

A Study on the Extent & Severity of Increased Probing Depth in an Adult Indian Population

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Abstract

Background: There is a little information about occurrence and risk indicators for periodontal diseases in India. The present study describes the prevalence, extent and severity of periodontal depth (PPD) in Indian population and assesses its association with various demographic, behavioral and environmental risk indicators.

Materials and Methods: The target population was adult 20 years in Jaipur city in Rajasthan, India. A representative sample was selected including 100 dental subjects. A full mouth clinical examination was carried out at six sites per tooth on all permanent teeth, excluding third molar. OHI-S index was calculated to estimate the oral hygiene status of the patients. Subjects are categorized according to their age, oral hygiene status, gender, socioeconomic status, education, dietary preference, dental visits, interdental hygiene, habits and diabetes. Their clinical examination was done using a Hu-friedy UNC-15 probe. Data will be analyzed statistically.

Results: Probing pocket depth shows as insignificant association with age, education and method to clean teeth and a non-significant association with gender, location, socioeconomic status, diet, dental visit, smoking, tobacco, interdental hygiene, diabetes. Oral hygiene status proved to be improved with educational status, socioeconomic status, regular dental visits, using brush and interdental aids to clean the oral cavity and cessation of smoking.

Introduction

Oral health is an important part of general health and may be defined as the 'standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general wellbeing' (Department of Health, 1994).¹ There is a little information about occurrence and risk indicators for periodontal diseases in India. However, presence of inequalities in oral health is noticed throughout the country. Over the last few decades the improvements in oral health have been noted in India. There can be factors that can be the determinants for poor oral health in Indian population. Various demographic, behavioral and environmental risk indicators can be gender, socioeconomic status, education, dietary preference, dental visits, interdental hygiene, habits and diabetes.

In 2003, the World Health Organization (WHO) Europe suggested that the social determinants of health included: social gradient, stress, early childhood development, social exclusion, unemployment, social support network, addiction, availability of healthy food, availability of healthy transportation/ active

travel, religion, caste, all social diversities.² Various series of international health promotion conferences reaffirmed the essential value of equity in health and recognized that "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition".³ In other words the above mentioned determinants affects the general health as well as the oral health of the people and it is fundamental right of each and every person to achieve a healthy state of body, mind and soul.

The prevalence and severity of periodontal disease has been known to increase with ageing. While the prevalence of periodontal disease is only 6% for individuals 25–34 years of age, it is over 40% for individuals 65 years of age.⁴ The association between aging and oral health is complex and multifaceted. Declining oral health status over the life span may be partly attributed to physiological changes resulting from the breakdown of various biological systems and the onset of diseases.⁵

Although the prevalence of early-life oral health problems has been declining over time, stark differences exist between racial and ethnic subgroups of the population as

well as in groups with different socioeconomic status, oral hygiene habits, diabetes, education and dental visits. The present study aims to describe the prevalence, extent and severity of periodontal depth (PPD) in Indian population and assesses its association with various demographic, behavioral and environmental risk indicators.

Materials & Methods

Population: The target population in the present study is adults aged 20 years and older in Jaipur city of Rajasthan state in India.

Study Sample: The study sample included 113 individuals of age 20 years and above and has been divided into categories according to their age, gender, socioeconomic status, location, education, diet, dental visits, smoking, tobacco use, method used to clean their teeth, interdental hygiene, and diabetes.

Study design: The study sample has been asked for their personal, dental and medical history, their habits, income for the categorization.

Age groups for categorization will be five including: 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60 years and above. Categorization on basis of gender will be male and female.

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According to socioeconomic status categories are: class I – upper high class, class II – lower high class, class III – upper middle class, class IV – lower middle class and class V - low class / poor.

Individuals will be categorized in these groups according to B.G.Prasad's classification of socioeconomic status.

BG Prasad's classification is based on the following factors:⁶

Per capita monthly income = total monthly income of the family/total members of family.

SES Class	SES Status	Dec- 2014
I	Upper high	Rs.5775 and above
II	Lower high	Rs.2888-5774
III	Upper middle	Rs.1732-2887
IV	Lower middle	Rs.866-1731
V	Low/poor	Below Rs.866

#MF= Multiplication Factor = $4.93 \times 4.63 \times \text{AICPI}^{**}/100$
 *Linking Factor between 1982 and 2001 Series for the AICPI** is 4.63 **AICPI for December 2014=253 {All-India Average Consumer Price Index Numbers for Industrial Workers (Base: 2 0 0 1 = 1 0 0) } .
 †Number is rounded off to nearest 10 rupees after multiplication with MF.

Location will be determined on the basis of patient's permanent address i.e. rural or urban.

Four categories for patient's education are: above high school educated- education above 12th standard, till high school educated- educated till 12th standard, below high school educated- educated below 12th standard and uneducated.

Subject's diet preference is also considered whether vegetarian or non-vegetarian.

Subject's will also categorized on the basis of their regular and irregular dental visits, their method of cleaning their teeth i.e. whether they use brush or finger or other aids for cleaning, and also on the basis of their interdental hygiene.

According to personal habits of patient i.e. smoking patients will be categorized into heavy, moderate and light smokers and other non-smoker tobacco users on the basis of their habits of chewing pan, gutka, supari, etc. Are categorized as tobacco chewers or not.

Daily smokers are classified by how many cigarettes they reported smoking per day: Heavy: 25 or more cigarettes per day, Moderate: 15 to 24 cigarettes per day, and Light: 14 or fewer cigarettes per day.

Patient's diabetic condition will also be taken into consideration and according to that they will be categorized as diabetic and non-diabetic.

Clinical Examination: Oral Hygiene Index- Simplified (OHI-S) - will be calculated to determine patient's oral hygiene status. OHI-S the no of tooth surfaces scored is 6. It has also got two components like OHI index- the Debris index (DI-S) and the Calculus (CI-S). Surface of the tooth examined are 16-buccal, 11-labial, 26-buccal, 36-lingual, 31-labial, 46-lingual.

Debris Index(DI-S):

SCORE	CRITERIA
0	No debris or stains present.
1	Soft debris covering not more than one third of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered.
2	Soft debris covering more than one third but more than two thirds of the exposed tooth surface.
3	Soft debris covering more than two third of the exposed tooth surface.

Calculus Debris Index(CI-S):

SCORE	CRITERIA
0	No calculus present.
1	Supragingival calculus covering not more than one third of the exposed tooth surface.
2	Supragingival calculus covering more than one third but less than two thirds of the exposed tooth surface.
3	Supragingival calculus covering more than two third of the exposed tooth surface.

Calculation of Index: For each individual debris and calculus index is totalled and divided by the no of tooth surfaces scored. The OHI-S value ranges from 0 to 6, that is interpreted as: GOOD – 0.0 TO 1.2, FAIR – 1.3 TO 3.0 and POOR – 3.1 TO 6.0

Periodontal Pocket Depth: All permanent teeth excluding third molars were examined involving six sites per tooth for probing depth measurement. A standard manual periodontal probe UNC-15 Hu-friedy was used for the purpose having markings from 1 to 15 at a distance of 1mm per marking. Six site examined are mesiobuccal, midbuccal, distobuccal, distolingual, midlingual and mesiolingual. Probing depth was defined as the distance from the free gingival margin to the bottom of the pocket/ sulcus. All the measurements were made in millimetres and decimal numbers will be rounded off to nearest whole number. Average probing depth per person will be calculated.

Average probing depth = sum of all readings of all sites of all teeth / (no of teeth*6)

Score: Probing depth will be categorized into following categories: (1) 4m (2) 4mm(3) 5mm(4)

6mm(5) 7mm

Statistical Analysis: The values obtained were presented as range, mean, and standard deviation. The Pearson Chi-square test was used for comparisons among various groups and with different variables. Relationship between various clinical parameters and periodontal pocket depth was assessed by Pearson's correlation coefficient and a P-value of 0.05 or less was considered as statistically significant.

Result

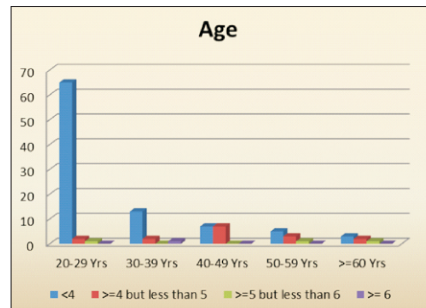
There were total 113 subjects involved in the study, out of which 73(64.6%) were male and 40(35.4%) were female. 68 subjects involved were aged between 20-29yrs, 16 between 30-39 yrs, 14 between 40-49 yrs, 9 between 50-59 yrs and 6 subjects were above 60yrs. Age of the subjects showed a significant relationship with oral hygiene status (table 1) and periodontal

pocket depth (graph 1). Oral hygiene status and the depth of periodontal pocket were found to be non-significant with gender, location, diet, dental visit, smoking, tobacco, interdental hygiene, diabetes (controlled). However, the presence of pockets was slightly more in female subjects (graph 2), rural population (table 2), patients with vegetarian diet preferences (table 3) and, non-regular dental visits (table 4). Education does effects oral hygiene status and pocket depths (graph 3 & 4). Poor oral hygiene status and greater pocket depth were found in uneducated subjects. Oral hygiene status is significantly related to socio-economic status of the population (table 5). Also, use of interdental aids and brushing method to clean the oral cavity were found to be more successful in maintaining a good oral hygiene status and reduction of pocket depths.

Table 1: relationship of oral hygiene status with age

Age(yrs)	OHI-S index			Total	Chi-sqr value	p-value
	Poor	Fair	Good			
20-29 Yrs	16	31	21	68	26.19	0.001
30-39 Yrs	10	6	9	16		
40-49 Yrs	8	5	1	14		
50-59 Yrs	4	4	1	9		
>=60 Yrs	6	0	0	6		
Total	44	46	23	113		

Graph 1: relationship of age and PPD



Graph 2: gender and PPD

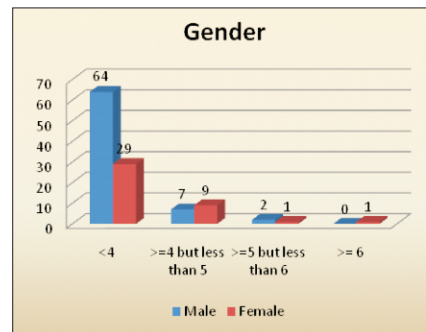


Table 2: location of the subjects v/s PPD

LocationRural/urban * PPD		PPD				Total
Count		<4	>=4 but less than 5	>=5 but less than 6	>= 6	
LocationRural/urban	Rural	26	5	3	0	34
	Urban	67	11	0	1	79
Total		93	16	3	1	113

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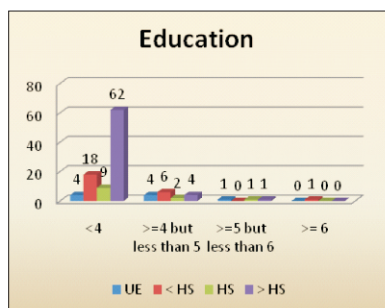
Table 3: diet v/s PPD

Diet * PPD		PPD				Total
Count		<4	>=4 but less than 5	>=5 but less than 6	>= 6	
Diet	Veget.	63	12	3	1	79
	Non-veget.	30	4	0	0	34
Total		93	16	3	1	113

Table 4: dental visit v/s PPD

Dental visit * PPD		PPD				Total
Count		<4	>=4 but less than 5	>=5 but less than 6	>= 6	
Dental visit	Reg.	19	3	0	0	22
	Non-reg.	74	13	3	1	91
Total		93	16	3	1	113

Graph 3: education status v/s PPD



Graph 4: education status v/s oral hygiene status.

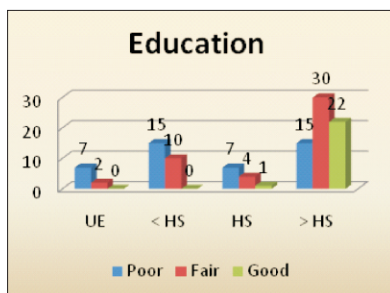


Table 5: effect of socio-economic status on oral hygiene status.

S.E. Status * OHI-S index		OHI-S Index			Total
Count		Poor	Fair	Good	
S.E. Status	Low	2	1	0	3
	LM	14	9	1	24
	LH	11	11	7	29
	UM	9	5	2	16
	UH	8	20	13	41
Total		44	46	23	113

Discussion

In this study Probing pocket depth shows a significant association with age, education and method to clean teeth and a non-significant association with gender, location, socioeconomic status, diet, dental visit, smoking, tobacco, interdental hygiene, diabetes. Oral hygiene status proved to be improved with educational status, socioeconomic status, regular dental visits, using brush and interdental aids to clean the oral cavity and cessation of smoking.

The prevalence and severity of periodontal disease has been known to increase with ageing. While the prevalence

of periodontal disease is only 6% for individuals 25–34 years of age, it is over 40% for individuals 65 years of age.⁴The association between aging and oral health is complex and multifaceted. Declining oral health status over the life span may be partly attributed to physiological changes resulting from the breakdown of various biological systems and the onset of diseases.⁵ Studies suggest that periodontal disease is more severe in elderly people because of cumulative tissue destruction over a lifetime rather than an age-related, intrinsic deficiency or abnormality which affects periodontal susceptibility.⁷

The progression of periodontal disease on the basis of gender discrimination has not been established till date. However, some studies suggest the higher prevalence of destructive periodontal disease in men than women. The reasons for these gender differences have not been explored in detail, but are thought to be related more to poorer oral hygiene, less positive attitudes toward oral health, and dental-visit behaviour among males than to any genetic factor. The important factor to be considered is that women still have varied periodontal problems due to hormonal fluctuations in various decades of life.⁸The reasons for these sex differences have not been explored in detail, but are thought to be related to poor oral hygiene and dental-visit behavior among males than to any genetic factor. It has been shown that males usually exhibit evidence of poor oral hygiene than females.⁹

The subjects who are more aware about their oral health tend to maintain a better oral hygiene status. Brushing twice a day using a brush and use of interdental aids are some measures taken by such population. These people tend to visit a dentist regularly i.e. within 6-8months if possible. That helps them to maintain oral health.

In this study socioeconomic status does not affect the probing pocket depth, however, it does affect the oral hygiene status. Some studies are in favor of this effect and some are in against. A study done by Russell and Ayers stated that persons with the higher educational attainment tend to follow occupations with better pay and social prestige, to show cleaner mouths, and to receive more adequate professional dental care. A person's occupational status could be inferred with great accuracy on the basis of his education and debris and dental care status. At this point, the question occurs as to whether the difference between groups of unequal socioeconomic status might be due wholly to differences in personal cleanliness and professional care.¹⁰ when the comparisons are carried out with persons of similar debris and care status, those with the better education continue to show the better periodontal experience.¹⁰ A better

socioeconomic status provide better means for oral hygiene practices. Educational status or level of education of the subjects is the better determinants for pocket depths. An educated person knows the value of oral health and thus takes measures related to the betterment. Also, two diabetic patients of controlled sugar levels were also included in the study who showed good oral hygiene status and no presence of pockets. That may be in spite of being affected by diabetes they were aware of the importance of good oral hygiene and were maintaining that.

Conclusion

Oral hygiene status proved to be improved with educational status, socioeconomic status, regular dental visits, using brush and interdental aids to clean the oral cavity and cessation of smoking. Oral hygiene status directly affects the periodontal status of the patient. A vast difference in the oral health status can be seen in the Indian population. Various actions at local, national or international levels to promote sustainable oral health improvements are necessary to be carried out. Person's educational status affects the overall health which needs to be improved in Indian population. Other studies regarding awareness, hygiene practices at higher scale needed to be carried out and oral hygiene measures should be followed for the betterment.

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