

Periodontal health status and treatment needs of the rural population of India: A cross-sectional study

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Abstract

Background: Periodontal disease is of public health concern and hence data on its prevalence rate are necessary. We have documented the prevalence pattern of periodontal disease in a rural population of Belgaum district, India, and identify the optimal treatment needs (TNs). **Materials and Methods:** A cross-sectional study was carried on 1680 dentate adult subjects, examined from 12 villages in Belgaum district, Karnataka, India for prevalence of periodontal status and their TNs (using Community Periodontal Index for Treatment Needs [CPITN]). **Results:** Increase in CPITN score positively correlated with age. Only 4.3% (13) of subjects in the age-group of 20-29 had a CPITN score of 4 indicative of pockets of 6 mm or more when compared to 26% (91) of subjects in the age-group of 45-60 years. 92% (569) of the subjects in the age-group of 30-44 were having a TN score 2 whereas only 5.3% (33) of subjects were having a TN score 0 in the same age-group. Significantly higher need for treatment was observed in males, smokers and subjects using finger and tooth powder. Surprisingly diet of the subjects did not influence TNs. **Conclusion:** Increased prevalence of periodontal diseases and TNs was observed. There is a need for initiating adequate awareness regarding oral hygiene, specifically primary prevention could help in reducing the prevalence of periodontal disease.

Key words: Community periodontal Index for treatment Needs index, oral hygiene, periodontal health, rural, treatment needs

INTRODUCTION

Periodontitis is a destructive inflammatory disease of the supporting tissues of the teeth and is caused either by group of/specific microorganisms, resulting in progressive destruction of the periodontal ligament and alveolar bone resulting in periodontal pocket formation and/or gingival recession.^[1] The potential of periodontal infections to initiate other systemic pathologies makes it a complex multiphase disease.^[2] Periodontal diseases affects the

supporting and investing tissues of the teeth and hence is recognized as a major health problem worldwide.^[3] About 72.2% of the Indian population resides in rural areas and the dentist to population ratio here can be as high as one dentist for every 250K resident.^[4] This high ratio and acute shortages of trained dental manpower have led to severe compromise in dental health. Alarming 75-80% of the populations living in rural areas are affected by periodontal disease.^[5]

In dental health care delivery system, a dominant preventive approach explains part of the decrease in oral diseases.^[6] Direct risk behaviours such as poor oral hygiene practices and dietary habits, tobacco use, and excessive consumption of alcohol are factors that may lead to oral diseases.^[7] Of concern, the very high prevalence of chronic inflammatory periodontal disease in rural Indian population are left untreated.^[8,9] Socio-cultural factors and systemic infrastructure deficiencies are the major causes of

Access this article online	
Quick Response Code:	Website: www.jnsbm.org
	DOI: 10.4103/0976-9668.149102

dental diseases in rural India.^[10] Nevertheless establishing community programmes to prevent and treat periodontitis is mandatory to know the disease status and treatment needs (TNs) of the target population. Hence, the present study was initiated to:

1. Estimate the prevalence of periodontal health status and TNs of the rural population of Belgaum, Karnataka, India.
2. Study the effect of oral hygiene practices and habits of the population on the periodontal TNs.
3. Identify possible remedial measures if required.

MATERIALS AND METHODS

Study population and sample size

A cross-sectional study was conducted after obtaining ethical clearance from the concerned authorities. Belgaum district is situated in northern Karnataka having 10 Talukas and 1200 villages. 1% of the villages were selected with uniform representation based on lottery method. According to 2001 census, the total population of Belgaum district was 32,00,000 people. In each village, 140 people were randomly selected and examined. The survey was done in nearby schools, and prior information was given to the people through health workers to have free dental checkup and to encourage the maximum number of people to attend. Sample size was calculated using the formula $n = 4 (pq/L^2)$ where P = population proportion of positive character, $q = 1 - P$ and L = allowable error. The total study population consisted of 1680 subjects who were selected based on a convenient sample from 12 villages of Belgaum district in the age groups of 15 years and above. Informed consent was taken from each subject prior to recording oral health.

Recording and diagnosis criteria

The Community Periodontal Index of Treatment Needs (CPITN) was developed by the Oral Health Unit of the World Health Organization (WHO) in collaboration with the Federation Dentaire Internationale to assess periodontal health status. It is a simple, time-saving method of assessing the TNs of a specified population group, and has stood the test in a number of major epidemiological studies on the prevalence of periodontal disease.^[11,12] The examination of the subjects in this study was conducted according to

WHO guidelines using the WHO CPITN–E probe. The teeth examined were 17, 16, 11, 26, 27, 36, 37, 31, 46 and 47. Scoring criteria were followed as previously suggested.^[11] The TNs and variables such as age, sex, location, socioeconomic (occupation), oral habits, teeth cleaning habits and diet were also categorized on a printed Performa. To avoid the bias, the author himself examined all the subjects.

Examiner calibration

The examiner was calibrated in the Department of Oral Medicine and Radiology and all the subjects were examined by a single examiner. Intra examiner calibration was undertaken by examining 50 subjects, followed by their re-examination a week later, which resulted in 89% of the diagnostic acceptability with a kappa value of 0.86. Demographic details were filled in the Performa by a trained assistant.

Statistical analysis

Data were analyzed using SPSS package (SPSS Inc., Chicago, IL, version 13.0 for Windows). Qualitative data are summarized using frequencies and percentages. Parametric tests were used for comparisons involving continuous data. One-way analysis of variance was used to determine differences at the 5% significance level ($P < 0.05$), whereas proportions were compared by the use of Chi-square test. $P < 0.05$ was selected to denote statistical significance.

RESULTS

The population was examined and distributed into five age groups according to WHO standard age grouping [Table 1]. The patient details are summarized in Tables 1 and 2. The percentage of dentate persons showing signs

Table 1: Distribution of study population on the basis of age and gender

Groups	Age-group	Male		Female	
		Number	Percentage	Number	Percentage
Group I	15-19	56	7	60	6.8
Group II	20-29	145	18	155	17.7
Group III	30-44	297	37	320	36.5
Group IV	45-60	169	21	180	20.5
Group V	61 years and above	137	17	161	18.4
Total		804	100	876	100

Table 2: Distribution of study population on the basis of teeth cleaning habits, smoking habits and diet patterns

Study population	Various habits					
	Teeth cleaning habits		Smoking habits		Dietary habits	
	Toothbrush with paste	Finger with toothpowder	Smokers	Nonsmokers	Vegetarian	Mixed
Number of subjects	460	1220	183	1497	578	1102
Percentage	27.3	72.6	10.8	89.1	34.4	65.5

of periodontal disease status in all age groups by highest CPITN code number is summarized in Table 3. 30.2% (35) of subjects in the age-group of 15-19 years had a CPITN score 0 indicative of a healthy periodontium as compared to only 3% (10) in the age-group of 45-60 years. Only 4.3% (13) of subjects in the age-group of 20-29 had a CPITN score of 4 indicative of pockets of 6 mm or more as compared to 26% (91) of subjects in the age-group of 45-60 years. The result indicated a positive association of severity of periodontal disease with increasing age.

Periodontal TNs of the study population according to various age groups is presented in Table 4. 92% (569) of the subjects in the age-group of 30-44 were having a TN score 2 indicative of deep scaling and root planning whereas only 5.3% (33) of subjects were having a TN

score 0 indicative of no treatment required in the same age-group. Periodontal TNs increased with increase in the age. When gender of the subjects was compared with the periodontal TNs, it was found that males had significantly higher TNs as compared to the females ($P < 0.05$). Furthermore, statistically higher TNs was observed in the patient group using finger and tooth powder as compared to the group using toothbrush and paste ($P = 0.012$) [Figure 1]. Comparatively higher TNs was also observed from the subjects who were smoking when compared to nonsmokers ($P < 0.05$) [Figure 2]. Interestingly diet of the subjects did not influence the TNs [Figure 3].

Table 3: Distribution of CPITN score according to various age-groups

Age-groups	n	TN			
		TN-0	TN-1	TN-2	TN-3
15-19	116	35 (30.2)	81 (70)	50 (43)	1 (0.8)
20-29	300	40 (13.3)	260 (87)	213 (71)	13 (4.3)
30-44	617	33 (5.3)	584 (94.6)	569 (92.2)	100 (16.2)
45-60	349	10 (2.9)	339 (97.1)	331 (94.8)	91 (26.1)
61 years and above	298	4 (1.3)	294 (98.5)	290 (97)	136 (45.6)

P: 0.024 (statistically significant), *n*: Number of subjects in each age-group, Values in parenthesis () denote percentage, TNs: Treatment needs, CPITN: Community periodontal index for treatment need

Table 4: Periodontal TNs of the study population according to various age groups

Age-groups	n	CPITN score				
		Healthy (0)	Bleeding (1)	Calculus (2)	Pockets <4-5 mm (3)	Pockets >6 mm (4)
15-19	116	35 (30.2)	31 (26.7)	46 (39.6)	3 (2.6)	1 (0.8)
20-29	300	40 (13.3)	47 (15.7)	148 (49.3)	52 (17.3)	13 (4.3)
30-44	617	33 (5.3)	15 (2.4)	169 (27.4)	300 (48.6)	100 (16.2)
45-60	349	10 (2.9)	8 (2.3)	33 (9.4)	207 (59.3)	91 (26.1)
61 years and above	298	4 (1.3)	4 (1.3)	26 (10.7)	122 (40.9)	136 (45.6)

P: 0.015 (statistically significant), *n*: Number of subjects in each age-group, Values in parenthesis () denote percentage, CPITN: Community periodontal index for treatment need

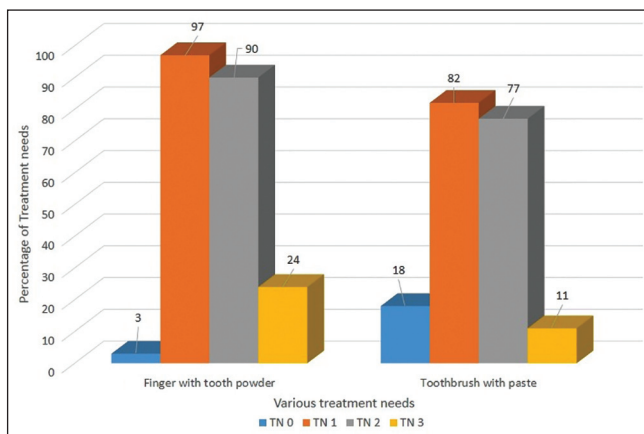


Figure 1: Comparison of treatment needs of the group using toothbrush and paste with finger and tooth powder

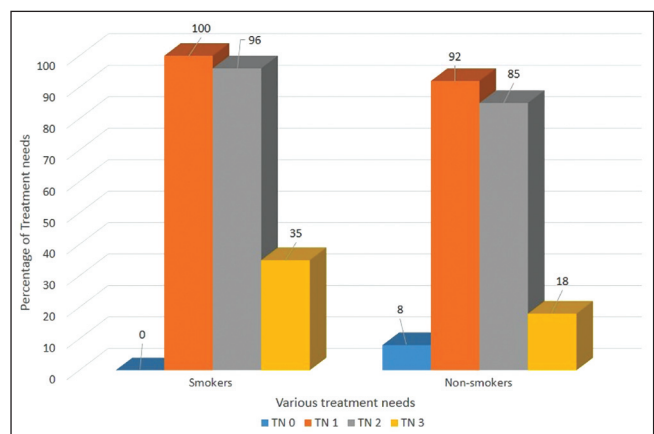


Figure 2: Treatment needs of the study population on the basis of smoking habits

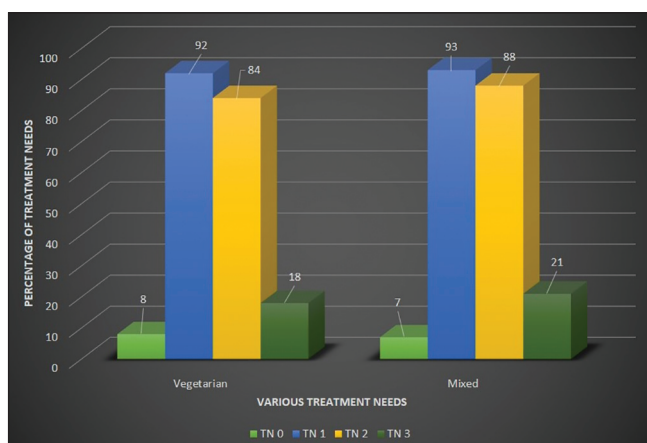


Figure 3: Comparison of treatment needs of subjects on vegetarian diet as compared to mixed diet

treatment in the population (61%), which is consistent with other studies attributing such observations to lack of dental health care facilities, awareness, motivation and dental health education among the rural population.^[13,14]

Although we observed a positive correlation of periodontal disease severity with age, this may be cumulative effects of other disease conditions and prolonged exposure of periodontium to pathogenic factors in bacterial deposits.^[15,16] The higher prevalence of periodontal disease severity among men may be due to their higher indulgence in adverse oral habits when compared to women.^[17,18] Although, some studies have shown no gender difference on the TNs.^[19] While one study has attributed higher periodontal disease rate among females to poor nutrition, hormonal imbalance and frequent child births.^[20]

We observed higher prevalence of periodontal disease and TNs among individuals indulging in tobacco smoking habits. Our observations are consistent with other studies^[18,21] linking tobacco smoking and chewing to plaque formation as a major cause of initiating periodontal diseases.^[21,22] Individuals using toothbrush and toothpaste were less severely affected and had lower TNs than those using finger and toothpowder/other users which may be anticipated as tooth brushing with paste is one of the most effective and available devices for removal of bacterial plaque from the teeth.^[23,24]

Interestingly diet pattern did not influence prevalence of periodontal disease or TNs. Although our results are consistent with other studies,^[25,26] some studies have indicated a higher prevalence of periodontal disease among vegetarians compared with nonvegetarians.^[27] Contrasting this, recent study has reported better periodontal health among vegetarians as compared to people on mixed diets^[28] necessitating further clarity on this issue.

CONCLUSION AND RECOMMENDATIONS

Consistently higher prevalence of periodontal disease (61%) and TNs was observed coinciding with lack of awareness among the individuals about periodontal diseases. Oral habits such as smoking and tooth cleaning procedures have a significant effect on the periodontal health and TNs. Hence if awareness of present day knowledge is increased, the prevalence and severity and TNs could be reduced considerably. Studies conducted at regular intervals in the community would produce substantial data to form a baseline from which the planning of the countrywide program could be initiated to meet the future dental health needs.

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How to cite this article: Sekhon TS, Grewal S, Gambhir RS. Periodontal health status and treatment needs of the rural population of India: A cross-sectional study. *J Nat Sc Biol Med* 2015;6:111-5.

Source of Support: Nil. **Conflict of Interest:** None declared.