Assessment of Knowledge and Awareness about Periodontal Health among Pregnant Women in Benin City

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ABSTRACT

Objective: To assess the knowledge and awareness about periodontal health among pregnant women presenting at the Antenatal Clinic of the University of Benin Teaching Hospital

Methods: A descriptive cross- sessional study was carried out among one hundred and fifty-two pregnant women attending antenatal clinic at the University of Benin Teaching Hospital. Respondents were selected using systemic sampling techniques. Data was obtained using a structured interviewer-administered questionnaire and was analyzed with IBM SPSS version 25.0 and frequency distribution and cross tabulation were computed for categorical variables. Oral health practices, knowledge and awareness of periodontal health were determined. Ethical approval was obtained for this study.

Results: A total of one hundred and fifty-two women were included in the study. The age of participants varied from 22 - 44 years, with mean age of 31.8 ± 5 years. About two-thirds (63.8%), of the women were skilled workers while those with a tertiary level of education were 73.7%. About 54.6% of the respondents were in their third trimester. Majorly of the respondents (78.8%) had never visited a dentist. Majority of the respondents (71.1%), had fair oral health practice, while 22.4% of them had good knowledge about periodontal diseases. A high level of awareness about oral health and periodontal diseases was reported by 18.5% of the respondents. There was no significant association between education and oral health practice (P = 0.203).

Conclusion: This study has shown that the awareness level of periodontal health among the pregnant women is low irrespective of the fact that majority of them had fair oral health practice and average knowledge of periodontal health.

Key words: Periodontal health, Awareness, Knowledge, Pregnant women

INTRODUCTION

Periodontal disease is an inflammatory condition of the soft and hard tissues surrounding the teeth (Jaiganesh *et al*, 2017). Various forms of periodontal diseases are; gingivitis, periodontitis, etc.

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Gingivitis is an inflammation of the gingiva, without loss of periodontal attachment, while

periodontitis causes inflammation and destruction of the supporting tissues around the teeth and its axis (Jaiganesh et al., 2017; Thomas et al., 2008).

Periodontal diseases, if left untreated, can result in loss of tooth. The main cause is bacterial plaque that colonizes the gingival crevice and attaches to the tooth surfaces. The pathogenic potential of the bacteria within the plaque varies from the gingiva site. The host defence plays a role in the tolerance of a small amount of plaque accumulated (Rajesh et al., 2018; Shantipriya et al., 2008).

In conditions where bacteria and its products in plaque increase to a level beyond that of the host defence, then the balance shifts from health to disease. The pathogenesis of the periodontal disease can be caused by subgingival bacteria alone or indirectly by evasion of the immune host response. There is also a direct cause which may be due to bacterial invasion, production of exotoxins and endotoxins, role of cell constituents and certain enzymes. This direct effect can be on the epithelial cells, fibroblasts, inflammatory cells and endothelial cells (Shantipriya et al., 2008).

The microbial mass releases large number of metabolites like propionic acids and butyric acids which are toxic to periodontal tissues. Response to these bacterial products is done by available keratinocytes by releasing cytokines and pro inflammatory mediators such as the interleukins (IL) and prostaglandins (PG E2) and matrix metalloproteinase from the junctional epithelium. The complement system is activated as they play an important role in the initial host defence in the gingival crevice (Shantipriya et al., 2008). Oral disease such as dental caries, gingivitis and periodontitis are common and may cause pain and disability in all age groups and in susceptible individuals, including pregnant women (Azofeifa et al., 2014)

Periodontal disease has the potential to affect the outcome of pregnancy. A systemic review of 25 studies has demonstrated that periodontal disease may be associated with adverse pregnancy outcomes in human (Thomas et al., 2008). Pregnancy is a unique state for a woman associated with a great number of physiological and emotional changes. Several oral pathologies have been reported among pregnant women. Pregnant women are exposed to the overwhelming inflammatory response of the gingiva to bacterial plaque known as pregnancy gingivitis (Adeniyi *et al.,* 2011). Periodontitis has been linked to the increased amount of circulating oestrogen and progesterone with neglected oral hygiene during pregnancy. (Adeniyi *et al.,* 2011; Khalaf *et al.,* 2018). This is manifested by redness, oedema and high possibility of bleeding (Adeniyi et al., 2011).

The most frequent changes in the oral cavity during pregnancy are, pregnancy gingivitis, dental erosions, pregnancy epulis and halitosis These are initiated by oral biofilm and exacerbated by increase in sex hormones (Liena et al., 2019). Several studies continue to reveal the presence of relationship between periodontitis and adverse pregnancy outcomes (Khalaf et al., 2018). The development of periodontal diseases during pregnancy can be influenced by factors such as human immunodeficiency virus infection, lack of dental care, poor oral hygiene, smoking, low-educational level, low-employment status, increased age and ethnicity. These contribute to worsened periodontal condition during pregnancy (Onigbinde et al., 2014).

The objective of this study was to assess the knowledge and awareness about periodontal health among pregnant women presenting at the Antenatal Clinic of the University of Benin Teaching Hospital.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted among the pregnant women attending antenatal clinic of University of Benin Teaching Hospital, Benin City, Nigeria from January, 2021 to June, 2021. Pregnant women who voluntarily declined not to partake in the study were excluded. Ethical aapproval for the study was obtained from University of Benin Teaching Hospital Ethics Research and Ethics Committee. Permission was obtained from the Head of Department; Obstetrics and Gynaecology to allow the researcher distribute questionnaires to the pregnant women at the antenatal Clinic. Informed consent was obtained from the pregnant women before participation in the study. The information gathered from this study was used only for research purposes and in ways that will not reveal participants' identity. The interviewer protected respondents' personal information so no one will be able to connect their responses and any other information that identifies them. Directly identifying information (e.g. names, home addresses, and telephone numbers) did not featured on the questionnaire.

The sample size was determined using the Cochran formula ($N = Z^2Pq / d^2$) (Cochran, 1977), the minimum sample size for the study was 150, where Z = 95 confidence interval, P is the prevalence of pregnant women with good knowledge) Rajesh *et al*., 2018) was set at 11%, q was equal to 1–P, and d is minimum acceptable degree of error which is set at 5%. A two-staged sampling method was used to select participants from a representative sample,

based on the average monthly antenatal clients. An average of 416 ANC attendees are seen monthly in the University of Benin Teaching Hospital.

Stage 1. Simple Radom Sampling method (balloting) was used to select three days each out of the four days in a week used for antenatal clinic in the hospital. Approximately 26 clients are seen daily (104/week). After calculating the Sampling fraction, an average of 9 participants were recruited on each selected clinic day.
Stage 2. Systemic Sampling method was used to select the respondents on each selected clinic day. A Sampling Interval of 3 was obtained. Before commencing questionnaire administration daily, a die was tossed to determine the first respondent, subsequently every third respondent was recruited for the study out of the daily clinic attendees. This was carried out for a period of six weeks until the required sample size was obtained.

Data were collected using a self-administered questionnaire. The study questionnaires were distributed to the pregnant women who made the study participants at the antenatal clinic. The purpose of the questionnaire was explained by the principal investigator and its anonymous nature was emphasized. The questionnaire consisted of 29 questions which was divided into four sections;
SECTION A: Personal data, stage of pregnancy, number of pregnancies
SECTION B: General questions which include daily oral health practices and the changes seen in gingiva during pregnancy.
SECTION C: Knowledge about changes in oral health during pregnancy and their effect on pregnancy outcomes.
SECTION D: Awareness about oral health and pregnancy outcomes.

The questionnaire was pre-tested on 10 pregnant women, with similar characteristics as the study group and were excluded from the study. It was tested for validity and reliability. The validity was examined by evaluating whether the questions in the questionnaire were correct and comprehensive reflection of the concept the questionnaire was intended to measure. While the reliability was tested by making the pilot sample to complete a questionnaire on two separate occasions 2 weeks apart. The two sets of responses were then compared statistically using Pearson correlation
The data collected in this study was tabulated and analyzed using the IBM SPSS version 25. 0. Frequency tables were generated. Data transformation was undertaken in particular dichotomization of some variables that had more than two options for example, age (22–29 years, 30-39 and 40- 44 years) and level of education (primary secondary and tertiary education). Furthermore, the type of occupation of the study participants was dichotomized and recoded as highly skilled, skilled, semi-skilled, unskilled and students. The responses to specific oral hygiene practices and self-reported periodontal problems were dichotomized into presence (Yes) or absence (No) of the specific condition. Cross tabulations were processed between dichotomized categorical variables that generated two-by-two contingency tables. The chi-square test was used to detect statistically significant association between two groups of any categorical variables under consideration. In all analyses, the statistical significance level was set at $p<0.05$."

For the data analysis related to Oral health Practices, 1 point was assigned to good oral health practice and 0 for poor oral health practice. Then, the number of correct answers in each block was calculated, and the Oral health practice was grouped and categorized as poor (<50% of correct answers), fair (50%–70% of correct answers) and good practice (>70% of correct answers). The questions in the level of knowledge block and level of awareness block were also codified separately according to the 1/10-point system. 1 point was assigned to correct answers and 0 for the wrong answers. Then, the number of correct answers in each block was calculated, and the level of knowledge was grouped and categorized as poor (<50% of correct answers), average (50%–70% of correct answers), or good (>70% of correct answers). while the awareness level was grouped and categorized as low (<50% of correct answers), average (50%–70% of correct answers), or high (>70% of correct answers).

RESULTS

One hundred and fifty-two women were included in the study. The age of participants varied from 22 to 44 years, with a mean age of 31.8 ± 5 years. Just over half (57.9%) were between 30 and 39 years of age and about one-third (36.2%) of the participants were between 22 and 29 years.
About two-thirds (63.8%) of the participants were skilled workers while those with a tertiary level of education were 73.7%/ About 54.6% of the women were in their third trimester while 5.9% were in their first trimester (Table 1)

Table 1: Socio-demographic characteristics of the participants

Variable	Frequency (n)	Percent (%)
Age (years)		
22-29	55	36.2
30-39	88	57.9
40-44	9	5.9
Occupation		
Highly skilled	1	0.7
Skilled	97	64.7
Semi-skilled	33	22.0
Unskilled	5	3.3
Students	14	9.3
Highest level of Education		
Primary	2	1.3
Secondary	38	25.0
Tertiary	112	73.7
Gestational age		
First trimester	9	6.0
Second trimester	58	38.7
Third trimester	83	55.3

The oral health practice of most of the participants was fair (71.1%), while 13.2% had good oral health practice. (Figure 1) About 98.7% of the participants reported cleaning their teeth with toothbrush and toothpaste. On the frequency of brushing, 36.2% brushed twice daily. On the use of oral hygiene aid, 8.0% of the participants reported using interdental cleaning aids. About 16.8% reported to have made use of mouthwash (Table 2) About 78.8% had never visited a dentist and only 3.3% visits their dentist every 6 months. About 16.7% visited the dentist only during pregnancy while 70.0% of them about visited only when problem arises. (Table 2). The chi-square test showed that there was no significant association between education and oral health practice (P = 0.203) (Table 3). In assessing the level of knowledge about periodontal diseases, most participant with about 52.6% had average knowledge while 25.0% had poor knowledge (Table 4). In assessing the awareness level about oral health and periodontal diseases, most participants with about 51.0% had low awareness level, while 18.5% with high level of awareness about oral health and periodontal diseases. (Figure 2)

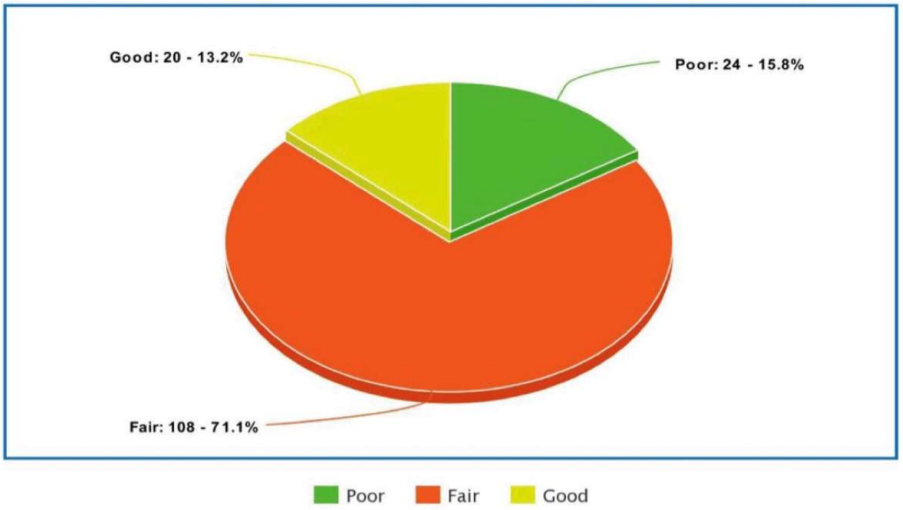

Figure 1: Oral health practices among the participants

Table 2: Teeth cleaning practices among the participants

Variable	Frequency (%)	Percent (%)
Brushing Habits		
Tooth brush and tooth paste	150	98.7
Tooth brush and powder	2	1.3
Frequency of brushing		
After every meal	5	3.3
Once daily	92	60.5
Twice daily	55	36.2
Other Oral hygiene aids	Yes	No
Interdental cleaning aids	8.0%	92%
Mouth wash	16.8%	83.2%

Table 3: Relationship between Oral health practice and Education

		Oral Health Practice			P-value
		Poor (%)	Fair (%)	Good (%)	
Education	Primary	0.0	100.0	0.0	0.203
	Secondary	31.6	60.5	7.9	
	Tertiary	10.7	74.1	15.2	

Table 4: Knowledge of periodontal diseases

	Frequency (n)	Percent (%)
Poor knowledge	38	25.0
Average knowledge	80	52.6
Good knowledge	34	22.4

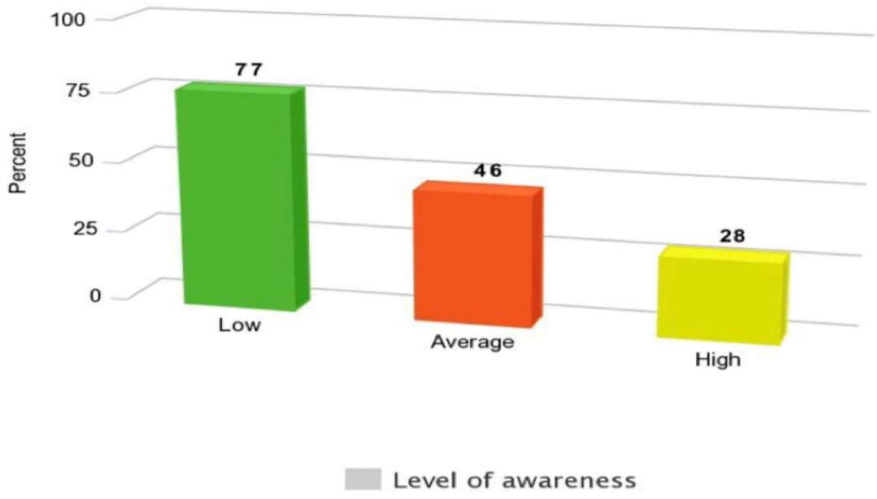

Figure 2: Level of awareness among the participants

DISCUSSION

A good oral health during pregnancy is important especially in view of the recent suggestions that poor oral health may result in adverse pregnancy outcomes. This is important in Nigeria because of the high maternal mortality rates (Adeniyi *et al.*, 2011). The commonest oral disease during pregnancy is periodontal disease which can be prevented by the institution of simple measures such as regular tooth-brushing and flossing. However, such positive behaviour would be influenced by the individual's oral health awareness and knowledge (Singh et al., 2015). Several related studies have been conducted on this topic in Nigeria in the past, but the most recent survey was conducted over four years ago. Thus,

this study was designed to assess the periodontal health practices, knowledge and awareness of a sample of pregnant women in a Federal Health Facility located in Benin City, Edo State, Nigeria.

The predominant age group was the 30 to 39year age group; 57.9%. In a related study in Lagos, by Adeniyi et al. (2011) the predominant study population constituting 69.5% were less than 25 years. In comparison to another study (Abdelseed, 2012), just over half (52.5%) were between 20 and 29 years of age and one third (34.3%) between 30 and 39 years of age.

For teeth cleaning practices, in the study carried out by Avula et al. (2013), 20.9% brushed their teeth twice a day, while in the study carried out by Assery, 2011, 33.3% of the sample brushed their teeth twice a day. However, in the present study, 36.2% affirmed that they brushed their teeth twice a day. These percentages are closely related but contrasted with other studies carried out by Martínez-Beneyto et al. (2011) with a report of 84% and that by Gaffar et al. (2016) with a report of 51%.

In Ibrahim *et al*. (2018), 66% of the women had bad oral health practice while in the present study, a better level of oral health practice was observed among pregnant women (15.8% poor, 71.1% fair, 13.2% good). On the other hand, in the study by (Liena *et al,* 2019), the oral health prevailed as medium. However, this does not coincide with the studies by Avula et al. (Avula *et al*, 2013) and Aguilar-Cordero et al. (Aguilar-Cordero *et al*, 2018) where a predominance of the good level was observed.

Regarding the level of knowledge about oral health, in the study by Aguilar-Cordero et al. (Aguilar-Cordero *et al*, 2018) the predominant level of knowledge was average (64%), followed by the low level (26%), while the high represented only 10%. Although the percentages differ with the present study, the distribution is similar, since the highest percentage of knowledge of periodontal diseases is also represented by the average level of knowledge (52.6%). This also coincides with other available literature (Liena *et al,* 2019). However, there are also studies in which the prevalent levels of knowledge were low. In a similar study, most of the respondents (89%) had poor knowledge and only 11% had good knowledge (Rajesh *et al*, 2018). Overall, the awareness level of oral health and periodontal diseases by the respondents in the present survey was low in 51.0%, while 30.5% had average level of awareness and 18.5% with high level of awareness. This is similar to a study carried out by Jaiganesh et al. (Jaiganesh *et al*, 2017). Although the percentages differed with the present study, the distribution is similar, with most of the respondents (75%) with a low awareness level and 34% with an average level of awareness with 1% of the respondents with a high level of awareness of oral health. Another similar result is that obtained from a similar study by Singh S et al (Singh *et al*, 2015) which showed low awareness (60%) among majority of the study population followed by average awareness among rest 40% of the participants.

In a similar study by Aguilar-Cordero et al. (Aguilar-Cordero *et al*, 2018), as the trimester of pregnancy increased, the percentage of good oral knowledge increased. This coincides with the results found in the present study. Although they were both not statistically significant. On the contrary, in the study by Barrios (Barrios, 2012), a significant association was found between the trimester and the level of knowledge. Women who were in the second trimester were the ones that represented the highest percentage within the group of good knowledge, those in their third trimester with poor knowledge

The chi-squared test showed that there was no significant relationship between education and oral health practice (P = 0.203), this contrasted a similar study by El-Mahdi et al. (2013) (P = 0.003). Furthermore, in the present studies, the relationship between oral health practice and occupation was not statistically significant (P = -0.167).

Pearson correlation indicated that there was no significant relationship between oral health practice and gestational age (P = -0.104), occupation and level of awareness (P = -0.069), gestational age and level of awareness (P = 0.062). However, there was significant relationship between education and level of awareness (P = 0.043), and gestational age and gum bleeding (P = 0.016) with Pearson correlation assessment. The level of awareness tallied with education because of exposure. The hormonal effect on gingiva could be explanation of the relationship between gestational age and gum bleeding.

There is no gainsaying that pregnant women need accurate information about their oral health. Simple educational preventive programmes on oral self-care practice and periodontal disease prevention before and during pregnancy should be provided to improve oral health.

CONCLUSION

The following conclusions were made from this study:

I. The oral health self-care practices of the pregnant women include; brushing with tooth

brush and paste, use of interdental cleaning aids and mouth wash, and visit to the dentist

II. The oral health status of most of the studied pregnant women was fair

III. III, Pregnant women with poor oral health self-care practices had poor oral health status

IV. The knowledge of the periodontal oral health of majority of the studied pregnant women was average, with majority having average knowledge on the need for extra care of oral hygiene during pregnancy

V. The level of awareness of most of the studied pregnant women on the effect of periodontal oral hygiene on adverse pregnancy outcomes was low, with majority unaware that dental disease and pregnancy are related

RECOMMENDATIONS

Based on the findings of this study, it can be recommended that:

1. Oral health should be integrated into all preventive interventions related to pregnant women through a primary health care approach in Nigeria

2. The provision of oral health education during antenatal care to educate women on the importance of maintaining good oral health is essential.

3. Collaborative efforts between the ministry of Health and the private sector must be established so as to ensure delivery of more accessible oral healthcare programme for antenatal mothers in Nigeria.

4. An oral health education, screening and treatment package should be developed to be incorporated in the mother child health (MCH) activities, both in antenatal and postnatal clinics in Benin City.

5. Further research should be conducted to determine the reasons for the low awareness of periodontal health in pregnant women in Benin City.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

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