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Gingival Hyperplasia during Pregnancy: Frequency and Clinical Presentation in a Tertiary Level Hospital in Yaoundé-Cameroon

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Abstract

Gingival hyperplasia or gingival overgrowth, which is a common trait of gingival disease, is characterized by an increase in the size of the gingiva. Gingival hyperplasia according to past reports has numerous etiological factors one of which is pregnancy due to increased hormone levels. Although pregnancy does not directly cause gingival hyperplasia, it may catalyze local etiological factors. **Objectives:** To determine the frequency and clinical aspects of gingival hyperplasia during pregnancy. **Methodology:** We conducted a cross sectional descriptive study from November 2021 to June 2022 at the Yaoundé Gyneco-Obstetrics and Pediatrics Hospital. Data were collected using a pretested questionnaire and clinical assessments done using dental consultation kits. Data were analyzed with the International Business Machine Statistical Package for Social Sciences (IBM SPSS) version 21.0 software. **Results:** We recruited 231 eligible participants for our study. Of 231, 101 (43.7%) had gingival hyperplasia. Most of our study population were between 20 - 40 years old and gingival hyperplasia was most commonly found in the 3rd trimester (60.7%). We reported that 31.3% of our population had a plaque score 2 and only 7.8% had consulted a dentist during pregnancy. We also observed that 93.3% of our population manifested a mild/moderate form of the disease while 6.9% had a severe form. Our study showed that 72.3% and 27.3% had a localized and generalized form of the disease, respectively. **Conclusion:** We concluded that gingival hyperplasia is a common pathology in pregnant women. It is most found in the third trimester. It presents more commonly as a localized form, and degree of severity is mostly moderate.

Keywords

Pregnancy, Gingival Hyperplasia, Yaoundé

1. Introduction

The pregnant state in a female affects many organ systems, resulting in localized physical alterations of these systems, which can include the oral cavity [1]. Gingival hyperplasia or overgrowth, a common trait of gingival disease, is characterized by an increase in size of the gingiva. There are many systemic causes of gingival hyperplasia one of which is pregnancy [2]. The function of periodontal cells may be affected by estrogen and progesterone. In one report, sex steroid hormones have been shown to, directly and indirectly, exert influence on cellular proliferation, differentiation, and growth in gingiva [3]. Moreover, hormonal factors in pregnancy have been shown to aggravate hyperplasia [1]. Gingival hyperplasia is associated with complications for both mother and baby, including the potential for the mother to lose teeth as well as an increased risk of preterm birth or low birth weight [3].

The prevalence of gingival hyperplasia in the literature varied from 2.9% to 25% [4]. A study on the prevalence of oral lesions in pregnancy was carried out in Asia, and showed that gingival hyperplasia had an incidence of 25% in pregnant women [5]. Specifically, in Singapore the overall incidence of oral lesions during pregnancy was 44.2%. This varied by trimesters with lesions observed in 27.5%, 52.5% and 52.5% of women in the first, second and third trimesters, respectively [5]. In a meta-analysis of 5935 participants, the overall prevalence of oral mucosal disorders was 11.8%. The most common were gingival hyperplasia at 17.1%, morsicatio buccarum (10%), oral candidiasis (4.4%), pyogenic granuloma (3%), and benign migratory glossitis (2.8%) [4]. A study including 404 pregnant women in Sudan, Africa showed that 97 women had periodontal disease and of these, 45 had gingival hyperplasia [6].

We carried out this study because, while research on periodontal disease in pregnancy has been carried out in various parts of Africa [7] [8] [9], there is sparse information regarding this pathology in Cameroon. We sought to determine frequency and clinical presentation of gingival hyperplasia during pregnancy in a tertiary level hospital.

2. Methods

We carried out a cross-sectional descriptive study with prospective data collection at the Yaoundé Gyneco-Obstetric and Pediatric Hospital, a tertiary hospital in Yaoundé, Cameroon. The study was carried out over a period of 8 months from November 2021-June 2022. Our inclusion criteria was all pregnant women in the second and third trimester at outpatient clinic who consented. We excluded all pregnant women with suspected drug-induced gingival hyperplasia,

hereditary gingival hyperplasia, and systemic diseases, such as, diabetes or HIV infection.

Sample size was determined using the formula for qualitative case studies [10]:

$$\text{Sample size} = \left(\left[Z_1 - \alpha/2 \right]^2 P(1-P) / d^2 \right)$$

where:

$Z_1 - \alpha/2$ = standard normal variant ($P < 0.05$).

p = Expected proportion in population based on previous or pilot studies.

d = Absolute error or precision.

Using a prevalence of gingival hyperplasia of 17.1% [4], and a level of statistical significance at 5%, the minimum sample size was set at 218 cases. Two hundred and thirty-one participants met our inclusion criteria.

We used a structured, pre-tested, questionnaire on consenting subjects. Variables recorded were socio-demographic and clinical profiles, and frequency of gingival hyperplasia. The socio-demographic profile included age, marital status, educational level, profession, ethnic group, and religion. Clinical variables included history of pregnancy (trimester of pregnancy, drugs taken during current pregnancy and awareness of dental care); presence of potential causes of gingival hyperplasia such as, systemic disease or medication and oral hygiene practices (number of daily tooth brushings and method of teeth care). We performed a detailed periodontal assessment on all participants using indices as described below. Oral hygiene and gingival enlargement were evaluated using the following scoring systems: the oral hygiene simplified index (CI-S-given by Greene and Vermillion) [9], plaque index (PI-given by Silness and Loe) [11], and Miranda-Brunet index [12].

Coded data was entered in CSPro (Census and Survey Processing system) version 7.1 and analysed using IBM-SPSS (International Business Machine-Statistical Package for Social Sciences) version 21.0. Categorical variables were presented using frequencies and percentages.

We obtained ethical clearance from the Ethical Committee of the Faculty of Medicine and Biomedical Sciences (FMBS) of the University of Yaoundé, and administrative authorizations from the director of the Yaoundé Gyneco-Obstetric and Pediatrics Hospital and the gynecology unit chief.

3. Results

3.1. Frequency of Gingival Hyperplasia and Socio-Demographic Characteristics

Of the 231 candidates included in our study, 101(43.72%) had gingival hyperplasia (**Figure 1**).

The patients' age ranged from 18 to 43 years with a mean of 29.22 ± 5.73 years. In our study population 51.09 % (118) comprised women aged between 20 - 30 years; 41.55% and 7.36% were 30 - 40 and 40 - 50 years, respectively.

Table 1 shows that most participants were Christian (89.6%), employed

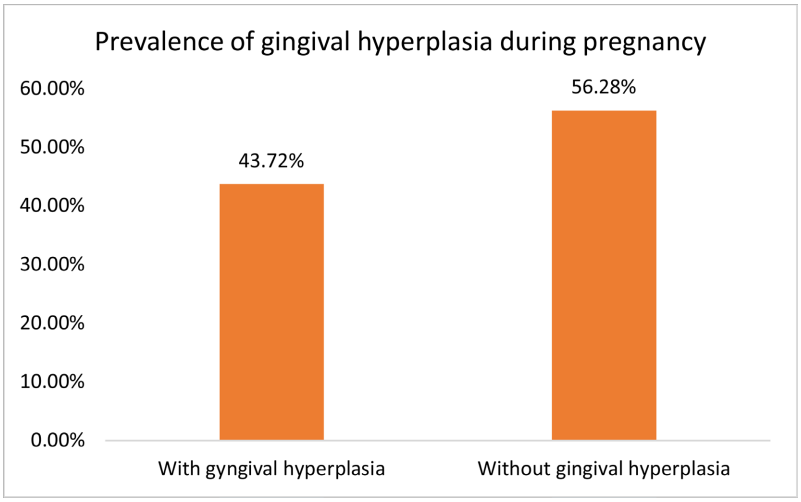

Figure 1. Prevalence of gingival hyperplasia during pregnancy.

Table 1. Socio-demographic characteristics of study population.

Variable	Number	Percentage (%)
Age (years)		
20 - 30	118	51.09
30 - 40	96	41.55
40 - 50	17	7.36
Marital status		
Single	126	54.5
Married	101	43.7
Divorced	3	1.3
Widow	1	0.4
Educational level		
University	139	60.2
Secondary/college	82	35.5
Primary	10	4.3
Profession		
Student	66	28.6
Employed	132	57.1
Stay-at-home spouse	26	11.3
Unemployed	7	3.0
Belief system		
Christian	207	89.6
Muslim	22	9.5
Atheist	2	0.9

(57.1%), single (54.5%), and had a university level education (60.2%).

3.2. Clinical Characteristics

Figure 2 shows the gestational profile of our participants. Majority were in the 3rd trimester (115 or 49.8%). There were 67 (29%) and 49 (21.2%) in the 2nd and 1st trimester, respectively. Concomitant pathologies were found in our study population including malaria, gastritis, asthma, and urinary infection. Malaria was the most common (48.8%) as shown in Figure 3.

In assessing oral hygiene, Table 2 depicts practices of our study population. More than half our study population brushed their teeth daily (51.1%), 89.6% used toothpaste, 72.7% practiced both the horizontal and vertical method of brushing, 41.6% changed their tooth brush every 3 months and 36.4% changed toothbrushes only when the filaments where destroyed (Table 2). Additionally, as shown on Table 3 & Table 4, we noted that 56.3% of study participants had not visited a dentist prior to pregnancy. Most did not consult a dentist during pregnancy (92.2%). However, of 18 who consulted a dentist during pregnancy, 50% went for a routine check-up, 27.8% and 22.2% went for bleeding and dental

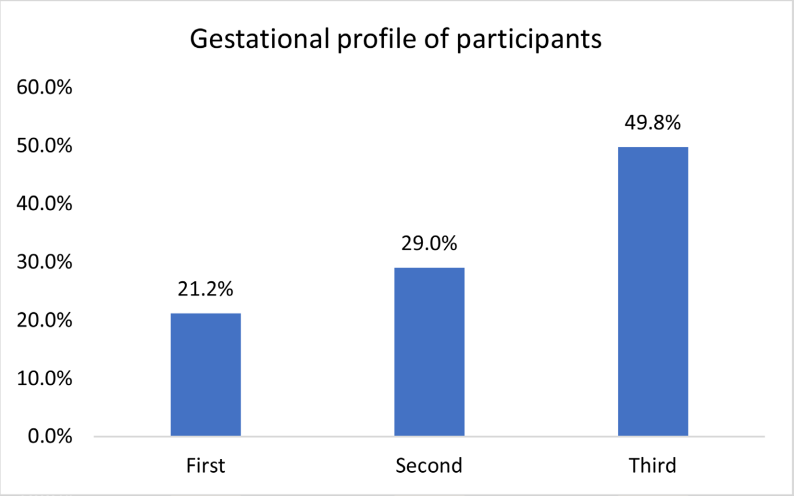

Figure 2. Gestational profile of participants.

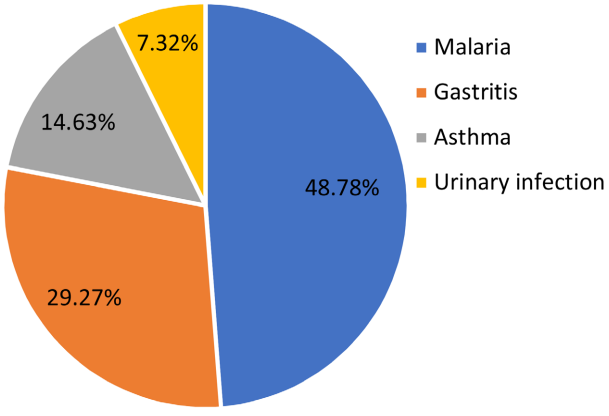

Figure 3. Concomitant pathologies in patients with gingival hyperplasia.

Table 2. Characteristics of oral hygiene practices of study population.

Variables	Number	Percentages (%)
Brushing frequency		
Once	118	51.1
Twice	108	46.8
Thrice	5	2.2
Mouth cleaning products		
Tooth paste	207	89.6
Bicarbonate powder	12	5.2
Salt	8	3.5
Soap	4	1.7
Frequency of toothbrush changes		
Every 3 months	96	41.6
When the filaments are all destroyed	84	36.4
Monthly	28	12.1
Every six months	23	10.0
Brushing method		
Vertically	15	6.5
Horizontally	48	20.8
Both	168	72.7

Table 3. Distribution of study population according to dental consultation routine.

Variable	Number	Percentage (%)
Before pregnancy		
No	130	56.3
Yes	101	43.7
During pregnancy		
No	213	92.2
Yes	18	7.8
Reason for consultation		
Routine check-up	9	50.0
Bleeding	5	27.8
Pain	4	22.2
Scaling		
Never	157	68.0
Rarely	50	21.6
Frequently	24	10.4

Table 4. Distribution of our study population according to the plaque index.

Variables	Number	Percentage (%)
Score		
0	106	45.9
2	73	31.6
1	46	19.9
3	6	2.6

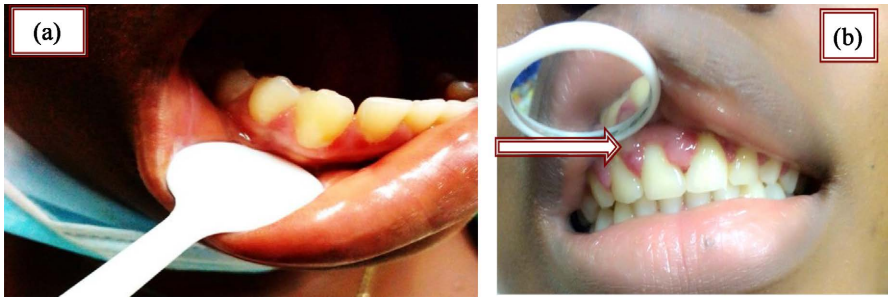

Figure 4. Stages of gingival hyperplasia ((a) moderate and (b) severe).

pain, respectively. We observed that 68.0% of our study population had never carried out scaling and only 10.4% carried out scaling regularly.

Regarding the clinical presentation of gingival hyperplasia during pregnancy, we observed that 93.1% (94) patients who had gingival hyperplasia had a mild-moderate form and 6.9% had a severe form of the disease. **Figure 4** illustrates some of our findings.

In terms of scoring plaque and calculus in our study population, majority had no plaque with 19.9% and 31.6% participants having a score of 1 and 2, respectively. Similarly, regarding the calculus index most participants scored zero. However, we reported that 19.9% scored 1 and 25.1% scored 2. In terms of gingival disease stage, we showed that 28.2% and 17.7% of our subjects had stage 2 and 3, respectively. We also noted that, gingival hyperplasia was most frequently found in the 3rd trimester (60.4%). The frequency in the 1st trimester was relatively low (8.9%). Finally, we noted that localized gingival hyperplasia was pre-dominant (72.3%) relative to generalized (27.7%) (**Figure 5**).

4. Discussion

This study sought to determine the prevalence of gingival hyperplasia, report the socio-demographic and clinical profile of patients in the study population, and describe clinical aspects of gingival hyperplasia in pregnant women at the Yaoundé Gyneco-Obstetric and Pediatric Hospital. To accomplish this, we carried out a prospective, descriptive study.

4.1. Frequency of Gingival Hyperplasia

Gingival hyperplasia was present in 43.7% of our study population. This result is

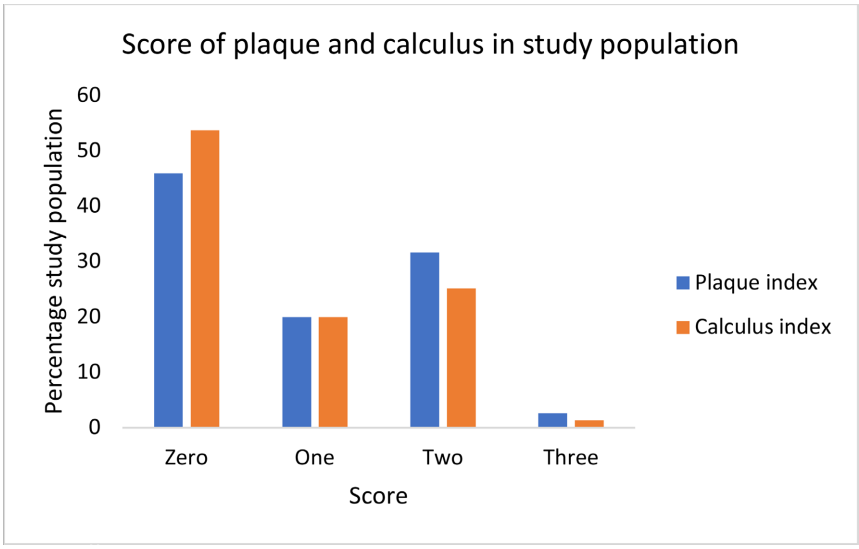

Figure 5. Score of plaque and calculus in study population.

similar to the 2006 study of Bengondo *et al.* in Cameroon who reported a frequency of 46% [13]. This is consistent with the notion that an increase in hormones (estrogen and progesterone) during pregnancy leads to an increase in the influx of fluids in the gum conjunctival tissues, resulting in a tendency to swell, hyper vascularization and a congestive state which is responsible for gingival hyperplasia [14]. Also, both studies were carried out in urban settings and the women were of the same age group. They also had common habits which could justify the similarity in our findings.

4.2. Socio-Demographic Profile

The age of our participants varied from 18 - 43 years. These extremes are like those of Naumah *et al.* in Ghana who reported an age range from 16 to 45 years [15]. This could be justified by the standard reproductive age set by UNICEF which is of 15 - 43 years [16].

The most represented educational level in our study population was the university level which made up of 60.2% participants. This result is different from that of Diallo *et al.* in Mali that reported the university level at 16.5% [17]. This variance could be explained by the fact that unlike the Mali study, ours was carried out in Yaoundé which is a metropolis and consequently filled with institutes of tertiary education increasing the likelihood of our study population to have attained this level of education. The study in Mali was carried out in rural areas where education is not advanced. In addition, Raatikaairen *et al.* carried out a study which showed that highly educated women represented by 52.66% were more likely to go to a reference hospital unlike non-educated women who would more likely go to primary care health centers [18]. Given that the Yaoundé Gyneco-Obstetric and Pediatric Hospital is a reference hospital this could also explain why the educational level of our study population is mostly made up of the university level.

4.3. Clinical Profile

The third trimester was most represented with 115 women (49.8%) of all participants. These results are different from that of Diallo *et al.* from Mali in 2014 that reported the majority of their study population being in the first trimester [17]. This discrepancy in antenatal care attendance would need an in-depth exploration considering other factors that influence antenatal care in rural versus urban settings in these countries.

The most represented pathology in our study population was malaria at 48.8%. These findings are similar to those of Chukwoucha *et al.* in Nigeria who found malaria in 57.1% of pregnant women [19]. The high incidence of malaria among pregnant women in these studies is likely due to the similarity in study areas, both studies being carried out in endemic areas of malaria. We did not establish a clear association between gingival hyperplasia and the presence of malaria infection in our study population. However, we can hypothesize that since both afflictions are aggravated by pregnancy a possible underlying common denominator exists. We could also theorize on the possible effect of anti-malaria medicines on the already fragile gingiva in pregnancy. This would require further studies.

In our study, 46.8% brushed their teeth twice daily. These results are different from that of Bengondo *et al.* in 2006 in Cameroon which reported 32.7% [13]. This could be explained by the fact that majority of patients at the Yaoundé Gyneco-Obstetric and Pediatrics Hospital had a tertiary level of education and thus, were more enlightened on the most appropriate methods of dental hygiene. Nevertheless, a significant proportion of our study participants (51.1%) reported brushing their teeth only once and mostly in the morning which is not ideal. They reported low energy levels, nausea and vomiting as reasons for not brushing enough. This could explain the relatively high frequency of plaque and consequently high rate of gingival hyperplasia.

Our study revealed that only 7.8% of patients visited the dentist while they were pregnant. These results are similar to those of Diallo *et al.* in Mali in 2014 and Offenbach *et al.* in the U.S.A. in 2009 [17] [20]. Many reported having no dental problems that would require consulting a dentist. Some also reported busy schedules, fear of dentists, and financial challenges as reasons. Furthermore, some study participants claimed that mild pain or discomfort could be treated at home with simple pain killers or natural remedies.

In our study, 73.2% of gingival hyperplasia was localised while 27.7% was generalized. We also observed that 93.1% of gingival hyperplasia presented itself in the moderate form while 6.9% the severe form. These results are similar to that of Erchick *et al.* in 2019 in Nepal that found moderate gingival hyperplasia in 79% of the population studied and the severe form in 9.7% [21]. This can be explained by the fact that inadequate brushing techniques make some areas of the mouth more susceptible to developing plaque, thereby affecting the site and severity of gingival hyperplasia. In our study, gingival hyperplasia was more

common in the 3rd and 2nd trimesters, 60.4% and 30.7%, respectively. This is similar to a study carried out by Silness *et al.* in 1963 in America that found a high frequency of gingival inflammation in the 3rd trimester [11]. This could be explained by the fact that, estrogen and progesterone levels peak in the last trimester, constituting a more significant hormonal imbalance in the oral cavity leading to aggravation of gingival hyperplasia.

5. Limitations and Difficulties of Our Study

The patients were insufficiently cooperative to facilitate our data collection. We felt that they might have omitted information.

Although our study reveals the presence of gingival hyperplasia in pregnant women, the descriptive study doesn't demonstrate the sequence of appearance and effects of gingival hyperplasia on the outcome of pregnancy. There is a necessity for a longitudinal study.

This work was carried out only in one hospital in Yaoundé. More studies would be needed in other regions and hospitals to obtain a clearer perspective of this disease in pregnancy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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