

Prevalence of Gingivitis in Malian Military Personal Consulted at the Department of Odontology of Military Hospital of Bamako (MALI)Kane A. S. T¹, Maiga A. S², Togo A. K¹, Diarra D¹, Kamissoko K¹, Kone A¹, Tangara M², Dissa Y², Traore L²¹Department of Odontology, Military Hospital of Bamako, Bamako, Mali²Department of Odontology, Military Hospital of Kati, Bamako, Mali

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Abstract: *Introduction:* The objective of this study was to determine the prevalence of gingivitis in Malian military population. *Method:* This is a descriptive and cross-sectional study which lasted two years from January 1st, 2014 to December 31st, 2015. The study population consisted of soldiers aged 18 to 65 who came to consult during the study period. A clinical examination was carried out in order to collect socio-demographic and clinical data and to lead to a diagnosis. The data collected were listed on Excel spreadsheet and processed by epi-info software version 3.5.3. *Results:* 2760 patients presented gingivitis with a prevalence of 85.2%. Patients in the 18-34 age group were the most affected with a prevalence of 53.5%. Moderate gingival inflammation was strongly represented 46.7% of cases. Plaque-induced gingivitis representing 78.2%. *Conclusion:* The prevalence of gingivitis was high in our study. These data illustrate the importance of implementing effective means to prevent not only these gingivitis, but also possibilities of managing its onset and complications in military setting.

Keywords: Gingivitis disease; gingivitis; prevalence; military; military hospital.

INTRODUCTION

Periodontal diseases are multifactorial infectious diseases that involve the periodontium, the support tissue of teeth. Gingivitis is a reversible inflammatory lesion of the superficial periodontium consisting of the gingiva. If the lesions affect the deep periodontium it calls a periodontitis (Rakoto, A. S. 2012). Gingivitis is a reversible type of periodontal disease in which inflammation is limited to the gingiva without further destruction of the supporting tissues of the tooth. It is considered the second most common oral disease by following dental caries, affecting more than 75% of the world's population (Mostafa, B., & El-Refai, I. 2018).

The etiological factor of gingivitis is sometimes dental plaque, consisting mainly of bacteria. These bacteria are foreign bodies; they cause a defense reaction of gingiva. This reaction results in visible inflammation: an influx of blood which induces immune defense cells (Bouchard, P. 2015).

When making a diagnosis of gingivitis, it comes confusion from the fact that all diseases affecting the gingiva have historically been referred to as gingivitis, whether they are atrophy, growth, neoplasm, or trivial inflammation in response to bacterial plaque. Gingiva 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 the term "gingivitis" to design any localized damage to the gingiva, whatever its origin. Classically, we distinguish between plaque-induced gingivitis and non-plaque-induced gingivitis (Bouchard, P. 2015).

The National Health and Nutrition Examination Survey III (NHANES III) conducted in the United States between 1988 and 1994 showed that 50% of adult population suffers from gingival inflammation (Ababneh, K. T, *et al*, 2012). Gingivitis defined as the presence of gingival bleeding in at least one site, is a mild form of periodontal disease and a public oral health problem. Plaque-induced gingivitis is the most common form of gingivitis (Ababneh, K. T, *et al*, 2012). 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 (Elías-Boneta, A. R, 2018).

In Mali, specifically at the Military Hospital of Bamako, data on the prevalence of gingivitis are almost non-existent. That is why we initiated this study whose objective was to determine the prevalence of gingivitis among military consulting the Odontology Department of the Military Hospital of Bamako in Mali.

METHODS

This is a descriptive and cross-sectional study which lasted two years from January 1st, 2014 to December 31st, 2015 in the Odontology Department of the Military Hospital of Bamako in Mali. The study population consisted of soldiers aged 18 to 65 who came to consult during the study period. A clinical examination was carried out in order to collect socio-demographic and clinical data by two (2) teams each composed of a dental surgeon and a dental assistant all calibrated to the measurement of gingival inflammation indices. The teams were equipped with the following equipment (examination tray, probe 6, WHO periodontal probe, precelle, mirror). Thus, the diagnosis of gingivitis was made according to the signs mentioned in Table-1. The gingival index of (LOE 1967) was used to determine the degree of gingival inflammation (0 = no sign of inflammation, 1 = mild inflammation (slight color change, mild edema), 2 = moderate inflammation (redness, edema, hyperplasia and bleeding on probing), 3 = severe inflammation (redness, swelling, ulceration and tendency of spontaneous bleeding). All military personals suffered from with gingivitis were divided

according to the following variables: age, gender, ranks (Enlisted men, Non-commissioned officer, and officer), and clinical forms of gingivitis. The data collected were listed on Excel spreadsheet and processed by epi-info software version 3.5.3. The study was carried out in accordance with the legal and ethical aspects of Helsinki Declaration on the protection of persons suitable for biomedical research and with the agreement of the hospital medical authorities.

RESULTS

In total, 5860 patients constituted our sample. 2760 patients presented gingivitis with a prevalence of 85.2% (Table-2). Patients in the 18-34 age group were the most affected with a prevalence of 53.5% (Table-3). There were more men at 54.4% with a sex ratio of 1.19 (Table-3). Enlisted men were the military rank the most affected with 1211 soldiers (43.9%) (Table-4). Moderate gingival inflammation was strongly represented with 1289 cases (46.7%) (Table-5), plaque-induced gingivitis (2157) representing 78.2% and non-plaque-induced 21.8% (Table-6).

Table-1: Differential diagnosis between plaque-induced gingivitis and non-plaque-induced gingivitis (Elias-Boneta, A. R *et al.*, 2018)

Plaque-induced gingivitis	Non-plaque-induced gingivitis
✓ Presence of plaque ++++++	✓ Presence of little plaque or not
✓ Redness,	✓ Spontaneous bleeding
✓ œdema,	✓ Systemic disease
✓ Gingival hypertrophy-hyperplasia	✓ Frequent pain
✓ Bleeding on probing without loss of attachment	✓ Color variation depends on severity
	✓ Hyperplasia, hypertrophy

Table-2: Distribution of military according to the prevalence

Pathologies	Number of military	Percentage %
Gingivitis	2760	85,2
Others pathologies	480	14,8
Total	3240	100

Table-3: Sociodemographic characteristics of military suffered from gingivitis

Age	Age group	Number	Percentage
	18 – 34 years	1476	53,5
	35 - 49 years	972	35,2
	50 – 65 years	312	11,3
Sex	Gender	Number	Percentage
	Male	1502	54,4
	Female	1258	45,6
Total		2760	100

Table-4: Distribution of military according to rank

Grade	Number	Percentage %
Enlisted men	1211	43,9
Non-commissioned officer	996	36,1
Officer	553	20,0
Total	2760	100

Table-5: Distribution of military according to gingival index (LOE 1967)

Gingival index LOE	Number	Percentage %
Mild inflammation	996	36,1
Moderate inflammation	1289	46,7
Severe inflammation	475	17,2
Total	2760	100

Table-6: Distribution of military according to clinical forms of gingivitis

Clinical forms of gingivitis	Number	Percentage %
Plaque-induced gingivitis	2157	78,2
Non-plaque-induced gingivitis	603	21,8
Total	2760	100

DISCUSSION

The study covered 3240 soldiers aged between 18 and 65 consulted in the Department of Odontology at the Military Hospital of Bamako, Mali. This age group was chosen because it represents the age of enlistment (18 years) and the age of retirement (65 years) for officers. In the literature, some studies have also chosen other age groups according to the objectives of their studies (Mostafa, B., & El-Refai, I. 2018).

Our study reported a prevalence of 85.2% of gingivitis. This prevalence is comparable to the population observed by (Khansa T *et al.*, 2017) in northern Jordan (76%) and Basma M *et al.*, in Egypt who reported 100% in adults aged 18 to 45 years. This high prevalence could be explained by a lack of knowledge about oral hygiene techniques by military personal.

The age group between 18 and 34 was the most represented with 53.5% followed by the group of 35 to 49 years old. This result is comparable to (Zhang J *et al.*, 2010) study who found an average age of 42.2 years in China. Then, a mean age of 37.9 years was found by (Li Y *et al.*, 2010) in the United States of America. The prevalence of 53.5% in the age group between 18 and 34 years could be explained by a defective hygiene at the end of basic training of enlisted men and Non-commissioned officer training.

The results of our study showed that men were the most affected with 1502 cases (54.4%) with a sex ratio of 1.19. This male predominance is comparable to what found in ANAES meta-analyzes, which showed that the presence of plaque and gingivitis is more common in men than in women, but contrary to what found by (Elías-Boneta, A. R *et al.*, 2017) in Puerto Rico which reported a female predominance of 52% and 48% of men. This result could be explained by our target population (military) as well as the place of study (Odontology department of Military Hospital of Bamako). In our study, enlisted men came in first with 1211 (43.9%) followed by non-commissioned officers (36.1%) and officers (20%). This result is confirmed by the study conducted by (ANAES, 2000) which shows

that lower the socio-economic level, the higher the need for periodontal care.

In our study, gingival inflammation was moderate in 1289 cases (46.7%), plaque-induced gingivitis (78.2%), and non-plaque-induced gingivitis (21.8%). These results are comparable to those found in the literature, since (Elías-Boneta A. R. *et al.*, 2017) reported a prevalence of 83% moderate gingival inflammation, mild in 7.3% and severe in 9.3% in Puerto Rico. In Saudi Arabia, (Majdy MI *et al.*, (2012) reported that mean gingival inflammation was 1.68 ± 0.31 (moderate gingival inflammation), $p = 0.001$ and 28.8% had an equal gingival inflammation score 2 (severe gingival inflammation). According to (Rania Rodan *et al.*, 2015), the students examined in southern Jordan, 70.2% had gingivitis. According to the gingival index, 29.8% had a healthy gingiva (no gingival inflammation), 38.5% mild gingival inflammation (GI 0.1-1.0), 31.4% moderate gingival inflammation (GI 1.1-2.0) and 0.3% severe gingival inflammation (GI 2.1-3.0).

As a consequence in the military, gingivitis is an inflammation of the gums due to the presence of bacteria. Constant exposure to bacteria, their compounds and products of their metabolism stimulates the body's defense system of local inflammatory response and immune responses. These local inflammations generate very intense pain accompanied by genes. If this gingivitis is not treated, it can progress to periodontitis, a common cause of consultation and loss of teeth.

For overall health, several epidemiological studies demonstrated the link between periodontitis and various systemic diseases such as diabetes, chronic obstructions of the respiratory tract, chronic renal diseases and rheumatoid arthritis. Thus, these pathologies can influence the military's operational capabilities and the risk of emergency dental consultation during missions.

Military personal operates in difficult condition which influences their oral hygiene. Means

which prevent the onset of gingivitis before and during missions are virtually non-existent and / or ineffective. 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 level of evidence.

CONCLUSION

The prevalence of gingivitis was high in our study. The most common type is plaque-induced gingivitis. These data illustrate the importance of implementing effective means to prevent not only these gingivitis (awareness campaigns, information and education on the importance of oral hygiene), but also possibilities of managing its onset and complications in military setting.

REFERENCES

1. Ababneh, K. T., Hwajj, Z. M. F. A., & Khader, Y. S. (2012). Prevalence and risk indicators of gingivitis and periodontitis in a multi-centre study in North Jordan: a cross sectional study. *BMC Oral Health*, 12(1), 1.
2. Agence Nationale d'Accreditation et d'Évaluation en Santé. (1998). Service des recommandations et références professionnelles. *Les examens préopératoires systématiques*. Paris.
3. Bouchard, P. (2015). Parodontologie & Dentisterie Implantaire: Volume 1: Médecine Parodontale. *Lavoisier Médecine, France*.
4. Charon, J., & Mouton, C. (2003). Parodontie médicale, Editions CDP groupe liaisons PARIS, 127-159.
5. Elías-Boneta, A. R., Encarnación, A., Rivas-Tumanyan, S., Berríos-Ouslán, B. C., García-Godoy, B., Murillo, M., Diaz-Nicolas, J., Lugo, F., & Toro, M. J. (2017). Prévalence de la gingivite dans un groupe de 35 à 70 ans résidant à Porto Rico. *P R Health Sci J*. 36 (3), 140-145.
6. Elias-Boneta, A. R., Ramirez, K., Rivas-Tumanyan, S., Murillo, M., & Toro, M. J. (2018). Prevalence of gingivitis and calculus in 12-year-old Puerto Ricans: a cross-sectional study. *BMC oral health*, 18(1), 13.
7. Idrees, M. M., Azzeghaiby, S. N., Hammad, M. M., & Kujan, O. B. (2014). Prevalence and severity of plaque-induced gingivitis in a Saudi adult population. *Saudi medical journal*, 35(11), 1373.
8. Kané, A. S. T., Guirassy M. L., Traore, H., Diawara, O., Maiga, A. S., Diaby, L. M., & Samb, A. (2017). A rôle du *porphyromonas gingivalis* dans la relation entre parodontites et polyarthrite rhumatoïde : revue de la littérature. *Rev Col Odonto-Stomatol Afr Chir Maxillo-fac*, 24, 3, 10-14.
9. Li, Y., Lee, S., Hujoel, P., Su, M., Zhang, W., Kim, J., ... & De Vizio, W. (2010). Prevalence and severity of gingivitis in American adults. *American journal of dentistry*, 23(1), 9.
10. Mostafa, B., & El-Refai, I. (2018). Prevalence of Plaque-Induced Gingivitis in a Sample of the Adult Egyptian Population. *Open access Macedonian journal of medical sciences*, 6(3), 554.
11. Rakoto, A. S., Ramaroson, J., Ralaiarimanana, L. F., Rakotoarison, R. A., Aunezifort, P., & Ralison, G. (2011). Santé parodontale dans la région du Menabe à Madagascar, *Revue d'odontostomatologie malgache*, 3:18-28.
12. Rodan, R., Khlaifat, F., Smadi, L., Azab, R., & Abdalmohdi, A. (2015). 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 research notes*, 8(1), 662.
13. Zhang, J., Xuan, D., Fan, W., Zhang, X., Dibart, S., De, W. V., ... & Zhang, Y. P. (2010). Severity and prevalence of plaque-induced gingivitis in the Chinese population. *Compendium of continuing education in dentistry (Jamesburg, NJ: 1995)*, 31(8), 624-629.