Prevalence of Periodontitis in Nuh (Haryana State): The Most Backward District of India

Abstract
Background: Majority of the Indian population suffers from oral health diseases, especially periodontitis. Clinical manifestations of the disease are most commonly seen after 35 years of age, which if left untreated will ultimately result in loss of the tooth. Materials and Methods: A total of 576 subjects of different age groups were selected from 11 villages of Nuh district by simple random selection. The demographic data and oral hygiene habits along with deleterious habits such as smoking, panmasala, and tobacco chewing were recorded. Community periodontal index of treatment need (CPITN) was recorded with the help of CPITN probe. Results: Deep pockets were observed in 45.6% of the participants and 26.2% of the sextants. Shallow pockets were observed in 38.3% of the participants and 36.4% of the sextants. Calculus had the highest score in 15.6% of the participants and 49.15% of the sextants. An inference was drawn from the results that among 576 participants 72.89% of individuals needed TN2 whereas 26.23% of individuals needed TN3 and 0.65% of individuals needed TN1. Conclusions: Severity of periodontal disease increased with age. The severity of periodontitis was observed significantly more in smokers and tobacco chewers as compared to nonsmokers and nontobacco chewers, respectively.

Keywords: Community periodontal index of treatment need, periodontal disease, prevalence

Introduction
Periodontitis is an infectious disease resulting in inflammation with in supporting tissues of the teeth, progressive attachment loss and bone loss which may lead to the pocket formation and/or recession and recognized as a major health problem worldwide.[1]

Indian is the second largest populated country which represents almost 17.31% of the world’s population. In India, 68.84% of the population lives in rural areas.[2] The national density of dentist is just 2.4 per lac population. Hence, the acute shortage of trained dental practitioners has led to severe compromise in dental health which leads to severe form of gingivitis and in later stage periodontitis.[3] To overcome this problem, there is a need of proper planning to prevent periodontitis at the community level which based on baseline information about health-related states in terms of distribution as well as determinants. Many national probability surveys have assessed the periodontal status of the U. S. population. The earliest of these surveys (1960–1962) Health Examination Survey and the (1971–1974) National Health and Nutrition Examination Survey (NHANES) assessed periodontal status visually, while subsequent surveys (NIDCR Survey of Employed Adults and Seniors 1985–1986, NHANES III 1988–1994, NHANES 1999–2004 and 2009–2010) have used probe measurements to assess pocket depth (PD) and gingival recession around teeth.[4] Many epidemiological studies have been carried out on the prevalence of periodontal disease in populations of various parts of India. Nuh district of Haryana state is one of the most backward districts in India, which stands at the bottom of the National Institute of Transforming India (NITI) Aayog’s 101 most backward districts.[5] Poor health, education, infrastructure, and the lack of qualified dental personnel make this area needful for proper treatment planning through epidemiological surveys in the field of dentistry.[6,14] No studies have been conducted with respect to the prevalence of periodontitis in Nuh district of Haryana state, India.

This present cross-sectional survey was done in which we estimated the prevalence...
of periodontitis among the rural population of Nuh district of Haryana by using community periodontal index of treatment need (CPITN). This index was developed especially by joint committee of the World Health Organization (WHO) and Federation Dentaire Internationale to evaluate the periodontal status and treatment need at a community level. It is simple, inexpensive, and less time consuming because of examining a subset of index teeth.

The present study was done with the following aims and objectives:

1. To estimate the prevalence of periodontal disease in subjects aged between 20 and 50 years and above in Nuh (Haryana, India), using CPITN of periodontal disease assessment
2. To assess the periodontal treatment need of the population surveyed
3. To estimate the effects of age, gender, oral hygiene habits such as smoking, panmasala, and tobacco chewing on the periodontal status of the study population.

Materials and Methods

Study population and sample size

A cross-sectional study was conducted in which the study population was selected by multistage stratified randomized sampling technique. Eleven villages were selected from district Nuh by simple random selection. In each village, 52–54 individuals of different age groups were examined among the participants after obtaining their written consent. The sample size was calculated using the formula \( n = 4 \left( \frac{pq}{L^2} \right) \) where \( P = \) population proportion of positive character \( q = 1 - P, \) and \( L = \) allowable error. The survey was conducted using structured questionnaire. Total sample of 576 individuals consisting of 302 males and 264 females was divided into four groups: Group I – 20–30 years, Group II – 30–40 years; Group III – 40–50 years; and Group IV – 50 years and above. Data were collected both on the basis of percentage of individuals and percentage of sextants having different CPITN scoring and treatment needs. After calculating the mean values and standard deviation, Chi-square test and Z-test were done to evaluate inter-group statistical significance of the observations. Deep periodontal pockets were recorded in 45.3% of the individuals and 26.2% of the sextants. Shallow pockets were observed in 38.3% of the participants and 36.4% of the sextants population [Tables 1 and 2]. Calculus was found to be present in 15.6% of the participants and 49.25% of the sextants. Treatment Need III was present in 45.3% of the subjects and 26.2% of the sextants. Treatment Need II was observed in 41.13% of the participants and 72.99% of the sextants. On the basis of sextants, scaling was the treatment needed in largest group of the population [Table 3]. Age-wise changes have been observed in CPITN coding both on the basis of sextant as well as subjects. Calculus status was more in younger age group (60.55%) than older age group (28.2%). Deep and shallow pockets were observed to be maximum (52.12%) in Groups III and IV (50 years and above). It decreased with age as follows: 32.26% in Group II (30–40 years) and 16.64% in Group I (20–30 years). On inter-group comparison, most of the differences were statistically significant with “Z” values more than 1.96. The pattern of observation was nearly the same for different treatment need categories. Shallow pockets were observed to be maximum (29.18%) in Group IV (50 years or older) and minimum (21.5%) in Group I (20–30 years). Calculus was maximum (52.5%) in Group I (26–35 years) and minimum (42.58%) in Group IV (50 years and above).
The severity of the disease has been observed to increase with increasing age [Tables 1 and 2]. CPITN periodontal status was found to be nearly the same for male and female gender. The difference was not significant statistically. In smokers, the percentage of deep pockets was observed to be double in comparison to nonsmokers. The difference was significant statistically with "P" = 0.041. Shallow pockets were also found to be more in smokers than nonsmokers. Calculus was less (27.60%) in smokers than nonsmokers (51.79%) [Table 4]. Deep pockets were more (22.1%) in individuals using finger and powder to maintain their oral hygiene in comparison to datum users (10.12%) and toothbrush and paste users (0.25%). The same pattern was observed for shallow pockets [Table 5]. The difference in periodontal status tobacco users and nonchewers was small but significant statistically. The percentage of sextants with severe disease was little less (30.00%) in chewers than nonchewers (18.37%) [Table 6].

Discussion

In the present study, overall estimation of CPITN Code 4 and 3 on the basis of percentage of subjects was 38.3% and 45.6%, respectively [Table 1]. Periodontitis was seen in 83.9% of the subjects. Similar prevalence of periodontitis was reported from Meerut, Bangladesh, Kenya, and Nepal.\[^{6-9}\] In Trivandrum, Joseph and Cherry reported prevalence rate of periodontitis (27%) which was lower from our study prevalence rate (83.9%). The main reasons for this difference were the age of the population and oral hygiene habits. More than 50% of the population was below 30 years of age and 70% of the population studied was using toothbrush once daily and the rest 30% was using brush twice daily.\[^{10}\] Jageedear M et al. demonstrated 45% overall prevalence in Puducherry, which was also less in comparison to the present study. The main reasons were Puducherry being a small union territory has a small population with good infrastructure and health services, as reported by the authors.\[^{11}\] The prevalence of periodontitis in the present study may be because of improper oral hygiene maintenance, deficiency doctors, and inferior health services in district Nuh.

This cross-sectional study is similar to a study conducted by Bansal et al. Who observed that the prevalence and severity of periodontal disease increased with the advancing age.\[^{16}\] The reason could be attributed to the general deterioration in immune function and tissue integrity in the older age that may increase the severity of the periodontal disease.\[^{17}\]

The prevalence of periodontitis was different when data presentation was done on the basis of percentage of subjects and sextants affected from periodontal disease; 45.6% of
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### Table 4: Percentage of sextants with different community periodontal index of treatment need codings on the basis of smoking

| Habit          | Total number of sextants (n=5760) | Code 0 (%) | Code 1 (%) | Code 2 (%) | Code 3 (%) | Code 4 (%) | P     |
|----------------|-----------------------------------|------------|------------|------------|------------|------------|-------|
| Smoker         | 4656                              | 1 (0.02)   | 200 (4.2)  | 1450 (31.14) | 2070 (44.45) | 940 (20.18) | 0.041 |
| Nonsmoker      | 1104                              | 150 (13.58)| 362 (32.78)| 552 (50.0)  | 30 (2.71)   | 10 (0.90)  |       |

Code 0: Healthy; Code 1: Bleeding; Code 2: Calculus; Code 3: Shallow pockets; Code 4: Deep pockets

### Table 5: Percentage of sextants with different community periodontal index of treatment need codings on the basis of oral hygiene habits

| Habit                        | Total number of sextants (n=5760) | Code 0 (%) | Code 1 (%) | Code 2 (%) | Code 3 (%) | Code 4 (%) | P     |
|------------------------------|-----------------------------------|------------|------------|------------|------------|------------|-------|
| Toothbrush and paste user    | 3860                              | 2320 (60.10) | 1300 (33.67) | 200 (5.18) | 30 (0.72)  | 10 (0.25)  | P<0.0001 (HS), df=12, χ²=123.85 |
| Toothbrush powder user       | 470                               | 3 (0.63)   | 137 (29.14) | 175 (37.23) | 112 (23.82) | 43 (9.14)  |       |
| Finger and powder user       | 660                               | 0 (0)      | 80 (12.12)  | 420 (63.63) | 120 (18.18) | 40 (22.1)  |       |
| Datun users                  | 770                               | 0 (0)      | 14 (1.81)   | 438 (56.88) | 240 (31.16) | 78 (10.12) |       |

Code 0: Healthy; Code 1: Bleeding; Code 2: Calculus; Code 3: Shallow pockets; Code 4: Deep pockets; HS: Highly significant

### Table 6: Percentage of sextants with different community periodontal index of treatment need codings on the basis of pan masala and tobacco chewers

| Habit                        | Total number of sextants (n=5760) | Code 0 (%) | Code 1 (%) | Code 2 (%) | Code 3 (%) | Code 4 (%) | Adjusted OR (95% CI) | P     |
|------------------------------|-----------------------------------|------------|------------|------------|------------|------------|----------------------|-------|
| Nonpan masala and tobacco chewers | 3002                              | 2 (0.06)   | 3 (0.99)   | 831 (27.60) | 1264 (42.1) | 902 (30.00) | 1.00 (reference)     |       |
| Panmasala and tobacco chewers | 2558                              | 21 (0.82)  | 160 (6.25) | 1325 (51.79) | 603 (23.5)  | 470 (18.37) | 2.22 (0.95-4.12)     | 0.511 |

Code 0: Healthy; Code 1: Bleeding; Code 2: Calculus; Code 3: Shallow pockets; Code 4: Deep pockets; OR: Odds ratio; CI: Confidence interval

the subjects and 26.2% of the sextants were observed to be having Code 4 disease severity which is similar to the study conducted by Singh, et al.[7] [Tables 1 and 2].

Deep pockets and gingival recession were more in smokers in comparison to nonsmokers. Smoking affects microbial colonization, host immune responses, and collagen metabolism [Table 4].[10,12] Disease severity was more in persons using finger and powder for oral hygiene maintenance as compared to toothbrush and paste in maintenance of oral hygiene on a daily routine.[6,10] Hence, deleterious oral habits such as smoking, panmasala, and tobacco chewing had a significant adverse effect on the periodontal health and treatment needs. Individuals who used toothbrush and paste for cleaning their teeth required significantly less treatment compared to those who used other methods such as powder user, finger and powder user, and datun users [Table 5].

In the present study, the percentage of deep pockets more in nonpanmasala and tobacco chewers than chewers can be explained on the basis of recession. Recession is expected to be more in tobacco and pan chewers. The parameter measured in CPITN is PD which will be reduced because of recession. True severity of disease (clinical attachment loss) may be more in panmasala and tobacco chewers [Table 6].

Grover et al. conducted a study in Gurgaon district of Haryana state in which they found treatment needs (TN2 = 68.30% and TN3 = 14.90%) in the rural population. However, in our study, population treatment needs were higher (TN2 = 72.89% and TN3 = 26.23%) [Table 3].[14] The main reason was due to lack of medical and dental facility in Nuh as compared to other rural areas of Haryana state. Nuh is the most backward district of Haryana state in India as also reported by NITI aayog.[5]

**Conclusions**

Based on the results of this study, the following conclusions can be drawn:

1. Periodontal disease was found to be highly prevalent in the study population and severity of disease increased with age
2. Younger age group individuals were found to be healthier than older age group individuals
3. Smokers had more severity of periodontitis as compared to nonsmokers
4. Occurrence rate of periodontitis is high in tobacco chewers as compared to nonchewers.

Hence, the treatment needs are very high for the population of Nuh district in Haryana state for which an immediate dental intervention is required at larger scale.

There is also a need for a comprehensive survey of all districts of all the States of India, to assess the prevalence of periodontal disease over a wider geographic area to
develop a strategy to improve the periodontal status of the population as a whole. Such surveys do help the Government to take the necessary steps to improve the health and living status of the population. Government hospitals, health centers and dispensaries, dental teaching institutions, and even private practitioners can generate such data, which will contribute tremendously to the formulation of a sound and effective oral health-care policy in India.

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Conflicts of interest
There are no conflicts of interest.

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