 0) as their highest CPI score. This is in comparison to other studies<sup>5, 25</sup>. Lack of proper dental health knowledge and awareness and the virtual absence of preventive and therapeutic dental services could be the factors responsible for this rather alarming state of unhealthy amongst this backward, rural community. Calculus (Code 2) and shallow pocketing (Code 3) were the most frequently observed conditions. Thus this rural population exhibited a high level of periodontal disease as was evident from the prevalence of periodontal pockets which is in agreement with several earlier studies<sup>24,26</sup>.

The detrimental effect of tobacco smoking on the periodontal tissue was demonstrated in this study, corroborating earlier reports<sup>27,28,29,30,31</sup>. The estimated risk of periodontal destruction for smokers increased, compared to the non smokers. Non smokers in general had less periodontal destruction than smokers. This value is comparable to those obtained by Goultschin<sup>28</sup>. The percentage of subjects with deep pockets (Code 4) were observed to be more in heavy cigarette smokers,

followed by light smokers and least in non smokers. This finding demonstrates the detrimental effect tobacco has on the periodontal tissues, which is in accordance with other studies<sup>27, 29, 32</sup>. Various factors such as altered host response<sup>33,34</sup>, changes in oral microflora<sup>35</sup> may probably contribute to more severe forms of periodontal disease in smokers. Although the mechanisms by which tobacco exerts its influences are not clearly known, it seems likely that it primarily has a systemic influence affecting host response or susceptibility<sup>27</sup>. The results suggest that smoking influences the prevalence and severity of periodontal diseases and thus favour the hypothesis that it is a major risk factor for periodontal disease. The habit of tobacco and betel nut chewing was also shown to adversely affect the health of the periodontal tissues of the subjects. This finding is in agreement with earlier reports<sup>36, 37, 38</sup>.

Prevalence of gingival recession was observed to be more in subjects with chewing habits than non chewers in the present study. Gingival recession and advanced periodontal destruction have been reported adjacent to the regions where the tobacco quid is held<sup>36, 37</sup>. This greater severity of gingival recession observed in the present study could probably be the result of mechanical injury to the gingiva. Holm G<sup>38</sup> has shown that increased prevalence of gingival recession could be attributed not only to mechanical but chemical irritating effect of smokeless tobacco components. According to him, this stimulus is likely to result in the release of inflammatory mediators, toxic substances such as nitrosoamines which may play a role in the development of periodontal attachment loss and gingival recession. These observations lend credence to the view that control of such deleterious habits could pave the way to a great extent in promoting periodontal health.

The various oral hygiene practices employed by this rural population included the use of toothbrush and tooth paste, tooth powder and others like charcoal, ash and sand. It was observed that majority of subjects used other methods. The tooth brush users were found to have better periodontal health when compared to tooth powder and other method users. This is in agreement with other studies<sup>32,39,40</sup>. Greene JC<sup>40</sup> noticed both in urban and rural samples in India that tooth brush users had lower periodontal disease scores than those who used the finger as a means of cleaning the teeth, while Ramfjord<sup>32</sup>, in an attempt to compare methods of oral hygiene with the periodontal scores, showed that the use of a brush was associated with a lower periodontal disease score than other methods of oral hygiene. This reinforces the belief that to date, the most dependable mode of plaque control is mechanical cleaning with a tooth brush.

In the present study, statistically significant higher plaque scores were observed in smokers. This is comparable with earlier report<sup>18</sup>. It could be attributed to the devices used by higher percentages of smokers for cleaning their teeth as most of the smokers used other devices than tooth brush to clean their teeth. Majority of non-smokers used tooth brush to clean their teeth (Table 3) Plaque scores in chewers and non chewers were found to be relatively similar.

Results of this study indicate a high prevalence of plaque, calculus and shallow pockets among the population examined, which shows that effectiveness of the oral hygiene methods employed amongst them is not very high and further, that the low number of dental professionals in Nepal are unable to treat these conditions adequately.

However, though CPI includes measurement of attachment loss, determination of loss of attachment is in general not sufficient for the assessment of the periodontal status. As CPI measurements are done only in index teeth, it can overestimate or underestimate the prevalence of periodontal disease. A disadvantage of the CPI is that, by using the highest score per sextant and not individual tooth scores, the extent of periodontal disease within and between individuals and populations is poorly defined. CPI codes could be recorded as non-contiguous, distinct categories for each tooth rather than a sextant score. In this way, the index would be more representative of the disease distribution within the mouth. As new diagnostic aids such as tests that detect pathogenic bacteria or actively deteriorating periodontal sites become validated, their incorporation into CPI should be explored to better detect and assess destructive periodontal diseases.

## Conclusion

In conclusion, we estimated the overall prevalence of severe periodontal disease (6 mm or deeper periodontal pockets) in subjects 35 -44 years of age to be 20.33% using CPI and loss of attachment >3 mm to be 64% using LOA, in a 300 study population of Jhor Mahankal village. Data analysis revealed that this community which is deprived of professional dental services or any oral health education programmes had a high prevalence of periodontal diseases. In light of these observations from the present study the following recommendations for a community based oral health programme suited to such a population group may be made. The public needs to be educated and motivated towards prevention of periodontal diseases during childhood. This goal can be pursued by laying adequate emphasis on school dental health education programmes. A proper strategy thus needs to be adopted in Nepal to promote and maintain oral health through a well designed health care delivery system. Such a scheme has already been introduced in Chiang Mai, Thailand with remarkable success. To contend with the oral health problems in Nepal, National Oral Health Policy that emphasizes prevention will be more advantageous and cheaper than the establishment of traditional curative programmes. This survey was confined to just one of the numerous villages of this nation. More such surveys need to be conducted in different parts of Nepal amongst populations with different cultures, living conditions and habits. This should enable us to devise and implement a National Oral Health Programme best suited to this country.

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