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Prevalence of aggressive periodontitis in 15-18 year old school-children in Tehran, Iran

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***Objective*:** Aggressive periodontitis is one of the periodontal diseases that affects systemically healthy individuals usually under the age of 30 years. The disease is characterized by rapid bone destruction which is inconsistent with the amount of bacterial plaque. The purpose of this cross-sectional study is to determine the prevalence of aggressive periodontitis among students aged 15 to 18 years in high schools of Tehran, Iran. ***Research Design*:** Based on systematic and cluster random sampling, 5,590 students were selected. Probing pocket depth on six areas of incisors and first molars was carried out. Students with pocket depth ≥ 4 mm on more than one tooth were referred for radiographic examination. In cases where the distance between the crest of interdental septa and CEJs were ≥ 2mm, full clinical and radiographic examination were performed. ***Results*: O**nly seven persons, four girls and three boys, had the diagnostic criteria of localized aggressive periodontitis. One patient was diagnosed with generalized aggressive periodontitis. Therefore, the prevalence of aggressive periodontitis among 15-18 years old school- children was 0.13% in this study. ***Conclusion*:** The present study indicates that the prevalence of aggressive periodontitis in Tehran is low and similar to the studies of the same age range and diagnostic criteria in other countries.

Key words: Aggressive periodontitis, prevalence.

Aggressive periodontitis (AP) which was formerly classified as early onset periodontitis comprises a group of periodontal conditions with often severe and rapid rate of progression (Newman et al 2006, American Academy of Periodontology 2003). The disease can be localized or generalized (American Academy of Periodontology 2003). Localized aggressive periodontitis (LAP) was previously described as localized juvenile periodontitis. The time of onset of the disease is usually around puberty (Newman et al 2006). Generalized aggressive periodontitis (GAP) used to be called generalized juvenile periodontitis or rapidly progressive periodontitis (Newman et al 2006). The disease usually affects persons under 30 years, but may also be seen in older patients. (Lang et al.,1999). According to the American Academy of Periodontology (2003), LAP is clinically characterized by interproximal attachment loss localized on at least two permanent first molars and incisors. GAP is characterized by interdental bone loss affecting at least three permanent teeth other than first molars and incisors.

A review of the literature shows that the prevalence of AP may vary significantly between different countries. A low prevalence rate, about 0.1% - 0.2%, has been reported in many European countires (Kronauer et al., 1986, Saxby, 1987) but in some South American and African countries higher prevalence, about 5.5%, was reported (Albandar et al, 2002, Susin and Albandar, 2005). The prevalence of AP in Asian countries, like Saudi Arabia and Iraq was reported as being 0.42% and 1.8% respectively (Albandar, 1989, Nasser et al, 1994).

Since there is limited information about the prevalence of AP in Iran, the purpose of the present research is to study the prevalence of AP in school children of Tehran where approximately 14.3% of the population reside.

Methods

A group of 15-18 year old students were selected from high schools in different geographic regions and different living standards in Tehran during the years 2003-2004. The total high school population of this age range, based on the data received from Tehran central office of education was 662,264 (341,402 female and 320,862 male). The study sample included 5,590 students of 15-18 years (2,870 females, 2,720 males) which were selected based on systematic clustered sampling from 375 high schools throughout Tehran.

A two stage diagnostic examination was performed. At first, the examiners were referred to the selected high schools and chose five students from each of four grades (total number of 20 students in each high school which was the cluster size).

Seven dental students, who were trained for probing depth measurement before the field examination, performed all examinations. The measurement reliability was assessed in a sample of 56 patients of the periodontology department in Shahed Dental School. These subjects were divided into seven groups. One of the faculty members served as gold standard examiner. In each group probing depth was measured by one examiner and by gold standard examiner. No significant clinical difference between the examiners, and between the examiners and gold standard examiner.

A questionnaire was completed for each examined subject, which included questions about student identification, parent education and surface area of their house (in order to evaluate socio-economic status) (Mohammad & Noorbala, 2000). Probing depth was measured at six sites, mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual and distolingual of incisors and first molars with the University of Michigan-O-probe (Williams probe).

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Every subject with at least two teeth with 4mm or more probing depth was invited to Shahed Dental School for further clinical and radiographic examinations. The latter consisted of peri-apical radiographs of incisors and bitewing radiographs of first molars, using the paralleling technique.

The distance between CEJ and alveolar crest on radiograph was measured with caliper with 0.1mm precision. The clinical examination consisted of determining plaque (Silness & Loe, 1964), calculus (Green & Vermilion, 1964), gingival indices (Loe & Silness, 1963), and probing depth of the teeth.

Localized aggressive periodontitis (LAP) was diagnosed according to the following criteria (Lang et al, 1999, Saxen, 1980):

- Patients were systemically healthy
- Presence of 2mm or more radiographic bone loss in at least two permanent teeth, one of them must be first molar
- Subjects shouldn't have overhang, interproximal caries, open interproximal contact, orthodontic appliances and occlusal disharmony at the area of bone loss.

Subjects with gingival and plaque index of more than two, which indicated poor oral hygiene and severe inflammation, and calculus index more than 1.8 were excluded from LAP patient group. If more than 14 teeth were affected by bone loss, the patient was categorized as Generalized Aggressive Periodontitis (GAP).

Results

Prevalence rate were calculated as the percentage of subjects who were classified with AP. After screening 90 of the 5,590 individuals were invited to Shahed Dental School, for further clinical and radiographic examination. Seventy two of the invited individuals accepted to come for detailed examination; Sixty two subjects didn't show 2mm or more bone loss on the radiographs, hence they were excluded from the diagnosis of aggressive periodontitis. From the remaining ten patients that showed bone loss and periodontal pocket around molars and incisors, three patients (2 females and 1 male) where classified with chronic periodontitis because they had excessive amounts of local irritants, based on their indices and clinical examination.

Finally, only seven subjects were diagnosed with aggressive periodontitis (4 female and 3 male patients) (Table 1). Of these seven subjects with AP, six were diagnosed as LAP (4 females and 2 males) and only one male as GAP. The educational and economic status of the AP patients is shown in Table 1.

The total prevalence of AP was 0.13% . With 95% confidence interval, this gives an estimate between 0.04% and 0.36%. 0.11% of subjects were estimated to have LAP and 0.02% to have GAP. The female to male ratio was 4: 3.

Discussion

Individuals with a minimum age of 15 were selected in this study because according to previous studies few cases of AP have been recorded below this age (Saxen, 1980, Aass et al, 1988). The upper age range 18 was chosen because we wanted to select our samples from high schools. The two-stage diagnostic examination method has been shown to be reliable in determining the prevalence of AP (Harley& Floyd, 1988, Lopez et al., 1991, Saxby, 1987). At the initial stage subjects with probing depth $\geq$ 4mm around two or more teeth was selected. According to the related studies, the criteria of a minimum probing depth of 5.5mm around two or more teeth was considered for patient selection (Albandar et al., 2002, Harley& Floyd, 1988, Saxby, 1987, Saxen, 1980). Using this probing depth in the initial screening of subjects, there is a possibility of missing some cases of incipient disease. A minimum probing depth of 4mm was chosen in some studies (Harley & Floyd, 1988, Saxen, 1980). In other epidemiologic surveys, screening was performed using bitewing radiographs (Aass et al., 1988, Gjermo et al., 1984, Kronauer et al, 1986, Saxen, 1980) that is more reliable for diagnosis of incipient AP. But this method is expensive and sometimes impossible especially for examination of a large number of subjects.

Table 1. Characteristics of seven subjects, diagnosed with aggressive periodontitis patients

	Educational region	*Age*	*Plaque index*	*Gingival index*	*Calculus index*	*Economic status*	*Father education*	*Mother education*
Patient 1 Female	1	16	2 fair	2 fair	1.1 fair	Moderate	High school diploma	High school diploma
Patient 2 Female	5	16	2 fair	1.1 fair	1.7 fair	Moderate	High school diploma	High school undergraduate
Patient 3 Female	9	16	2 fair	1.1 fair	1.7 fair	Moderate	High school undergraduate	High school undergraduate
Patient 4 Female	19	17	2 fair	1.5 fair	1.6 fair	Moderate	illiterate	illiterate
Patient 5* Male	4	18	0.6 mild	2 fair	1.8 fair	Well	High school undergraduate	High school undergraduate
Patient 6 Male	8	16	0.6 mild	1.7 fair	1.6 fair	Moderate	High school undergraduate	High school diploma
Patient 7 Male	18	17	0.7 mild	1 mild	1.4 fair	Poor	High school undergraduate	High school undergraduate

* The GAP Patient

In this study the overall prevalence of AP among Iranian schoolchildren aged 15-18 years was 0.13% which is in accordance with many studies in European countries among school children under the age of 19 years (Kronauer et al, 1986, Saxby, 1987, Saxen, 1980). In Asian countries, a prevalence of 0.42% was reported in 5480, 17-23 year-old individuals in Saudi Arabia (Nasser et al., 1994). The prevalence of the disease has been reported to be 1.8% in Iraq (Albander, 1989). Comparison of different studies has shown that the age range of the subjects could have an effect on the results of the study; that is, the older the age range, the higher the prevalence of AP (Albander et al., 2002). It seems that different age ranges of subjects in the studies can be one of the reasons for variation in prevalence of AP. In addition it should be mentioned that comparison of different studies on the prevalence of aggressive periodontitis and early onset periodontitis is difficult due to changes in the diagnostic criteria of the disease.

When the prevalence was assessed by ethnic origin, LAP is found more commonly in black and Asian subjects (Loe & Brown, 1991, Susin & Albandar, 2005). Also, some studies have reported that in non-industrialized countries the prevalence of the disease can be higher (Eisenman et al., 1983 and Harvey et al., 1981). As a developing Middle East country, it is expected that the prevalence of the disease would be higher in Iran than in industrialized countries. However, the prevalence of 0.13% in this study is not in line with the result of those studies (Eisenman et al., 1983; Harvey et al., 1981, Loe & Brown, 1991, Susin & Albandar, 2005).

It has been reported that the prevalence of LAP is much higher in white females than in white males (Loe & Brown, 1991, Lopez et al., 1991, Saxen, 1980), but there are studies which have reported almost similar ratios (Kronauer et al, 1986, Saxby, 1987). Also, it has been suggested that the disease affects females more than males at a younger age; probably, because of earlier puberty (Hormand and Frandsen, 1979). Although in the present study, in Tehran, AP showed 4:3 female to male ratio, LAP was seen in females twice as in males (4:2).

When prevalence was assessed by socio- economic status, some researchers have reported higher prevalence of LAP for low socio-economic groups (Gjermo et al., 1984, Lopez et al., 1991 and Susin & Albandar 2005), but another study showed no significant difference between socio-economic groups (Albandar et al., 2002). In the present study, a spatial index has been used for family economy evaluation. According to this index, if the living space per person is ≤ 10 m^2, the family is classified as poor, 10- 30 m^2 as moderate, and more than 30 m^2 as well-conditioned economic status (Mohammad & Noorbala, 2000). In this study, most of the subjects with AP belonged to moderate economic group but, the number of subjects affected by AP is low (seven patients), therefore it is not possible to make a conclusion about the relationship between socio-economic status and the prevalence of disease.

This study shows that the prevalence of AP among 15-18 year old school children in Iran is relatively low. The estimate for incidence rate for AP is 13 cases per 10,000 at risk. Despite this low prevalence, it is suggested that children should receive periodic periodontal and radiographic evaluation as a component of school routine dental visits.

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