Oral hygiene status, interdental cleaning and perception of gingival bleeding among a group of pregnant women in Nigeria

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ABSTRACT
Background: Hormonal and vascular changes in pregnancy can lead to exaggeration of inflammatory response to local irritants like dental plaque causing pregnancy gingivitis which if not treated can result in advanced periodontal diseases and consequent adverse pregnancy outcomes.
Objective: To assess the oral hygiene and gingival bleeding perception of pregnant women
Methods: Self-administered questionnaires were used to collect data. Oral hygiene status and gingival status were assessed with Simplified Oral Hygiene Index (OHI-S) and gingival bleeding index respectively. Data was analysed using IBM SPSS (Statistical Package for the Social Sciences) version 25. Results were presented in frequency and percentages and chi square analysis done for the categorical variables with statistical significance set at $P < 0.05$.
Results: One hundred and fifty-one participants with age range of 20 to 43 years with a mean age of 29.85±4.05years participated in the study. All participants used toothbrush to clean their teeth and 44.4% used medium bristled toothbrush. Two-third used herbal toothpaste. More than two-thirds (84.1%) of the participants used both horizontal and vertical tooth brushing technique. Only 33.8% brushed twice daily. Though 92.1% claimed to clean interdentally, only 19.4% used dental floss. Prevalence of gingival bleeding was 31.8%. Two persons (1.3%) thought it normal to bleed from the gum while brushing and 86.8% did not know one can bleed from the gum during pregnancy Forty-four (29.1%) and 18(11.9%) of participants had fair and poor oral hygiene status respectively. 55.6% bled on probing and had gingival bleeding index of 1 and 2. Four (2.6%) of participants had gingival recession measuring 3mm to 4mm and 8.6% had halitosis. Statistical analysis of the association between participants' perception of gum bleeding and oral hygiene status showed statistical significance.
Conclusion: The knowledge of pregnancy gingivitis is poor among the participants. There is the need to educate them about this and incorporate periodontal care into antenatal care so as to increase their quality of life during pregnancy.
Keywords: gingival bleeding, oral hygiene status, pregnancy

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Introduction

Oral health has been proven to be crucial to overall health. Since, physiologic changes in pregnancy can affect oral health and vice versa, it is important for women to have adequate knowledge about oral changes induced by pregnancy.[1] Although pregnancy is a biological process, it has been associated with hormonal, vascular, immunology and metabolic changes among others in women.[1] These changes can lead to exaggeration of inflammatory response to local irritants like dental plaque in the oral cavity leading to periodontal diseases such as gingivitis and periodontitis.[2-5]

The virulence as well as the composition of subgingival plaque has been reported to change in pregnancy with an increase in the growth of gram-negative bacteria resulting in periodontal inflammation.[6-8] Thus, pregnant women can develop gingival bleeding and swelling which if not treated can result in increased periodontal pocket depth and tooth mobility.[5-9] Also reported in a previous study by Usin et al[4] was the presence of halitosis in pregnant women.

Furthermore, studies have reported associations between periodontitis and adverse pregnancy outcomes like preterm deliveries (PD), low birth weight babies (LBW) and preterm low birth weight babies (PLBW).[10-14] Hence, good oral hygiene in pregnancy will help reduce the accumulation dental plaque and thus prevent the initiation of gingival inflammation and periodontal disease.[15]

This study evaluated the perception of gingival bleeding in pregnancy as well as the oral hygiene practice, interdental cleaning and oral hygiene status of pregnant women attending the antenatal clinic of the Obstetrics and Gynaecology of the University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria.

Methodology

This was a cross-sectional study done among pregnant women who attended the antenatal clinic of the Department of Obstetrics and Gynaecology, University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State, Nigeria between March and April, 2020.

Institutional ethical approval was obtained from the ethics committee to carry out the study. Consecutive participants who gave consent after the objective of the study was explained to them were recruited.

Self-administered questionnaire was used to collect data on demographics, participants perception of gingival bleeding, oral hygiene practice and use of interdental cleaning aids. Oral hygiene and gingival status were assessed using Simplified Oral Hygiene index (OHI-S) by Green and Vermillion and gingival index by Loe and Silness (1964) respectively. The patients were examined by a dentist sitting on a chair in the antenatal clinic using sterile dental instruments and natural light. Infection control measures were used throughout the examination.

Simplified Oral Hygiene Index (OHI-S). [16]

The OHI-S is a composite index that scores debris and calculus deposition on selected teeth. It was developed by (Greene and Vermillion in 1964.[16] It is expressed as the sum of the mean debris index (DI-S) and calculus index (CI-S) of the examined teeth. The OHI-S is interpreted as follows: Score 1 (good oral hygiene) = 0.0 – 1.2, Score 2 (fair oral hygiene) =1.3 – 3.0, Score 3 (poor oral hygiene) = 3.1 – 6.0.

Gingival index of Loe and Silness (1963) [17]

This index involves a scale from 0 to 3 for the buccal, lingual, mesial and distal surfaces that is scored as follows: 0 indicates healthy gums; 1 indicates slight colour changes, light oedema and no presence of bleeding on probing; 2 indicates oedema with slight redness and bleeding on probing; and 3 indicates severe oedema, redness, the presence of ulceration and a tendency for spontaneous bleeding.

Sample size was determined using the formula for cross sectional study.

$$n = \frac{z^2pq}{d^2} = \frac{1.96^2 \times 0.89(1-0.89)}{0.05^2} = \frac{3.84 \times 0.89\ (0.11)}{0.0025}$$

$$= 150.4$$

Where n is the sample size

Z = the statistic corresponding to level of confidence at 95% = 1.96

P = expected prevalence.[18]

D =precision of 5% at type 1 error of 5%= 0.05 Q = 1-p

151 subjects participated in this study

Data analysis was done using SPSS version 21 (Armonk, NY: IBM Corp). Continuous variables were described with mean and standard deviation while nominal variables were described with frequencies. Association of perception of gingival bleeding with oral hygiene status was explored by the $\chi 2$ test. Statistical significance was set at $P < 0.05$.

Results

Table 1 shows the sociodemographic characteristics of the study participants. One hundred and fifty-one participants with age range between 20-43 years and mean age of 29.85±4.05 years participated in the study. Almost three-fifth of participants were in the third decade of life, half are from south-south, 54.3% had tertiary education and 57.6% were in their second trimester.

All participants used toothbrush to brush and 44.4% of them used medium texture bristled brush. Two-fifth cleaned with herbal toothpaste. 84.1% brushed with both horizontal and vertical tooth brushing technique. Only 33.8% brushed twice daily. Though 92.1% claimed to clean interdentally, only 19.4% used dental floss. **Table 2**.

Table 3 shows the participants' perception of gingival bleeding. Prevalence of self-reported gingival bleeding among participants was 31.8%, but clinical examination showed a prevalence of 55.6%. Two (1.3%) thought it is normal to bleed from the gum while brushing and 99.3% did not know it is possible to bleed from the gum during pregnancy.

The oral hygiene status of the participants showed that 29.1% and 11.9% had fair and poor oral hygiene respectively. 55.6% bled on probing and about half had gingival bleeding index of 1. Four (2.6%) of participants had gingival recession measuring between 3- and 4-mm. 8.6% of participants had halitosis. **Table 4.**

Statistical analysis of the association between participants' perception of gum bleeding and oral hygiene status showed statistical significance. **Table 5.**

Table 1. Socio-demographics and obstetric profiles of the participants

Variables	Frequency	Percentage
Age Group (Years)		
10-20	1	0.7
21-30	90	59.5
31-40	59	39.1
41-50	1	0.7
Ethnicity		
Yoruba	24	15.9
Igbo	48	31.8
Hausa	3	2.0
South-South	76	50.3
Educational Level		
Primary	8	5.3
Secondary	61	40.4
Tertiary	82	54.3
Period of gestation(weeks)		
0-13	16	10.6
14-26	87	57.6
>26	48	31.8
Total	**151**	**100.0**

Mean age=29.85±4.05years

Table2. Participants' Oral Hygiene Practice

Variables	Frequency	Percentage
Cleaning Item		
Toothbrush	151	100.0
Cleaning Material		
Fluoridated Toothpaste	90	59.6
Herbal Toothpaste	61	40.4
Toothbrush Bristles		
Soft	20	13.2
Medium	67	44.4
Hard	64	42.4
Method of Brushing		
Horizontal (H)	6	4.9
Vertical (V)	18	11.9
H & V	127	84.1
Frequency of Brushing		
Once Daily	100	66.2
Twice Daily	51	33.8
Interdental cleaning		
Yes	139	92.1
No	12	7.9
Total	**151**	**100.0**
Interdental cleaning materials		
Dental floss	27	19.4
Toothpick	112	80.6
How often?		
After brushing	1	0.7
After eating	138	91.3
Total	**139**	**100.0**

Table3. Participants' Perception of gingival bleeding during pregnancy

Variables	Frequency	Percentage
Gum bleeding while brushing		
Yes	48	31.8
No	103	68.2
Do you think it is normal?		
Yes	2	1.3
No	129	85.4
Don't Know	20	13.2
Is it ok to bleed from the gum during pregnancy?		
Yes	1	0.7
No	131	86.7
Don't Know	19	12.6
Total	**151**	**100.0**

Table4. Participants' oral hygiene status and other clinical profile

Variables	Frequency	Percentage
Oral hygiene status		
Good	89	59.0
Fair	44	29.1
Poor	18	11.9
Bleeding on probing		
Yes	84	55.6
No	67	44.4
Gingival bleeding index		
0	67	44.4
1	80	53.0
2	4	2.6
Gingival recession (GR)		
Yes	4	2.6
No	147	97.4
Total	**151**	**100.0**
GR in millimeters		
3mm	2	50.0
4mm	2	50.0
Total	**4**	**100.0**
Halitosis		
Yes	13	8.6
No	138	91.4
Total	**151**	**100.0**

Table5. Association between participants' oral hygiene status and perception of gingival bleeding in pregnancy

	Oral hygiene status								*P*
Variables	**Good**		**Fair**		**Poor**		**Total**		
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	
Gum bleeding in pregnancy									**0.007**
Yes	20	22.5	18	40.9	10	55.6	48	31.8	
No	69	77.5	26	59.1	8	44.4	103	68.2	
Is it good to bleed from the gum									**0.008**
Yes	1	1.1	0	0.0	0	0.0	1	0.7	
No	81	91.0	39	88.6	11	61.1	131	86.7	
Don't know	7	7.9	5	11.4	7	38.9	19	12.6	
Is it normal to bleed from the gum during pregnancy									**0.001**
Yes	1	1.1	1	2.3	0	0.0	2	1.3	
No	80	89.9	39	88.6	10	55.6	129	85.4	
Don't know	8	9.0	4	9.1	8	44.4	20	13.3	
Gingival bleeding index									**<0.0001**
0	50	56.2	15	34.1	2	11.1	67	44.4	
1	35	39.3	29	65.9	16	88.9	80	53.0	
2	4	4.5	0	0.0	0	0.0	4	2.6	
Total	**89**	**100.0**	**44**	**100.0**	**18**	**100.0**	**151**	**100.0**	

Discussion

One hundred and fifty-one subjects participated in this study with age range of 20 to 43 years, a mean age of 29.85±4.05 years and majority were in the third decade of life. This compares with the study done among pregnant women in India with age range of 20 to 50 years and 79% were in the third decade of life.[19] The reproductive age in women has been documented to be between 15 and 49 years.[20]

All participants in this study used toothbrush for cleaning their teeth. Other Nigerian studies reported high prevalence of use. [20-24] Toothbrushing is a universally accepted method for oral self-care and it can be used to prevent common oral diseases.[25] More so, many studies have reported the effectiveness of toothbrush in maintaining good oral hygiene.[26,27]

Toothbrush bristle can be soft, medium or hard. Medium bristles are generally recommended because they cause less damage to the periodontal tissues and can clean adequately.[26] It has been reported that a properly designed brush when used with an effective technique, for a sufficient duration of time can result in adequate plaque control. 44.4% of our participants used medium bristled toothbrush. This is comparable to other studies that reported that 54.6% and 53% of participants respectively used medium bristled toothbrush. [24,28] Only 33.8% brushed twice daily. This compares with the study done on traders in Ibadan, Oyo State Nigeria that reported that 36.5% of their participants brushed twice daily.[23] Brushing twice a day has been shown to increase gingival health significantly.[29]

Two-fifth (40.4%) of our participants used herbal toothpaste. This contrast with other studies that reported that 71.3% and 70% of their participants used herbal toothpaste.[30,31] 59.6% of our participants used fluoridated toothpaste. This is lower than that reported by the Ibadan study.[23]

Studies have shown that removal of interdental plaque results in improved clinical parameters such as plaque score, bleeding scores and probing depth compared to brushing alone.[32] Thus, interdental cleaning is encouraged after the use of toothbrush so as to have access to the inaccessible areas of the teeth such as the interdental surfaces. The interdental cleaning aids usually recommended are dental floss, interdental brushes and wood sticks.[29] Wood sticks are similar to interdental brushes in that they remove interdental plaque up to 2-3mm subgingivally by depressing the papilla.[33] Use of floss for interdental cleaning is low among our participants (19.4%). Our result compares to the prevalence of dental floss use in other studies.[34-35] A prevalence of between 10% and 30% use has been reported.[36] This low prevalence has been accounted for by the difficulty experienced while flossing tight contact points and the challenge associated with its use.[37-39] Interdental brushes have been reported to be more effective than dental floss in removing interdental plaque, but they are more prone to cause trauma to the periodontal tissue when used in tight embrassures.[29] Furthermore, they are readily accepted by patients and encourage better compliance in terms of comfort.[40,41] Eighty percent of our participants claimed they used toothpicks as interdental cleaning aids. Toothpicks unlike wood sticks are round and only permit point contact with tooth surfaces and are better at removing food debris after meals than plaque from interdental surfaces.[36] A study done in Brazil however reported that toothpick and wood sticks have same efficiency at removing interdental plaque in their particicpants.[42]

Studies have reported that the prevalence of pregnancy induced gingivitis is between 35-100% among women.[43] Our study reported a prevalence of 55.6%. Though, the prevalence of self-reported gingival bleeding among participants was 31.8%, but clinical examination showed a prevalence of 55.6%. Majority of the participants (86.8%) did not know that gingival bleeding can be associated with pregnancy.

Halitosis called 'bad breath' is caused by both intra and extra oral causes. Intra oral causes make up of 80-85% of cases.[44] Periodontal infections cause an increase in gram-negative bacteria that produce volatile sulphur compounds (VSCs) resulting in malodour,[45] and 8.6% of our participants had halitosis. This is not surprising as halitosis has always been associated with gingival bleeding in many studies.[46-50] Usually, untreated gingival inflammation will progress to periodontitis with the characteristic pocket formation with or without gingival recession.[2-9] A few (2.6%) of our participants had chronic periodontitis expressed as gingival recession measuring between 3- and 4-mm. This is because they did not treat the initial gingival inflammation and this progressed to periodontitis.

Oral hygiene status measures the cleanliness of the oral cavity. The oral hygiene status of the participants showed that 29.1% and 11.9% had fair and poor oral hygiene respectively. More than half had good oral hygiene. This did not correlate with the clinical findings of gingival inflammation. This however, is not surprising as pregnancy physiology exaggerate response to little amount of dental plaque.[1-3]

The association between perception of gingival bleeding, gingival index and oral hygiene status of the participants in this study was statistically significant. This is not surprising since knowledge influences practice

Conclusion

Majority of our participants do not clean interdentally, and do not know that pregnancy can induce gingivitis. Though, this study was done in a hospital setting, its findings can definitely be transposed to the communities since the participants are representatives of their communities.

Recommendation

There is the need to educate all women about the likely physiological related oral findings in pregnancy and for their care givers to incorporate periodontal care into their antenatal care.

Conflict of interest

None declared

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