

Prevalence of Aggressive Periodontitis in a Specified Population of District Yamunanagar, Haryana, India

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Abstract

Objective: To assess the prevalence of aggressive periodontitis and associated risk factors in 15–30-year-old school/college-going adolescent population/adults in district Yamunanagar, Haryana, India. **Methodology:** A total of 3875 individuals from 12 schools and 6 colleges of 6 blocks of district Yamunanagar were assessed on random basis in two stages. The first stage included assessment of risk factors and any systemic illnesses and periodontal assessment. In the second stage, complete periodontal and radiographic examination including bitewing examination of the molar region and periapical examination of incisor regions was carried out for the confirmation of aggressive periodontitis. **Statistical Analysis:** Chi-square and Fisher's exact test was applied to find the association between different variables. The overall model was tested by the Chi-square test and goodness of fit of the model was assessed using Hosmer and Lemeshow goodness-of-fit test. **Results:** In the present study, 2043 participants were male and 1832 were female while 6 participants (2 males and 4 females) were found to be affected with aggressive periodontitis, thus giving the prevalence of aggressive periodontitis in the present study of 0.15% (95% confidence interval: 0.05%–0.34%) with female: male ratio of 2:1. Religion, socioeconomic status, diet, method and frequency of tooth cleaning, and smoking/tobacco were not significantly associated with aggressive periodontitis. **Conclusion:** This study provides an insight into the existing lifestyle trends, attitude, and oral hygiene behavior of children/young adolescents and their association with the progression of disease.

Keywords: Adolescents, adult population, aggressive periodontitis, prevalence

INTRODUCTION

Periodontal diseases are a group of silent disease where there is a progressive destruction of the alveolar bone leading to tooth loss. Periodontitis presents a major health-care challenge to the clinicians as the patients are unaware of their periodontal status till the disease has progressed into advanced stages. The resurgence of periodontal–systemic link has, further, highlighted the importance of management of periodontal diseases. Epidemiological surveys form the backbone to formulate therapeutic as well as preventive strategies to deal with the prevalent periodontal diseases in a given population. Such surveys in young individuals have been performed in many parts of the world and among individuals with a widely varied background. In India, the prevalence of periodontitis has been reviewed by various epidemiological studies which have provided varied data on different population samples.^[1–5] Because of lack of clear distinction between aggressive and chronic periodontitis, the data obtained from such studies, however, are incomparable at times, particularly,

the data related to aggressive periodontitis, leading to difficulty in formulating oral health-care policies for dealing with such rapidly progressing degenerative disease.^[6,7] The present study was, therefore, undertaken to estimate the prevalence of aggressive periodontitis in the district of Yamunanagar, Haryana, India, in individuals in the age group of 15–30 years, attending schools and colleges of this district.

METHODOLOGY

Ethical approval for the study was sought from the institutional ethics committee and board of studies. Before the start of the study, list of all the schools and colleges was obtained from the office of district education officer. The district

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Access this article online

Quick Response Code:



Website:
www.ijcmmment.com

DOI:
10.4103/ijcd.ijcd_3_17

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How to cite this article: Almadi AK, Pandit N, Bali D, Marya P. Prevalence of aggressive periodontitis in a specified population of district Yamunanagar, Haryana, India. *Int J Community Dent* 2018;6:3-7.

Yamunanagar is divided into six blocks, namely, Radaur, Jagadhri, Bilaspur, Sadhaura, Mustafabad, and Chhachhrauli.^[8] Two schools (government/private) and one college from each block were selected randomly for the examination. The study plan included examination of participants in two phases. In the first phase, after taking written informed consent, a total of 3875 individuals (15–30 years of age) were screened at the school/institution site by a single examiner under natural daylight/suitable light conditions using sterile instrument kits. The information regarding participant's socioeconomic status, oral hygiene habits, any systemic illnesses, and previous periodontal disease and its treatment was obtained using a self-devised questionnaire and the WHO modified periodontal assessment form.^[9] Initial screening of the individuals was done using WHO-CPITN-C probe, and selected index teeth (17, 16, 11, 26, 27, 37, 36, 31, 46, and 47) were evaluated for gingival bleeding, presence of pockets, and clinical attachment loss. Patients with any of the systemic involvement were excluded from the study. Localized aggressive periodontitis patients were the ones with proximal attachment loss of ≥ 3 mm on at least two permanent teeth one of which included first molar and involved no more than two teeth other than the first molars and incisors while generalized aggressive periodontitis patients included ones with proximal attachment loss of ≥ 3 mm affecting at least three teeth other than the first molars and incisors.^[10] In the second phase, periodontal examination included probing depth and clinical attachment level of the six sites per tooth in both the arches including mesiobuccal, midbuccal, distobuccal, distolingual, midlingual, mesiolingual,^[11] plaque index,^[12] calculus surface index,^[13] and gingival bleeding index.^[14] Radiographic examination included bitewing examination of the molar region and periapical examination of incisor regions for confirmation. A distance exceeding 2 mm from the cemento-enamel junction to the alveolar crest was recorded as bone loss.^[15] After the radiographic examination, the diagnosis of aggressive periodontitis was confirmed or refuted on the basis of the following criteria:^[16]

- a. History and family anamnesis
- b. Complete periodontal examination
- c. Radiographic interpretations
- d. Presence of iatrogenic factors, for example, overhanging restorations.

Statistical analysis

Data analysis was done using Statistical analysis was performed with SPSS (version 13, SPSS Inc., Chicago, USA) package. The prevalence of each score >0 and its 95% confidence interval using exact binomial method was calculated. Chi-square and Fisher's exact test was applied to find the association between different variables. The overall model was tested by the Chi-square test and goodness of fit of the model was assessed using Hosmer and Lemeshow goodness-of-fit test. $P < 0.05$ was selected to include in the model and $P > 0.1$ to exclude from the model. $P < 0.05$ was considered statistically significant.

RESULTS

Of the total 3875 individuals examined for the prevalence of aggressive periodontitis in district Yamunanagar, 2043 were male and 1832 were female, and only 6 (2 males and 4 females) were found to be affected with aggressive periodontitis, i.e., the prevalence of aggressive periodontitis was found to be 0.15% indicating predilection toward females with a female: male ratio of 2:1. An analysis of the data for associated risk factors is depicted in Table 1. Religion was not found to be significantly associated with aggressive periodontitis with $P = 0.131$; the prevalence, however, was found to be higher in other religious groups (0.6%) as compared to Hindus and Muslims. Socioeconomic status and level of parental education were, also, not significantly associated with the prevalence of aggressive periodontitis ($P = 0.601$). Furthermore, vegetarians had a higher prevalence (0.2%) as compared to nonvegetarians (0.1%). Individuals who used finger as a method for tooth cleaning had higher prevalence for aggressive periodontitis (1.1%) as compared to those who used toothbrush (0.1%). Toothpowder users were more commonly associated with aggressive periodontitis as compared to those who used toothpaste and/or other products as a method of tooth cleaning ($P = 0.045$). Use of tobacco products did not show a significant association with aggressive periodontitis ($P = 1.000$) as well as the observations were the same for tobacco smokers as well as tobacco chewers ($P = 1.000$).

DISCUSSION

Very few studies from Asia and specifically from India have been reported which have tried to estimate the prevalence of aggressive periodontitis. Such studies are, also, incomparable at times due to difference in the case definitions used and methods employed for the study.^[6,7] The present study was undertaken with the use of proper case definition and standardized parameters for risk factor evaluation.

Smoking and tobacco usage

There is a long-term association between tobacco usage and periodontal disease; however, the effect of smoking on the development and progression of aggressive periodontitis is not much documented. A study in Virginia reported that smoking had significant effects on serum immunoglobulin levels with reduced IgG2 and IgG4 levels, and that these effects were both race and serum antibody specific.^[17] The present study, however, did not find any significant association of aggressive periodontitis with smoking similar to the results of the study conducted by Imran and Atta, also, which did not find any relationship between smoking and aggressive periodontitis.^[18] This might be due to the sample size that was, too, small to make any assumptions.

Gender

Gender predisposition can be related to hormones, genetics, behavior, and the body's physiological response to stress. The shape and height of residual alveolar ridge are, also, reported to be lower in females as compared to males which may be due to decreased circulating estrogen levels with age in females and possible positive anabolic effects of androgens

Table 1: Association of various predictors with aggressive periodontitis

Variable	Aggressive (zero) (n=3869)	Aggressive >0 (n=6)	P	Significance (Fisher's exact test)
Gender				
Male	2041 (99.1)	2 (0.1)	0.431	NS
Female	1828 (99.8)	4 (0.2)		
Religion				
Hindu	3309 (99.9)	2 (0.1)	0.131	NS
Muslim	223 (100.0)	0 (0.1)		
Others	337 (99.4)	2 (0.6)		
Socioeconomic status				
Low	724 (100.0)	0 (0.0)	0.601	NS
High	3145 (99.8)	6 (0.2)		
Education				
Illiterate	494 (99.8)	1 (0.2)	0.601	NS
Primary school	1047 (98.8)	2 (0.2)		
High school	1889 (99.8)	3 (0.2)		
Graduate or above	439 (100.0)	0 (0.0)		
Diet				
Vegetarian	2832 (99.4)	4 (0.1)	0.662	NS
Nonvegetarian	1037 (99.8)	2 (0.2)		
Tooth loss				
Yes	5 (100.0)	0 (0.0)	1.00	NS
No	3863 (99.8)	6 (0.2)		
Method of cleaning				
Finger	86 (98.9)	1 (1.1)	0.137	NS
Toothbrush	3675 (99.9)	5 (0.1)		
Datun/Miswak	108 (100.0)	0 (0.0)		
Material used				
Tooth paste	3563 (99.9)	4 (0.1)	0.045	S
Tooth powder	196 (99.0)	2 (1.0)		
None	110 (100.0)	0 (0.0)		
Frequency of cleaning				
Once a day	2894 (99.9)	4 (0.1)	0.196	NS
Twice a day	759 (99.9)	1 (0.1)		
Do not clean	126 (99.2)	1 (0.8)		
Tobacco/smoking				
Nonsmokers	3799 (99.8)	6 (0.2)	1.00	NS
Smokers	70 (100.0)	0 (0.0)		
Tobacco chewing				
No	3821 (99.8)	6 (0.2)	1.00	NS
Yes	48 (100.0)	0 (0.0)		
Tobacco products				
No	3760 (99.8)	6 (0.2)	1.00	NS
Yes	109 (100.0)	0 (0.0)		

NA: Not significant, S: Significant

on periodontal cells and bone metabolism by stimulating osteoblast proliferation and differentiation in males.^[19] A review of global studies is, however, unclear in analyzing the effect of gender as a risk factor for aggressive periodontitis. The available evidence suggests that young females in the circumpubertal age might be more predisposed than males and this effect decreases with increasing age. The present study showed that aggressive periodontitis was seen more commonly in females as compared to the males (female: male ratio of 2:1). The results of the present study were in accordance with numerous authors who concluded that females are more likely

to develop juvenile (aggressive) periodontitis which could be related to the earlier eruption of first molars and incisors in females.^[20-22] However, similar occurrence frequency in both males and females with no gender predilection has, also, been reported by many authors in the past.^[16,18,23]

Socioeconomic status

It has been seen that individuals from higher socioeconomic status enjoy better health status than less educated and poor segments of the society who are unable to bear the high expenses of dental treatment and are more inclined toward extreme

measures such as extraction of teeth rather than the curative ones.^[24] They are, also, unable to use prevalent oral hygiene aids because of increasing costs. Many studies have reported a strong relationship between the low socioeconomic level and aggressive periodontitis while the periodontal health improves as the income level rises.^[18,20,22,25] However, in the present study, the prevalence of aggressive periodontitis was not significantly associated with the socioeconomic status of the individuals ($P = 0.601$). This could be explained on the basis that the sample size of aggressive periodontitis patients was very less in the present study and statistical analysis failed to provide any significant result.

Diet

Dietary patterns differ from family to family and also in different regions, religions, and castes. Younger generations have a tendency to consume more of the refined and processed foods which are cariogenic, less nutritive, lack of fiber, and less stimulatory for the periodontium. Ramfjord *et al.* found no significant difference in the periodontal status of malnourished and well-nourished individuals.^[26] Russell *et al.*, also, reported similar findings in a nutritional survey in Alaska.^[27] The results of the present study, too, were in line with the results of these studies and reported no significant association between the prevalence of aggressive periodontitis and the diet (0.1% vegetarians affected as compared to 0.2% of the nonvegetarians; $P = 0.662$). On the contrary, Rao and Tewani found that vegetarian diet was typically associated with periodontosis.^[20]

Religion

India is a country with diverse religions playing a major role in the lives of the people. Every religion has its own cultural beliefs, customs, and practices which significantly affect the oral and general health through diet, care-seeking behaviors, and use of home remedies. Islam as a religion that allows interfamily marriages which might lead to significant pooling of the genes among the family members and many diseases with genetic predisposition are inherited unchanged in the families. Periodontal disease, in particular aggressive periodontitis, is such an example which aggregates in families.^[28,29] Religion, also, influences the method, frequency, and use of cleaning aids and certain products which might have a negative impact on the oral health. District Yamunanagar is a diverse district in terms of religion constituting 81.12% Hindus, 11.41% Muslims, 6.96% Sikhs, 0.30% Christians, 0.13% Jains, and 0.2% others.^[30] However, no specific predilection toward any religion was found in the present study with such a diverse religious distribution ($P = 0.131$). Rao and Tewani, however, had found the existence of periodontosis (aggressive periodontitis) to be significant among Muslims ($P < 0.05$).^[20]

Method of cleaning

The method of tooth cleaning has a major role in removing dental plaque and prevents the development and progression of periodontal disease. Many people use twigs of neem/banyan/coconut/datun or twigs from *Salvadora persica* for the mechanical cleaning and antimicrobial properties. Muslims, as part of the namaaz (prayer) ritual, use Miswak sticks,

tooth picks and gum massaging which may promote the oral health.^[31] Hardie and Ahmed claimed that the mechanical plaque removing properties of chewing sticks may be similar to that of conventional toothbrushes commonly used.^[32] Shetty *et al.* found a remarkable effect of Miswak in reducing gingival inflammation and in inhibiting plaque formation.^[33] Kapoor *et al.* reported that use of datun or finger is more prevalent in rural population (5.6%) as compared to urban population (3.0%) as a cleaning aid.^[34] The present study reported the use of finger, toothbrush, datun, and Miswak as the commonly used cleaning aids used, and the prevalence of aggressive periodontitis was not found to be significantly associated with the method of cleaning; the study came out with a conclusion that people who used finger for cleaning teeth had a higher prevalence of aggressive periodontitis (1.1%) as compared to the toothbrush users (0.1%).

Frequency of cleaning

Ariado *et al.*^[35] and Lang *et al.*^[36] have recommended that oral hygiene procedures should be performed at the intervals of 48 h to maintain gingival health, although there is no optimum frequency mentioned as for humans to maintain optimal oral hygiene. A recent research conducted on dogs reinforces tooth brushing once a day to maintain gingival fibroblast activity and proliferation of the junctional epithelium.^[37] The present study did not report any significant association of aggressive periodontitis with the frequency of cleaning ($P = 0.196$).

Material used for tooth cleaning

The type of material used for tooth cleaning has a significant impact on the oral hygiene of an individual and prevalence of oro-dental diseases. Use of branded toothpastes has become a social status feature, and increased commercialization has led to an increase in the cost of basic oral hygiene aids, which sometimes remains unavailable for the lower socioeconomic groups and those living in rural areas. Such populations, then, have to resort to home remedies or other easily available low-quality products. In South Asia, toothpowders and other abrasive agents are used on a very large scale for cleaning purposes. In the present study, which had both urban and rural populations in its inclusion, the material used for cleaning teeth was significantly associated with aggressive periodontitis ($P = 0.045$). It was seen that 1% of tooth powder users and only 0.1% of toothpaste users were affected by aggressive periodontitis.

Parental education

Level of parental education has a significant effect on a child's attitude toward general and oral health care including maintenance of oral hygiene, use of tobacco, health-care promotion, as well as preventive measures. Habits once formed have significant impact on one's overall health behavior, especially in adolescents and young adults. Very few studies have correlated the effect of parental education on the prevalence of aggressive periodontitis. Imran and Atta reported that parental education level appeared to be significantly related to the prevalence of aggressive periodontitis ($P < 0.05$).^[18] The present study, however, did not find any significant association between aggressive periodontitis and the level of parental

education ($P = 0.601$) which might be possible because the study population consisted of mixed sample of different levels of parental education, and thus, any conclusive statement could not be derived. Furthermore, the small sample size and genetic factors might have affected the association of this variable with aggressive periodontitis.

CONCLUSION

This study concluded that the prevalence of aggressive periodontitis in district Yamunanagar in a population attending schools and colleges in the age group of 15–30 years was 0.15% which was in accordance with the earlier epidemiological studies worldwide. Also, in the present study, which had both urban and rural populations in its inclusion, the material used for cleaning teeth was significantly associated with aggressive periodontitis ($P = 0.045$). The present study provides an insight into the existing oral health conditions, lifestyle trends, and problems faced by the specific age group in maintaining oral health and mandates the need for further studies to be conducted with more detailed epidemiological data and surveys regarding the oral health status of the population of the area. This study, also, helps in guiding the government to make policies toward better oral health maintenance.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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