

ORIGINAL ARTICLE

Prevalence of periodontitis in rural and urban populationVimal Kumar¹, Vipin Agarwal², Manish Khatri³, Guljot Singh⁴, Sunny⁵

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Citation

Kumar V, Agarwal V, Khatri M, Singh G, Sunny. Prevalence of periodontitis in rural and urban population. Indian J Comm Health. 2015; 27, 3: 366-371.

Source of Funding : Nil **Conflict of Interest**: None declared

Article Cycle

Submission: 17/09/2015; **Revision**: 20/09/2015; **Acceptance**: 25/09/2015; **Publication**: 30/09/2015

Abstract

Background: Periodontal diseases are multifactorial in origin having different forms and progression. The incidence and prevalence rates of periodontitis may be different in different areas of the World & India. **Aim & Objective**: To estimate the prevalence of periodontal disease. **Methods & Materials**: The study population consisted of multistage stratified random sample of 1280 subjects from total population of district Ghaziabad. A cross-sectional study was conducted with multi stage stratified random sampling techniques to select the sample population. The subjects were divided into different age groups and the periodontal assessment was made on the basis of, oral hygiene index – simplified (OHI-S, Index), CPITN index, ESI Index. The statistical analysis was done using the CHI-Square test to determine the p value. **Results**: Significantly more number of females were found to be having good oral hygiene status than males. **Conclusions**: Significant association was observed between males and females having different scores of OHI-S, CPITN and ESI index in different age groups.

Key Words

Periodontitis; prevalence; OHI-S; CPITN; ESI; Ghaziabad

Introduction

Periodontal diseases are a group of lesions affecting the tissues surrounding and supporting the teeth in their sockets. Dental caries historically developed as a result of emerging civilizations, paleo-pathological studies have indicated that diseases of the gums and loosening of teeth are as old as humanity. These occur in animals, wild as well as domesticated, and continue to be one of the most common diseases afflicting the human dentition, (1).

Periodontal diseases have a number of characteristics that must be considered in conducting epidemiological studies. Periodontitis appears to be an infectious disease that has many

characteristics of a chronic disease, most forms progress slowly and some aspects are not reversible, even if the infective agent is removed. Thus, the incidence and prevalence rates of periodontitis may be quite different. In addition, the disease exhibits a pattern of multiple attacks, often affecting one or more sites around one or more teeth resulting in the epidemiological measures of the disease being very sensitive to tooth loss and creates a problem of repeated non-independent measures. The way in which the disease progress is not clear, creating problems in measurement of active disease and in defining a case,(2).

It becomes essential that the exact definition or descriptions of the disease conditions to be

investigated are clearly delineated when describing the disease distribution within a particular population. The particular foci of the clinical investigation may depend on the study purpose.

Aims & Objectives

To estimate the prevalence of periodontal disease in subjects aged between 10- 50 years and above in district Ghaziabad (Uttar Pradesh, India) using the Community Periodontal Index of Treatment Needs, along with the modified Oral Hygiene Index and Extent and Severity Index by checking the actual load of the disease in the population surveyed.

Material and Methods

A cross-sectional study was conducted in which multi stage stratified random sampling techniques was used to select the sample population as under:

1) First Stage: Out of four Tehsils of District Ghaziabad, two of them were selected by simple randomization (Modinagar and Hapur).

2) Second Stage: The selected tehsils having 10 zones (Modinagar, Patala, Niwari, Faridnagar, Bhojpur, Muradnagar, Philakawa, Babugarh, Hapur and Dholana,) out of these three zones were selected by the systematic randomization. (Modinagar, Bhojpur and Hapur).

3) Third Stage: Modinagar was having 26 wards. Out of these, 6 wards were selected by Fisher and Yates table of Random Number (Multanipura, Fafranabasti, Adarshnagar, Modipone, Govindpuri, Modisteel Colony) from Modinagar.

Bhojpur was having 54 colonies, Ten villages were selected by Fisher and Yates table of Random Number (Sara, Yakutpurmavi, Kadrabad, Rori, Saidpur, Phaphrana, Sikri khurd, Bhakharwa, Khanjarpur and Bhojpur).

Hapur was having 72 villages, seven were selected by Fisher and Yates table of Random Number (Anwarpur, Abdullahpur Mori, Upada, kurana-kamalpur, Nizampur, Firozpur and Firozabad).

4) Fourth Stage: Full information was collected from the ward members and village Pradhans about the areas to be examined like the total number of residents, age group etc. The study population consisted of random sample of 1280 subjects from total population of district Ghaziabad. The selected subjects for the study were informed briefly about the study plans and were asked to sign a consent form.

Valuable information from every patient was collected via structured questionnaire which

consisted of questions of our interests like Age, Educational status, Occupation, Socio-Economic Status, Oral Hygiene Status, Smoking or Chewing tobacco. Total numbers of subjects selected for the study were divided into the following age groups: 20-30yrs, 30-40yrs, 40-50yrs, 50yrs and above. Every individual along with routine dental examination was assessed for the periodontal disease status by using sterilized Mouth Mirror and Explorer (Shepards Crook) for the simplified oral hygiene index introduced in 1964 by John C. Green and Jack R. Vermilion, (3) Sterilized Mouth Mirror and WHO CPITN-C Probe for Community Periodontal Index of Treatment Needs introduced by Jukka Ainamo, Jean Martin and Jennifer Sardo- Infirri in 1982, (4) and Sterilized Mouth Mirror, Williams Graduated Periodontal Probe for Extent and Severity Index developed in 1986 by J.P Carlos, M.D.Wolfe, and A.Kingman, (5). **Statistical Analysis:** The statistical analysis was done using the CHI-Square test to determine the p value. The formula used for CHI-square test was:

$$\chi^2 = \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Results

The present study was done to estimate the prevalence of chronic periodontitis in the population of district Ghaziabad. By multistage stratified sampling technique total 1280 subjects were selected from different tehsils and blocks of district Ghaziabad.

Out of 1280 total sample population 703 (54.92%) were males and 577 (45.08 %) were females. Same populations was further divided into different age groups viz 20-30 years [male- 212 (30.15%), female – 200 (34.66%)], 30-40 years [male -201 (28.59%), female- 155 (26.86%)], 40-50 years [male- 164 (23.32%), female -103 (17.86%)], 50 years and above [male – 126 (17.92%), female -119 (17.86%)]. Two indices were used, Community Periodontal Index of Treatment Needs (CPITN) and Extent and Severity Index (ESI) to assess chronic periodontitis prevalence and Oral hygiene index simplified (OHI-S) was used to evaluate overall hygiene of study population. ([Table 1](#)).

15.39 percent of total population was having good oral hygiene. Percentage of female (18.7%) was more in comparison to male (12.66%). 36.8 percent of total population was having fair oral hygiene. Percentage of female (38.82%) was more than male

(35.13%). 47.81 percent of total population was having poor oral hygiene. Percentage of female (42.46%) was less than males (52.2%). (Table 2)

4.45 percent of total population was periodontally healthy. Percentage of female (4.85%) was slightly more than male (4.12%). 54.84 percent of total population was suffering from chronic gingivitis. Percentage of female (55.46%) was more than male (42.96%). 40.70 percent of total population was suffering from chronic periodontitis with combined shallow and deep pockets. Percentage of female (39.69%) was less than male (41.53%). (Table 3)

47.12 percent of total population was having absence of loss of attachment. Percentage of female (48.70%) was slightly more than male (45.80%). 51.79 percent of total population was having loss of attachment generalized either 1-3 mm or more than 3mm. Percentage of female (29.28 %) was less than male (32.5%) in generalized loss of attachment 1-3mm. Percentage of female (21.49%) was slightly more than males (20.57%) in generalized loss of attachments more than 3mm. Only (0.11%) of total population was having localized loss of attachment either 1-3mm or more than 3mm

11.3% (20-30 years male), 17.5% of (30-40 yrs male), 9.7% of (40-50 yrs males) and 10.3% of (50 yrs & above male) were having good oral hygiene. 23.5% of (20-30 yrs female), 17.4% of (30-40 yrs female), 14.5% of (40-50 yrs female) and 16% of (50 yrs & above) female were having good oral hygiene. 52.2% of (20-30 yrs male), 38.4% of (30-40 yrs male), 25.6% of (40-50 yrs male) and 13.5% of (50 yrs and above male) were having fair oral hygiene. 51% of (20-30 yrs female), 36.1% of (30-40 yrs female), 27.2% of (40-50 yrs female) and 31.9% of (50 yrs & above female) were having fair oral hygiene. 35.8% of (20-30 yrs male), 44.4% of (30-40 yrs male), 64.6% of (40-50 yrs male) and 76.1% of (50 yrs & above male) were having poor oral hygiene. 25.5% of (20-30 yrs female), 46.4% of (30-40 yrs female), 59.11% of (40-50 yrs female) and 32.1% of (50 yrs & above female) were having poor oral hygiene. Maximum percentage (59.11%) of poor hygiene category was in 40-50 yrs of female. Results indicate that good oral hygiene was better in younger males and females, poor oral hygiene was more in elder age group. Females showed better oral hygiene than males

3.7% of (20-30 yrs male), 6% of (30-40 yrs male), 4.8% of (40-50 yrs male) and 0.7% of (50 yrs & above male) were having healthy periodontium. 8.5% of (20-30 yrs female), 2.6% of (30-40 yrs female), 6.8%

of (40-50 yrs female) and 0% of (50 yrs & above female) were having healthy periodontium. 10.8% of (20-30 yrs male), 24% of (30-40 yrs male), 6.6% of (40-50 yrs male) and 14.3% of (50 yrs & above male) were having bleeding from gingiva. 18% of (20-30 yrs female), 15.4 of (30-40 yrs female), 9.5% of (40-50 yrs female) and 14.2% of (50 yrs & above female) were having bleeding from gingiva. 57% of (20-30 yrs male), 38% of (30-40 yrs male), 40.2% of (40-50 yrs male), and 30.1% of (50 yrs & above male) were having calculus deposits. 40% of (20-30 yrs female), 42.5% of (30-40 yrs female), 40% of (40-50 yrs female), and 37.7% of (50 yrs & above female) were having calculus deposits. 9% of (20-30 yrs male), 13% of (30-40 yrs male), 10.3% of (40-50 yrs male), and 12.6% of (50 yrs & above male) were having shallow pockets. 11% of (20-30 yrs female), 15.4% of (30-40 yrs female), 5.6% of (40-50 yrs female), and 10.9% of (50 yrs & above female) were having shallow pockets. 18.9% of (20-30 yrs male), 29.5% of (30-40 yrs male), 37% of (40-50 yrs male), and 41.9% of (50 yrs & above male) were having deep pockets. 22.5% of (20-30 yrs female), 23.2% of (30-40 yrs female), 38.3% of (40-50 yrs female), and 36.9% of (50 yrs & above female) were having deep pockets. Percentage of males & females subjects with healthy gingiva, bleeding, calculus and shallow pockets was more in younger age group, but deep pockets were more in elder age group.

Negligible percentage of male as well as female subjects were having localized 1-3 mm loss of attachment. No percentage of male and female of any age group was having localized loss of attachment more than 3mm. 21.2% of (20-30 yrs male), 30% of (30-40 yrs male), 40.8% of (40-50 yrs male), and 42.7% of (50 yrs & above male) were having generalized 1-3mm of loss of attachment. 23.5% of (20-30 yrs female), 25.7% of (30-40 yrs female), 41.7% of (40-50 yrs female), and 32.8% of (50 yrs & above female) were having generalized 1-3mm of loss of attachment. 15.9% of (20-30 yrs male), 15% of (30-40 yrs male), 21.3% of (40-50 yrs male), and 36.6% of (50 yrs & above male) were having generalized loss of attachment more than 3mm 12% of (20-30 yrs female), 25.1% of (30-40 yrs female), 22.3% of (40-50 yrs female), and 31.8% of (50 yrs & above female) were having generalized loss of attachment more than 3mm. Results indicate more percentage of male as well as female of elder subjects than younger in generalized loss of attachment 1-3 mm or more than 3 mm. 61.3% of

(20-30 yrs male), 52.9% of (30-40 yrs male), 35.9% of (40-50 yrs male), and 20.7% of (50 yrs & above male) were having no loss of attachment. 64.5% of (20-30 yrs female), 44.2% of (30-40 yrs female), 35.7% of (40-50 yrs female), and 35.3% of (50 yrs & above female) were having no loss of attachment. Results indicate more percentage of male as well as female of younger subjects than elder subjects with no loss of attachment or healthy periodontium

Discussion

It was a cross-sectional survey done by using multi-stage stratified sampling procedure. Sampling method is a critical issue in descriptive type of epidemiological surveys to assess the true magnitude of the disease. Sample population is expected to represent the whole population without any bias. In the present trial 1280 subjects were selected based on the above said sampling technique. The population was further divided on the basis of gender and age group and the data was collected. (Table 1) More number of male populations (52.2%) in comparison to female (42.9%) was found to be having poor oral hygiene status with score more than 3 in OHI-S. Slight difference was observed for OHI-S fair inference among male and female with value 35.13% and 38.82 % respectively. Significantly more number of females (18.7%) were found to be having good oral hygiene status than males (12.66 %, Table 2). These results are in conformity with several studies reported, (6,7,8).

The more percentage of population showing poor oral hygiene in spite of brushing atleast once a day indicate utmost attention. Incorrect brushing technique is the major issue why people are not able to maintain teeth plaque free by daily home care (9,10).

Distribution of male/female in different CPITN coding was 0 (4.1% / 4.8%), 1 (4% / 15%), 2 (42% / 40.3%), 3 (11% / 11%) and 4 (30% / 28%). Percentage of female was comparatively less in periodontal healthy category in comparison to male. If we compare the percentage of subjects having periodontal pocket with percentage of subjects having poor oral hygiene status, the values are comparable, indicating correlation of poor oral hygiene with CPITN scoring 3 and 4.

The extent and severity index (ESI) is an attempt to collect the maximum amount of information from a clinical examination consistent with the need to achieve a reasonable degree of data collection. Here

one can compare overall percentage of subjects suffering from chronic periodontitis as per ESI (55%) which was different from that has been reflected in CPITN (40%). The CPITN has shown to underestimate or overestimate the different coding as has been reported by several authors, (11,12).

Age related distribution of periodontal disease indicate that good oral hygiene was better in younger male and female, poor oral hygiene was more in elder age group. Female showed better oral hygiene than males. In majority of the age groups, lesser number of female participants were shown to be having poor oral hygiene status this is in accordance with several studies, (13). Joseph Z Alaise (14) demonstrated significantly lower mean OHI-S values in girls as compare to boys in the total studied population and within the different age groups.(14) The increased percentage of subjects in poor oral hygiene status with increase age, indicates increase in prevalence of periodontal disease with age this has been confirmed in several studies, (15,16) as well as in present study these observation necessitates the enforcement on primary level of disease prevention that is oral hygiene maintenance instructions.

Percentage of male and female subjects with healthy gingiva, bleeding, calculus, and shallow pockets was more in younger age groups, but deep pockets were more in elder age group. This indicates the increase in prevalence of periodontal disease with age, as in conformity with several studie, (15,16).

Negligible percentage of male as well as female subjects were having localized loss of attachment 1-3 mm. No percentage of male and female of any age group was having localized loss of attachment more than 3mm.

Results indicate more percentage of male as well as female of elder subjects than younger had generalized loss of attachment of 1-3 mm or more than 3 mm. Results also indicate more percentage of male as well as female of younger subjects than elder subjects with healthy periodontium or relative no loss of attachment. Age related prevalence of periodontal disease indicated by loss of attachment was observed to be associated with increasing age as in conformity with different studies, (10,15).

It has been observed in the present study that periodontal disease prevalence as well as poor oral hygiene was increased with increased age. Age is not a causative factor responsible for initiation or progression of periodontal disease but in the

cumulative effect of local factors responsible for chronic periodontitis over the period of time.

Conclusion

Based on the result of study, following conclusions were drawn:

Periodontal disease was found to be highly prevalent in the study population and severity of disease increased with age. More number of subjects in younger age group was found to be healthy.

Periodontal diseases were more in male subjects in comparison to females.

Severity of the disease was more in rural population in comparison to urban population

Authors Contribution

VK: Acquisition, analysis and interpretation of data, VA: Drafting of the manuscript, Final approval of manuscript; MK & GS: Conception and design of study; S: Drafting of article.

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Tables

TABLE 1 GENDER WISE DISTRIBUTION OF STUDY POPULATION IN DIFFERENT AGE GROUPS

Sex	Age group					Total				
	20-30 years	30-40 years	40-50 years	50 years & above						
Male	212	30.15%	201	28.59%	164	23.32%	126	17.92%	703	54.92%
Female	200	34.66%	155	26.86%	103	17.86%	119	20.62%	577	45.08%

TABLE 2 OVERALL DISTRIBUTION OF STUDY SAMPLE IN DIFFERENT SEVERITIES OF OHI-S

OHI-S score	Male		Female		Total	
0-1.2	89	12.66%	108	18.7%	197	15.39%
1.3-3.0	247	35.13%	224	38.82%	471	36.8%
3.1-6.0	367	52.20%	245	42.46%	612	47.8%

TABLE 3 OVERALL DISTRIBUTION OF STUDY SAMPLE IN DIFFERENT SEVERITIES OF CPITN

CPITN score	Male		Female		Total	
0	29	4.12%	28	4.85%	57	4.45%
1	80	11.38%	87	15.07%	167	13.0%
2	302	42.96%	233	40.38%	535	41.8%
3	78	11.09%	65	11.26%	143	11.2%
4	214	30.44%	164	28.42%	378	29.53%

TABLE 4 OVERALL DISTRIBUTION OF STUDY SAMPLE IN DIFFERENT SEVERITIES OF ESI

Loss of attachments		Male		Female		Total	
1-3mm	Localized	11	1.57%	03	0.51%	14	0.11%
More than 3mm		0.0	0.0%	0.0	0.0%	0.0	0.0%
1-3mm	Generalized	226	32.5%	169	29.28%	395	30.85%
More than 3mm		144	20.57%	124	21.49%	268	20.93%
0 mm		322	45.8%	218	48.70%	603	47.12%

TABLE 5 AGE AND GENDER WISE DISTRIBUTION OF STUDY SAMPLE IN DIFFERENT SEVERITIES OF OHI-S

	20-30 yrs		30-40 yrs		40-50 yrs		50 yrs & above	
	Male	Female	Male	Female	Male	Female	Male	Female
0.0-1.2	25(11.2%)	47(23.5%)	35(17.4%)	27(17.4%)	16(9.71%)	15(14.5%)	13(10.3%)	19(16%)
1.3-3.0	111(52.2%)	102(51%)	77(38.4%)	56(36.1%)	42(25.6%)	28(27.2%)	17(13.5%)	38(31.9%)
3.1-6.0	76(35.8%)	51(25.5%)	89(44.4%)	72(46.4%)	106(64.6%)	60(59.1%)	96(76.1%)	62(32.1%)

TABLE 6 AGE AND GENDER WISE DISTRIBUTION OF STUDY SAMPLE IN DIFFERENT SEVERITIES OF CPITN

	20-30 yrs		30-40 year		40-50 yrs		50 yrs & above	
	Male	Female	Male	Female	Male	Female	Male	Female
0	8(3.7%)	17(8.5%)	12(6%)	4(2.6%)	8(4.8%)	7(6.8%)	1(0.7%)	0(0%)
1	23(10.8%)	36(18%)	28(24%)	24(15.4%)	11(6.6%)	10(9.5%)	18(14.3%)	17(14.2%)
2	121(5%)	80(40%)	76(38%)	67(42.5%)	66(40.2%)	41(40%)	38(38.1%)	45(37.7%)
3	19(9%)	22(11%)	26(13%)	24(15.4%)	17(10.3%)	6(5.6%)	16(12.6%)	13(10.9%)
4	40(18.9%)	45(22.5%)	59(29.5%)	6(23.2%)	62(37%)	39(38.3%)	53(41.9%)	44(36.9%)

TABLE 7 AGE AND GENDER WISE DISTRIBUTION OF STUDY SAMPLE IN DIFFERENT SEVERITY OF E.S.I

Loss of attachment	20-30 yrs		30-40 yrs		40-50 yrs		50 yrs & above	
	Male	Female	Male	Female	Male	Female	Male	Female
1-3 mm	4(1.4%)	0(0%)	3(1.4%)	3(1.9%)	3(1.7%)	0(0.1%)	1(8%)	0(0%)
More than 1-3 mm	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
1-3 mm	45(21.2%)	47(23.5%)	61(30%)	40(25.7%)	67(40.8%)	43(41.7%)	53(42.7%)	39(32.8%)
More than 3 mm	32(15.9)	24(12%)	31(15%)	39(25.1%)	35(21.3%)	23(22.3%)	46(36.6%)	38(31.8%)
No loss of attachment	131(61.3%)	129(64.5%)	106(52.9%)	73(44.2%)	59(35.9%)	37(35.7%)	26(20.7%)	42(35.3%)