Pesquisa Brasileira em Odontopediatria e Clinica Integrada 2018, 18(1):e4129
DOI: http://dx.doi.org/10.4034/PBOCI.2018.181.108
ISSN 1519-0501

SHORT COMMUNICATION

Prevalence of Gingivitis among Malian Children

Aboubacar Sidiki Thissé Kane[1], Amsalla Niang[2], Daoulata Mariko[2], Hamed Djire[1], Ousseynou Diawara[2], Boubacar Ba[2], Mamadou Ba[2], Marie Luise Konate[3], Drissa Diarra[1], Adama Traore[2], Samba Ibrahim Diop[4]

[1]Department of Dentistry, Military Hospital of Bamako, Bamako, Mali.
[2]University Hospital Odontostomatology of Bamako, Bamako, Mali.
[3]Children's Dental Center of Bamako, Bamako, Mali.
[4]Faculty of Medicine and Odontostomatology, University of Sciences, Techniques, and Technologies of Bamako, Bamako, Mali.

Author to whom correspondence should be addressed: Dr. Aboubacar Sidiki Thissé Kane, Department of Dentistry, Military Hospital of Bamako, Bamako, Mali. Phone: +223 7602-7283. Email: aboukane3@yahoo.fr.

Academic Editors: Alessandro Leite Cavalcanti and Wilton Wilney Nascimento Padilha

Received: 01 June 2018 / Accepted: 16 October 2018 / Published: 21 October 2018

Abstract

Objective: To determine the prevalence of gingivitis among Malian children in Bamako, Mali. **Material and Methods:** This cross-sectional study evaluated 2640 children aged between 3 to 14 years old and two examiners collected the data. The gingival index was used to determine the degree of gingival. Gingival inflammation has been classified localized and / or generalized according to site rate achieved. Descriptive statistics were used to calculate the absolute and relative frequencies. **Results:** The prevalence of gingivitis was 87.5%. Regarding the distribution according to sex, the girls presented 60.6% while the boys 39.4%, with a sex ratio of 0.6. The most represented age group was 11-14 years old with 52.5% of cases. Plaque-induced gingivitis was the most common (58.2%), while moderate gingival inflammation affected 67% of the students with localized gingival inflammation involving 64.7% of the participants. **Conclusion:** The prevalence of gingivitis was high, so that early and correct management of this condition in children avoids complications and requires good oral hygiene.

Keywords: Epidemiology; Gingival Diseases; Periodontal Index; Child.

Introduction

The health of children is one of the first concerns of public health, especially in developing countries where infectious diseases still cause casualties among the infant population. However in these countries prevention and health programs are rare or non-existent in some places. Gingivitis is a reversible type of periodontal disease in which inflammation is limited to the gum without further destruction of the supporting tissues of the tooth. It is considered the second most frequent oral disease following dental caries, affecting more than 75% of the world's population [1].

The confusion when it comes to diagnosing gingivitis comes from the fact that all diseases affecting the gum have historically been referred to as gingivitis, whether atrophy, neoplasm or trivial inflammation in response to bacterial plaque. Gum disease is not a single disease, but rather a spectrum of disease that results from distinct disease processes. Thus, the term gingival disease has replaced that of gingivitis to design any localized damage to the gum, whatever its origin. Classically, there are: plaque-induced gingival diseases and non-plaque-induced gingival diseases [2].

Plaque-induced gingivitis is the most common type of gingivitis. Gingival inflammation is exacerbated during puberty due to the expression of intracellular steroid hormone receptors in human gingival cells and increased levels of steroid hormones [3].

Untreated gingivitis can progress to periodontitis, a common cause of tooth loss. In Mali, and particularly at the Children's Dental Center, the prevalence of gingivitis in children has never been studied. It is in this context that this work was carried out with the objective of determining the prevalence of gingivitis among children who came for consultation in the Children's Dental Center of Bamako, Mali.

Material and Methods

Study Design

This was a cross-sectional and descriptive study lasting 6 months from January 1st to June 30th, 2015 at the Bamako Children's Dental Center, Mali.

Sampling and Data Collection

All children seen in consultation during the study period were evaluated. The data collection was done on the basis of a fact sheet developed for this purpose according to the objectives of the study.

The survey was filled out by two dental surgeons and their assistants all calibrated to master and differentiate the symptoms of gingivitis before the start of the investigation that allowed us to make the diagnosis (Table 1). The gingival index was used to determine the degree of gingival inflammation [4,5]: 0 = no sign of inflammation; 1 = inflammation slight (slight change in color, slight edema); 2 = moderate inflammation (redness, edema, hyperplasia and bleeding on probing); 3 = severe inflammation (redness, swelling, ulceration and spontaneous bleeding tendency). Gingival

inflammation has been classified localized and / or generalized according to site rate achieved (localized if less than 30% and generalized more than 30%).

Table 1. Differential diagnosis between plaque-induced gingivitis [4,5].

Plaque-induced Gingivitis	Non Plaque-induced Gingivitis
• Presence of plaque	• Little or no plaque
• Bleeding caused (brushing, chewing or spontaneous)	• Spontaneous bleeding
• Sensation of irritation (erythema) of heat	• Systemic disease (general order)
• Infrequent pains	• Frequent pain
• Color (red, bluish, purplish)	• Variant color according to the attacks
• Increased volume	• Hyperplasia, hypertrophy
• Texture and consistency smooth, soft	
• Bleeding in the survey	
• Papillary edema leading to loss of scallop and maladjustment to the contours of the tooth	
• Exudate of increased gingival fluid	
• Increased sulcular temperature.	

Data Analysis

The data collected were listed on Excel spreadsheet and processed by Epi-Info Software version 3.5.3 (CDC, Atlanta, USA). Descriptive statistics were used to calculate the absolute and relative frequencies.

Ethical Aspects

This study followed recommendations of the Declaration of Helsinki and was approved by the Military Hospital of Bamako Ethics Research Committee. Prior to examinations, parents / legal guardians of research subjects were clarified about the objectives of the study and agreed to their participation by signing the Free and Informed Consent Form.

Results

A total of 2640 patients were evaluated and 2312 patients presented gingivitis, a prevalence of 87.5% (Table 2). Regarding the distribution according to sex, the girls presented 60.6% while the boys 39.4%, with a sex ratio of 0.6. The most represented age group was 11-14 years old with 52.5% of cases. Plaque-induced gingivitis was the most common (58.2%), while moderate gingival inflammation affected 67% of the students with localized gingival inflammation involving 64.7% of the participants.

Table 2. Distribution of the sample according to the presence of gingivitis.

Variables	N	%
Gingivitis		
Present	2312	87.5
Absent	328	12.5
Sex		
Male	911	39.4
Female	1401	60.6

Age (in years)		
3-6	216	9.4
7-10	881	38.1
11-14	1215	52.5
Clinical Forms		
Plaque-induced gingivitis	1346	58.2
Non Plaque-induced Gingivitis	966	41.8
Gingival Inflammation		
Slight	215	9.3
Moderate	1548	67.0
Severe	549	23.7
Extended		
Localized	1496	64.7
Widespread	816	35.3

Discussion

This descriptive and cross-sectional study has made it possible to determine the prevalence of gingivitis in children consulted at the Bamako Dental Center in Mali. The prevalence of gengivitis was 87.5% and this result is comparable to observed in Southern Jordan (70.2%) [6], and in Puerto Rico who had reported a prevalence of 80.4% [7]. This high prevalence could be explained by the phenomena related to teething (dental eruption) and with poor oral hygiene [8].

In this study, females were more affected than males, with a sex ratio (male / female) of 0.6. This result is contrary to observed in Mali, in which there was a predominance of males, with a ratio between the sexes of 1:0 [9]. A study conducted in Dakar reported 53% of boys versus 47% of girls in school children aged 3-15 [10], while another research team in Quebec has found 49% girls and 51% boys, both in Grade 2 and Grade 6 [11]. This difference could be explained by the choice of the place of study (schools and health center). The most represented age group was 11-14 years with 52.5% of cases. This result is compared to that described by other authors in Jordan [6] and in Puerto Rico [7] and, therefore, may be due to the fact that this age group corresponds to the mixed dentition or we have physiological and pathological phenomena of eruption and resorption of temporary and permanent teeth.

There are several epidemiological studies in children and adolescents on periodontal disease. Epidemiological surveys are essential for the surveillance of oral diseases such as periodontal diseases through the diagnosis of these diseases, it is possible to guide decision making in the implementation of effective preventive and curative policies, so that adolescents can reach adulthood with periodontal health [12].

Plaque-induced gingivitis was the most common finding, with moderate gingival inflammation and localized. Among Jordanian children, it was reported a prevalence of 29.8% healthy gingiva (no inflammation), 38.5% mild gingival inflammation, 31.4% moderate gingival inflammation and 0.3% severe gingival inflammation [6]. In Puerto Rico, it was found that 60.8% of the children had generalized gingival inflammation [7].

A recent study in Algeria, involving children of 6, 12 and 15 years old, reported a prevalence dental caries of 74.1% and 46.4% of children present localized gingivitis, more common at 12 years and 15 years than at 6 years [13]. Among Canadian children, the authors found that students had gingivitis in 50% of cases and had gingival bleeding in one in five students in second grade and almost one-third in sixth grade [11]. In Senegal, 73.4% of Comorian students had calculus, while only 15.8% had healthy gums, and girls had a better periodontal state than the boys with (healthy gingiva: 21% *versus* 11%, gingival bleeding: 9.5% *versus* 12%, dental calculus: 69.5% *versus* 77%). Periodontal status was not different between urban and rural students [14]. Previous authors in northern Lebanon found that 50.9% of children aged 12 had localized gingivitis and 12.3% had generalized gingivitis. The dental malpositions were mentioned in 40,1% of the cases [15]. Among Brazilian adolescents, the prevalence of healthiness was only 1.6%, and gingival bleeding and presence of calculus were the most frequent changes, 34.4% and 37.8%, respectively [12].

This study has a limitation related to the low level of evidence of cross-sectional studies in general, however the results remain useful for further studies with a high level of scientific evidence.

Conclusion

In this study, we found a high prevalence of gingivitis, possibly due to a lack of oral hygiene. Proper daily elimination of dental plaque prevents periodontal disease (periodontal disease and gingivitis) and dental caries. The most common and effective way is to promote oral hygiene; it is therefore recommended to adopt brushing as a habit, which is repeated every morning and evening at least twice a day. In addition to hygiene, frequent brushing with fluoride toothpaste increases the resistance of the tooth against decay. Brushing teeth and other behaviors that make up the lifestyle of young people can have a direct or indirect impact on their health in the short or long term.

References

1. 1. Bouchard P. Parodontologie et Dentisterie Implantaire. Volume 1: Médecine Parodontale. Paris: Lavoisier MSP, 2015. pp. 325-326, 437-445.
2. Ababneh KT, Abu Hwaij ZM, Khader YS. Prevalence and risk indicators of gingivitis and periodontitis in a multi-centre study in North Jordan: A cross sectional study. BMC Oral Health 2012; 12:1. doi: 10.1186/1472-6831-12-1.
3. Mostafa B, El-Refai I. Prevalence of plaque-induced gingivitis in a sample of the adult Egyptian population. Open Access Maced J Med Sci 2018; 6(3):554-8. doi: 10.3889/oamjms.2018.131.
4. Löe H. The gingival index. The plaque index and the retention index systems. J Periodontol. 1967; 38(6):610-6. doi: 10.1902/jop.1967.38.6.610.
5. Charon J, Mouton C. Parodontie médicale. Paris: Editions CdP groupe liaisons, 2003. pp. 127-159.
6. Rodan R, Khlaifat F, Smadi L, Azab R, Abdalmohdi A. Prevalence and severity of gingivitis in school students aged 6-11 years in Tafelah Governorate, South Jordan: Results of the survey executed by National Woman's Health Care Center. BMC Res Notes 2015; 8:662. doi: 10.1186/s13104-015-1532-y.
7. Elias-Boneta AR, Ramirez K, Rivas-Tumanyan S, Murillo M, Toro MJ. Prevalence of gingivitis and calculus in 12-year-old Puerto Ricans: A cross-sectional study. BMC Oral Health 2018; 18 (1):13. doi: 10.1186/s12903-017-0471-5.
8. Castilho LS, Abreu MHNG, Souza DH, Souza e Silva ME, Resende VLS. Factors associated with gingivitis in children with developmental disabilities. Braz Res Pediatr Dent Integr Clin 2016; 16(1):441-8. doi: 10.4034/PBOCI.2016.161.46.

9. Diawara O, Sidibé TP, Ba B, Niang A, Ba M, Kané AST, et al. Dental and periodontal disorders in schoolchildren in Bamako. Health Sci Dis 2018; 19(2):1-5. [French]
10. Sissoko B. Etude de la relation entre l'état de santé bucco-dentaire des parents et celui de leurs enfants (A propos de 200 parents et 200 de leurs enfants recensés au CHNEAR et à l'IOS). [Thesis]. Faculte de Medecine, de Pharmacie et D'odonto-Stomatologie. Universite Cheikh Anta Diop de Dakar, 2005. [French]
11. Galarneau C, Arpin S. Étude clinique sur l'état de santé buccodentaire des élèves québécois du primaire 2012-2013 (ÉCSBQ). Montreal: Institut National de Santé Publique du Québec; 2015. Availble at: https://www.inspq.qc.ca/pdf/publications/2034_sante_buccodentaire_primaire_sommaire.pdf. [Accessed on March 12 2018]. [French]
12. Santos FG, Aguiar YPC, Cavalcanti AFC, Fernandes LHF, Macedo RF, Sousa DP, Cavalcanti AL. Assessment of oral hygiene level and periodontal condition in Brazilian Adolescents. Braz Res Pediatr Dent Integr Clin 2016; 16(1):207-17. doi: 10.4034/PBOCI.2016.161.22.
13. République Algérienne Democratique et Populaire. Ministère de la Santé. Institut National de Santé Publique. Etat de santé Bucco-dentaire de l'Enfant Algérien 6 ans, 12 ans et 15 ans. Available at: http://www.insp.dz/images/PDF/Etat%20de%20Santé%20Bucco.pdf. [Accessed on March 12 2018]. [French]
14. Daouda C, Abdoulaye D, Lo Cheikh MM, Omar M, Massamba D, Daouda F, et al. Etat parodontal chez les élèves de 15 ans aux Comores. Available at: https://www.sfsp.fr/manifestations/congres2011/donnees/ensavoirplus/fs_tout_revue.htm. [Accessed on March 12 2018]. [French]
15. Kalaajleh WK, Rima AC. Comportements liés à la santé bucco-dentaire chez les écoliers au Liban-Nord. Eastem Mediterranean Health J 2000; 6(5/6):987-92. [French]