

Assessment of Periodontal Health Status and Treatment Needs in Rural Population of the Central Maharashtra: A Cross-sectional Study

Monica J Mahajani¹, Vishwas Diwakar Acharya², Emmanuel Samson³, Amit Prabhakar Chavan⁴, Sagar Vikas Sewane⁵, Balagangadhartilak P⁶

Contributors:

¹Professor and Head, Department of Periodontics, Dr. Hedgewar Rugna Sewa Mandal, Dental College and Hospital, Hingoli, Maharashtra, India; ²Senior Lecturer, Department of Oral Medicine and Radiology, Dr. Hedgewar Rugna Sewa Mandal, Dental College and Hospital, Hingoli, Maharashtra, India; ³Professor, Department of Conservative and Endodontics, Dr. Hedgewar Rugna Sewa Mandal, Dental College and Hospital, Hingoli, Maharashtra, India; ⁴Senior Lecturer, Department of Prosthodontics, Dr. Rajesh Ramdasji Kambe Dental College and Hospital, Akola, Maharashtra, India; ⁵Senior Lecturer, Department of Periodontics, Dr. D.Y. Patil Dental School, Lohegaon, Pune, Maharashtra, India; ⁶Senior Lecturer, Department of Oral Surgery, Dr. Hedgewar Rugna Sewa Mandal, Dental College and Hospital, Hingoli, Maharashtra, India.

Correspondence:

Dr. Acharya VD. Department of Oral Medicine and Radiology, Dr. Hedgewar Rugna Sewa Mandal, Dental College and Hospital, Hingoli, Maharashtra, India. Phone: +91-9970879100. Email: pawan0804@gmail.com

How to cite the article:

Mahajani MJ, Acharya VD, Samson E, Chavan AP, Sewane SV, Balagangadhartilak P. Assessment of periodontal health status and treatment needs in rural population of the central Maharashtra: A cross-sectional study. J Int Oral Health 2016;8(7):772-775.

Abstract:

Background: The aim of this study was to evaluate the epidemiological profile of periodontal health status in rural population of central Maharashtra of India.

Materials and Methods: A total of 1710 dentate adult patients were examined from the villages in Hingoli, Akola, and Pune districts of the central Maharashtra, India, for occurrence of periodontal disease, and the treatment needs using community periodontal index of treatment needs (CPITN) indexing system. Patients were drawn from the age groups of 14-18 years, 19-28 years, 29-33 years, 44-59 years, and 60 years and overhead.

Results: It was perceived that as the age increased, the CPITN score also increased. It was observed that the CPITN Score 2 (calculus) was maximum in the age groups 14-18 years and 19-28 years; the CPITN Score 3 (i.e., the pathological pocket of 4-5 mm) was common in the age groups 29-43 years and 44-59 years. The CPITN Score 4 (the pathological pocket more than 6 mm) was the uppermost in age groups 60 years and overhead. The treatment need was mainly TN-1 (oral hygiene instructions). The need for multipart treatment, i.e., TN-3 (deep scaling, root planning, or surgery) was less in the age group 14-18 years, but TN-3 was found increased with increasing age and was significantly high in the age group 60 years and overhead.

Conclusion: The present study shows surge occurrence of periodontal diseases, and hostile treatment needs as the age

progresses in the population of the rural area. Steadily higher prevalence of periodontal disease (64%) and treatment needs was observed in rural populations of central Maharashtra population. It concurs with absence of awareness among the individuals about periodontal health status.

Key Words: Community periodontal index of treatment needs score, Maharashtra population, oral health, periodontal disease

Introduction

The periodontium comprises of the financing and supporting tissues of the tooth (gingiva, periodontal ligament, cementum, and alveolar bone).^{1,2} The periodontium is subject to morphologic and functional variations as well as changes linked with age. The clinical appearances of periodontal disease result from a complex interaction between the etiologic agents; in this case, specific bacteria found in dental plaque and the host tissues.^{1,3} The successes of both improved health consciousness and preventive dentistry have led to decreasing tooth loss for all age groups. The effects of this shift in tooth retention on the periodontal needs of a population with increased life expectancy and oral health outlooks need to be considered carefully. It is important not only to review aging effects in isolation but also from the perceptions of their clinical significance to the disease process and their possible effects on treatment outcomes.⁴

Periodontal health is a standard of the oral and related tissues which empowers an individual without active disease, discomfort or mortification and which donates to general well-being.⁵ Dental caries and periodontal disease are the most common oral diseases distressing 50-60%⁶ and 95-100%⁷ adult population in India, respectively. Approximately, 19% of the population between ages 65 and 74 years is edentulous.

The periodontal disease is major and most common oral disease among the human population in the world. It affected the secondary and participating tissues of the teeth and documented as a chief health problem in the world.^{2,4} The most severe score of the sign of the periodontal disease (community periodontal index of treatment needs [CPITN] Score 4) varies worldwide from 10% to 15% in the adult population.^{3,6} The WHO recently published an overview on oral health stating that in spite of the great enhancements in the oral health status of the population across the world, problems still stick at, particularly among the deprived groups in the developing countries.^{8,9}

In developed countries, oral health has markedly enhanced while in developing countries there has been general worsening. These patterns and trends have been observed and established by WHO Oral Data Bank.⁹ The increase in the occurrence of periodontal diseases, periodontal infection, and compromised masticatory functions are triggering an increasing affliction on populations in these countries. In India, it is seen that the periodontal diseases are one of the major causes of tooth loss. Periodontal and gingival diseases mark 90% of the population.⁵ The occurrence of periodontal disease rests on parameters such as age, race, sex, ethnicity, geographic and environmental status, education, oral hygiene habits, living lifestyle, and dental health awareness.

Epidemiological studies evaluating the oral health status of school children have been accompanied in central Maharashtra. However, very few studies have been conducted on periodontal disease in urban and rural areas. However, the data on periodontal disease in rural adult population in central Maharashtra population are still not presented. The purpose of the present study was to assess the periodontal and oral health status of the rural adult population of central Maharashtra. The data will serve as baseline data for expressing approaches for periodontal disease prevention and treatment needs in the region.

The CPITN was established by joint efforts of WHO and Foreign Direct Investment, in 1978, for evaluating the periodontal treatment needs of the population. This data can be construed in relations of the disease prevalence and complexity of the treatment needs.

Materials and Methods

This cross-sectional study was conducted to assess the periodontal health status of the rural population of central Maharashtra. The clearance from Ethical Committee was done before starting the study. Sampling was done using systematic multistage random sampling. Sample size was designed using the formula $n = 4 (pq/L^2)$ where p = population fraction of positive character, $q = 1-p$, and L = Allowable error. For this study, L was presumed to be 5% of p giving a power of $(1-L)$, i.e., 95% to study; p was 60%, as obtained from the pilot study. The final sample consisted of 1710 patients, which were randomly selected in the age groups of 14 years and above. From each tehsil of Hingoli, Akola, and Pune districts, six villages were randomly selected. Dental check-up camps were systematized in the villages with the help of local worker related to the primary health center and dental students. The examination of the patients in this study was conveyed according to the WHO strategies with the help of the WHO CPITN-E probe. The teeth examined were 11, 16, 17, 26, 27, 31, 36, 37, 46, and 47. The scoring norms were H = healthy (Score 0), B = bleeding (Score 1), C = calculus (Score 2), P1 = shallow pocket 4-5 mm (Score 3), P2 = Deep pocket >5 mm (Score 4) Scoring norms were followed as

recommended by Ainamo *et al.*¹⁰ The authors himself examined all the patients to avoid the bias.

Treatment needs

The population groups or individuals are allocated to the appropriate treatment need category on the following basis:

- TN 0 – No treatment (Code 0)
- TN 1 – Oral hygiene instructions and motivation (Code 1)
- TN 2 – Scaling and/or correction of overhanging margins and oral hygiene instructions (Code 2 and Code 3)
- TN 3 – Complex periodontal treatment (Code 4).

Inclusion criteria were the patients residing in a rural area for at least 5 years were considered eligible for the study. The patients who gave consent were included in the present study.

Exclusion criteria were edentulous persons. Those who were medically compromised were not considered in the present study. The individuals having habit of chewing betel nut, tobacco, and smoking were excluded from the study.

The statistical analysis of the data was done which comprises of classification of data and calculation of frequencies. The Pearson Chi-square test was performed to test the significance. The complete data were transferred to the coding forms and analyzed by computer using software Statistical Package of Social Sciences (SPSS, version 11.0).

Results

In the study, 1710 patients were surveyed from rural parts of three district of central Maharashtra, in which 810 (47.36%) males and 900 (52.63%) females were evaluated. They were scrutinised and disseminated into the five age groups rendering to the WHO standard age grouping, i.e., 14-18 years (Group I), 10-28 years (Group II), 29-43 years (Group III), 44-59 years (Group IV), and 60 years and overhead (Group V) (Table 1).

Table 1 presented that in the Group I, the percentage of Score 0 and Score 1 was 26.44% and 29.7%, respectively, which were almost similar while the percentage of the CPITN Score 2 were the highest (38.84%). In the Group II, it was observed that the percentage of CPITN Score 2 was the uppermost (48.69%) followed by Score 3 and Score 1. While in the Groups III and IV, the percentage of CPITN Score 3 was the uppermost (48.39% and 58.59%, respectively), whereas in Group V, the percentage of CPITN Score 4 was the uppermost (45.06%) followed by Score 3 (40.46%).

The results evidently show that as the age advances, the brutality of periodontal disease increases.

The overall treatment needs observed had conclusion that the TN 0 decreased from 33.88% in Group I to 2.3% in Group V. TN 1 increased from 71.90% in Group I to 99.01% in Group V. TN 2 increased from 46.28% in Group I to 95.06%

Table 1: Periodontal Treatment Needs of the study population according to various age groups.

Group	Sample (N)	Age (Years)	H	%	B	%	C	%	P1	%	P2	%
I	121	14-18	36	29.75	32	26.44	47	38.84	4	3.3	2	1.65
II	306	19-28	41	13.39	47	15.35	149	48.69	53	17.32	14	4.57
III	622	29-43	34	5.46	16	2.57	170	27.33	301	48.39	101	16.36
IV	355	44-59	11	3.09	9	2.5	34	9.5	208	58.59	92	25.91
V	304	61 years and Above	5	1.6	5	1.6	27	8.8	123	40.46	137	45.06

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

Table 2: Distribution of CPITN score according to various age-groups.

	n	Age Groups	TN 0	%	TN 1	%	TN 2	%	TN 3	%
Group I	121	14-18	41	33.88	87	71.90	56	46.28	4	3.3
Group II	306	19-28	39	12.74	278	90.84	223	72.87	16	5.2
Group III	622	29-43	41	6.5	566	90.99	578	82.92	89	14.30
Group IV	355	44-59	13	3.6	322	90.70	309	87.04	81	22.81
Group V	304	61 years and Above	7	2.3	301	99.01	289	95.06	147	48.35

P: 0.021 (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

in Group V, and TN 3 also increased from 3.3% in Group I to 48.35% in Group V (Table 2).

The overall treatment needs results propose that the occurrence of periodontal disease and treatment needs increased with increasing age (Table 2).

Discussion

A healthy periodontium is crucial for successful therapy in every branch of dentistry. Providing appropriate treatment also often necessitates cooperation between the various disciplines within our profession.²⁻⁴ Inflammation is the central pathologic feature of the periodontal disease, and bacterial plaque is the etiologic factor accountable for tempting the host inflammatory processes.^{1,5} In a healthy host, small but variable amounts of bacterial plaque are controlled by the body's defense mechanisms with no net destruction. Specific bacteria in plaque are more likely to be accompanying with periodontal destruction. The periodontal treatment requires an interrelationship between the care of the periodontium and other phases of dentistry. The perception of total treatment is based on the elimination of gingival inflammation and the factors that lead to it (e.g., plaque accumulation favored by calculus and pocket formation, inadequate restorations, and areas of food impaction).⁴

Regardless of great accomplishments in the oral healthiness of populations globally, problems still endure in rural populations in India. Dental caries and periodontal diseases have historically been measured the most important global oral health problems. The current epidemiological study was accompanied to evaluate the periodontal health status and treatment needs of adults (14-61 years and overhead) residents of rural areas of central Maharashtra population. The objective of the study was to deliver systematic evidence on the periodontal health status of the rural population of central Maharashtra population, which will further aid in the planning for prevention and oral health advancement program.

For evaluation of periodontal disease and treatment needs on a population source, the great efforts had been made, which would benefit in the scheduling of dental public health services. The CPITN is a practical method for screening population because it uses putative clinical criteria, fractional mouth scoring, and a simple recording method, which enables rapid valuation of individuals for periodontal health conditions associated to treatment needs.¹⁰ The appraised data deliver evidence on the magnitude of needs and type of health care personnel essential to public health policy makers.

In gathering the ideas of the study, we perceived a high percentage of periodontal disease and treatment needs in the population (64%), which is reliable with other studies assigning such observations to absence of dental health care facilities, responsiveness, incentive, and dental health education among the rural population.¹¹⁻¹³ With affections to age, the occurrence and harshness of the periodontal disease increased with age in rural population and same conclusions were perceived in the studies by Pol *et al.*,¹⁴ Pol *et al.*,¹⁵ Joshi and Marawar,¹⁶ Freitas *et al.*,¹⁷ and Bader *et al.*¹⁸ A strong association with age probably imitates increasing effects of disease rather than diminishing resistance of older people. The consequence might be due to prolonged acquaintance of periodontium to pathogenic factors in bacterial deposits.^{14-16,19-21}

The occurrence rate for periodontal disease countrywide for 35-44 year age group was 89.2% rendering to National Oral Health Survey and Fluoride Mapping.¹¹ A study done by Chinmaya *et al.*¹² at Chitradurga presented that 92% of the population in the sample was grief from one the other form of periodontal disease.

The greater necessity of periodontal treatment in lower income group individuals can be accredited to the use of inexpensive and less efficient teeth cleaning aids such as mishri, snuff, and manjan by them.⁴ In addition, the oral habits particularly pan,

tobacco chewing, and ghutka eating are more prevalent among them. Moreover, patients of these group belong to the low educational status, having little oral health awareness, which could be contributing factor for poorer oral hygiene. Although we observed a positive connotation of periodontal disease brutality with age, this may be collective effects of other disease conditions and prolonged acquaintance of periodontium to pathogenic factors in bacterial deposits.^{14-16,20,21}

A limitation of the present study appears that the sample was composed among the individuals who attended the dental camps. The population appearing would have some sickness which made them attend the camps, therefore, the encumbrance of disease depicted by the study can be to some extent exaggerated than the general population. The main limitation is the fact that this cross-sectional study is limited population was considered from rural areas of only three district of central Maharashtra population, and therefore, the results cannot be generalized to complete central Maharashtra Area. In addition, the index "CPITN" does not evaluate the clinical attachment loss, which is the prime criterion mandatory to institute periodontitis.

Conclusion

Steadily higher prevalence of periodontal disease (64%) and treatment needs was observed in rural populations of central Maharashtra population. It coincides with the absence of consciousness among the individuals about periodontal diseases. The greater use of inexpensive and less efficient teeth cleaning aids such as mishri, snuff, and manjan by them have a noteworthy outcome on the periodontal health status and treatment needs. Hence, if the consciousness of present day knowledge is increased, the occurrence and severity could be reduced considerably. Further such epidemiological studies should be conducted at regular intervals in the community. Hence, it would produce substantial data to form a baseline so that the planning of the countrywide program could be originated to meet the future dental health needs.

References

1. Oliver RC, Brown LJ, Loe H. Variations in the prevalence and extent of periodontitis. *J Am Dent Assoc* 1991;122(6):43-8.
2. Soben P. Indices used in dental epidemiology. *Essentials of Preventive and Community Dentistry*, 2nd ed. New Delhi: Arya (Medi) Publishing House; 2003. p. 430-1.
3. WHO: Technical Report Series No. 621. *Epidemiology, Etiology and Prevention of Periodontal Disease*. Geneva: World Health Organization; 1978.
4. Park K. *Concepts of Health and Disease*. Textbook of Preventive and Social Medicine, 17th ed. Jabalpur, India: Banarsidas Bhanot Publishers; 2002. p. 11-47.
5. Yewe-Dyer M. The definition of oral health. *Br Dent J* 1993;174(7):224-5.
6. Shah N. *Oral & Dental Diseases: Causes, Prevention &*

Treatment Strategies. NCMH Background Papers: Burden of Disease in India; 2004. p. 276-8.

7. Patro BK, Ravi Kumar B, Goswami A, Mathur VP, Nongkynrih B. Prevalence of dental caries among adults and elderly in an urban resettlement colony of New Delhi. *Indian J Dent Res* 2008;19(2):95-8.
8. Petersen PE. The world oral health report 2003: Continuous improvement of oral health in the 21st century – The approach of the WHO global oral health programme. *Community Dent Oral Epidemiol* 2003;31 Suppl 1:3-23.
9. Petersen PE, Ogawa H. Strengthening the prevention of periodontal disease: The WHO approach. *J Periodontol* 2005;76(12):2187-93.
10. Ainamo J, Barmes D, Beagrie G, Cutress T, Martin J, Sardo-Infirri J. Development of the World Health Organization (WHO) community periodontal index of treatment needs (CPITN). *Int Dent J* 1982;32(3):281-91.
11. Singh GP, Bindra J, Soni RK, Sood M. Prevalence of periodontal disease in urban and rural areas of Ludhiana, Punjab. *Indian J Community Med* 2005;30(4):127-9.
12. Chinmaya BR, Shaik HA, Srivastava BK, Pushpanjali K. Oral health status and treatment needs in Chitradurga, India and strategies to meet the needs. *Arch Oral Sci* 2011;1:14-25.
13. Rao P, Pol DG. Periodontal health status and treatment needs in rural and urban population of Pune division of Maharashtra state using community periodontal index of treatment needs – An epidemiological study. *J Indian Dent Assoc* 2011;5:5-7.
14. Pol DG, Nayak P, Chitguppi R, Satarkar G, Baghele O, Shrinivas A. Oral and periodontal health status using WHO criteria in rural and urban population of Kolhapur district. *Dent Dialogue J* 2001;3(9):72-80.
15. Pol DG, Baghele O, Chitguppi R, Dalvi S, Nayak P, Satarkar G, *et al*. A oral and periodontal health status using WHO criteria in rural and urban population of Nagpur district, Maharashtra. *Dent Dialogue J* 2002;1(3):19-26.
16. Joshi NV, Marawar RP. Periodontal health status of rural population of Ahmednagar district, Maharashtra using CPITN indexing system. *JISP* 2004;7(2):115-8.
17. Sanei SA, Nasrabadi AZ. Periodontal health status and treatment needs in Iranian adolescent population. *Arch Iranian Med* 2005;8(4):290-4.
18. Freitas E, Meyer K, Davis RK, Kristoffersen T. A baseline study of periodontal conditions among youths and adults in Portugal. *Community Dent Oral Epidemiol* 1983;11(4):250-4.
19. Bader JD, Rozier RG, McFall WT, Ramsey DL. Periodontal status and treatment needs among regular dental patients. *Int Dent J* 1988;38(4):255-60.
20. Curtis MA, Slaney JM, Aduse-Opoku J. Critical pathways in microbial virulence. *J Clin Periodontol* 2005;32 Suppl 6:28-38.
21. Fives-Taylor PM, Meyer DH, Mintz KP, Brissette C. Virulence factors of *Actinobacillus actinomycetemcomitans*. *Periodontol* 2000 1999;20:136-67.