

Factors associated with Gingival bleeding in Pregnant women

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Abstract

Background: Studies have reported a relationship between maternal periodontitis and complications associated with pregnancy. Thus, prevalence estimates and risk factor identification for gingivitis during pregnancy in Nigeria are important.

Aim: To determine the prevalence of gingivitis and identify related risk factors among pregnant women in Nigeria.

Methods: A cross sectional study of women who attended the maternity centre of Lagos State University Teaching Hospital, Ikeja Lagos Nigeria. Self-administered questionnaire was used to collect data on participants' sociodemographic. The oral clinical examination of each participant was carried out according to World Health Organization (WHO) basic survey criteria.

The Statistical Package for the Social Sciences version 21 (SPSS Inc., Chicago, IL, USA) was used to analyze the data.

Results: Two hundred and six pregnant women were recruited for the study. The overall prevalence of gingivitis was 55.3%. Education, bleeding on brushing, dental visit and oral hygiene score was significantly associated with gingivitis.

Conclusion: Gingivitis appears to be a common problem among pregnant women in Nigeria. Risk factor screening could help identify pregnant women at higher risk of periodontal disease.

Key word: Demographics, Gingival bleeding, Oral hygiene, Pregnancy

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I. Introduction

The periodontium, the surrounding tissue of the tooth is composed of the gingiva, cementum, periodontal membrane, and alveolar bone. The gingival is that part of periodontium that covers the alveolar process and surrounds the cervical area of the tooth.¹ Generally, the colour of the healthy gingiva is coral pink, but it is dependent on the vascular supply, thickness of tissue, amount of keratinized epithelium, and melanin pigments.²

Periodontal diseases include a group of inflammatory conditions of the supporting structures of the teeth, initiated by oral bacteria, progressing from reversible accumulation of plaque and inflammation of gingival tissue (gingivitis) to irreversible breakdown of the supportive tissues of the teeth and eventually tooth loss (periodontitis).^{3,4}

Gingivitis, the mild form of periodontal disease, is the most common, affecting 75% of adult populations globally.^{5,6} The signs and symptoms of gingivitis include gingival redness, swelling, bleeding on brushing and on probing, and no periodontal attachment loss (AL).^{6,7}

Gingival bleeding (GB) is one of the first clinical manifestations of periodontal diseases such as gingivitis and periodontitis. Bleeding is the sign of gingivitis.⁸ Gingival bleeding during tooth brushing or on probing is an indication of an active gingivitis.^{2,9}

It is established that gingivitis in pregnant women is induced by the bacterial plaque present. The risk of gingivitis increase,^{10,11} due to the gingival response to the hormonal changes in pregnancy. The rise in progesterone level is 10 times more in pregnant women than in non-pregnant women,^{12,13} a condition that

promotes the increase in a specific pathogenic microbial growth which induces gingivitis.¹² There are changes also in the immune system during pregnancy, leading to alteration in host response to bacterial plaque and aggravation of existing gingivitis.^{12, 13}

The most prevalent oral manifestation associated with pregnancy is gingivitis,¹⁴ and ranges from 35% to 100%.^{13, 15} It is usually observed between 2nd and 8th month of pregnancy.^{16, 17}

A study reported that gingivitis rarely progresses into periodontitis, (connective tissue attachment loss) in pregnant women as a result of the suppressive action of progesterone on gingival fibroblasts which inhibits the production of metalloproteinases (MMP), the enzyme that is responsible for the destruction of collagen fibers.¹⁷ However, studies showed that if gingivitis is left untreated for so long, it could progress to periodontitis.^{3, 4}

Cross sectional studies conducted in Nigeria reported that the prevalence of gingivitis in pregnant women was 85.2% in Lagos, 82.3% in Kano.^{2, 18} While some cross-sectional studies reported that the frequency of gingivitis in pregnancy was 86.2% in Thailand population, 89% in Ghana, and 47% in Brazilian population.¹⁹⁻²¹

It is also documented, that gingivitis during pregnancy can be prevented or minimized with good oral hygiene practice.^{15, 22} However, it may progress into periodontitis, the irreversible form, for certain patients if ignored and left untreated leading to tooth mobility and eventual tooth loss.^{3, 4, 23}

Several factors have been reported to increase the risk of gingivitis and these include age, gender, poor oral hygiene, tobacco use, alcohol consumption, stress, malnutrition, and diabetes mellitus and other chronic diseases, other factors include low income and lack of education, location (especially rural), race, and ethnicity.²⁴⁻²⁷ Risk factors play important role in both the initiation and progression of periodontal disease and an attempt at managing the risk factors are important components of prevention and successful treatment.^{26, 27}

The identification of risk factors for gingivitis among pregnant women may facilitate its early detection and management and intercept its progression to irreversible condition called periodontitis. The management may therefore help to reduce its adverse effects on pregnancy, such as intrauterine restriction of babies, preterm and low birth weight babies.

Thus, this study was to assess the prevalence of gingivitis and its associated risk factors among pregnant women in Nigeria.

II. Material and Methods

This was a cross-sectional study conducted amongst consenting pregnant women attending Ayinke house, the antenatal clinic of the Lagos University Teaching Hospital (LASUTH), Ikeja Lagos. The study was carried out between August and October 2020.

Study Design: A cross-sectional study.

Study Location: Ayinke house, the antenatal clinic of the Lagos University Teaching Hospital (LASUTH), Ikeja Lagos

Sample size: 206 patients.

Sample size calculation: Sample size calculation was done using this formula: $N = Z^2pq/d^2$.²⁹ Standard normal deviate of 1.96 for a confidence level set at 95% was used, with a prevalence of 85.2% from a previous study,² and standard error of 0.05, to calculate the sample size.

The minimum sample size obtained was 206 including the 10% possible attrition rate.

Subjects and selection method: Consecutive consenting pregnant women who met the inclusion criteria and freely consented to participate were recruited for the study.

Inclusion criteria:

Pregnant women (14–17 weeks of pregnancy) aged 18 years and above and those who gave informed consent for participation. Dentate patients with at least 16 permanent teeth.

Exclusion criteria:

Pregnant women (14-17 weeks of pregnancy) aged 18 and above who did not agree to participate in the study.

Procedure.

A structured, self-administered questionnaire was used to obtain information on the socio-demographic, trimester of pregnancy, brushing habit and dental visits of participants.

Clinical examination was carried out on each participant under natural light source using mouth mirror and CPI probe to assess their oral and gingival status.

The criteria for periodontal examination was based on the WHO Oral Health Surveys—Basic Methods.³⁰ The gingiva of all teeth excluding the third molars was examined. The CPI probe tip was inserted gently into the gingival sulcus or pocket and the full extent of the sulcus or pocket was explored. The probe was moved gently with short upward and downward movements following the anatomical configuration of the surface of the tooth root to assess the absence or presence of bleeding response.

Gingival bleeding was scored as 0 (absent) or 1 (present). An individual gingival bleeding score was assessed as the proportion of bleeding teeth to the total number of teeth examined.

Simplified Oral Hygiene Index (OHI-S) ³¹ was used to determine the oral hygiene status of the participants scoring 0-1.2 is good, 1.3-3.0 is fair, and 3.1-6.0 is poor oral hygiene respectively.

Ethical approval was obtained from the Lagos University Teaching Hospital, Health Research and Ethics Committee before commencement of the study.

Statistical analysis: The data entry and analyses were done using SPSS 20.0 software (IBM SPSS, IBM Corp, Armonk, NY). The categorical data were expressed by the number of cases (percentage), and the chi-square test was performed for comparison between groups. Statistical significance was set at $p < 0.5$.

III. Results

A total of 151 pregnant women participated in the study. Age range of respondents was from 20 to 43 years with a mean age of 29.85 ± 4.05 . Seventy six (50.3%) were from other tribes and 48 (31.8%) were Yoruba. Majority of the participants 82(54.3%) had tertiary education.

More than half, 87 (57.6%) were in the 2nd trimester. Gravidity ranged from 1 to 6 with majority 64 (42.4%) of the participants carrying their 2nd pregnancies.

All the 151 (100.0%) participants used toothpaste and brush to clean their mouth, majority, 100 (66.2%) brush once a day while 97 (64.2%) had never visited the dentist.

One hundred and three (68.3%) of the participants reported no gum related condition, while 84 (55.6%) had bleeding on probing. Oral hygiene index score was good in 89 (59.0%). Table 1.

Table 1. Participants' demographics and gingival profile

Variables	Frequency(n)	Percentage (%)
Age group		
<24	15	10.0
25-34	118	78.1
>35	18	11.9
Ethnicity		
Yoruba	24	15.9
Igbo	48	31.8
Hausa	3	2.0
Others	76	50.3
Educational Level		
Primary	8	5.3
Secondary	61	40.4
Tertiary	82	54.3
Trimester		
First	16	10.6
Second	87	57.6
Third	48	31.8
Gravidity		
1	50	33.1
2	64	42.4
>2	37	24.5
Frequency of Cleaning		
Once	134	65.0
Twice	72	35.0
Dental Visit		
Yes	62	30.1
No	144	69.9
Bleeding on Brushing		
Yes	74	35.9
No	132	64.1
Bleeding on Probing		
Yes	114	55.3
No	92	44.7
OHI Score		
Good	111	53.9
Fair	73	35.4
Poor	22	10.7
Total	206	100

The prevalence of gingivitis was 55.3% in this study. Education, bleeding on brushing, dental visit and oral hygiene score were statistically significant with gingivitis ($p < 0.05$). Gingivitis was more common in the lower educational levels, those who bled while brushing, those that had never visited the dental clinic and those

with poor oral hygiene. The effect of age, trimesters, gravidity and frequency of cleaning on gingivitis was not statistically significant ($P>0.05$). Gingivitis was higher in the younger age group, more common in women who had previous pregnancies, and in those that cleaned once daily. The detailed statistics are shown in Table 2

Table 2. Factors associated with gingivitis

Variables	Present N (%)	Absent N (%)	P value
Age Group			0.839
<24	9 (60.0)	6 (40.0)	
25-34	66 (55.9)	52 (44.1)	
>35	9 (50.0)	9 (50.0)	
Educational level			<0.0001*
Primary	13(50.0)	13 (50.0)	
Secondary	61(72.6)	23(27.4)	
Tertiary	40(41.7)	56 (58.3)	
Trimester			0.550
First	13 (46.4)	15 (53.6)	
Second	64 (55.7)	51 (44.3)	
Third	37 (58.7)	26 (41.3)	
Gravidity			0.409
1	39 (55.7)	31 (44.3)	
2	42 (50.6)	41(49.4)	
>2	33 (62.3)	20 (37.7)	
Frequency of cleaning			0.258
Once	78 (58.2)	56(41.8)	
Twice	36 (50.0)	36(50.0)	
Bleeding on brushing			<0.0001*
Yes	39 (76.5)	12 (23.5)	
No	75 (48.4)	80 (51.6)	
Dental Visit			<0.0001*
Yes	21 (33.9)	41 (66.1)	
No	93 (64.6)	51 (35.4)	
OHI Score			0.029*
Good	57(51.4)	54(48.6)	
Fair	39(53.4)	34(46.6)	
Poor	18(81.8)	4(18.2)	
Total	114 (55.3)	92(44.7)	

IV. Discussion

We found that 55.3% of women in this population had bleeding on probing (gingivitis). This study is in agreement with many other studies.^{24,25, 32,33} Some other authors like Uwambaye et al, Kaura et al and Soroye et al reported a pregnancy gingivitis prevalence of 77.3%, 82.3%, 85.2% respectively among their participants.^{2, 18, 34} According to earlier studies the gingivitis prevalence ranges from 30% to 100% during pregnancy.^{13, 15}

The risk factors for gingivitis that was prevalent in our study included education, bleeding on brushing, lack of dental visit and poor oral hygiene score.

Gingival bleeding can appear after tooth brushing or on probing, or it may be spontaneous. Bleeding is one of the most reliable parameters in evaluating periodontal status. Gingival bleeding during tooth brushing is an indication of an active gingivitis that may progress into periodontitis, the irreversible form; for certain patients if ignored and left untreated leading to tooth mobility and eventual tooth loss.^{2, 4, 23} Hence, GB can be considered a warning sign for pregnant women that should prompt them to consult a dentist for management.

About two-third of pregnant women in this study had never visited a dentist or received any dental care. This compares with other studies that reported that majority of their participants never visited the dentist.^{32, 34}

Accumulation of dental plaque which leads to poor oral hygiene is the etiologic factor for gingivitis. Poor oral hygiene has been reported to be significantly associated with gingivitis.^{2, 34} Similar to our findings, another study found that poor oral hygiene correlates well with gingivitis and that people who reported better oral hygiene also had less gingivitis.³⁴ Though, gingivitis is associated with poor oral hygiene, it can be reversible with improved oral hygiene.²

Good oral hygiene habits such as flossing and brushing twice a day and regular dental check-up are protective factors against gingivitis. The removal of bacterial plaque and dental calculus is the most important objective of periodontal therapy and prevention.

Education was also found to be significantly associated with gingivitis in our study. This compares to another study that reported that participants with a lower degree of schooling had a greater chance of exhibiting gingivitis.³² This may be due to the fact that lack of schooling may mean lack of awareness on good oral hygiene practices and need for frequent dentist visits.³⁴

Age was not statistically significant with gingivitis in this study, similar to the report of Shrestha et al.³⁵ The prevalence of gingivitis is higher in the younger age group in this study similarly to the report from the study of Hussain et al,³³ and Shrestha et al,³⁵ but in contrast to the report of Erchick et al,³² where the prevalence of gingivitis was higher in the older age group.

There was no statistically significant association between gestational age and gingivitis in our study, but the percentage of gingivitis increased through the first trimester to the third trimester. Gestational age is associated with susceptibility of pregnancy gingivitis because of hormonal change such as an increase of estrogen and progesterone as gestational age increases.³⁶

On third trimester of pregnancy, estrogen and progesterone level increases, thus vascularization and blood vessel permeability of gingiva is also increased.³⁷ The presence of debris and calculus causes exaggerative response by the gingiva leading to gingival inflammation with accompanying redness and bleeding. It shows that hormonal factor could worsen local accumulation of plaque bacteria.³⁸

Pregnancy gingivitis is one of oral diseases that frequently affects pregnant woman particularly between the 2nd and 8th month of pregnancy.^{16, 17} This is confirmed by this present study that reported that (58.7%) of pregnant woman had gingivitis in their third trimester of pregnancy similarly to 51.0% reported by Setijanto et al in their study.³⁶

Our study showed that frequency of cleaning was not a significant predictor of gingivitis. Oral hygiene habits identified in this study, such as the practice of cleaning teeth only once per day was reported by other studies.^{32,33,39,40}

Limitation.

There is a large variation in prevalence of pregnancy associated gingivitis in previous studies depending on population. Our results can be different from other studies due to ethnic, genetic and environmental factors.

V. Conclusion

A prevalence of 55.3% of gingivitis was reported among pregnant women in this study and the risk factors reported for gingivitis were less education, bleeding on brushing, lack of dental visit and poor oral hygiene score.

Recommendations

The dental practitioners should be vigilant and educate pregnant women on the need to have adequate plaque control and prompt treatment if they bled while brushing in order to prevent its progression to periodontitis which has been linked to adverse pregnancy outcomes.

Also, periodontal care should be incorporated into antenatal care so as to improve the quality of life of women during pregnancy

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