

Profile of Aggressive and Chronic Periodontitis in Kinshasa Dental Hospitals, DR Congo

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Abstract

Periodontitis is a prevalent destructive gum disease, characterized by loss of tissues supporting the teeth. The two main forms, chronic and aggressive have not been assessed in Kinshasa, DR Congo. **Aim:** The aim of this study was to investigate the Prevalence and the pattern of chronic periodontitis (CP) and aggressive periodontitis (AP) in order to improve its management. **Materials and Methods:** A cross sectional study of 404 subjects attending the dental services of the four hospitals of Kinshasa city, from October 2013 to April 2014 was carried out. The plaque index (PII), bleeding on probing (BOP), probing pocket depth (PPD) and frequency of tooth brushing (FTB) were the parameters assessed. The SPSS software version 20.0 was used. **Results:** Out of 404 patients examined, 322 (79.7%) had chronic periodontitis versus to 44 (10.9%) of aggressive periodontitis. The female was higher than males with a sex ratio of 1.49:1 and the age group between 20 and 29 was the most represented. PPP of ≥ 6 mm was found in 24.6%, 5 or 5.5 mm in 27.3% and PPP of 3.5 to 4.5 mm in 48.1% of patients with periodontitis. Significant difference was found between CP and AP according to age variable, p-value < 0.001 . PII for CP was 0.97 (SD ± 0.38) while that for AP was 0.90 (SD ± 0.43). No significant differences were found between PII, p-value = 0.47; FTB (p = 0.055) and BOP of subjects with AP and those with CP (p = 0.105). **Conclusion:** The two main forms of periodontitis diseases are more prevalent in patients attending dental services in Kinshasa and affect male as well as female. Age remains an essential variable to distinguish between CP and AP.

Keywords

Prevalence, Profile, Aggressive Periodontitis, Chronic Periodontitis, Probing Pocket Depth

1. Introduction

Periodontitis is an inflammatory disease characterized by a progressive destruction of the tissue supporting the teeth [1]. Subgingival plaque bacteria initiate the inflammation [2], but the host response is determinant in the onset and progression of the disease. Environmental, systemic and genetic factors may play an important role as risk factors by modifying this process.

According to the current classification of Periodontal disease, there are three primary clinical forms of periodontitis distinguished [3]. Out of these forms, chronic periodontitis (CP) and aggressive periodontitis (AP) are the main forms [3]. CP is the most prevalent form and can occur at any age, but mostly affects adults from 35 years old. It affects approximately 48% of adults in United States of America; moderate and advanced disease is more prevalent in the older age groups, and rates of 70% or more have been reported in certain populations [4].

AP is a less common form in the prevalence and mostly affects the young as well as adolescents, and can also be found in adults. The prevalence is generally considered to be low in several countries. It varies between 0.1% and 0.2% in Europe [5] [6], 0.13% in Iran population aged 15 to 18 years [7], 0.6% in Turkey among young people aged 13 to 19 years [8]. Studies in the United States of America attributed high prevalence of AP to the populations of Hispanic and African origins and to the socio-economic level [9] [10].

The absence of treatment in both forms can lead to the tooth loss and the treatment of patients with advanced disease is challenging [9]. Some studies reported a negative impact of periodontitis on the quality of life [11] [12]. Presently, in D R Congo, no study had investigated out the two entities nor compared them. The objective of this study was to investigate the prevalence of CP and AP and to compare their clinical and epidemiological profile.

2. Material and Methods

This cross sectional study took place in four hospitals of Kinshasa city from October 2013 to April 2014. These hospitals were chosen in order to take into account the geographical location as well as the concern to include all of the social strata of population. The number of patients from each center was proportional to its attendance. These centers were Boyambi Clinic, Saint Joseph Hospital, Ngaliema Clinic and Affiliated Clinic of the University of Kinshasa. The study assessed 404 subjects aged between 12 and 81 years who had consulted the dental services of the four hospitals mentioned above. Each patient voluntarily agreed to participate. Any patient undergoing antibiotics regimen or those who had

taken antibiotics for the last three months were not included in the study.

The structured interview as well as the clinical examination was used to collect data. The subject comfortably seated on a dental chair was first interviewed and then a periodontal clinical examination was performed under the surgical light by the same trained and calibrated examiner. PII, BOP and PPD were the parameters assessed on clinical examination whereas FTB was assessed on interview.

All fully erupted permanent teeth were examined and the measurements were assessed at six sites per tooth (mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual and distolingual). Erupting teeth not yet in occlusion, supernumerary and partially impacted teeth and the fully erupted permanent third molar teeth were excluded. In addition, Periodontitis manifestation of systemic disease and ulcero-necrotic periodontitis were not diagnosed. The probing depth was defined as the distance from the free gingival margin to the bottom of the pocket/sulcus. The periodontal probe (Hu-Friedy, PCP 11.5, CHICAGO, Illinois) was used for PPD measurements and BOP. In this paper, subject with periodontitis was defined as the patient with a PPD of 3.5 mm on at least one tooth. The subject with CP was one who had a PPD of at least 3.5 mm on at least one tooth and whose the amount of bone destruction was estimated to be proportional to local deposits, whereas the subject with AP was one who had a PPD of 4.5 mm and whose the amount of bone destruction was inconsistent with local deposits.

3. Statistical Analysis

All data collected were recorded on an evaluation record sheet prepared for this purpose. The data collected were entered into the computer using Excel 2007 software. The SPSS software version 20.0 was used for descriptive statistics. The Pearson chi-square test was used to calculate associations between variables. The Student's T-test was used to compare the means as well as the Fischer Exact Test. The significance level was set at 0.05%.

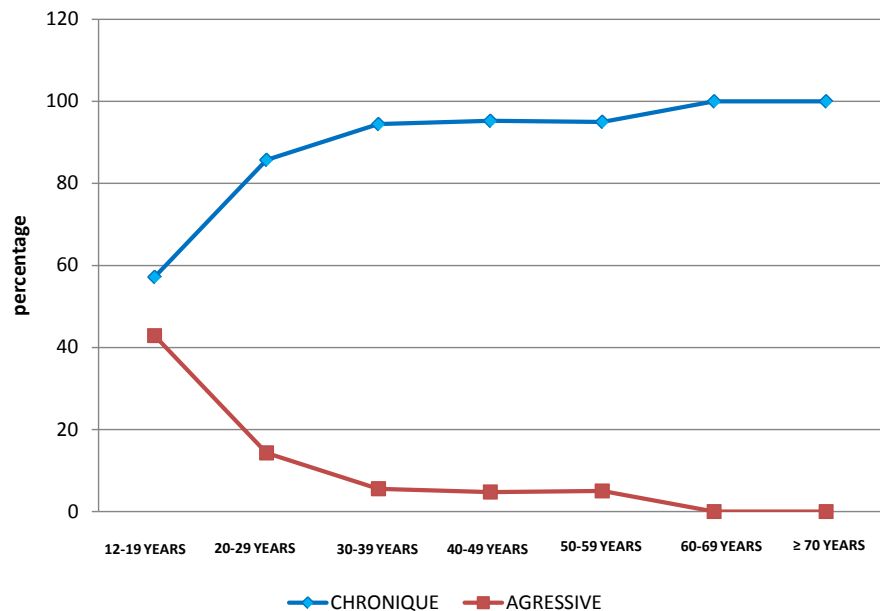
Ethical approval was obtained from the ethics committee, School of public health of the Kinshasa University. Prior to perform interview and clinical examination, free agreement and informed consent was obtained and provided by each patient. The purpose of the study, methodology, impacts and possible consequences were explained.

4. Results

Out of 404 patients examined in the present study, 322 (79.7%) had CP versus to 44 (10.9%) of AP (**Table 1**). The proportion of females was higher than males with a sex ratio of 1.49:1. The age of patients was ranging from 12 to 81 years; with a mean age of 35.26 (SD \pm 16.943) years and a median of 30 years. According to age, the prevalence of CP increased with age, reaching 100% in this survey from the 60 - 69 age group; whereas the prevalence of AP decreases with age until reaching 0% from the same age group (**Figure 1**). The age group between 20 and 29 was the most represented. Comparing the two forms of periodontitis,

Table 1. Profile of AP and CP.

Periodontal Pathology	Number	Percentage
Chronic	322	79,7
Aggressive	44	10,9
Healthy and gingivitis	38	9,4
Total	404	100

**Figure 1.** CP and AP according to age group.

there was no significant difference between CP and AP according to gender, $p = 0.351$ (Table 2). A PPD of ≥ 6 mm on at least one tooth was present in 24.6% of patients with periodontitis, 27.3% had PPD of 5 or 5.5 mm and 48.1% had PPD of 3.5 to 4.5 mm on at least one tooth among patients with periodontitis (Table 3).

The mean age for CP was 38.28 (SD \pm 16.58) years compared with 23.05 (SD \pm 10.54) years for AP. Significant difference was found between CP and AP according to age variable, $p < 0.001$ (Table 4). The mean plaque index of the study population was 0.95 (SD \pm 0.39). The plaque index for CP was 0.97 (SD \pm 0.38) while that for AP was 0.90 (SD \pm 0.43). No significant differences were found between PII, p value = 0.47; FTB ($p = 0.055$) and BOP of subjects with AP and those with CP ($p = 0.105$) (Table 4). The BOP of the study population had a median of 14, 20.

5. Discussion

The variation of methodologies and diagnostic criteria used in periodontal research renders comparisons between studies difficult if not impossible and greatly compromises the drawing of meaningful conclusions. The results of the present study show that both chronic and aggressive periodontitis are prevalent

Table 2. CP and AP according to gender.

Gender	Periodontitis		Total (N = 366)	p-Value
	Chronic	Aggressive		
Male	136 (90.70%)	14 (9.30%)	150 (100%)	0.351
Female	186 (86.10%)	30 (13.90%)	216 (100%)	

Table 3. Probing pocket depth (PPD) by patient with periodontitis.

PPD*	Number of patients	Percentage
Mild	176	48.1
Moderate	100	27.3
Severe	90	24.6
Total	366	100

Mild: 3.5 - 4.5 mm; Moderate: 5 - 5.5 mm; severe: 6 mm and above. *PPD in this study was measured at six sites per tooth in all teeth (third molar excluded), but in this table, the highest PPD per patient is considered.

Table 4. Comparison between AP and CP according to different variables.

Variable	Chronic periodontitis		Aggressive periodontitis		p-Value
	N	Mean	N	Mean	
Age	320	38.28 ± 16.58	44	23.05 ± 10.54	<0.001*
FTB	322	1.66 ± 0.65	44	1.39 ± 0.79	0.055
PLI	320	0.97 ± 0.38	44	0.90 ± 0.43	0.470
BOP	290	18.71 ± 17.02	44	24.91 ± 14.55	0.105

FTB: frequency of tooth brushing; PLI: plaque Index; BOP: Bleeding on probing.

in patients consulting the dental services of hospitals of Kinshasa City in DR Congo with predominance for the CP. These results were similar with several authors showed that the chronic form is more prevalent than aggressive form [13] [14] [15] and [16].

The prevalence of AP varying between 0.1 and 0.2% found in Europe [5] [6] and also in Iran [7] were lower compared to our result (10.9%). It should be noted that the methodologies used are different and hamper greatly comparisons of the results. These studies referred were carried out in a younger population of 14 to 19 years old and the radiographic appearance was used in case definition. However, in our study, the age of participants varied between 12 and 81 years and no radiographic appearance was used as criteria definition. Thus, the absence of radiography may overestimate the proportions of the disease [17]. To minimize this, the probing pocket depth for periodontitis case was taken into account only when a loss of attachment was certain. In the present study, AP was not specified in its localized and generalized forms. This can result in a possible inclusion of what has been defined as the “incidental disease” [9] [10]. However,

the recent result was approximately similar to those found in Brazil in subjects aged between 12 and 29 years old [18].

But a study by Albandar *et al.* [9] in Uganda among 12 - 25 years old of the patients found a high prevalence of 28.8% of early-onset periodontitis. Thus, the prevalence in Africa appears therefore to be high. This may be due to not only the poor socio-economic conditions of African's populations but may be also related to race as supported by some publications [9] [10] [19]. The report of Albandar *et al.* [20], estimated that 1.3% of whites, 5% of Hispanics and 10% of African-Americans had a loss of attachment indicative of early-onset periodontitis, currently AP.

The prevalence of CP in this study was high, 79.7%. It should be emphasized, however, that these proportions are dependent on the diagnostic criteria [2] [21]. The prevalence of CP varies with age as it will be noted in the following lines. In Brazil, the age group between 24 - 29 years old, had a high rate of 72% of CP reported [22], and also a high proportions of periodontitis have been reported by other authors in Africa [23]. Franklin [23], in a study carried out in some African countries, concluded that periodontitis affected up to 95% of people over 40 years old.

Dremmer *et al.* [16], noted the complexity of the differential diagnosis between CP and AP. For example, the familial aggregation of disease, a feature of AP, is often impossible to ascertain upon examination of a patient. Most of our patients have no idea about the oral health of their relatives. It is difficult, in these circumstances to verify this feature when conducting a cross-sectional study. In this study, the prevalence of CP increased with age, while that of AP decreased. The progression of the prevalence of CP is in agreement with the literature [2] [16] [21]. Authors have pointed out that age is not a determinant risk factor in the occurrence of periodontitis. It is rather an aggravating factor in the fact that the cumulative effect of the disease during the life of the individual is measured [2].

The decrease in the prevalence of AP with increase of age, observed in this study can be easily understood. Indeed, AP is more common in young and adolescents. It often starts around puberty in its localized form and often affects people under 30 years old in its generalized form [24].

In this study, a significant difference was found between the age of subjects with CP and those with AP. Although age has been abolished from the 1999 classification as a primary diagnostic criterion, it remains essential in the differential diagnosis between CP and AP [16] [15] [24]. A recent pilot study that tested the consistency of the diagnosis of AP and CP by certified periodontists showed that, knowledge of the patient's age influenced clinical diagnosis, when a distinction was made between CP and AP [25]. It is therefore important, to reconsider age in the diagnostic criteria of AP.

Both male and female appear to be affected in the same way by either forms of the disease. The data in the literature remain contradictory especially with regard to AP. Albandar *et al.* [9], Elamin *et al.* [19] found that the male were more

affected by AP, unlike to other authors found [8] [14] [26]. The present results are in agreement with those of Susin *et al.* [27] and Vandana *et al.* [28] who found an equal distribution of AP in male and female.

The distribution of PPD per patient indicate that 24.6% of patients with periodontitis had severe probing depth versus 75.4% mild to moderate. The PPD was the main parameter to categorize patients with periodontitis and those without periodontitis. The majority of periodontitis patients had mild to moderate PPD indicating that they had mild to moderate periodontitis. This is in agreement with studies suggesting that mild to moderate periodontitis affects the majority of adults [29] [30].

Concerning the plaque index, in the present study, there was no significant difference between CP and AP. These results are in agreement with those found in India by Vandana *et al.* [28]. According to the 1999 classification of periodontal diseases, there is inconsistency between local factors and the level of bone destruction for AP [3]. However, it should be noted that generalized AP has clinical signs similar to those of CP. This study considered the localized and generalized form as single entity. This aspect is also valid for the BOP which does not show significant difference in this study.

This study has some limitations. This was carried out in patients attending hospitals and therefore is prone to selection bias. Another shortcoming of this study is that the size of sample is relatively small. Future studies involving big samples of populations selected randomly should be considered to determine the prevalence in the population.

6. Conclusion

Within the limitations of this study, it provides high prevalence of AP and CP in patients attending dental services in Kinshasa and that these two forms of periodontitis affect male as well as female. This study is one of the rare studies where the prevalence of periodontitis, especially of AP, was studied by taking into account patients with no upper age limit in order to be in agreement with the 1999 International Classification Workshop. According to this classification, AP affects young and adolescents, but can occur at any age. Thus, this study was able to report a prevalence of 10.9% of AP in patients aged 12 to 81 years and confirmed that AP was more prevalent in those under 30 years old. Age remains an important feature to distinguish between AP and CP.

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