# Oral Health Behavior and Utilization of Oral Health Services among Pregnant Women in Ile-Ife, Nigeria.

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***Abstract***
***Introduction****: Pregnancy status has been said to increase host's susceptibility to periodontal inflammation, it is not clear whether such heightened status is affected by the oral health behaviorof pregnant women.*
***Objectives :*** *To determine the oral health behavior of oral health utilisation of pregnant women in Ile-Ife*
***Methods****: This was a cross sectional study of two hundred and fifty-eight pregnant women. recruited from the antenatal clinic of Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC). Questionnaire to assess the oral health service utilization and pattern of oral hygiene practices of the participants. The oral examination was done on the dental chair with good lightning. The oral hygiene of the pregnant women was rated using Gingival index (GI) and Community Periodontal Index of Treatment Needs (CPITN).*
*The data analysis was done using IBM SPSS Statistical significance was inferred at p<0.05.*
***Results****:The age range of the participants was 19-40 years with the mean age being 29.52 (SD 3.82) years. The majority of the participants irrespective of their level of education used toothbrush and paste to clean their teethonce a day(p>0.05). Also, there was no significance difference in the duration of brushing and the level of education (p>0.05).Those with tertiary level reported more past dental visits than those in secondary and primary level of education (p>0.05). In addition, most of the women demonstrated poor oral hygiene practice; Based on CPITN majority of the mothers will need scaling and polishing.*
***Conclusions****: The pregnant women in this study demonstrated poor oral health behavior and poor oral health utilization. The majority of the women will benefit from preventive measures and non-surgical periodontal therapy such as scaling and polishing*
***Keywords***

## I.  Introduction

Periodontal diseases are diseases affecting the periodontium and they can be broadly classified asgingivitis and periodontitis.[1]Gingivitis is the inflammation of the gingiva without loss of attachment while periodontitis is inflammation of the periodontium with the loss of clinical attachment.[2] Bacterial plaque remains the primary aetiological factor in periodontal diseases in addition to other predisposing factors such as calculus, faulty restorations, complications of orthodontic therapy, self-inflicted injuries, tobacco and others[3,4]which can include systemic or environmental factors that may modify the host's response to plaque accumulation. An example of such a systemic factor is pregnancy.[5]

During pregnancy, major physiological and hormonal changes occur in the systemic and local environments. The most significant hormonal changes in pregnancy are the increased levels of estrogen and progesterone. [5]Estradiol levels in plasma are reported to increase up to 30 times higher than those found during a reproductive cycle. Estrogen regulates cellular proliferation, differentiation, and keratinization. But progesterone affects the permeability of the microvasculature and also changes the production of collagen.[5] It is these hormonal alterations during pregnancy that tend to increase the incidence of gingivitis.

These changes lead to a significant increase in the severity of gingivitis and periodontitis when they are within the deeper tissues. Although pregnancy status has been said to increase host's susceptibility to periodontal inflammation, it is not clear whether such heightened status is affected by the oral health behaviour of pregnant women. Some authors have shown that pregnant women with good oral hygiene before pregnancy have better oral hygiene status during pregnancy compared to those with poor oral hygiene before pregnancy.[6]

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Reports from several studies carried out in Nigeria on pregnant women revealed that even though many women reported having high awareness of oral hygiene measures, however, this has not translated to having good oral hygiene.[7, 8]Furthermore, most pregnant women do not seek dental care nor utilize oral care services,despite having oral health problems.[9] The reasons vary from lack of awareness of the relationship between oral health and adverse pregnancy outcome, to paucity of information especially from the caregivers such as nurses and medical doctors.[10]Also, the caregivers do not refer the pregnant women to the dental clinic due to their lack of awareness about the relationship between pregnancy and oral health. [10,11]Most often than not, the women are referred when they are in severe discomforts.[7]In Maryland, United States of America, for example, every pregnant woman is advised to see the dentist after the first antenatal visit.[12] For optimal health during pregnancy, the women are expected to have sought for oral care before becoming pregnant and at least every three months during the course of the pregnancy whereas among non-pregnant population,[13]dental professionals' recommend preventive dental visits at least twice a year.[14]However Nigeria with a high proportion of poor oral health and adverse pregnancy outcome does not have such policy. The reason for this may be due little or no report on oral health outcome behaviour and oral health utilization vis- a -vis pregnancy outcome.

The poor oral health seeking behavior of Nigerian pregnant women has been reported earlier by Arowojolu et al,[11]and Bassey et al. [15]In the study done on Nigerian women, only 15% visited the dentist in and out of pregnancy and all were for therapeutic purposes.[10]The poor oral health seeking behaviour has been positively correlated with poor oral hygiene.[16]Recently, there are evidences that poor oral hygiene has adverse effect on pregnancy outcome with black women having higher predisposition.[17]Therefore, it is important to improve the oral health seeking behaviour among pregnant women in Nigeriawith a view to reducing the incidence of adverse birth outcomes in the country. To address this, it is important to first of all have baseline data on the oral health behaviour of pregnant women in Nigeria as this will help health officials and planners to device ways of improving oral hygienepracticeand reduce poor oral hygiene which has been linked to adverse pregnancy outcome in Nigeria.

## II.  Materials and Method

This was a cross sectional study of two hundred and fifty-eight pregnant women. The women were recruited from the antenatal clinic of Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC). Interviewer-administered questionnaires and secondary data sources (Case notes) were used for data collection.The survey tool was a questionnaire to assess the oral health service utilization and pattern of oral hygiene practices of the participants. The survey tool was administered in person and had a target length of fifteen minutes.[18]

Information extracted from the hospital case notes includesage, occupation, educational level, and marital status. History of past dental visits and past dental treatments was obtained. Furthermore, oral hygiene practices such as what they use to clean their teeth, number of times that they clean and the duration of cleaning was also obtained from the participants.The oral examination was done on the dental chair with good lightning. The oral hygiene of the pregnant women was rated using Gingival index (GI) and Community Periodontal Index of Treatment Needs (CPITN).

The data analysis was done using IBM SPSS Version 22, Illinois, Chicago, USA. Descriptive statistics were used to characterise the socio-demographic variables such as age, sex, marital status, and occupation. For categorical variables, simple frequency and percentages were determined and compared using Chi-square. Statistical significance was inferred at $p < 0.05$.

## III. Results

The age range of the participants was 19-40 years with the mean age being  29.52 (SD 3.82) years.The majority of the subjects were from the Yoruba ethnic group (78.1%) followed by the Igbos (13.3% - other ethnic groups are listed in **Table I**. The educational level attained did not correspond with their occupation. Hence, it may not reflect the socio-economic status (SES) of the subjects; however, it reflects the recent societal norm in the country and, thus, justifies the use of occupational status to classify the subjects in the present study. The majority of the subjects have secondary and tertiary education. (**Table I**).

**Table 1:** Distribution if the pregnant women according to ethnicity and educational level

| Tribe | Number | % |
|---|---|---|
| Hausa | 2 | 0.8 |
| Igbo | 22 | 8.5 |
| Yoruba | 221 | 85.7 |
| Minor ethnicity | 13 | 5 |
| **TOTAL** | **258** | **100** |
| **Educational Attainment** | | |

| Primary | 4 | 1.6 |
|---|---|---|
| Secondary | 101 | 39.1 |
| Tertiary | 153 | 59.3 |
| **TOTAL** | **258** | **100** |

All the women claimed to use toothbrush and toothpaste to clean their mouth. Majority of the participants irrespective of their level of education used toothbrush and paste to clean their teeth (p>0.05).Most of the respondents in the secondary and tertiary level clean their teeth once a day. There was no significant variation in the frequency of brushing and the level of education (p>0.05).

The study also sought to know the average duration of tooth brushing and found that the majority of the subjects brushed their teeth for less than 3 minutes (**Table II**). There was no significance difference in the duration of brushing and the level of education (p>0.05).

In addition, most of the women demonstrated poor oral hygiene practice; however, the majority of the women reported that they experienced no bleeding from the gingiva when they brushed their mouth. (**Table II**)

**Table II:** Oral health behaviour of the pregnant women

| Agent of brushing | Number | % |
|---|---|---|
| Toothbrush and paste | 252 | 97.7 |
| Cleaning stick | 2 | 0.8 |
| Cotton wool | 2 | 0.8 |
| Others | 2 | 0.8 |
| **TOTAL** | **258** | **100** |
| **Duration of cleaning** | | |
| Less than 1 min | 35 | 13.6 |
| About 3 min | 126 | 48.8 |
| About 5-7 min | 70 | 27.1 |
| More than 7 min | 16 | 6.2 |
| Others | 11 | 0.8 |
| **TOTAL** | **258** | **100** |
| Frequency of brushing | | |
| Once | 189 | 73.3 |
| Twice | 66 | 25.6 |
| Thrice | 1 | 0.4 |
| Others | 2 | 0.8 |
| **TOTAL** | **258** | **100** |
| **Bleeding gingiva** | | |
| Yes | 72 | 27.9 |
| No | 186 | 72.1 |
| **TOTAL** | **258** | **100** |
| **Time bleeding noticed** | | |
| No bleeding gingiva | 187 | 72.5 |
| Bleeding before pregnancy | 49 | 19.0 |
| Bleeding during first trimester | 16 | 6.2 |
| Others | 6 | 2.3 |
| **TOTAL** | **258** | **100** |
| **Rate of changing brush** | | |
| Every month | 27 | 10.5 |
| Every 3 months | 140 | 54.3 |
| Every 6 months | 49 | 19.0 |
| Others | 42 | 14.2 |
| **TOTAL** | **258** | **100** |

Most of the pregnant women had never visited a dentist before. The few who visited had visited had extractions, scaling and polishing (although in the past two years); and tooth fillings as the commonest dental procedure.

**Table III:** Previous oral health treatments according to group

| Previous Dental Procedure | No | % |
|---|---|---|
| Yes | 43 | 16.7 |
| No | 215 | 83.3 |
| **TOTAL** | **258** | **100** |
| **Procedure undergone** | | |
| No previous procedure | 214 | 83.0 |
| Filling | 5 | 1.9 |
| Extraction | 19 | 7.4 |
| S&P | 19 | 7.4 |
| Others | 1 | 0.4 |

| TOTAL | 258 | 100 |
|---|---|---|
| **When was S&P done** | | |
| No previous S&P | 235 | 91.1 |
| Last one year | 7 | 2.7 |
| Within past two year | 8 | 3.1 |
| More than two year | 8 | 3.1 |
| **TOTAL** | **258** | **100** |

**Table IV:** Agent of cleaning and Levels of education

| Agent used | Levels of education | | | Total | p |
|---|---|---|---|---|---|
| | Primary | Secondary | Tertiary | | |
| Toothbrush and paste | 4 | 96 | 145 | 245 | 0.12 |
| Cleaning stick | 0 | 2 | 0 | 2 | |
| Cotton wool | 0 | 2 | 0 | 2 | |
| **Total** | **4** | **100** | **145** | **249** | |

**Table V:** Frequency of cleaning teeth and Levels of education

| Frequency of cleaning | Levels of education | | | TOTAL | p |
|---|---|---|---|---|---|
| | Primary | Secondary | Tertiary | | |
| Once | 4 | 75 | 104 | 183 | 0.46 |
| Twice | 0 | 24 | 40 | 64 | |
| Thrice | 0 | 0 | 1 | 1 | |
| Others | 0 | 1 | 0 | 1 | |
| **TOTAL** | **4** | **100** | **145** | **249** | |

Also, the majority of the respondents brushes on the average of 3 minutes and changes their toothbrush every three months and this is irrespective of their level of education.

**Table VI:** Duration of cleaning and levels of education

| Duration | Level of education | | | Total | p |
|---|---|---|---|---|---|
| | Primary | Secondary | Tertiary | | |
| Less than 1min. | 0 | 11 | 23 | 34 | |
| About 3mins | 3 | 39 | 80 | 122 | 0.05 |
| About 5-7mins | 1 | 36 | 32 | 69 | |
| More than 7mins | 0 | 10 | 6 | 16 | |
| Others | 0 | 1 | 0 | 1 | |
| **Total** | **4** | **97** | **141** | **242** | |

**Table VII:** Rate of changing brush and levels of education

| | Levels of education | | | | |
|---|---|---|---|---|---|
| **Rate of changing brush** | Primary | Secondary | Tertiary | Total | p |
| Every month | 0 | 10 | 17 | 27 | 0.19 |
| Every 3 months | 2 | 62 | 73 | 137 | |
| Every 6months | 2 | 13 | 34 | 49 | |
| Others | 0 | 15 | 18 | 33 | |
| **Total** | **4** | **100** | **142** | **246** | |

There was a significant variation in the levels of education based on the past dental visits by the pregnant women with majority of women with tertiary level of education reporting more past dental visits than those in secondary and primary level of education ($p>0.05$).

**Table VIII:** Past dental procedure

| | Levels of education | | | | |
|---|---|---|---|---|---|
| **Past dental procedure** | Primary | Secondary | Tertiary | Total | p |
| Yes | 0 | 6 | 35 | 41 | 0.00 |
| No | 4 | 94 | 104 | 202 | |
| **Total** | **4** | **100** | **139** | **243** | |

Generally, the mean oral hygiene of the pregnant mothers based on CPITN shows that the pregnant women need treatment such as scaling and polishing. However, based on Gingival index (GI), the oral hygiene of the women can be said to be fair. Table of ANOVA shows a significant variation in the mean GI of the pregnant women($F=3.51$)($p=0.03$). Post hoc test show that the significant variation was between the women in secondary and tertiary level of education. (**Table IX**)

**Table IX:** ANOVA of mean values of CPI and GI according to levels of education

| Level of Education | N | Mean CPITN | SD | F, p | Mean GI | SD | F, p |
|---|---|---|---|---|---|---|---|
| Primary | 4 | 2.00 | 0.00 | 0.61, 0.55 | 0.81 | 0.43 | 3.51, 0.03 |
| Secondary | 100 | 1.87 | 0.32 | | 1.05 | 0.37 | |
| Tertiary | 139 | 1.81 | 0.59 | | 0.94 | 0.32 | |

## IV. Discussion

There is evidence that periodontal health has a link with systemic health. In particular, poor periodontal health has been associated with preterm birth and other adverse pregnancy outcomes.[19]Poor oral healthis a product of neglect and poor utilization of oral health care services.[18]Therefore, if the oral health behaviour and oral health utilization of the pregnant women were improved, the incidence of adverse pregnancy outcomes such as preterm birth may be reduced.

One of the oral health behaviour investigated was the agent used for cleaning. Over the years there have been a secular trend in the agent used for cleaning by Nigerians. Older studies reported common use of traditional substances such as cleaning sticks[8]while latter reports reported a shift towards modern tools such as toothbrush and paste. [18]The present study indicated that the majority of the participants reported that they used toothbrushes and pastes to clean. This finding corroborates the findings of previous studies among Nigerians that there is a shift towards the use of modern tools such as the toothbrush and paste.[7, 10,20]The reason for this may be due to exposure of people to advertisement of such products on television and radio.[7,10] For the younger age groups, the influence may be from information obtained from school.[7,20]Some authors reported that the social class influences the type of material used in cleaning the teeth. [18]This study found no relationship between the type of agent used and their level of education of the participants. A few of the participants reported that they used items such as cotton wool and other substances such as water and salt for mouth cleaning. This is similar to other findings, which indicate that a variety of items are used for oral hygiene measures among Nigerians.[18]?(rephrase)There is no scientific evidence on the efficacy of such tools and promotion of their use should be done with caution. [18]

It was not surprising to note that over 70 percent of the pregnant mothers brush once daily. This is similar to previous studies conducted among Nigerians where they found less than a quarter of Nigerians brushing two times a day. [18] Our findings is also similar to that of Olusile et al where they found that more than a third of their study participants reported that they brush twice daily.[18]This shows that the information they received from media or oral health campaign does not translate to their oral health behaviour. Another reason may be the cost of toothpaste.[20] Studies have shown that the inability to afford the cost of tooth paste may be a reason why they brush only once in a day.[20]Interestingly, the frequency of tooth brushing is not related to the level of education and economic status of an individual. One would have thought that the women in the higher educational class with access to better income would be more compliant with the brushing regimen of at least twice a day. This shows that their action is more of a habit rather than for financial reasons. A more sustainable and productive approach may be the promotion of good oral hygiene habits early in life. [18]This is because habits are formed early in life and become difficult to change later in life.

A good proportion of the pregnant women did not experience bleeding gum before and during pregnancy. One would have expected greater proportion of bleeding gum because of the their low frequency of brushing and their pregnancy status. No reason can be readily adduced for our findings but the adequate time they used to clean their teeth and the frequency at which they change their toothbrush might have contributed to the low gingival bleeding reported. It may also be that the women underreported the bleeding from the gingiva. Also, those with hyperemesis gravidarum may not pay much attention to their oral hygiene in view of their experience with early morning sickness.

The oral health utilization of the pregnant women study was poor. Less than fifteen percent of the women have visited dental hospital in the past. Furthermore, only about eight percent of the pregnant women have been to dental hospital for scaling and polishing. A pattern of not visiting the dentist regularly has been reported among various groups in Nigeria indicating a need to actively promote the utilization of dental services in the country as part of a strategy for achieving overall good health.[18]This situation even calls for greater concern in the light of recent evidence that poor oral hygiene can lead to preterm birth and other adverse pregnancy outcomes which simple preventive procedure such as scaling and polishing can ameliorate.[19] Presently Nigeria is ranked third on the global list of countries with the highest incidence of preterm birth. [21]Therefore, we suggest that government and policy makers compulsorily introduce oral health into the school curriculum of all heath care providers and that preventive oral care should be instituted for all pregnant women.

Previous reports suggest that Nigerians generally associate visiting a health facility with poor health and similarly do see any need to visit a dentist when they do not have toothache.[18, 22] Furthermore, there is a tendency for Nigerians to initially seek the attention from alternative health care practitioners before visiting a health facility. [18]This in our view may explain the low utilization rates recorded. However, it is worth noting that oral health services are not readily available in all communities and this may have limited the utilization of oral

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health services by these women.[18]We also observed that educational levels, is associated with utilization of dental services. Those with higher levels of education seek oral health services compared to those with lower levels of education. This finding is similarto what was reported in other countries. The reason is obvious, education exposed one to the knowledge about health and also those with higher levels of educations are likely to be employed with higher pay. Thus they are able to access oral health care.

This study is not without limitations. One limitation is its reliance on self-reported data, which is often subject to biases inherent to questions being asked such as recall bias. Another limitation is the use of non-probability method in the selection of study participants. In addition, the high proportion of highly educated women in this survey is not a reflection of the general population where most women are uneducated. This limits the ability to generalize the results obtained to the larger population. Nonetheless, the results would serve as a veritable tool for designing and specifying appropriate oral health education message(s) for pregnant women receiving antenatal care.

## V. Conclusion
Oral health behaviour and their oral health utilization of Nigerian pregnant women is poor. General sensitisation of pregnant women during antenatal care that poor oral hygiene could lead to adverse pregnancy outcomes should be encouraged and various policy-making bodies such as the World Health Organisation, federal and state ministries of health should integrate oral health into maternal and child health policies.

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