

Comparative Analysis of the Oral Hygiene of Pregnant Women Attending Urban and Rural Primary Health Care Centres in Abuja, Nigeria

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Abstract

Background: The oral cavity is connected to the other parts of the body hence any disease in the oral cavity can eventually affect the overall health of the individual. The aim of this study was to assess the oral hygiene of women attending antenatal care clinic at Primary Health Care Centres in urban and rural areas in Abuja, Nigeria.

Methods: A cross-sectional comparative study was carried out among pregnant women attending antenatal care clinic in Primary Health Care facilities in Abuja. Participants were selected using consecutive sampling. Data were collected using a semi structured, interviewer-administered questionnaire and analyzed using Statistical Package for the Social Sciences version 23. Significance level was set at $p = 0.05$. Chi square for proportions was used to compare the two groups.

Results: In total 201 participants were from urban areas while 206 were from rural areas. Participants were aged between 16 and 49 years and their occupations ranged from business; 131(32.2%) to job applicants; 4(1.0%). Thirty three (16.4%) urban women and 37(18.0%) rural women understood that poor oral hygiene can affect pregnancy ($p = 0.68$). Six (3.0%) of the pregnant women had visited a dentist during their current pregnancy. Twenty four (11.9%) urban and 31(15.1%) rural women used vertical motion to clean their teeth ($p = 0.001$). One hundred and twenty one (60.2%) urban and 156(75.7%) rural women had good oral hygiene and the difference was statistically significant ($p = 0.001$).

Conclusion: The pregnant rural women had better oral hygiene than the pregnant urban women.

Keywords: Oral Hygiene, Pregnant women, urban and rural areas, Abuja

Introduction

Oral health can “be defined as a state of being free from chronic facial and mouth pain, throat and oral cancer, oral sores and infection, periodontal diseases, tooth loss and decay, other diseases and disorders that negatively affect an individual's capacity in biting, smiling, chewing, speaking and psychosocial wellbeing”.¹ Good oral hygiene means the teeth are clean and free of debris, there is no mouth odour and the gingiva are not inflamed.² Physiologic changes in the body during pregnancy result in raised estrogen levels which in turn results in the increase in the incidence of dental diseases like pregnancy gingivitis and dental occlusal attrition during pregnancy.³ During pregnancy, physiologic changes that occur in the body can also lead to pathological changes in the mouth.^{4,5,6} The following are the changes that occur in the mouth during pregnancy; pregnancy gingivitis, non-malignant gingival lesions, tooth mobility, tooth erosion, dental caries and periodontitis.^{4,5,6,7} Poor oral hygiene which is a predisposing factor to oral diseases during pregnancy may therefore worsen the oral health outcome.⁸ Indeed Periodontal diseases have been associated with poor pregnancy outcomes.⁹

Primary Health Care centres see a large volume of clients because they are closer to the people and therefore more accessible to them even though they are poorly equipped. Unfortunately the PHC centres in urban centres are usually better equipped and better staffed than those in rural areas. Similarly, dental health services are expected to be better in urban PHCs than rural PHCs making oral hygiene better among pregnant women in urban than rural areas.

The prevalence of pregnancy gingivitis (gingivitis gravidarum), a form of periodontal disease, ranges from 30% to 100% among pregnant women globally,¹⁰ while in Ibadan the prevalence of periodontal disease among pregnant women is 89.6%.¹¹ In 2013, only 6.1% of pregnant women attending antenatal care clinic in Port Harcourt knew that pregnancy could affect oral health and only 9.2% understood that poor oral hygiene could affect pregnancy outcome.¹² In a research on the dental health knowledge of pregnant women in Lagos, 32.0% had heard the term “dental caries” while for 19.4% of the participants the term

meant tooth decay. Seven in ten of the participants had heard of the term periodontal disease but only 3.3% understood it meant gum disease. Concerning dental health during pregnancy, 14.8% agreed that pregnancy is a cause of periodontal problems, 79.2% disagreed while 6.0% were uncertain.¹³

Also among mothers receiving ante natal care in Lagos, only 33.0% had ever visited a dentist, 7.0% had visited the dentist just before or during the current pregnancy, 53.9% visited the dental clinic because of pain and 62% of those who had never been to a dental clinic said they never visited one because they had no dental pain. Educational level had no relationship with the use of dental services.¹⁴ Oral hygiene practices vary widely among Nigerians. In Lagos, 94.2% use toothbrush, 65.1% clean their oral cavity once daily, 34.2% clean their oral cavity two or more times daily, 2.4% use chewing stick and 3.6% use other methods.¹³ In Ilorin, a comparison of the Oral hygiene between pregnant and non-pregnant women using the simplified Oral Hygiene Index (OHI-S) revealed that the pregnant women had over all better oral hygiene score than the non-pregnant women.¹⁵ Therefore, this research aimed to compare the oral hygiene of pregnant women attending primary health centres in Urban and rural areas in Abuja, Nigeria.

Methodology

Study Area

Abuja is the Federal Capital Territory (FCT) of Nigeria and is located centrally within the geographical landscape of Nigeria. It falls within latitudes 7° 25' N and 9° 20' North of the Equator and longitude 6° 45' and 7° 39' East of the Greenwich Meridian.¹⁶ Abuja consists of six Area Councils namely Abuja Municipal, Abaji, Bwari, Kuje, Kwali and Gwagwalada Area Councils.¹⁷ Each area council has 10 Political wards except Abuja Municipal Area Council (AMAC) which has 12 Wards and each political ward is the operational unit for the PHC programme implementation.¹⁸

Study population

The study population was made up of pregnant women attending ante-natal clinics in Primary Health Care facilities in Abuja.

Inclusion criteria: All pregnant women in any

trimester attending ante-natal clinics in nine primary health care facilities, three in each of the 3 area councils of Abuja.

Exclusion criteria: Women attending ante-natal clinics the 9 PHC clinics who refuse to give informed consent.

Study design

This was a cross sectional comparative study design.

Sample Size determination

Using the formula for sample size calculation for comparing 2 proportions we have; “ $n = (Z_{\alpha/2} + Z_{\beta})^2 * (p_1(1-p_1) + p_2(1-p_2)) / (p_1 - p_2)^2$ ”,¹⁹

$Z_{\alpha/2}$ is 1.96 which is the critical value for 95% confidence level. Z_{β} is 1.28 which is the critical value for a power of 90%. p_1 is 0.4 (40.3%) for urban area from a study¹¹ and p_2 is 0.6 (66%) for rural area from another study²⁰.

The minimum sample size calculated for each group i.e urban and rural is 121 making the total 242 participants which is the minimum number to be sampled.

Sampling technique

Multi-stage sampling method was used to select the PHCs.

Stage 1- Stratification of FCT area councils into urban and rural Area councils and selection of one urban area council and two rural area councils by simple random sampling using balloting

Stage 2- Selection of PHCs from the area councils using simple random sampling technique by balloting. The PHCs selected were;

1. AMAC-Kuchingoro PHC, Lugbe PHC and Karu PHC (urban)
2. Bwari Area council- Mpape PHC, Dutse Alhaji PHC and Dutse Makaranta (rural).
3. Gwagwalada Area Council- Zuba PHC, Township PHC and Dobi PHC (rural).

Stage 3- Consecutive selection of respondents from among the pregnant women attending ANC clinic

Data Collection

The study instrument was a semi structured interviewer administered questionnaire. The questionnaire was adapted from the Oral Hygiene

Index- Simplified (OHI-S) of Green and Vermillion.²¹ It consisted of questions on demography (age, gender, occupation, educational level, religion and parity), oral health knowledge, practices, dental service utilization, and an examination section for debris index score (DI-S) and calculus index score (CI-S).^{21,22} A tongue depressor, torchlight and gloves were used to examine the mouth of the women.

Data Analysis

The data was entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Frequencies and proportions were generated and presented using tables. The dependent variable was the oral hygiene while the independent variables were age, educational level, location and health practices. The relationship of the variables between the urban and rural areas were tested using the Chi Square test. A P-value 0.05 was considered statistically significant. A confidence interval of 95% was used. Proportions were used to compare the two groups. The OHI-S score is the total of DI-S + CI-S. A score of 0-1.2 means good oral hygiene, 1.3-3.0 means fair oral hygiene while 3.1 – 6.0 means poor oral hygiene.²¹

Ethical considerations

Ethical approval was obtained from the University of Abuja Teaching Hospital Health Research Ethics Committee (UATH/HREC/PR/2021/014/002). Informed verbal consent was obtained from every participant before data collection. Information obtained was treated with confidentiality. The research was carried out in compliance with the Declaration of Helsinki.

Results

From Table 1, a total number of 407 pregnant women (201 urban and 206 rural) participated in the study. Their median age was 24.5 IQR 9.7 years. The age range was between 15 to 49 years, with the majority; 243(59.7%), being in the age range of 20 to 29 years and the least was 40 to 49 years with one person (0.2%). It was only in the rural areas that there were 9(4.4%) participants with no western education. Majority of both groups of participants had secondary education; 203 (49.9%).

Thirty seven (18.0%) rural participants were aware that poor oral hygiene can negatively affect their pregnancy compared with 33(16.4%) of the urban

women. Out of the women who knew the association between pregnancy and poor birth outcomes, 6(18.2%) urban women, identified correctly adverse pregnancy outcomes associated with poor oral hygiene compared to 3(8.1%) rural women. Sixty eight (33.0%) of the rural women knew that poor oral hygiene can cause diseases in the body outside of the oral cavity compared with 54(26.9%) of the urban women. Table 2.

More urban women; 29(14.4%) had attended the dental clinic when they were not pregnant compared to 18(8.7%) of the rural women who attended the dental clinic when they were not pregnant. Only 6(3.0%) of the urban women and 4(1.9%) of the rural women attended the dental clinic during previous pregnancies. During the current pregnancy only 4(2.0%) of the urban women and 2(1.0%) of the rural women had attended the dental clinic. The main reason for not attending the dental clinic during either this pregnancy or previous pregnancies was that they had no teeth problem and this was 176(91.7%) of the urban women and 186(93.0%) of the rural women. Table 3.

In Table 4, all pregnant women clean their teeth daily. One hundred and fifty four (76.6%) of the urban women and 167(81.8%) of the rural women clean their teeth with tooth brush and tooth paste, while 6(3.0%) of the urban women and 9(4.4%) of the rural women use chewing sticks. For the urban women the method of brushing for majority of them; 132(65.7%), was a combination of vertical (up/down) and horizontal (back and forth) while for the rural women, the method of brushing for majority of them, 95(46.1%), was across but more rural women, 31(15.1%), got the better technique which was brushing up and down compared to 24(11.9%) of the urban women who brushed up and down. Majority of the women, 95(47.3%) for the urban and 108(52.4%) for the rural women brush twice daily. Only 22(10.9%) of the urban women and 13(6.3%) of the rural women had ever used home remedies for treatment of dental problems during any pregnancy.

According to Table 5, good oral hygiene was seen in 277(68.1%) of all the women. Good oral hygiene was seen in 156(75.7%) of the rural women and in 121(60.2%) of the urban women. The others had

fair oral hygiene. None of the women had poor oral hygiene.

Table 1: Demographic variables of study participants.

Demographic variables	Urban n (%) n=201	Rural n (%) n=206	Total n (%) n=407	X ²	P value
Age group					
<20	5 (2.5)	5 (2.5)	10 (2.5)	1.106	0.776
20-29	122 (60.7)	121 (58.7)	243 (59.7)		
30-39	74 (36.8)	79 (38.3)	153 (37.6)		
40-49	0 (0.0)	1 (0.5)	1 (0.2)		
Educational level					
None	0 (0.0)	9 (4.4)	9 (2.2)	12.142	0.016
Primary	22 (10.9)	24 (11.7)	46 (11.3)		
Secondary	101 (50.2)	102 (49.5)	203 (49.9)		
Tertiary	71 (35.3)	58 (28.2)	129 (31.7)		
Quaranic	7 (3.5)	13 (6.3)	20 (4.9)		
Marital status					
Single	4 (2.0)	2 (1.0)	6 (1.5)	0.728	0.695
Married	196 (97.5)	203 (98.5)	399 (98.0)		
Divorced	1 (0.5)	1 (0.5)	2 (0.5)		
Occupation					
Civil servant	5 (2.5)	5 (2.4)	10 (2.5)	20.106	0.010
Business	75 (37.3)	56 (27.2)	131 (32.2)		
Farming	0 (0.0)	9 (4.4)	9 (2.2)		
Artisan	48 (23.9)	54 (26.2)	102 (25.1)		
Unskilled labour	6 (3.0)	2 (1.0)	8 (2.0)		
Professional	23 (11.4)	19 (9.2)	42 (10.3)		
House wife	41 (20.4)	53 (25.7)	94 (23.1)		
Student	3 (1.5)	4 (1.9)	7 (1.7)		
Applicant	0 (0.0)	4 (1.9)	4 (1.0)		
Trimester					
First	3 (1.5)	16 (7.8)	19 (4.7)	9.178	0.010
Second	73 (36.3)	74 (35.9)	147 (36.1)		
Third	125 (62.2)	116 (56.3)	241 (59.2)		

Table 2: Awareness of oral health care during pregnancy amongst the pregnant women.

Variable	Location		x ²	p-value
	Urban n (%) n=201	Rural n (%) n=207		
Actions to improve oral health				
Proper brushing	198 (98.5)	155 (75.2)	52.327	0.001
Proper brushing/visit dentist twice a year	3 (1.5)	4 (1.9)		
Proper brushing/eating balance diet	0 (0.0)	22 (10.7)		
All of the above	0 (0.0)	25 (12.1)		
Reasons for cleaning teeth				
To keep it clean and healthy	84 (42.4)	68 (33.5)	8.562	0.128
To prevent mouth odour	62 (31.3)	86 (42.4)		
To look good	1 (0.5)	1 (0.5)		
To prevent disease	35 (17.7)	30 (14.8)		
To keep it clean and healthy/ prevent mouth odour	12 (6.1)	17 (8.4)		
To prevent mouth odour/ look good	4 (2.0)	1 (0.5)		
Knowledge of what a dental floss is				
Yes	11 (5.5)	12 (5.8)	0.024	0.878
No	190 (94.5)	194 (94.2)		
Use of dental floss				
Yes	7 (63.6)	3 (25.0)	3.486	0.062
No	4 (96.4)	9 (75.0)		
Awareness that poor oral hygiene can affect pregnancy				
Yes	33 (16.4)	37 (18.0)	0.170	0.680
No	168 (83.6)	169 (82.0)		
Awareness of poor pregnancy outcome due to poor oral hygiene				
Low birth weight	0 (0.0)	2 (5.4)	7.065	0.132
Preterm birth	2 (6.1)	1 (2.7)		
Miscarriage	4 (12.1)	0 (0.0)		
Others	13 (39.4)	18 (48.6)		
Don't know	14 (42.4)	16 (43.2)		
Awareness that poor oral hygiene can affect other parts of the body				
Yes	54 (26.9)	68 (33.0)	1.830	0.176
No	147 (73.1)	138 (67.0)		

Table 3: Dental service utilization among the respondents.

Dental service utilization	Location		X ²	p value
	Urban n (%) n=201	Rural n (%) n=206		
Visited the dentist when they were not pregnant				
Yes	29 (14.4)	18 (8.7)	3.225	0.073
No	172 (85.6)	188 (91.3)		
Reasons for the visit when they were not pregnant				
Treatment	26 (89.7)	15 (83.3)	0.434	
Check up	3 (10.3)	2 (11.1)		
To receive oral health education	0 (0.0)	1 (5.6)		
Visit to the dentist during previous pregnancies				
Yes	6 (3.0)	4 (1.9)	0.462	0.497
No	195 (97.0)	202 (98.1)		
Complaint for visiting the dentist during previous pregnancy				
Pain	5 (83.3)	2 (50.0)	0.132	
Bleeding gum	0 (0.0)	2 (50.0)		
Pain/Swelling of the gum	1 (16.7)	0 (0.0)		
Visit to the dentist during this pregnancy				
Yes	4 (2.0)	2 (10)	0.728	0.394
No	197 (98.0)	204 (99.0)		
Complaint for visiting the dentist during this pregnancy				
Pain	3 (75.0)	2 (100.0)	0.699	
Check up	1 (25.0)	0 (0.0)		
Treatment given by dentist during this pregnancy				
Scaling and polishing	1 (25.0)	0 (0.0)	0.392	
Extraction	1 (25.0)	2 (100.0)		
Recommended drugs	1 (25.0)	0 (0.0)		
Wait after delivery	1 (25.0)	0 (0.0)		
Reasons for not visiting the dentist in previous and this pregnancy.				
Cost	8 (4.2)	6 (3.0)	0.690	
Distance	1 (0.5)	0 (0.0)		
No teeth problem	176 (91.7)	186 (93.0)		
Others	7 (3.6)	8 (4.0)		

Table 4: Association between oral health care practices of the pregnant women attending antenatal clinic and location of the PHC clinic

Oral health care practices	Location of PHC clinic		x ²	p-value
	Urban n (%) n=201	Rural n (%) n=206		
Daily teeth cleaning				
Yes	201 (100.0)	206 (100.0)	0.061	0.804
No	0 (0.0)	0 (0.0)		
Materials for teeth cleaning				
Tooth brush and tooth paste only	154 (76.6)	167 (81.1)	2.770	0.250
Chewing stick only	6 (3.0)	9 (4.4)		
All (tooth paste, tooth brush and chewing stick)	41 (20.4)	30 (14.6)		
Time of cleaning teeth				
Morning	93 (46.3)	93 (45.1)	10.293	0.016
Night	2 (1.0)	10 (4.9)		
Morning and night	101(50.2)	103 (50.0)		
Morning, afternoon and night	5 (2.5)	0 (0.0)		
Method of teeth cleaning				
Up and down	24 (11.9)	31 (15.1)	31.446	0.001
Across	45 (22.4)	95 (46.1)		
Combination	132 (65.7)	80 (38.8)		
Number of times of teeth cleaning per day				
Once	94 (46.8)	91 (44.2)	2.136	0.344
Twice	95 (47.3)	108 (52.4)		
More than twice	12 (6.0)	7 (3.4)		
Used of home remedies for oral health treatment during pregnancy				
Yes	22 (10.9)	13 (6.3)	2.780	0.095
No	179 (89.1)	193 (93.7)		
Materials used to remove food particles stuck between teeth				
Tooth pick	172 (89.6)	157 (86.7)	7.262	0.064
Broom	11 (5.7)	21 (11.6)		
Rinse with water	3 (1.6)	2 (1.1)		
Dental floss	6 (3.1)	1 (0.6)		

Table 5: Comparison of respondents’ oral hygiene status and location of PHC clinic.

Oral hygiene status	Urban n (%) n=201	Rural n (%) n=206	Total n (%) n=407	χ^2	p-value
Good	121 (60.2)	156 (75.7)	277 (68.1)	11.286	0.001
Fair	80 (39.8)	50 (24.3)	130 (31.9)		

Discussion

It was only in the rural areas that there were women without western education. It is documented that females in rural Nigeria are educationally disadvantaged.²³ The educational level is important because higher level of academic qualification was related to better oral hygiene among pregnant women in a previous study.²⁴ However this finding is contrary to the findings in this study in which the rural women with lower level of education had better oral hygiene.

Majority in both groups of women agree that proper brushing is required to improve oral health. This is the type of knowledge required for good oral hygiene and it is in agreement with a study in Benin city where a high proportion of the pregnant women knew that tooth brushing is required for good oral health.²⁵ Even though a greater number of the rural women knew that poor oral hygiene can negatively affect their pregnancy compared with the urban women, a higher number of the urban women identified correctly specific adverse pregnancy outcomes related to poor oral hygiene in comparison with the rural women. This shows that more rural women had a general belief that poor oral hygiene affects pregnancy but it was the urban women who had specific knowledge of the outcomes of the association of poor oral hygiene and pregnancy. The generally low number who knew of the relationship between poor oral hygiene and adverse pregnancy outcomes is similar to a previous finding in Rivers State where two out of every five pregnant women knew this association.²⁶ The low practice of routine dental check-up is similar to findings in Ogun State in 2011 where only one in seven pregnant women had ever attended a dental clinic.²⁰ This low figure is because majority of the women believe that you only attend

the dental clinic when you have tooth ache. The poor routine dental check-up is a cause for concern because routine dental check-up is necessary for good oral health and it is during routine dental check-up that routine scaling and polishing is done which is necessary for good oral hygiene. It is good that all of the women clean their teeth daily because regular oral hygiene practice is necessary for good oral hygiene and this is the same as documented in Lagos²⁷. Majority of both groups of women clean their teeth both in the morning and at night. This was also the finding by other researchers in Rivers State where almost half of the women brush in the morning and at night but this figure should be higher because these are the correct times for tooth brushing and will have great impact on oral hygiene.²⁶ More rural women engaged in brushing up and down (vertical) compared to the urban women who brushed vertically. This is important because according to a study in Italy, the vertical brushing technique is the better brushing technique,²⁸ The higher percentage of rural women who engaged in vertical brushing could account for the better oral hygiene of the rural women.

None of the pregnant women had poor oral hygiene and this is in agreement with a study in Ibadan where none of the pregnant women had poor oral Hygiene.¹¹ In general majority of all the pregnant women had good oral hygiene. This could be as a result of daily cleaning and number of times of brushing per day. In Kano majority of the pregnant women attending ante-natal clinic had good oral hygiene.²⁹ When disaggregated based on PHC location more rural women had good oral hygiene compared to the urban women. Even though it has been proven that dental pathologies are higher among the socially disadvantaged such as people in the rural areas because of the deficiency of dental

facilities,³⁰ in this research the rural women had the advantage of the presence of dental facilities in three PHC centres in the rural areas which means there is greater oral health awareness in these PHC centres and their environs. Secondly, more rural women brushed with the better method of vertical (up and down) brushing and thirdly, slightly more rural women have had scaling and polishing done which improves oral hygiene.

This study has revealed that proper brushing techniques and the presence of oral health facilities in a location might improve the oral hygiene of people in those locations. Public health policy makers in government need to strengthen oral health education in PHCs.

Conclusion

The oral hygiene of majority of both groups of the women was good. Pregnant rural women had better oral hygiene than the pregnant urban women. However, further studies need to be carried out to ascertain why the rural women had better oral hygiene than their urban counterparts. It is hoped that the result of this study will encourage policy makers in government to integrate fully oral health care into PHCs in Nigeria because as the utilization of dental services and the knowledge of the pregnant women concerning the association of oral health and pregnancy outcome were found to be poor.

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