

# Periodontal Condition and Treatment Needs of Some Pregnant Women in Ibadan, Nigeria

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## Abstract

**Background:** Periodontal diseases had been reported to be worse in the presence of hormonal imbalance as seen during pregnancy, which if that is the case, should resolve following childbirth when the hormonal level of the women should have reverted to normal. **Subjects and Methods:** Periodontal health of 345 pregnant women was assessed once during pregnancy and at 14<sup>th</sup> week following their childbirth. The clinical variant of community periodontal index of treatment needs probe was used in the assessment. **Results:** During pregnancy, 167/345 (48.4%) of the women had deep pockets, 178/345 (51.6%) had shallow pockets. After childbirth, 5/345 (1.5%) had healthy periodontium, 25/345 (7.2%) had calculus and 7/345 (2.0%) had deep pockets. All of the respondents required oral hygiene instructions (OHI) and prophylaxis and 167/345 (48.4%) required complex treatment during pregnancy. After childbirth, 340/345 (98.5%) of the women required OHI and prophylaxis. Despite the great need for dental treatment among the respondents, majority never sought any treatment as 308/345 (89.3%) of the respondents had never visited a dentist before the study. **Conclusion:** The fact that the deep pocket reduced drastically following childbirth shows that it was not a true pocket. The high unmet treatment needs among the respondents require a concerted effort from dentists and policy makers in order to enlighten the women, especially those of child bearing age concerning the need for preventive dental visitation.

**Keywords:** Periodontal condition, Post-partum period, Pregnancy, Treatment needs

## Introduction

Periodontal disease is currently seen as an infection with many forms of the disease associated with specific pathogenic bacteria, which colonize the subgingival area.<sup>[1]</sup> Bacterial plaque accumulation around gingival margin and within periodontal pockets is implicated as the primary aetiologic factor of most of the periodontal diseases, while some other factors are considered to be of secondary importance. The secondary factors are considered as modifying factors and could either be localized within the mouth or are systemic in nature.<sup>[1,2]</sup> Some of the modifying factors include hormonal imbalance, stress and some medications such as phenytoin and nifedipine. Examples of hormonal imbalance that have been reported to have effects on periodontal health include

pregnancy, oral contraceptive use and menstruation.<sup>[3-6]</sup> Increased prevalence of gingival bleeding and swelling, which predisposes to increased pocket depth, has been reported among pregnant women.<sup>[3]</sup> The hormonal imbalance during pregnancy has been implicated as a major factor in these changes in the gingival health, as similar condition, which is comparable to that seen during pregnancy, is also seen among women who are on prolonged use of oral contraceptive.<sup>[3,5,6]</sup>

Periodontal diseases, especially gingivitis, have been reported to be highly prevalent among Nigerians.<sup>[7-10]</sup> This could have been due to the lack of dental awareness among the populace with the subsequent nonutilisation of the available services. Even when available, dental care services are majorly curative with little attention given to preventive aspect of dentistry in the country.<sup>[11]</sup> With this background, it is most likely that the prevalence of periodontal disease will be higher among pregnant women in this environment compared with other groups of people. The study was therefore, undertaken to assess the periodontal conditions of pregnant women in two teaching hospitals in South-Western Nigeria and to compare the finding during pregnancy with the finding 14<sup>th</sup> week after child birth.

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This was done with the aim of assessing the possible influence of pregnancy on the periodontal status of the women.

## Subjects and Methods

A longitudinal study of 384 pregnant women in their third trimester of pregnancy was carried out and the same set of women were re-examined at the 14<sup>th</sup> week after childbirth. Three-hundred and forty-five of the women were available for follow-up giving a response rate of about 90%. The women, recruited by one of the authors (O.I), were seen during pregnancy at the antenatal clinics of University College Hospital (UCH) and Adeoyo Maternity Teaching Hospital (AMTH), both in Oyo State, Nigeria. UCH is one of the largest hospitals in the country, and attends mostly to people in the higher socio-economic classes (SES), with referral that cut across other SES. The other hospital (AMTH) is smaller in size and caters mostly for those in the lower SES. Those women with diabetes mellitus, immunocompromised conditions, e.g., HIV/AIDS and those that will require premedication before oral examination were excluded from the study. Smokers and women wearing dentures were also excluded. A pretest, which involved periodontal assessment twice within an hour interval, was done among 20 pregnant women who were not included in the study. The margin of error between the repeated measurements was found not to be statistically significant. The periodontal assessment was done using the community periodontal index of treatment needs (CPITN).<sup>[12]</sup> The clinical variant of CPITN probe was used to assess the presence of gingival bleeding on gentle probing, calculus or other plaque retaining factors and periodontal pockets. The worst score for each of the six sextants was recorded for 10 index teeth, which consist of all the first two molars and the upper right and the lower left central incisors. For each of the index tooth, four sites involving the mesial and distal aspect of the index tooth on the lingual and buccal surfaces were examined and an average score calculated, with the worst score recorded for each of the sextants. TN of the women were considered as a measure of the proportion of the women that required different types of treatment. TN were calculated directly from the percentage of persons who scored a particular score as their highest [Table 1] and were defined as follows:

All the pregnant women were in the third trimester of pregnancy as confirmed with the results of their ultrasound scan. The same set of women were seen and re-assessed when they brought their children for immunization at 14<sup>th</sup> week after delivery. A questionnaire consisting of 18-items was administered on the subjects by one of the authors during pregnancy, but the intra-oral examination was done during pregnancy and after childbirth. The questionnaire sought to know among other things the last menstrual period of the subjects, whether they used oral contraceptive before getting pregnant or not, and the number of previous pregnancy.

Ethical approval was obtained from the local ethical review committee before the commencement of the study. The

data were analysed using Statistical Package for the Social Sciences version 14.0 (Chicago II, USA). Analysis included frequencies, cross-tabulations and calculation of mean values for the variables. Differences between means were tested using Students *t*-test. Statistical significance was inferred at  $P < 0.05$ .

## Results

A total of 345 women were seen at the ante-natal and followed-up at the immunisation clinics of the two teaching hospitals that were used for the study. The age range of the women was 18–45 years with a mean age (standard deviation [SD]) of 27.8 (5.2) years. Eleven (3.2%) of the subjects were younger than 20 years of age, while 8/345 (2.3%) of the subjects were above 40 years of age [Table 2]. One hundred and fourteen (33.0%) of the respondents were prima gravid, 29.0% (100/345) were carrying their second pregnancy, 18.3% (63/345) were carrying their third pregnancy and 68/345 (19.7%) had been pregnant for more than three times. Among the respondents, 43/345 (12.5%) reported that they were on oral contraceptives before being pregnant. Twenty-eight (65.1%) of those that reported using the medication, used it for less than a year, 7/43 (16.3%) of them used it for more than a year but <2 years. Two (4.6%) of them used the medication for more than 2 years but <3 years while 6/43 (14.0%) used it for more than 3 years before conception.

The percentage of persons affected as measured with CPITN revealed that 167/345 (48.4%) of the subjects had deep pockets, 178/345 (51.6%) had shallow pockets and no score was recorded for calculus, bleeding gum and healthy sextant during pregnancy, while 5/345 (1.5%) had healthy sextants and

**Table 1: Definitions of treatment needs**

CPITN scoring criteria	TN	% TN
0=Healthy periodontium	0=No treatment required	Code H
1=Gingival bleeding on gentle probing	1=OHI	Codes B + C + P1 + P2
2=Supra/subgingival calculus	2=SC + OHI	Codes C + P1 + P2
3=Shallow pocket (4-5 mm) deep		
4=Deep pocket (≥6 mm deep)	3=Complex treatment + SC + OHI	Codes P2

CPITN: Community Periodontal Index of Treatment Needs, TN: Treatment needs, OHI: Oral hygiene instruction, SC: Scaling and prophylaxis

**Table 2: Age distribution of the women**

Age group (years)	Frequency	Percentage
<20	11	3.2
20-24	82	23.8
25-29	117	33.9
30-34	92	26.7
35-39	35	10.1
>40	8	2.3
Total	345	100

25/345 (7.2%) had calculus at the 14<sup>th</sup> week following child birth [Table 3: I]. The mean number of sextants affected per person showed that the mean number of sextants coded as being healthy was 0.09 and that with deep pocket was 0.88 during pregnancy, while the corresponding scores at the 14<sup>th</sup> week post-partum period was 1.10 and 0.03 respectively [Table 3: II]. Concerning the TN of the respondents, all of them required oral hygiene instructions (OHI) and prophylaxis while 167/345 (48.4%) required additional complex treatment during pregnancy, while at the 14<sup>th</sup> week post-partum period, 340/345 (98.5%) required OHI and prophylaxis [Table 3: III].

The mean of the worst CPITN score was higher during pregnancy than following child birth, which was found to be statistically significant [Table 4]. The mean (SD) of the worst CPITN score for women not previously on oral contraceptive prior to conception was 3.48 (0.50) during pregnancy and 2.90 (0.45) after child birth. The mean (SD) for those that were on oral contraceptive during the same period of time was 3.51 (0.51) and 2.95 (0.53) respectively. There was no statistically significant relationship between the mean of the worst CPITN score and the numbers of previous live birth by the women. There was also no statistically significant difference when the mean of the worst CPITN score of the women who used oral contraceptive prior to conception was compared with that of those that did not use the medication.

## Discussion

The periodontal condition of the women during pregnancy was such that each of the respondents had either a shallow or deep pocket, which overshadows the presence of other CPITN scores. The absence of other CPITN scoring criteria during pregnancy was as a result of the hierarchical scoring method of the index, which overlooks the presence of the lower scores

once it co-exist with a higher score in the same sextant.<sup>[12,13]</sup> The increased pocket depth had been interpreted as being suggestive of gingival enlargement rather than periodontal tissue destruction, which makes it reversible following the resolution of the swelling.<sup>[3,14]</sup> The deep pockets in the respondents reduced following parturition, which suggest that the pockets were actually not a true one but were as a result of gingival swelling. This was similar to the finding of Løe and Silness, where it was reported that the gingival swelling regressed following child birth.<sup>[14]</sup> The gingival swelling had been said to be due to increased accumulation of fluid within the gingival tissue rather than a sign of true periodontal tissue destruction, which will require a chronic inflammatory condition lasting longer than the duration of pregnancy.<sup>[15-18]</sup> The fact that there was regression of the gingival pocket following parturition suggests that pregnancy contributed to the formation of the pocket. The finding in this study is in agreement with that of Figuero *et al.*,<sup>[19]</sup> who reported that the gingival inflammation (full mouth, anterior and posterior teeth) were higher in pregnant women during third trimester when compared with nonpregnant women. When assessing changes in women's periodontal status from an average of 31.3 ± 3.7 weeks' gestation to 21.6 ± 3.4 months postpartum, Xie *et al.*<sup>[20]</sup> also found decrease in mean probing pocket depth, clinical attachment levels, and proportion of women with periodontitis. However, the finding in this study is contrary to that reported by Miyazaki *et al.*,<sup>[16]</sup> who compared pregnant women with other women, with the conclusion that those pregnant women had better periodontal health compared with the nonpregnant women. The differences could have been due to the effects of the environmental and socio-cultural factors among the groups studied.<sup>[21-25]</sup> Generalized estimating equation result for the comparison of the worst CPITN scores during and after pregnancy was not calculated and this is considered a limitation for the study.

**Table 3: CPITN scores for the respondents**

CPITN tables	CPITN criteria	CPITN codes	Scores (%)	
			During pregnancy	14 <sup>th</sup> week postpartum
I	Percentage of persons who have different CPITN scores as their highest	H (0)	0	5 (1.5)
		B (1)	0	0
		C (2)	0	25 (7.2)
		P1 (3)	178 (51.6)	308 (89.3)
		P2 (4)	167 (48.4)	7 (2.0)
		Total	345 (100)	345 (100)
II	Mean number of sextants with different CPITN scores	0	0.09	1.1
		1+2+3+4	0.01	0.04
		2+3+4	0.63	2.18
		3+4	4.39	2.65
		4	0.88	0.03
		X	Nil	Nil
Total		6	6	
III	TN of respondents	% TN 0	0	1.5
		OHI (TN 1)	100	98.5
		Prophylaxis (TN 2)	100	98.5
		Complex care (TN 3)	48.4	2.0

CPITN: Community Periodontal Index of Treatment Needs, TN: Treatment needs, OHI: Oral hygiene instruction

**Table 4: Comparison of the mean of worst CPITN score during pregnancy and at 14<sup>th</sup> week postpartum period**

Period	Mean CPITN	SD	t	P
During pregnancy	3.484	0.500	16.639	<0.001
14 <sup>th</sup> week	2.904	0.463		

SD: Standard deviation, CPITN: Community Periodontal Index of Treatment Needs

The mean number of sextants that was adjudged to be healthy was 0.09 during pregnancy and this increased to 1.1 after child birth, which was an improvement in the score. This improvement was obvious in all the scores, with the scores for pockets reducing following childbirth. This shows that based on the sextant analysis, more sextants were healthy following childbirth in comparison with during pregnancy, which is contradictory to the findings of Miyazaki *et al.*,<sup>[16]</sup> who reported that periodontal health was better among pregnant women in comparison to that among post-partum women. However, Miyazaki *et al.*,<sup>[16]</sup> did not report the sextant analysis of their findings and their study did not compare the same set of women, which makes it difficult to compare this study with theirs.

An assessment of the TN of the women in this study revealed that all the respondents required OHI and prophylaxis (SRP) during pregnancy, which appreciably reduced to 98.5% after childbirth. The need for complex treatment also reduced from 48.4% during pregnancy to 2.02% after delivery. The reduction in the need for complex periodontal treatments following parturition is a reflection of the reversal in the gingival swelling. This should therefore, be taken into consideration when managing a pregnant woman. A more conservative noninvasive approach should first be instituted and the complex treatment reserved for those cases that persist. The high rate of TN in this study is in contrast to the findings of Agbelusi *et al.*,<sup>[26]</sup> which reported that 32.2% of the pregnant women in their study required no treatment, while 50.0% required SRP. However, Agbelusi *et al.*,<sup>[26]</sup> did not follow up the women after childbirth, but the difference in the two studies could have been due to a change in the trend of prevalence of periodontal diseases among pregnant women. The rate of the TN among women in this study was also higher than that reported by Yaghoobi and Haghghati,<sup>[27]</sup> who reported that 25% of their respondents required SRP and 33% required advanced periodontal treatment. The TN among the women were basically unmet as majority of them had never visited a dentist before. This should be of public health concern especially with the reported adverse effects of periodontal disease on pregnancy and pregnancy outcome.<sup>[28,29]</sup>

Majority of the women have never been to a dentist before, which could have been due to many reasons that this study did not look into. However, some studies have reported reasons that militate against the utilization of dental services among different populations. Some of these reasons include location of dental clinics in urban areas remote from those in the rural regions, time wasting in the dental clinic and the fear of pain

among other reasons.<sup>[11,30]</sup> In conclusion, the authors wish to point the attention of the public to the high prevalence of periodontal disease as well as the low rate of dental service utilization among women of childbearing age in the country. Though the prevalence of deep pockets among the women reduced drastically following childbirth, the prevalence of periodontal disease was still relatively high among the women. This should be of public health importance and greater efforts should be directed towards such groups of people so as to improve their preventive dental care utilisation.

## Conclusion

The fact that the deep pocket reduced drastically following childbirth shows that it was not a true pocket, which suggests possible effect of pregnancy on the periodontal tissue of the women. The high unmet TN among the respondents require a concerted effort from dentists and policy makers in order to enlighten the women, especially those of child bearing age concerning the need for preventive dental visitation.

## Limitation of the Study

The study could not assess if there is any change in the alveolar bone of the patients as this would have necessitated the use of radiographs, which might involve ethical issues as the patients were pregnant and did not need the exposure for any treatment.

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