

Prevalence of tooth loss and periodontal health among rural middle-aged and elderly population of Durg, Chhattisgarh: a comparative study**Rishee Dubey¹, V. Haridevaraya Chowdary², Yunus GY³, Ram Tiwari⁴, Hunny Sharma¹, Abhinav Parakh⁵**

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ABSTRACT:

Background: World is witnessing the omnipresence of periodontitis and dental caries. Periodontitis accounts for most cases of tooth loss, and their impact increases with age. In 2010, in the Global Burden Disease study, severe tooth loss was pointed as one of the 100 health conditions causing injuries among populations. One of the most important indicators of oral health is the ability to retain more number of teeth throughout life. Prevalence of disease is the key factor for effective and sound oral health care planning.

Aim: To determine and compare prevalence of tooth loss and periodontal health among rural middle aged (35-44) and elderly (65-74) population of Durg, Chhattisgarh, India.

Material and Methods: A total of 375 individuals were examined from age groups 35-44 years and 65-74 years for tooth loss, periodontal pockets and loss of attachment utilizing WHO oral health assessment 2013, adults form. Subjects who provided consent for the study and who weren't suffering from any systemic disease or were mentally or physically challenged were included. Prior to study ethical approval was obtained from the Institution. Sample size determination was done through conduction of brief pilot study and stratified random sampling technique was employed. Examiners were calibrated. SPSS version 16.0 (SPSS Pty Ltd, Chicago, IL, USA) was used for the statistical analyses. Frequency distribution and Chi-square tests at 95% confidence interval was used for analyzing the results.

Results: Out of 375 individuals in each age group, 66.7% were males and 33.3% were females in age group 35-44 years as compared to age group 65-74 years in which it was 78.4% and 21.6% respectively. There was significant difference in mean number of tooth loss in both age group (6.4 ± 7.9 and 15.3 ± 12.2) with $p=0.001$. There was statistically significant difference when considering healthy periodontium of both age group with $p=0.005$. Significant difference in mean loss of attachment was noted among both the age group in attachment loss of 6-8mm and 12 mm and more ($p=0.005$).

Conclusion: High prevalence of periodontitis followed by tooth loss was seen in both the age groups of middle-aged and elderly rural population. It was concluded that an association exist between age and periodontitis and subsequent tooth loss. A program policy should be developed for control of the dental diseases, particularly for the rural population as dental services are not available to them at their doorstep as other medical facilities through subcentres.

Keywords: Practice, Pupils, School, Sudan, Tooth brushing.

INTRODUCTION

Teeth and gums reflects a person's health and well-being throughout life. Oral disease have an impact on many aspects of general health, and vice-versa. Since many decades, world is witnessing the omnipresence of periodontitis and dental caries. Periodontitis accounts for

most cases of tooth loss, and their impact increases with age.^{1,2} Tooth loss in elderly population, was reported by several studies in the past, showing a strong association with mortality.^{3,4} In 2010, in the Global Burden Disease study, tooth loss was mentioned as

one of the 100 health conditions causing injuries among populations.⁵ One of the most important indicators of oral health is the ability to retain more number of teeth throughout life. Oral health goals recommended by WHO for the year 2020 has stated that at ages 35-44 and 65-74 years, an increase in the number of individuals with functional dentitions (21 or more natural teeth) should be seen.⁶

Renvert et al. in 2013 found that, prevalence of probing depth more than, or equal to 5 mm with radiographic bone loss more than 5 mm increased with age, regardless of frequent dental visits.⁷ It has been reported that age is associated with tooth loss, due to the progressive loss of attachment level.⁸ There is a need to prevent this periodontal progression among adults and thereby reduced tooth loss among elderly which can be done by maintenance of good oral hygiene. It has been reported that people who have good oral hygiene and periodically visit the dentist, had a lower mortality risk than those who did not have good oral hygiene maintenance.^{9,10} Thus, dental professionals should work for the goal of preservation of natural dentition.

According to National Oral Health Survey (2002-2003) in India, Periodontitis is the most prevalent oral condition affecting more than 50% of Indian population. Untreated chronic periodontitis leads to tooth loss in majority of the cases. The only national survey in India on oral health hadn't included Chhattisgarh state.¹¹ Prevalence of disease is the key factor for effective and sound oral health care planning. Cross sectional surveys has been conducted all throughout India but at local level particularly among urban populations.¹² But 70% of the population in India continues to live in rural areas.¹³ Among them 36% of the total population is children up to 14 years of age, 58% are in the age range of 15-59 years and 60 years and above are only 6.3%. In rural areas, literacy rate is as low as 44.54% with males more literate than females.¹⁴

According to various reviews over periodontitis and tooth loss among Indian

population, there is a very urgent need for standardized population-based studies with a robust design to identify the true prevalence of periodontitis, which will help in lobbying and advocacy of policies towards prevention of such oral diseases.^{11,12} The older people prompted to have a fatalistic attitude and were least likely to attend the dentist. To our knowledge from indexed literature, there are no studies that have investigated the prevalence of tooth loss and periodontal health among rural population of Durg, Chhattisgarh, India. Hence the current study is conducted with aim to determine and compare prevalence of tooth loss and periodontal health among rural middle aged (35-44) and elderly (65-74) population of Durg, Chhattisgarh, India.

MATERIAL AND METHODS

Source of Data (Study population)

The present study was conducted among 35-44 and 65-74 year old adults of rural community of Durg district, Chhattisgarh, India.

Ethical approval

Ethical approval had been obtained from the Ethical Committee of Rungta College of Dental Sciences and Research, Durg, India. An information sheet giving details about the study was provided to the participants to read and for illiterate individuals, the sheet was read out by the interviewers. A signature or a thumb impression was obtained from each of the participating subjects on the consent form.

Sample size determination and sampling procedure

Sample size was determine from the results obtained from the pilot study conducted among 50 individuals each from age group 35-44yrs and 65-74yrs at a rural site. For sampling purpose, 80 villages representing the rural area of Durg district, Chhattisgarh were categorized under five zones viz. East zone, West zone, North zone, South zone and Central zone for sampling purpose. Five villages from each zone were randomly selected by a lottery method. From each village 15 individuals from each age group

were recruited randomly to be a part of the sample who fulfilled the inclusion and exclusion criteria. So, 150 subjects were recruited from each of the five zones which made 750 subjects to be selected to form a representative sample from amongst 80 villages.

Training and calibration

Data regarding general information, periodontal health and tooth loss was collected using CPI index from WHO Oral Health Assessment Form for Adults, 2013.¹⁵ All examination was done by a single examiner who was calibrated to match a benchmark and also calibrated to minimize intra examiner variability. Prior to data collection, the researcher was trained for conducting the survey on 25 individuals from each desired age-group. Calibration was done on 25 individuals, who were checked for tooth loss and periodontitis twice using predefined criteria on successive weeks, and then the results were compared to know the time taken to complete the examination and variability. Agreement for assessment was 88 percent using kappa statistics. An assistant (recording clerk) to the investigator was also trained to enter the data correctly in the assessment form.

Data collection

A door to-door house hold survey was conducted for interviewing all the eligible candidates living in the study area. Subjects with history of systemic disease like epilepsy etc and mentally or physically challenged subjects were excluded. Investigator and the assistant started up with the examining those individuals who agreed to participate in the study, by seating the subject on an ordinary chair with a back rest under available natural light with aseptic preparation at the respective community premises. The natural light was assisted by the torch light in cases where proper illumination of the oral cavity could not be achieved with the natural light. Clinical examination was carried out according to

WHO Basic Oral Health Survey Methodology (2013).¹⁵ The examiner examined the subject and called out the scores for each item of examination clearly and the recorder then entered it in the appropriate place in the proforma for each subject examined. The recording assistant would sit close enough to the examiner so that the instructions and codes can be easily heard and the examiner could see that findings were being recorded correctly.

Health education and courtesy reporting

Researchers delivered education about the maintenance of periodontal health to prevent tooth loss and were asked to report to dentist for treatment. As the villagers couldn't afford dental treatment, they were provided with free and concessional treatments at the concerned college.

Statistical analysis

The data was transformed from pre-coded survey form to computer. Data entry was done by two trained data entry operators using Microsoft Excel (2007). Random verification of 10% of data was done by the principal investigator and internal validity checks were performed. A master excel sheet was created for the purpose of data analysis. SPSS version 16.0 (SPSS Pty Ltd, Chicago, IL, USA) was used for the statistical analyses. Frequency distribution and Chi-square tests at 95% confidence interval was used for analyzing the results and p value < 0.05 was considered as statistically significant.

RESULTS

A total of 750 individual were included in the study; 375 individual from each age group were surveyed. Of which 66.7% were males and 33.3% were females as compared to age group 65-74 years in which it was 294(78.4%) and 81(21.6%) respectively. Considering education, it was noted that majority of individual were either illiterate or were having education only till primary level. When asked about occupation majority 117(31.3%) and

18(4.8) were unskilled workers both from age group 35-44 years and 65-74 years

TABLE 1 – Tooth loss among the study population

Demographic characteristic		Mean number of tooth loss (mean ± SD)	p-value
Age-group	35-44 yrs (n = 375)	6.4 ± 7.9	0.001
	65-74 yrs (n = 375)	15.3 ± 12.2	

n – number of participants in each age-group
SD – standard deviation

44 years was found to be 6.4 ± 7.9 as compared to mean number of tooth loss in 65-74 years which was 15.3 ± 12.2. There was significant difference in mean number of tooth loss in both age group with p=0.001. It was observed that majority of individuals (93.33%) in age group 35-44 years suffered from bleeding on probing followed by 27.5% who suffered from periodontal pockets and only 6.67% possessed healthy periodontium. Surprisingly none of the individual in age group 65-74 years possessed healthy periodontium and were suspected of bleeding on probing out of which 30% suffered from periodontal pocket. There was statistically

TABLE 2 – Periodontal status among the study population

Demographic characteristic		Healthy periodontium (score 0)	Bleeding on probing (score 1)	Periodontal pockets (Score 1 and 2)
Age- group	35-44 yrs (n = 375)	25 (6.67%)	350 (93.33%)	103 (27.5%)
	65-74 yrs (n - ce = 291)	0	100%	87 (30%)
p-value		0.005	0.067	0.113

n – number of participants in each age-group
n-ce – number of participants – number of completely edentulous patient

respectively. 43(11.4 %) in age group 65-74 years were unemployed. None of the individual in age group 35-44 years were unemployed.

Table 1 represents tooth loss in study population. Mean number of tooth loss in 35-

significant difference when considering healthy periodontium of both age group with p=0.005. No statistical difference was found when case of Bleeding on probing (p=0.067) and Periodontal pockets (p=0.113) were considered.(Table 2)

TABLE 3 - Occurrence of periodontal pockets by age groups

Demographic characteristic		Percentage of participants with periodontal pocket as the highest score		
		4-5 mm	≥ 6mm	p-value
Age- group	35-44 yrs (n = 103)	87 (84.5%)	16 (15.5%)	0.0045
	65-74 yrs (n = 87)	54 (62.1%)	33 (37.9%)	

n – number of participants with pockets in each age group

In 34-44 years age group, n=87 (84.5%) had probing depths of 4-5 mm and only 16 (15.5%) had probing depths more than 6 mm, while in age group 65-74 years, n=54 (62.1%) had a probing depth of 4-5 mm while n=33

(37.9%) had a probing depth of 6mm or more. (Table 3)

Among 35-44 years old, attachment loss of 0-3mm, 4-5mm, 6-8mm, and 9-11mm was 123 (32.8%), 117 (31.2%), 114 (30.4%) and 19 (5.6%) respectively. None of the individual

among age group 35 -44 years have attachment loss of 12 mm or more. But for age group 65-74 years it was 61 (21%), 65 (22.3%), 125 (43%) and 30 (10.3%) respectively. In contrast to age group of 35-44 years, loss of attachment observed in 65-74

years noted was 10 (3.4%). Significant difference in mean loss of attachment was noted among both the age group in attachment loss of 6-8mm and 12 mm and more (p=0.005).[Table 4]

TABLE 4 – Loss of attachment among participants by age groups

Demographic characteristic		Percentage of participants with loss of attachment as the highest score					
		Mean number of excluded sextant	0-3mm	4-5mm	6-8 mm	9-11 mm	12 mm or more
Age-group	35-44 yrs (n = 375)	0.3 ± 0.24	123 (32.8%)	117 (31.2%)	114 (30.4%)	19 (5.6%)	0
	65-74 yrs (n- ce= 291)	2.9 ± 2.8	61 (21%)	65 (22.3%)	125 (43%)	30 (10.3%)	10 (3.4%)
p-value		0.001	0.015	0.012	0.005	0.023	0.005

n – number of participants in each age-group
n-ce – number of participants – number of completely edentulous patient

DISCUSSION

In the present study, an attempt was made to assess prevalence of tooth loss and periodontal health among rural middle aged (35-44 year-old) and elderly (65-74 year-old) population of Durg, Chhattisgarh, India. The rationale for choosing the age group of 35-44 and 65-74 years for this study was that, these age group have been specified as the global monitoring age for international comparisons and monitoring of disease trends by the WHO (World Health Organization) to monitor the oral health status.¹⁵ As per the literature search, this is one amongst the very few researches conducted in this context particularly in Chhattisgarh point of view.

Loss of teeth poses a major public health threat in many developing countries.¹⁶⁻¹⁹ Tooth loss has resulted in a state of physical and mental handicapness among the individuals worldwide. The present study indicates that there are predisposing variables which are associated with tooth loss. In the present study, out of the 750 (N) individual surveyed, 375(50%) individuals belonged to each age

group. Majority of individual in both the age group were males above 65 percent and only less than 35 percent were females. This could have been due to the difference in sex ratio.¹³ Majority of the surveyed population were only educated till primary school level or were illiterate. This may have being attributed to low socioeconomic status and large family to support which might have led them to leave the education at early age and work for their livelihood.

Similar was seen when considering occupation, it was observed that majority of the study population in age group 65-74 years consisted of retired individuals 46.4 %, 31.2% were unskilled worker or and 11.4 % were unemployed. From this it can be easily assessed the reason of low socioeconomic status of the study population.

In our study the mean tooth loss increase from 6.4 ± 7.9 to 15.3 ± 12.2 in age group 35-44 years and 65-74 years respectively and the difference were statistically significant (p=0.001). It shows that age is an important predisposing variable associated with tooth

loss. This result of the present study is in agreement with previous studies.^{16,20,21}

The overall prevalence of periodontal diseases in India has been shown to be high in several studies. It can be due to large population of India (approx 1000 million), out of which 72% lives in rural areas. The health care system in rural areas is deficient in oral health services with the dentist: population ratio of about 1:2,00,000. There is negligible existence of paradental infrastructure at village level and the primary health care center level. About 25% community health centers all throughout India are having posting of dental surgeons but have inadequate dental instruments and materials. It has been proven that good oral health care infrastructure at the primary level and easy access to those services has positive effect in decreasing the prevalence of periodontal diseases.²²⁻²⁴

It was observed in the study that majority of the population about more than 90% were having signs of gingivitis (Bleeding on probing) which resembles the data provided by WHO for adults. Although bleeding on probing and periodontal pockets in the present study were not statistically significant ($p=0.067$ and $p=0.113$ respectively), it still had a high prevalence. Such high prevalence may be attributed to lack of dental health care facilities, exposure to risk factors like smoking and chewing tobacco and use of indigenous oral hygiene methods for cleaning teeth prevalent in a rural population. Furthermore, lack of oral hygiene awareness among the rural population must have contributed to the increased risk of periodontal disease among them.^{25,26}

It was noted that individual with age group 65-74 years were more prone to have periodontal pockets (30%) as compared to individuals of age group 35-44 years (27.5%) which is similar to studies conducted in other parts of rural India.^{11,27} This could be due to decrease in cleaning ability due to decrease manual dexterity and also due to tobacco consumption by majority of the surveyed population. Lack

of awareness towards oral hygiene habits may also be one of the major reason of increase prevalence of periodontal disease in older adults. Majority of the adults aged 35-44 years were having periodontal pocket of 4-5 mm and about half of the study population in 65-74 years of age suffered from periodontal pocket of 4-5 mm. The prevalence of periodontal pocket of 6mm or more were more in age group 65-74 years as compared to 35-44 years. This shows the degradation of attachment tissue with increasing age and decreased regenerative process.^{29,30}

Loss of attachment of 6-8 mm was maximum in 64-74 years 125 (43%) as compared to age group of 34-44 years 114 (30.4%). Similar finding were observed in case of attachment loss of 9-11mm with percent of people suffering in age group 35-44 years being (5.6%) as compared to 65-74 years people³⁰ (10.3%). This shows that older adults are more prone to develop attachment loss as compared to young adults which is in accordance with the data represented in National Oral Health Survey & Fluoride Mapping 2002-2003.³¹

Tooth loss was widely prevalent in the present study population. Elderly adults being the valuable assets to the nation needs special attention. The main focus in providing adequate oral health to the elderly is to enable them to maintain adequate physical and social functions. To achieve this goal, needs assessment of oral health status of elderly adults and availability of this data for those who need them for proper planning. Measures should taken in order to provide them with appropriate health care services and guidance. Oral health assessment protocol should be included into every routine procedure to assess their oral health regular interval. It is important to integrate the preventive, curative and educational approach into oral health care program for proper education and motivation.

Proper policy should be for easy access and timely approach to medical and dental services

and technology needed for proper maintenance of oral health of older patients. Dental health education program must be implemented to improve oral health knowledge, skills and attitudes of health professionals and health care workers regarding the oral health of the elderly patients.

CONCLUSION

The oral hygiene status in this study population was very poor, and the majority had calculus, gingival bleeding and a moderate periodontal probing pocket depth of 4–5 mm. A minority had severe periodontal disease with a periodontal probing pocket depth of ≥ 6 mm. Risk factors for periodontal diseases in current rural population included increasing age. Gingival recession, when seen in the study population, was associated with age. Current study has provided an insight into the periodontal status of middle-aged and rural population. As such they provide valuable information to help plan a full national study, should resources be made available for such a study.

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