

ARTICLE

THE PREVALENCE OF GINGIVAL ENLARGEMENT IN CHILDREN AND SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS, IRAN, 2016

Amir Reza Ahmadiania¹, Mohammad Ali Vakili², Maryam Ghelichli^{3,*}

¹Periodontologist, Dental Research Center, Golestan University of Medical Sciences, Gorgan, IRAN

²Department of Health and Social Medicine Faculty of Medicine, Golestan University of Medical Sciences, Gorgan, IRAN

³Dental School, Golestan University of Medical Sciences, Gorgan, IRAN

ABSTRACT

There are different types of periodontal diseases with the common aspect of destructing periodontium. Most of patients are children and one of these diseases is gingival enlargement. Demographic factors like gender and age, socio-economic conditions, inflammatory factors, systemic conditions, medications and many other factors are the etiology of gingival enlargement. Due to physical and emotional complications of this problem, it is felt necessary to evaluate the prevalence of gingival enlargement and etiologic factors affecting it. 1113 girls and boys [7 to 13-year-olds] were selected from 10 primary schools of Gorgan-Iran. After filling the consent form by parents, a questionnaire was filled. Children were examined by McGraw index to assess the presence of gingival enlargement, location and severity. Achieved data were analyzed through SPSS16 statistical software and chi-square test and T-test. 716 children were normal. 397 children had gingival enlargement: 143 cases with minor gingival enlargement, 251 cases with moderate gingival enlargement, and 3 cases with severe gingival enlargement. Mother's education in 264 cases were academic and in 132 cases were non-academic and father's education in 250 patients were academic and in 141 patients were non-academic. Incidence of gingival enlargement was more in boys, But other factors were not significantly associated with its incidence.

INTRODUCTION

Several thousands of people in the world are suffering from periodontal diseases. The prevalence of these diseases is high and even exceeded the prevalence of dental caries [1,2]. There are different types of periodontal diseases, the common aspect of them is changing the ideal condition and destructing the periodontium [3]. This is despite the fact that a lot of people with these diseases are children [2-5]. Periodontal diseases are the main cause of permanent tooth loss. Inflammation, bleeding, gingival recession, bone loss, tooth mobility and displacement, pain and many other complications are symptoms of periodontal diseases [6]. It is believed that periodontal disease in adults is partly accelerated due to inflammation of the gingiva formed in childhood and early adolescence. In this case with no treatment, non-interference non-destructive gingival inflammation in children can progress to be more serious in adulthood [7]. One of the commonest periodontal diseases in children is gingival enlargement which starts from the cervical part of crown like a collar and will continue to mucogingival Junction [8]. Healthy gingival is coral pink with a view of orange peel [stippling] and in some breeds with dark skin, pigmentation may be seen [9,10]. If the gingival has increased in volume, the view will be red and inflamed with a smooth shiny surface or suspended light pink, firm and non-edematous [7,9].

Conditions such as gingival enlargement can lead to bad breath and difficulty in speaking, chewing, tooth eruption and pain [11]. On the other hand, health of gingival has effective role on the physical and mental health and psychic diseases such as anxiety and depression in children by interfering with the beauty [12]. In most patients gingival enlargement are ignored and the appropriate treatment are not presented; Even if gingival enlargement is mild and is not easily recognizable, it can act as a site for the accumulation of pathogens leading to gingivitis or periodontitis and damage surrounding tissue [13,14]. In severe cases it may require that the additional volume of gingiva being removed through surgery. This method has limitations and complications and its use in children is not easy [14]. The best approach for these problems is prevention and early diagnosis along with appropriate treatment [15,16]. Studies show that factors such as demographic factors like gender and age, socio-economic conditions, inflammatory factors, systemic conditions, medications and many other can cause gingival enlargement in children [17-27]. The most common cause of gingival enlargement is inflammatory changes in the gingival tissue due to poor oral hygiene. Local factors such as unfavorable anatomy of teeth and dental crowding affect the quality of oral health [18,19]. This increase in volume can be exacerbated by hormonal changes at puberty or mouth breathing, especially in the anterior part of maxilla [17,20-24].

The prevalence of gingival enlargement in children has been reported with different values [2,25]. According to a study it conducted in children and students below high school age, the prevalence of periodontal disease was three times more than adults [17]. However, other studies have shown that the prevalence of periodontal disease increases according to age and is not noticeable in children [22,28]. The role of gender in the prevalence of gingival enlargement is contradictory [3] [30,32]. In other studies, the effect of factors such as living conditions, education and socio-economic position on development of

KEY WORDS

Gingival enlargement,
McGraw index,
Children, Socio-
economic,
Demographic factors

Received: 30 Jun 2016
Accepted: 20 Aug 2016
Published: 30 Oct 2016

*Corresponding Author
Email:
goldis.ghelichli@gmail.com

gingival enlargement in patients have been reported [32,33]. However, in some studies, the relationship between individual and social characteristics associated with gingival enlargement is not clear [34]. Numerous studies showed conflicts and various results about gingival enlargement and its associated risk factors among children and In Iran also the exact number is not known. Due to physical and psychiatric complications of this problem, it is felt necessary to evaluate the prevalence of gingival enlargement and etiologic factors affecting it, while recognizing the positive samples, prevent the occurrence of more cases and try to improve the conditions of patients.

MATERIALS AND METHODS

In this cross-sectional study, 1113 girls and boys [7 to 13-year-olds] were selected from 10 primary schools of Gorgan city- Golestan state-Iran. The samples were selected randomly by use of questionnaires and based on inclusion and exclusion criteria. The inclusion criteria include: not suffering from any kind of diseases affecting gingival, not taking drugs affecting gingival, not having orthodontic treatment during examination or last 3 months, not having periodontal treatment during examination or last 6 months, no antibiotic use for 7 days in last 3 months, not having mouth breathing, not using partial dentures as a space maintainer, not having extensive tooth decay, and not having open bite. According to the similar study, in this study with primary estimation of %15 prevalence, %3 accuracy, %95 assurance, and $n=z^2pq/d^2$ relation, at least 545 samples were needed, but according to sampling structure and considering correction factor, 1113 samples were selected to be analyzed. The case selection method was multi-step random sampling, in each region of the city a male and a female school were selected as a cluster, and in each school from each grade, the appropriate number of students were selected by random sampling.

For this purpose, after coordinating with Golestan Office of Education and obtaining permits from the committee on ethics in academic research, the list of male and female elementary school children accompanied by the information related to the geographical position and the number of students per school was taken. Then by cluster random sampling, 10 elementary schools [5 male schools and 5 female schools] were determined in 5 parts of the city [North, South, West, East and central based on the administrative division of the municipality of Gorgan]. The demanded number of students were selected randomly proportional to the population per school based on number of students in the class. So that, from each school an average of 110 forms of personal information were taken and in total 1113 children came into this study.

A number was assigned to each elected child, and with the cooperation of selected schools' agents who were informed before during the explanatory meetings, a numbered envelope containing a form to obtain parental consent and a questionnaire was given. The form includes information such as age, gender, living location, used drugs, systemic diseases, history of dental treatment, history of antibiotic use, parents' education and job. Phone number of parents were also taken to contact if needed. After collecting the forms, the cases lacked the inclusion criteria were discarded, and in order to replace the cases, random sampling was repeated. After completing the required number of samples, clinical examination was performed with a disposable mirror and probe and explorer to investigate the presence or absence of gingival enlargement, location and severity by using McGraw index.

Table 1: McGraw gingival enlargement index

Grade	Explanation
0	Absence of gingival enlargement
1	Gingival enlargement is only in dental papilla
2	Gingival enlargement covers less than 1/3 of dental crowns
3	Gingival enlargement covers more than 1/3 of dental crowns

In the case of gingival enlargement, its location [localized/ generalized, anterior/ posterior, left/ right, mandible/ maxilla] and the severity [1-2-3] was determined. The total prevalence of gingival enlargement and its prevalence associated with age, gender, living location, parents job and education were analyzed through SPSS16 statistical software and chi-square test and T-test. Pvalue was 0.05.

RESULTS

According to children examination based on McGraw index, 716 children [64.3%] were normal and without gingival enlargement and 397 children [35.7%] were identified with gingival enlargement [Fig 1].

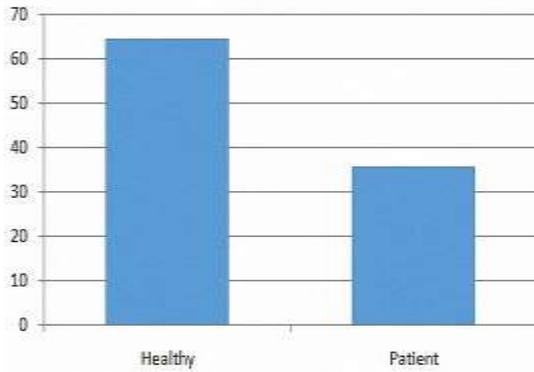


Fig. 1: Gingival enlargement prevalence

Among the 716 children without gingival enlargement, 357 were girls [49.9%] and 359 [50.1%] were boys and also among the 397 children who were diagnosed with gingival enlargement, about 185 of them were girls [46.6%] and 212 were boys [53.4%] [fig 2].

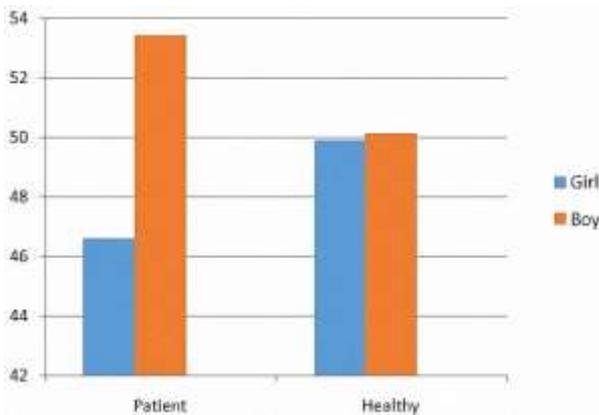


Fig. 2: The percentage of patient and healthy children according to gender

Of 397 known cases, 143 cases [36%] had minor gingival enlargement, 251 cases [63.2%] had moderate gingival enlargement, and 3 [0.75%] had severe gingival enlargement. Among patients with gingival enlargement, 60 cases were girls [42%] and 83 cases were boys [58%], of patients with moderate gingival enlargement, 122 cases were girl [48.6%] and 129 cases were boys [51.4%], and the patients with severe gingival enlargement, all were female [100%]. Mother's education of patients in 264 cases [66.7%] was non-academic and in 132 cases [33.3%] was academic, while mother's educational of healthy students in 478 cases [67.1%] was non-academic, and in 234 cases [32.9%] was academic.

Father's education of patients in 250 cases [63.9%] was non-academic and in 141 [36.1%] was academic, while father's education of children without the disease in 468 cases [66.3%] was non-academic and in 238 cases [33.7%] was academic. Mothers of patients in 295 cases [74.3%] were housewives and in 102 cases [25.7%] were employed, while mothers of healthy children, in 511 cases [71.5%] were housewives and 204 [28.5%] had a job. Fathers of patients in 238 cases [61%] had non-government job and in 152 cases [39%] had government job, whereas the fathers of healthy children, in 443 cases [63.3%] had non-government job and in 257 cases [36.7%] had government job. The mother's and father's jobs of both patient and healthy children are shown in Fig 3 and 4.

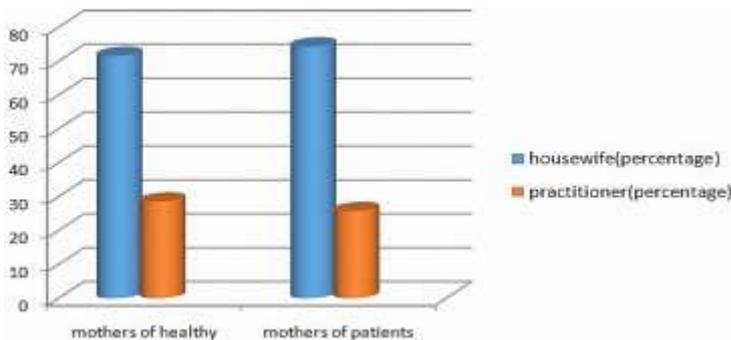


Fig. 3: Parents' education in patient children category

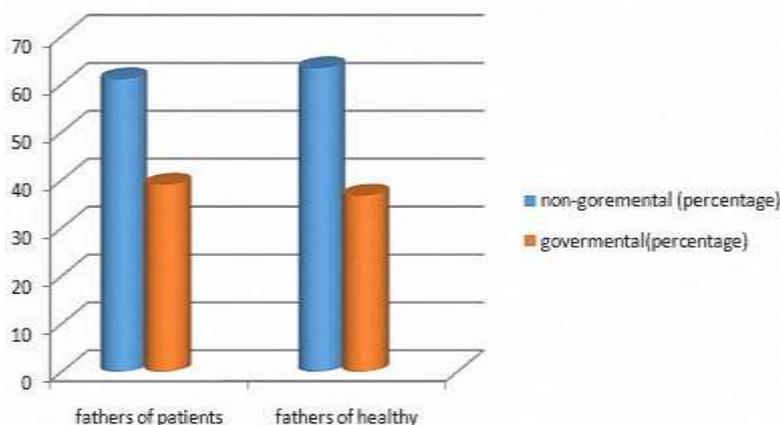


Fig. 4: Parents' job in patient children category

The habitat of patients, in 89 cases [22.4%] were in the north of city, in 83 cases [20.9%] were in downtown, in 78 cases [19.6%] were in west, in 64 cases [16.1%] were in Eastern section and in 24 cases [6%] were in the center of city.

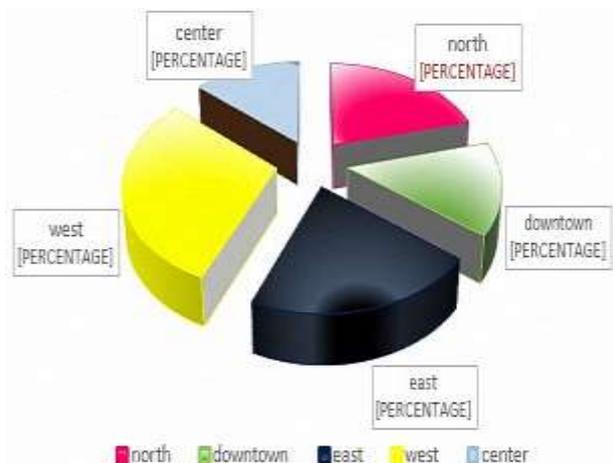


Fig. 5: Geographic distribution of patients

DISCUSSION

The results of this study show that the incidence of gingival enlargement was 35.7% and it was happening more in boys [p.value =0.014]. More boys had moderate and severe gingival enlargement. But factors such as living location, occupation and parental education were not significantly associated with the incidence of gingival enlargement in children. One can only conclude that boys are more likely to develop the condition than girls. The studies showed that factors such as demographic factors like age and gender, socio-economic conditions, inflammatory factors, systemic conditions, medications and many other factors cause gingival enlargement in children [17-27,30,32]. Monique and colleagues stated that age and sex are closely related to gingival inflammatory disease and gingival enlargement. They showed that gingival inflammatory disease had more incidence in men than in women and increased with increasing age [12].

Louisa and colleagues conducted a study in Colombia examined the association between social factors and gingival enlargement, they concluded that those with better social status suffer less [17]. While this study did not show statistically significant associations between these factors with gingivitis. In some studies it has been shown that the prevalence of periodontal disease increases with age and is not noticeable in children [22,28]. While this study did not show any significant association between age and gingival enlargement in children. Numerous studies showed conflicts and various results about gingival enlargement and associated risk factors among children and In Iran also the exact number is not known. Since gingival enlargement in children can be accelerated and modified by hormonal changes at puberty or mouth breathing and can be detected as gingivitis and gingival enlargement, especially in the anterior part of maxilla [7, 20-24], So it is necessary to instruct oral hygiene and oral health promotion in schools more centralized in boy schools]to avoid this problem in children and long-term effects in the future which is more cost effective for families. Because the exact number of this disease is not known in Iran, so wider

research is necessary to achieve more accurate results for authorities in order to plan with more certainty about improving oral health hygiene in schools.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

FINANCIAL DISCLOSURE

The research study was supported by Golestan University Of Medical Sciences.

REFERENCES

- [1] Krishna KB, Raju PK, Chitturi RR, Smitha G, Vijai S, Srinivas BV. [2014] Prevalence of gingival enlargement in Karnataka school going children: *J Int Oral Health*. Feb, 6(1): 106-110.
- [2] AAP (The American Academy of Periodontology). [1989] Consensus report on periodontal diagnosis and diagnostic aids. Proceedings of the world workshop in clinical periodontics. Chicago: Am Acad Periodontol, 1(31): 1-23.
- [3] Nanaiah KP, Nagarathna DV, Manjunath Nandini. [2013] Prevalence of periodontitis among the adolescents aged 15-18 years in Mangalore City: An epidemiological and microbiological study. *J India Soc Periodontol*, Nov-Dec, 17(6): 784-789.
- [4] Genio H. [1990] *Contemporary Periodontics*. 2th ed. St. Louis; Mosby ink., Chap 6: 148-152.
- [5] Lindhe J. [2003] *Clinical Periodontology and Implant Dentistry*. 4th ed. Munksgaard: Blackwell, Chap 50: 54.
- [6] Anegundi Rajesh T, Sudha P, Nayak Ullal Anand, Peter Joby. [2006] Idiopathic gingival fibromatosis. A case report: *Hong Kong Dent J*, 3(1): 53-7.
- [7] Newman MG, Takei HH, Carranza FA. [2011] *Clinical Periodontology*. 11th ed. Philadelphia: WB Saunders, chapter 9: 11.
- [8] Brunet L, Miranda J, Farre M, Berini L, Mendieta C. [1999] Gingival enlargement induced by drugs: *Drug Safety*, 15(3): 219-31.
- [9] Neville BW, Damm DD, Allen CM, Bouquet JE. [1995] *Oral and Maxillofacial Pathology*. 1st ed. Philadelphia, PA: W.B. Saunders Company. 122-133.
- [10] Research, Science and Therapy Committee of the American Academy of Periodontology. [2001] Treatment of plaque-induced gingivitis, chronic periodontitis, and other clinical conditions. *J Periodontol*, 72: 1790-1800.
- [11] Loe Harald. [2000] Oral hygiene in the prevention of caries and periodontal disease: *Int Dent J*, June, 50(3): 129-139. Article first published online: 6 SEP 2011.
- [12] Jiménez MC, Sanders AE, Mauriello SM, Kaste LM, Beck JD. [2014] Prevalence of periodontitis according to Hispanic or Latino background among study participants of the Hispanic Community Health Study/Study of Latinos. August, *JADA*, 145(8).
- [13] Meraw SJ, Sheridan PJ. [1998] Medically induced gingival hyperplasia: *Mayo Clin Proc*, 73(12): 1196-1199.
- [14] Bloom B, Dey AN, Freeman G. [2006] Summary health statistics for U.S children: National Health Interview Survey, 2005. *Nati Center Health Stat*, 10(231): 1-84.
- [15] Oh TJ, Eber R, Wang HL. [2002] Periodontal diseases in the child and adolescent. *J Clin Periodontol*, 29(5): 400-410.
- [16] Agarwal S., Suzuki JB, Riccelli AE. [1994] Role of cytokines in the modulation of neutrophil chemotaxis in localized juvenile periodontitis. *J Periodontol Res*, 29(2): 127-137.
- [17] Borrell LN, Burt BA, Warren RC, Neighbors HW. [2006] The role of individual and neighborhood social factors on periodontitis: The third National Health and Nutrition Examination Survey. *J Periodontol*, 77(3): 444-453.
- [18] Robin AS. [2006] Effects of medications on the periodontal tissues in health and Disease: *Periodontol 2000*, 40(1): 120-129.
- [19] Pedronirineu Gregnanin, Utumi Estevam Rubens, Tancredi Angelo Rafael Calábria, Perez Flávio Eduardo Guillin, Marcucci Gilberto. [2010] Non-neoplastic proliferative gingival processes in patients undergoing orthodontic treatment: *Dent Press J Orthod*, Nov-Dec, 15(6): 80-87.
- [20] Seymour RA. [2006] Effects of medications on the periodontal tissues in health and disease. *J Periodontol*, 2000, 40(1): 120-129.
- [21] Taani DQ. [2002] Relationship of socioeconomic background to oral hygiene, gingival status, and dental caries in children: *Quintessence Int*. Mar; 33(3): 195-198.
- [22] Matsson L. [1978] Development of gingivitis in preschool children and young adults. A comparative experimental study: *J Clin Periodontol*, 5(1): 24-34.
- [23] Esmaeili T, Bahreinian AM, Hashemian P. [2005] Methylphenidate with or without behavioral intervention in children with attention deficit hyperactivity disorder: *J Shahid Beheshti Univ Med Sci Health Serv*, 2(29): 140-135.
- [24] Chaturvedi R. [2009] Idiopathic gingival fibromatosis associated with generalized aggressive periodontitis: A case report: *J Can Dent Assoc*, 75(4): 291-295.
- [25] Reddy PM, Jariwala U, Somayaji BV. [1998] Prevalence of juvenile periodontitis in Mangalore (India). *J India Soc Periodontol*, 1: 83-85.
- [26] Gonçalves LM, Bezerra Júnior JR, Cruz M. [2010] Clinical evaluation of oral lesions associated with dermatologic diseases: *An Bras Dermatol*, April, 85(2): 150-6.
- [27] Mariotti A. [2005] Estrogen and extracellular matrix influence human gingival fibroblast proliferation and protein production: *J Periodontol*, Aug, 76(8): 1391-1397.
- [28] Greenstein G, Hart PC. [2002] Critical assessment of IL-1 genotyping when used in a genetic susceptibility test for severe chronic periodontitis. *J Periodontol*, 73: 231-247.
- [29] Doufexi A, Mina M, Ioannidou E. [2005] Gingival overgrowth in children: Epidemiology, pathogenesis, and complications. A literature review: *J Periodontol*, January, 76(1): 3-10.
- [30] Albandar JM. [2006] Periodontal disease in North America: *Periodontology 2000*. April, 29(1): 31-69.
- [31] Susin C, Albandar JM. [2005] Aggressive periodontitis in an urban population in southern Brazil: *J Periodontol*, 76(3): 468-475.
- [32] Gundala R, Chava VK. [2010] Effect of lifestyle, education and socioeconomic status on periodontal health: *Comtemp Clin Dent*, 1(1): 23-26.
- [33] Kamath DG, Varma BR, Kamath SG, Kudpi RS. [2010] Comparison of periodontal status of urban and rural population in Dakshina Kannada District, Karnataka State: *Oral Health Comm Dent*, 4(2): 34-7.
- [34] Kashyap SR, Munaz M, Shashikanth H, Kumar MSA. [2013] Influence of personality traits on gingival health. *J India Soc Periodontol*, Jan-Feb, 17(1): 58-62.
- [35] Gordis Leon. [2013] *Epidemiology, with Student Consult Online Access*, 4th edition, United States, December 9, chapter 1: 41-57.
- [36] Robert M, Kliegman MD, Bonita MD, Stanton MD, Joseph St. Geme MD, Nina F Schor MD, Richard E, Behrman MD. [2011] *Nelson textbook of pediatrics: Expert Consult Premium Edition*, 19th ed, Philadelphia, June 24, chapter 1,9,10,11.
- [37] Anmol Mathur, Manish Jain, Koushal Jain, Mahima Samar, Balasubramanya Goutham, Prabu Durai Swamy, Suhas Kulkarni [2009] Gingival recession in school kids aged 10-15 years in Udaipur, India: *J India Soc Periodontol*, Jan-Apr, 13(1): 16-20.