Assessment Of Periodontal Health Status Among Adult Population Of Sambhal, India – A Cross-Sectional Study

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Background
Oral health is a crucial component of overall well-being, with periodontal disease being a major cause of tooth loss in India. Despite improvements in oral health in industrialized nations, developing countries like India continue to experience a high burden of periodontal diseases. The study aims to assess the periodontal health status of the adult population in Sambhal, Uttar Pradesh, to aid in public health planning and intervention strategies.
Material &Methods
A cross-sectional study was conducted over two months among 600 adults aged 18-80 years in urban Sambhal. A purposive sampling technique was employed, with inclusion criteria requiring residency of at least 10 years. Periodontal health was assessed using the WHO (1997) criteria, including the Community Periodontal Index (CPI) and Loss of Attachment (LOA). Clinical examinations were conducted by a single examiner with high intra-examiner reliability (k=0.81-0.91). Data were analyzed using SPSS 21, with statistical significance set at $p<0.05$.
Results
The majority of subjects were 20-29 years old (26.0%), with a mean age of 40.49 years. Periodontal disease was present in 61.3% of participants, increasing with age ($p<0.01$). Deep periodontal pockets (≥6mm) were found in 32.3% of males and 20.7% of females, with males having a significantly higher prevalence of periodontal disease (79.8% vs. 47.5%, $p<0.01$). LOA was observed in 25.5% of subjects, increasing with age ($p=0.027$) and being more prevalent in males (31.9%) than females (20.7%) ($p=0.002$).
Conclusion
The study highlights a high prevalence of periodontal disease in urban Sambhal, particularly among males and older adults. Contributing factors include poor oral hygiene awareness, low literacy, and deleterious habits. Community-based oral health initiatives, including education, preventive care, and health worker training, are essential to improve periodontal health in the region.
Keywords: Periodontal Diseases, Community Periodontal Index, Attachment Loss, Oral Health

INTRODUCTION

Oral health means more than good teeth. Oral health is an integral component of general health and is essential for wellbeing.[1]This wider meaning of oral health does not diminish the relevance of the two globally leading oral afflictions - dental caries and periodontal diseases.[2]
Poor oral health conditions such as these have a profound impact on health and the general quality of life.[3]
In industrialised countries oral health has markedly improved while in developing countries there has been a general deterioration. These patterns and trends have been mentioned and trends have been monitored and demonstrated by the WHO Global Oral Data Bank (GODB). The increase in the prevalence of periodontal diseases, and the resulting pain, infection, and impaired masticatory functions are causing an increasing burden on populations in these countries.[4]
Periodontal diseases are one of the major causes of tooth loss in India. These include pathological conditions of the supporting structures of the teeth, i.e. gingiva, alveolar bone, periodontal ligament and cementum. Gingival and periodontal diseases affect 90% of the population.[5] Prevalence of periodontal disease depends on variables

like age, sex, race, ethnicity, education, geographic and environmental status, oral hygiene habits, living patterns, social characteristics and dental awareness.[6]

Studies indicate a high prevalence of periodontal issues across various regions,[7] with North India witnessing a considerable burden due to lifestyle factors, dietary habits, and socioeconomic disparities. Within Uttar Pradesh, one of the most populous states, oral health challenges are further exacerbated by inadequate healthcare infrastructure and lower dental health literacy. Sambhal, a district in western Uttar Pradesh, represents an urban setting where rapid urbanization, changing dietary patterns, and limited dental health initiatives may contribute to an increased risk of periodontal disease. Therefore, assessing the periodontal health status of the adult population in Sambhal is essential for formulating effective public health interventions tailored to the region's specific needs.

MATERIAL & METHODS

A population representative cross-sectional study of adults aged 18-80 years of urban Sambhal was conducted from two months.Ethical clearance for the study was obtainedfrom Institutional Ethical Committee. For estimating the sample size, the minimum expected prevalence of periodontal diseases was considered as 86%. This was based on results obtained during the pilot study conducted in study area. The sample size was estimated to obtain the true value at 5% level of significance. Estimated sample size of 600 subjects was calculated. Purposive Sampling Technique was used. Inclusion criteria included >18yrs subjects residing in a urban area for 10 and more years were considered eligible for the study. Exclusion criteria included edentulous persons, on medication and those who were medically compromised.

A self-designed questionnaire was used, to record the demographic. Periodontal health was assessed using WHO criteria (1997) which included Community Periodontal Index (CPI) and loss of attachment (LOA) assessment.[8]

Clinical examination was performed by one single examiner. Intra-examiner calibration was performed before the study began. The intra-examiner degree of agreement (k = 0.91, 0.86, 0.84, and 0.81) for calculus detection, bleeding on probing, probing depth and clinical attachment loss, respectively.The data collected were analysed using SPSS 21 (Statistical Package for the Social Sciences 21, IBM Corporation, United States). Chi-square test was used to test the level of significance of differences among the groups. The level of significance was set at $P < 0.05$.

RESULTS

Most subjects were aged 20-29 years (26.0%), followed by 30-39 years (25.3%) and 40-49 years (18.7%), with very few (<20 years: 2.0%). The mean age was 40.49 years (range: 18-79 years). Most subjects were female (57.2%) and illiterate (29.3%).

Periodontal disease was present in 61.3% of subjects, increasing with age (from 33.3% in <20 years to 71.4% in 70-79 years, $p<0.01$). In the 40-49 years group (n=112), only 23.2% had pockets of 4-5 mm, while 30.4% had pockets ≥6 mm, reflecting advanced periodontal deterioration. The 50-59 years group (n=88) showed further progression, with 30.7% having deep pockets (≥6 mm). The most severe cases were observed in the 70-79 years group (n=28), where 25.0% had pockets of 4-5 mm, and 39.3% had deep pockets ($p<0.001$), indicating a substantial burden of periodontal disease in older adults.

Among males (n=257), only 20.2% had healthy sextants, while 32.3% had deep periodontal pockets (≥6 mm), indicating more severe disease progression. In contrast, females (n=343) had better periodontal health, with 51.6% presenting with healthy sextants and only 20.7% having deep pockets. The difference is found to be statistically significant ($p<0.01$).

Loss of attachment was found in 25.5%, rising with age ($p=0.027$). While no LOA was found in the <20 years group, 17.9% of individuals in the 20-29 years group had LOA, rising to 30.4% in the 40-49 years group and 39.3% in the 70-79 years group, indicating progressive periodontal deterioration. Males (31.9%) had a higher LOA prevalence than females (20.7%) ($p=0.002$), suggesting a greater periodontal disease burden. Among males (n=257), 20.2% had healthy sextants, while 32.3% had pockets ≥6 mm; among females (n=343), 51.6% had healthy sextants, while 20.7% had pockets ≥6 mm. Males had higher periodontal disease prevalence (79.8%) than females (47.5%) ($p<0.01$) and greater loss of attachment (31.9% vs. 20.7%, $p<0.01$).

DISCUSSION

Periodontal diseases have historically been considered the most important global oral health burdens. The current epidemiological survey was conducted to assess the prevalence of periodontal health of adults residents of Sambhal, Uttar Pradesh. The intention of the study was to provide systematic information on periodontal health status which will further aid in the planning/evaluation for prevention and oral health promotion program.

The periodontal status was assessed using the CPI and measurement of LOA. About 61% of the population in the sample was suffering from one or the other form ofperiodontal disease. Such high prevalence may be due to lack of dental health care facilities,[9] exposure to certain risk factors such as smoking, chewing tobacco and use of indigenous oral hygiene methods for cleaning teeth prevalent in such a population. Furthermore, lack of oral

hygiene awareness among the population must have contributed to the increased risk of periodontal disease among them. The prevalence rate for periodontal disease nationwide for adults age group was 89.2% according to National Oral Health Survey and Fluoride Mapping.[7] A study done by Chinmaya et al[10] at Chitradurga showed that92% of the population in the sample was suffering from one the other form of periodontal disease.Males had a higher prevalence of periodontal disease than females in current study. It is in accordance with a study doneby Salman et al[11] which showed that females tended tohave higher percentage of healthy gingiva. This may be since there were differences in practice of oralhygiene between sexes. Another study done by de Macêdoet al[12] showed a similar result that in men, the frequencyof periodontal disease was 35% higher. Kumar et al[13] has also showed that females had healthier periodontiumthan males. This might be since femalesare more aware of maintenance of their oral hygieneand regular professional dental care. Males are moreexposed to deleterious oral habits like tobacco chewingand smoking, which are established as high-risk factorsfor periodontal diseases.[10]A study done by Khamrcoet al[14]reported the inverse result, that is, males having morehealthy gingiva than females.

The current periodontal health status of adultpopulation of Sambhal city can be attributed to lowliteracy along with socio economic status and oralhabits. To improve the periodontal health status of thepopulation, it is suggested that acommunity-based approach can be designed with aninitial curative care followed by preventive care. Sincethe literacy rate is low, more emphasis shouldbe laid in the rural area on the behavioral sciences andcommunity-based oral health education by addressing theimportance of oral hygiene and making people aware ofthe deleterious effects of substance abuse on oral health.Training of health workers, Anganwadi workers and schoolteachers to educate the target groups such as mothers andschool children about oral health can also be beneficial.

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TABLES

Table1. Demographic characteristics of study population

	Frequency	Percent
Age Group (Years)		
<20	12	2
20-29	156	26
30-39	152	25.3
40-49	112	18.7
50-59	88	14.7
60-69	52	8.7
70-79	28	4.7
Total	600	100.0
Mean±SD	40.49±3.24	
Gender		
Male	257	42.8
Female	343	57.2

Table2. Age and gender wise distribution of study population according to CPI findings

	Healthy N(%)	Bleeding N(%)	Calculus N(%)	Pocket Depth 4-5mm N(%)	Pocket ≥6mm N(%)	Total N(%)
Age Group						
<20 yrs	9 (75.0)	0 (0.0)	2 (16.7)	1 (8.3)	0 (0.0)	12 (100.0)
20-29 yrs	82 (52.6)	0 (0.0)	22 (14.1)	24 (15.4)	28 (17.9)	156 (100.0)
30-39 yrs	56 (36.8)	1 (0.7)	21 (13.8)	34 (22.4)	40 (26.3)	152 (100.0)
40-49 yrs	38 (33.9)	0 (0.0)	14 (12.5)	26 (23.2)	34 (30.4)	112 (100.0)
50-59 yrs	24 (27.3)	3 (3.4)	18 (20.5)	16 (18.2)	27 (30.7)	88 (100.0)
60-69 yrs	12 (23.1)	1 (1.9)	14 (26.9)	11 (21.2)	14 (26.9)	52 (100.0)
70-79 yrs	8 (28.6)	0 (0.0)	2 (7.1)	7 (25.0)	11 (39.3)	28 (100.0)
p value	<0.01*					
Gender						
Male	52 (20.2)	4 (1.6)	48 (18.7)	70 (27.2)	83 (32.3)	257 (100.0)
Female	177 (51.6)	1 (0.3)	45 (13.1)	49 (14.3)	71 (20.7)	343 (100.0)
p value	<0.01*					

Table3.Age and gender wise distribution of study population according to LOA findings

	Absent N()	Present N()	Total N()
Age Group			
<20 yrs	12 (100.0)	0 (0.0)	12 (100.0)
20-29 yrs	128 (82.1)	28 (17.9)	156 (100.0)
30-39 yrs	113 (74.3)	39 (25.7)	152 (100.0)
40-49 yrs	78 (69.6)	34 (30.4)	112 (100.0)
50-59 yrs	61 (69.3)	27 (30.7)	88 (100.0)
60-69 yrs	38 (73.1)	14 (26.9)	52 (100.0)
70-79 yrs	17 (60.7)	11 (39.3)	28 (100.0)
p value	<0.01*		
Gender			
Male	175 (68.1)	82 (31.9)	257 (100.0)
Female	272 (79.3)	71 (20.7)	343 (100.0)
p value	<0.01*		