

Prevalence of Chronic Periodontitis and its associated risk indicators Among Saudi Nationals in Aljouf Province Kingdom of Saudi Arabia

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Abstract: Chronic Periodontitis is considered to be common dental disease with high tooth mortality as well as morbidity. Reports from different places around the world showed a prevalence of severe periodontitis in around 8-10% of the Population; Sweden 8%, England 7%, The Netherland 10%, Italy 9.6 % and Srilanka 8 %. The aim of the survey was to estimate the prevalence of chronic periodontitis among Saudi nationals in Aljouf Province, Kingdom of Saudi Arabia. 310 subjects were selected by stratified cluster sampling technique. They were examined in preselected areas of Aljouf region by using community periodontal index of treatment need. The impact of known risk factors for periodontal disease, e.g., oral hygiene habits, age and smoking. 53% of the subjects and 15.8% of the sextants. Shallow pockets were observed in 39.4% of the subjects and 38.4% of the sextants. Calculus was found to be present in 9.8% of the subjects and 48.8 % of the sextants. Calculus was maximum (53%) in group I (30-40 years) and minimum (21%) in Group IV (60 years and above). Periodontal disease was found to be highly prevalent in the study population (90%) and the periodontal treatment needs increased with advancing age. Nationwide surveys are recommended to assess the periodontal disease which helps in planning prevention and treatment of periodontal diseases.

Keywords: periodontal diseases; prevalence,

INTRODUCTION

Periodontal diseases are inflammatory conditions affecting the tooth-supporting tissues. Gingivitis and periodontitis are the two most common manifestations. Periodontitis contributes extensively to the global burden of oral diseases[1]. It is also associated with systemic conditions such as cardiovascular diseases and diabetes mellitus [2,3] .The mild-to-moderate form of periodontitis is the most common, with prevalence estimates ranging from 13% to 57%, depending on the sample characteristics and the case definition used [4-6]. High rate of tooth mortality and morbidity is seen in chronic periodontitis which is considered to be common dental disease. Most of the population suffers from moderate grade of periodontitis at an early age with clinical manifestation which are noticeable. Untreated cases will ultimately result in loss of tooth. Several national oral health surveys have assessed periodontal health, e.g., the health examination survey and National Health and Nutritional Examination Survey III [7]. Epidemiological studies that have been performed in many parts of the world indicate that periodontal diseases of varying severity are of nearly universal in both children and adolescents [8]. Using data from the 1999-2002 to 2004 National Health

and Nutrition Examination Survey (NHANES), United States of America (USA), Researchers demonstrated that adults with low income and less than a high school education are approximately two times more prone to have periodontal diseases compared with more prosperous adults with higher educational attainment. The prevalence of periodontitis has been elucidated by the World Health Organization (WHO) presenting data on periodontal condition from many countries in its worldwide oral data bank using the community periodontal index of treatment needs (CPITN) criteria [9]. Reports from different places around the world showed a prevalence of severe periodontitis in around 8-10% of the Population; Sweden 8%, England 7%, The Netherland 10%, Italy 9.6 % and Srilanka 8%. In India periodontal diseases are the main cause of dental extractions [8, 10, 11]. Assery M demonstrated in a study at King Saud University Riyadh that prevalence of periodontal disease was about 51% with the age group of above 40[10].

Cross-sectional surveys are simple and cost-effective. They need a suitable study sample with clear-cut disease diagnostic criteria at a community level, e.g., chronic periodontitis can be diagnosed if on

full/partial mouth examination, single site is affected from equal to or more than 2 mm of attachment loss. Survey also offer useful evidence about the possible risk factors responsible for disease of interest and finally a hypothesis can be formulated regarding etiologic factors and prevention/intervention of disease. It also assists in deciding the necessity of infrastructure, manpower, and finances from health care agencies.

Till date, there is no epidemiological study conducted at national level to determine the prevalence of periodontal diseases in the Kingdom of Saudi Arabia. There is a lack of data regarding prevalence of periodontitis among the Saudi nationals. Qualitative data about magnitude of problems and various epidemiological factors are required in planning a nationwide and regional oral health programs which aim to prevent and treat oral health problems. There is an urgent need for surveys on the prevalence, extent and severity of periodontal diseases (gingivitis and periodontitis) in higher important prerequisite to aid practitioners and policy makers to develop clear dental care strategies specific for this group. Therefore the present survey is designed to estimate the prevalence of chronic periodontitis among Saudi nationals in Aljouf Province, Kingdom of Saudi Arabia.

MATERIALS & METHODS

Study population

A cross-sectional oral health survey was conducted among 300 subjects in the Al Jouf province of Saudi Arabia who were selected through stratified cluster sampling. Sample size was calculated based on prevalence of chronic periodontitis among Saudi nationals in pilot study. A total of 266 subjects will be sufficient to detect statistically significant difference of 5% with 95% confidence interval and 80% power using chi square test and considering design effect of two and expecting 20% non-participation, so sample size was increased to 310. Al Jouf province divided in to three region for administrative purpose i.e Sakaka, Qurayyat and Dumat Al jandal. Sample for each region was decided by proportionately- Sakakah, 120 (40%), Qurayyat 90 (29.4%), Dumat Al-Jandal. 90 (30.6%). From each region one cluster has been selected and required sample from each cluster was selected by Systematic random sampling (through dental health centres) until the desired sample size is achieved. The designed study was carried out from September 2015 to May 2016. Inclusion criteria included patients who are permanent residents of Aljouf region, aged between 30-70 years and those who gave written voluntary consent to participate in the study. Exclusion criteria included patients with debilitating diseases such as diabetes, blood dyscrasias, with less than 2 teeth in a sextant and generalized aggressive periodontitis. Chronic periodontitis was defined for survey purpose as with least one periodontal site with 3 mm or more of attachment loss (CAL) and 4 mm or more of pocket

depth (PPD) of age above 30 years. Ethical clearance for this study was obtained from the Institutional ethical committee, Al Jouf University, KSA (JU_IRB_2015_36). All the procedures were followed according to Helsinki declarations.

Data collection

Using structured questionnaire demographic and socio-demographic variables were documented including age, gender, address, occupation, educational status, medical history, oral hygiene habits such as smoking. Clinical examination was done by single examiner using Community periodontal index for treatment needs (CPITN).

Recording of CPITN index

Ten index teeth (17, 16, 11, 26, 27, 36, 31, 46 & 47) were observed as per the WHO guidelines by means of sterilized CPITN probe and a mouth mirror under good light source. Dentition was divided into six sextants. Scoring was done all index teeth.

The scoring was done as follows

- Code 0: Healthy
- Code 1: Bleeding on probing
- Code 2: Supra or subgingival calculus
- Code 3: Shallow pocket of 4-6 mm
- Code 4: Deep pocket of 6 mm or more

Study population or samples were allocated to the appropriate treatment needs category on the following basis:

- Code 0: No treatment
- Code I: Improvement in personal oral hygiene
- Code II: Code I scaling
- Code III: Code I + Code II+ complex treatment

Training and calibration of investigators

Two examiner recorded CPITN scores and intra examiner kappa score for KKG and SA was 0.84 and 0.96 respectively and inter examiner agreement was 98%.

Statistical Analysis

Data obtained from CPITN scoring and treatment needs were segregated based on the basis of percentage of individuals and percentage of sextants. Mean values, standard deviation were calculated using SPSS (version 22.0) (SPSS Inc., Chicago, Ill). Chi-square test and "Z" test were used to evaluate inter-group statistical significance of the observations. A *p*-value of 0.05 was considered to statistically significant.

RESULTS

In the current study deep periodontal pockets were noted in 53% of the subjects and 15.8% of the sextants. Shallow pockets were detected in 38.4% of the sextants and 39.4% of the subjects. Calculus was found

to be evident in 48.8 % of the sextants and 9.8% of the subjects. Bleeding or health periodontium was not evident in either or the subjects or sextants (code 0) as the highest score [Figure 1 and 2]. Treatment need III was existing in 54.7% of the subjects and 19.8% of the sextants. Treatment need II was needed in 47.7% of the subjects and 80.3% of the sextants. Based on sextants wise, scaling was the treatment required in largest group of population [Figure 3]. Age-related variations have been observed in CPITN coding both on the basis of sextant as well as subjects. Group IV (56 years and above) presented with maximum percentage of deep pockets (31%). It declined with age as follows: 25% in group III (50-60 years), 28.2% in group II (40-50 years), and 11.3% in group I (30-40 years). The overall prevalence was found to be 90%.

Statistically significant differences with "Z" values more than 1.96 was evident on inter-group comparisons. The pattern of observation was almost the same for different treatment need categories as per the CPITN criteria. Shallow pockets were detected to be lowest (32.8%) in group I (30-40 years) and highest (48%) in group IV (60 years or older). Calculus deposits were found to highest (53%) in group I (30-40 years) and lowest (21%) in Group IV (60 years and above). With increasing age it has been observed that disease severity also increased [Figure 1 & 2] .The percentage of deep pockets was detected to be increased to two-fold in smokers on comparison with non-smokers. The difference was significant statistically with χ^2 calculated (360.2) $>\chi^2$ tabulated (9.488) at "P" value 0.05. Smokers also presented with more shallow pockets than non-smokers. Calculus was not as much of (27.8%) in smokers than non-smokers (47.1%) [Fi-4].

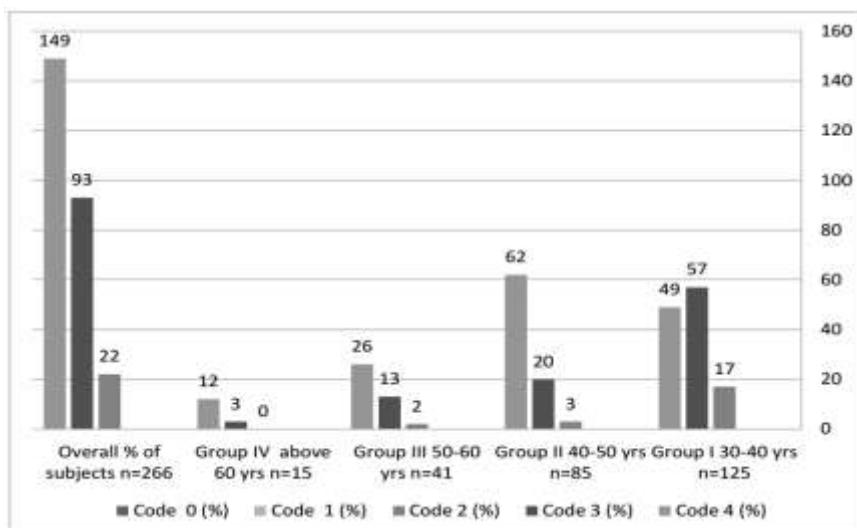


Fig-1: Age wise and overall distribution of subjects with different periodontal status

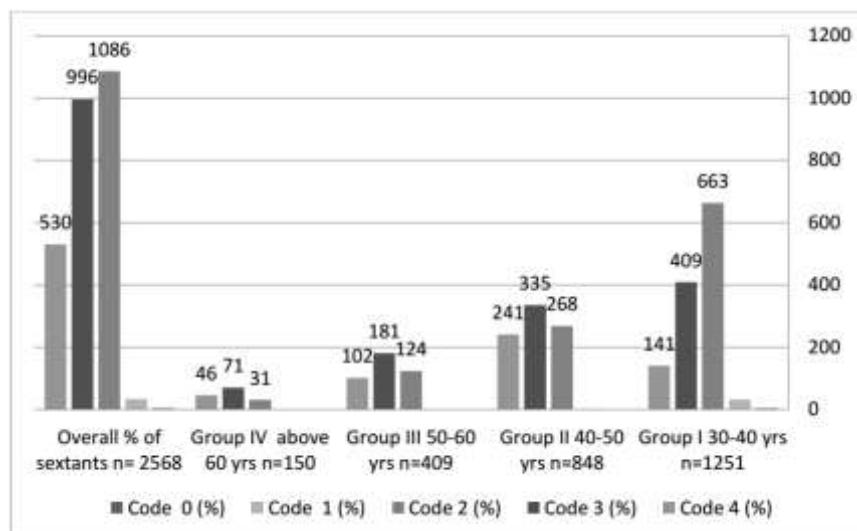


Fig-2: Age wise and overall distribution of sextants with different periodontal status

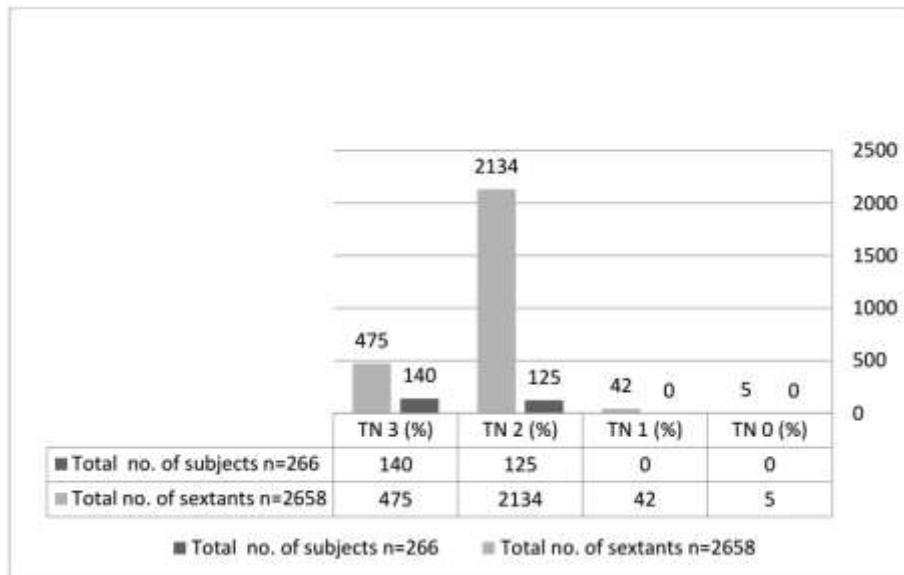


Fig-3: Overall estimation of treatment needs on the basis of percentage of subjects and percentage of sextants

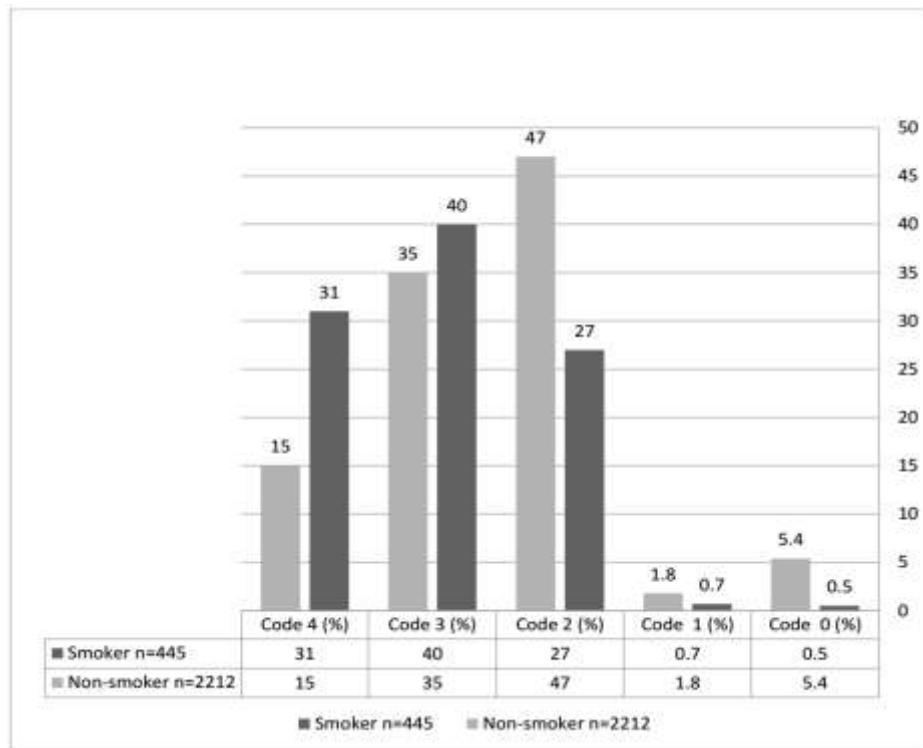


Fig-4: Percentage of sextants with different CPITN coding on the basis of smoking

DISCUSSION

The findings in the current study revealed overall estimation of CPITN code 4 and 3 was 52.7% and 37.4% respectively based on the criteria of percentage of subjects. Hence, 90% of the subjects were recorded to be having chronic periodontitis. These observations of the present study are in accordance with the study reports from Kenya, Bangladesh, Burkina Faso, Libya, and Nepal [12]. A great number of population were found suffering from periodontitis 38.6% (Figure 1) that is comparable with the published

data of Assery *et al.* with 51% prevalence of chronic periodontitis from the College of Dentistry, King Saud University in Riyadh between 1990~1992 and NHANES, USA 1990~2004 report (8.52% and 5.08%)[10]. Results of the present study was also in accordance to the study done by Hossain et al with 93% of prevalence of periodontitis in Abha region, Kingdom of Saudi Arabia [13]. The possible main explanations were the age of the population and oral hygiene habits. The large percentage of people affected from periodontitis in the present study may be because of

improper oral hygiene maintenance. As these findings are in accordance with the findings from a recent study addressing the among urban Saudi Arabians, that oral hygiene routines were introduced relatively late in life and knowledge and awareness of oral health is very low [14]. There are marked variations in oral hygiene habits, related mainly to age and educational levels. Such aspects should be taken into account in developing and planning oral health strategies.

With 43.8% of the sextants and 9.8% of subjects having calculus (Code 2) doesn't depict a true scenario. Possible reason for such finding could be accredited to the method of examination of CPITN, as it first judge the highest score, e.g., deep pocket depth, and if the reply is positive, existence of calculus and bleeding are not examined. Age has been recognized as a risk factor for periodontal disease. As age itself doesn't contribute to the periodontal status but it is the cumulative effect of untreated periodontal disease reflecting the consequence of the age on disease severity[15, 16]. In the present study maximum prevalence of periodontitis was seen in age group of 40-50 (Group II) and 50-60 (Group III) which was in accordance to the results reported by Lewis JM et al and Benigeri M et al. [17, 18]. Recent reports from Lopez et al. reveals that Caries and periodontitis burden in the elderly remain high[19]. Smoking now is well recognized risk factor responsible for rise in severity of periodontal disease with colonization of periodontal pathogens, altered host immune responses, and increased collagen destruction. Till date a limited studies only have revealed that the impact of smoking on the population level is far from negligible [20] as these reports are in accordance with the findings of the present study. Prevalence of deep pockets was doubled in smokers when compared to non-smokers. Available data suggest that as much as half of the periodontal disease burden on the population can be attributed to smoking [20, 21]. Unfortunately, available literature on smoking exposure among elderly people in the region of kingdom of Saudi Arabia lacks standardization with respect to age and regions wise. Only scant information on smoking exposure is available there by limiting us to predict smoking as pure risk indicator for periodontal diseases.

CONCLUSION

Periodontal disease was found to be highly prevalent in the study population (90%) and the periodontal treatment needs increased with advancing age. Nationwide surveys are recommended to assess the periodontal disease which helps in planning prevention and treatment of periodontal diseases.

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