ORIGINAL ARTICLE

Relationship Between Socio-Demographic Profile, Parity and Dental Caries Among a Group of Nursing Mothers in South East, Nigeria

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ABSTRACT

Objective: To determine the prevalence and risk indicators of caries among nursing mothers in a tertiary hospital. **Material and Methods:** This was a cross-sectional study of 408 nursing mothers aged 15 to 52 years who brought their children for immunization in a tertiary hospital in Enugu, Nigeria. Data on socio-demographic profile, parity, dental visits were collected. The presence of dental caries was recorded using the World Health Organization criteria. **Results:** The prevalence of dental caries was 11.0%, and the mean DMFT was 0.18. There was a statistically significant association between level of education (p<0.001), past dental visit (p<0.001) and the occurrence of dental caries. Caries was more prevalent in the mandibular teeth than the maxillary teeth. The left mandibular first and second permanent molars had the highest occurrence of dental caries. Missing (M) component of the DMFT index was highest and the care index was low. The significant predictors of caries among nursing mothers were fair oral hygiene and having below tertiary education. **Conclusion:** The prevalence of caries and the care index were both low in this study population. The significant predictors of dental caries were a tertiary level of education and poor oral hygiene. Incorporating oral health education during postnatal care can help reduce dental caries' occurrence and complications among nursing mothers in the study population.

Keywords: Dental Caries; Socioeconomic Factors; Oral Hygiene; Health Education, Dental.

Introduction

Dental caries is defined as a localized, post-eruptive, pathological process of external origin. It involves the softening of the hard tooth tissue and proceeds to forming a cavity [1]. Streptococcus mutans is one of the main aetiological factors of dental caries. Individuals, including nursing mothers with untreated dental caries, harbor this organism and eventually transfer it to their infants through vertical and horizontal transmission [2,3]. Ultimately, mothers' oral health determines the oral health of their children [4]. Hence, caries preventive programs on mothers at the antenatal and postnatal clinics are important to prevent transmission to their children.

Preventive and curative care of dental caries are obtained in the dental clinic, but as seen in a prior study, few mothers (12.5%) utilize dental services [5]. Factors such as age, cost, dental awareness, time, and distance are identified barriers limiting the utilization of dental care service [6-9].

In Hungary, the DMFT index of postpartum women was 12.57, with age and socioeconomic status significantly associated with dental caries [10]. In Nigeria, a study among adult female population showed a caries prevalence of 25.3%, with females of child-bearing age being the most affected [6]. Dental caries has also been associated with parity. A recent study in Nigeria found that parity was linked indirectly with tooth loss [11]. Even in Japan and the United States of America, parity was associated with tooth loss as a result of caries or periodontal disease [12,13]. It is worthy of note that several studies conducted on pregnant mothers, who eventually become nursing mothers, revealed a poor oral health status [14-16]. There is a dearth of information on dental caries and risk indicators of caries among nursing mothers in Enugu, southeastern Nigeria. This study identified the dental caries status of nursing mothers in the area. It also assessed the relationship between age, education level, past dental visits, oral hygiene status, parity, and dental caries. The predictor of dental caries was also determined.

Material and Methods

Study Area

The study was carried out at the University of Nigeria Teaching Hospital (UNTH), Enugu State, Nigeria. Enugu State is one of the 36 states in Nigeria. It is located in the south east zone, one of the 6 geopolitical zones of the country (south east, south west, south south, north east, north west and north central zones). The population of Enugu State is about 3.3 million [17]. UNTH is an apex tertiary health institution in the south east and it is located in Enugu. Patients are referred to UNTH by other health institutions in the region for specialist care. The hospital has an immunization clinic, which is under the Institute of Child Health, UNTH, Enugu. The National Programme on Immunization advocates that all vaccinations should be received during the child's first year of life [18]. The study area was chosen because the centre is a government establishment and many mothers utilize its services.

Study Population and Research Design

Study participants were mothers who brought their children for immunization. The research was a cross-sectional study that lasted from April to August 2017. All mothers who brought their children for immunization at the UNTH clinic and were willing to participate in the study were recruited consecutively. The dependent variable was dental caries, while age, education level, past dental visits, parity and oral hygiene status were the independent variables.

Nursing mothers who gave written consent to participate were included in the study, while those who had mental illnesses (depression and psychiatric disorders), which prevented them from giving adequate information were excluded.

Sample Size Calculation

The calculation of the sample size was done using the formula [19]: $N=t^2 \times p(1-p)/m^2$, where N is the required sample size, p is the prevalence of dental caries (25.3%) among adult female population[6], m is a margin of error at 5% standard value 0.05, t is the confidence level at 95% precision, and standard value is 1.96. Thus, N= 1.962 x 0.253 (1-0.253)/0.052 =291. To account for 10% non-responders, the formula, sample size x 100/100-10 was used. Thus, N=291 x100/100-10=323.3. This was approximated to 324. However, 430 were willing to participate in the study.

Standardization of Examiners

Two researchers administered the questionnaire while one examined the mothers. The examiner was a dental surgeon who has practiced for more than 15 years. Intra examiner reliability was assessed by examining five mothers with dental caries on two separate occasions at two weeks interval. The result was coded and fed into the computer. The data were then subjected to Cohen's kappa scores analysis to determine the intra-examiner reliability. The intra-examiner variability score was 0.92.

Study Procedure

An interviewer assisted questionnaire was administered to the mothers by the researchers. Intra-oral examination under natural light was conducted on the mothers while seated on their chair. Cotton wool was used to clean the debris on the teeth, while a wooden spatula was used to retract the tongue, cheeks and lips. According to the World Health Organization [20], the DMFT index was used to assess the caries experience of this population. Information on the Decayed (D), Missing (M) and Filled (F) teeth due to dental caries was charted on the oral examination assessment form. For analysis, caries was classified as present or not present.

The mothers' oral hygiene was assessed using the Oral Hygiene Index–Simplified (OHI-S) [21]. The Debris Index and Calculus Index were obtained based on six numerical determinations representing the amount of debris or calculus found on the surfaces of index teeth 11, 16, 26, 31, 36, 46 [21] in the permanent dentitions. The total of debris and calculus scores was divided by the number of surfaces scored. The oral hygiene was graded as good, fair, or poor if the scores were 0.0–1.2, 1.3–3.0 and >3.0, respectively. The nursing mothers were later educated on oral health care. The study period was four months (April to August 2017).

Data Analysis

Data was analyzed using SPSS version 18 (IBM, Chicago, IL, USA). Descriptive analysis was conducted using a wide variety of measures of location (mean). Bivariate analysis was conducted to test the association between age, education level, oral hygiene status, past dental visits and caries occurrence. Logistic regression was also conducted to determine the predictors of dental caries in the mothers. The effect of all significant factors on occurrence of dental caries was inferred at P<0.05. A model was developed to determine the predictors of dental caries among nursing mothers. The model included factors that show an association between risk factor and dental caries with p-values <0.2 [22].

Ethical Clearance

Ethical approval was obtained from the University of Nigeria Health Research and Ethics Committee (IRB00002323). Permission was sought from the Institute of Child Health, UNTH, Enugu and written informed consent was obtained from a parent or guardian for participants under 18 years old.

Results

There were 430 nursing mothers who participated in the study. However, 22 (5.2%) refused oral examination, which reduced the sample to 408 (94.8%) nursing mothers. The study participants' age ranged from 15 to 52 years and the mean age was 28.04 ± 5.28 years.

Table 1 shows that many of the study participants, 100 (24.5%), were in the 21 to 30 years age group and 196 (48.0%) had a secondary education level. Most 330 (80.9%) had never utilized dental services and 45 (11.0%) study participants had dental caries.

Table 1. General characteristics of the study participants.

Variables	N (%)
Age (Years)	
≤20	28 (6.9)
21-30	270 (66.1)
31-40	100 (24.5)
≥41	10 (2.5)
Level of Education	
Primary	51 (12.5)
Secondary	196 (48.0)
Tertiary	161 (39.5)
Past Dental Visit	
Yes	78 (19.1)
No	330 (80.9)
Oral Hygiene Status	
Good	7 (1.7)
Fair	398 (97.5)
Poor	3 (0.8)
Dental Caries	
Present	45 (11.0)
Absent	363 (89.0)

Table 2 shows no significant association between the mother's age (p=0.45), oral hygiene status (p=0.20) and occurrence of dental caries. However, there was a statistical difference between level of education (p<0.001), past dental visits (p<0.001) and occurrence of dental caries. Mothers with a tertiary level of education 33 (73.3%), and those who had past dental visits 23 (51.1%) had more dental caries occurrences than the other study participants.

Table 2. Association between age, sex, past dental visit, oral hygiene status and dental caries.

Variables	Dental Caries		Total	p-value
	Present N (%)	Absent N (%)	N (%)	
Age (Years)				0.45
<20	4 (8.9)	24 (6.6)	28 (6.9)	
21-30	25 (55.6)	245 (67.5)	270 (66.1)	
31-40	15 (33.3)	85 (23.4)	100 (24.5)	
>40	1 (2.2)	9 (2.5)	10 (2.5)	
Level of Education				

Primary	3 (6.7)	48 (13.2)	51 (12.5)	<0.001
Secondary	9 (20.0)	187 (51.5)	196 (48.0)	
Tertiary	33 (73.3)	128 (35.3)	161 (39.5)	
Past Dental Visit				<0.001
Visited	23 (51.1)	55 (15.2)	78 (19.1)	
Never Visited	22 (48.9)	308 (84.8)	330 (80.9)	
Oral Hygiene Status				0.20
Good	2 (4.4)	5 (1.4)	7 (1.7)	
Fair	42 (93.4)	356 (98.0)	398 (97.5)	
Poor	1 (2.2)	2 (0.6)	3 (0.8)	
Total	45 (100.0)	363 (100.0)	408 (100.0)	

Table 3 shows that 349 (85.5%) mothers disclosed the number of children they have while 59 (14.5%) did not. The mean parity was 2.4 ± 1.32. There was no significant association (p=0.33) between parity and dental caries among the nursing mothers. However, mothers with one or two children had the most (35.0%) occurrence of caries compared to other mothers.

Table 3. Association between parity and dental caries among nursing mothers.

	Dental Caries		Total	
Parity	Yes	No		**p-value**
	N (%)	N (%)	N (%)	
1	14 (35.0)	99 (32.1)	113 (32.4)	0.33
2	14 (35.0)	81 (26.2)	95 (27.2)	
3	7 (17.5)	64 (20.7)	71 (20.3)	
4	2 (5.0)	43 (13.9)	45 (12.9)	
≥5	3 (7.5)	22 (7.1)	25 (7.2)	
Total	40 (100.0)	309 (100.0)	349 (100.0)	

Figure 1 shows the total number of teeth with dental caries as 73. Fifty-two (72.2%) occurred in the mandibular arch, while 21 (28.8%) occurred in the maxillary arch. The left mandibular first (19.2%) and second (17.8%) molars were the most infected. The mean DMFT was 0.18: decay component was 25 (34.2%), missed component was 33 (45.2%) and the filled component was 15 (20. 5%). The treatment need index was (25/48 x100) 52.1%, while the restorative care index was (15/73 x100) 20.5%.
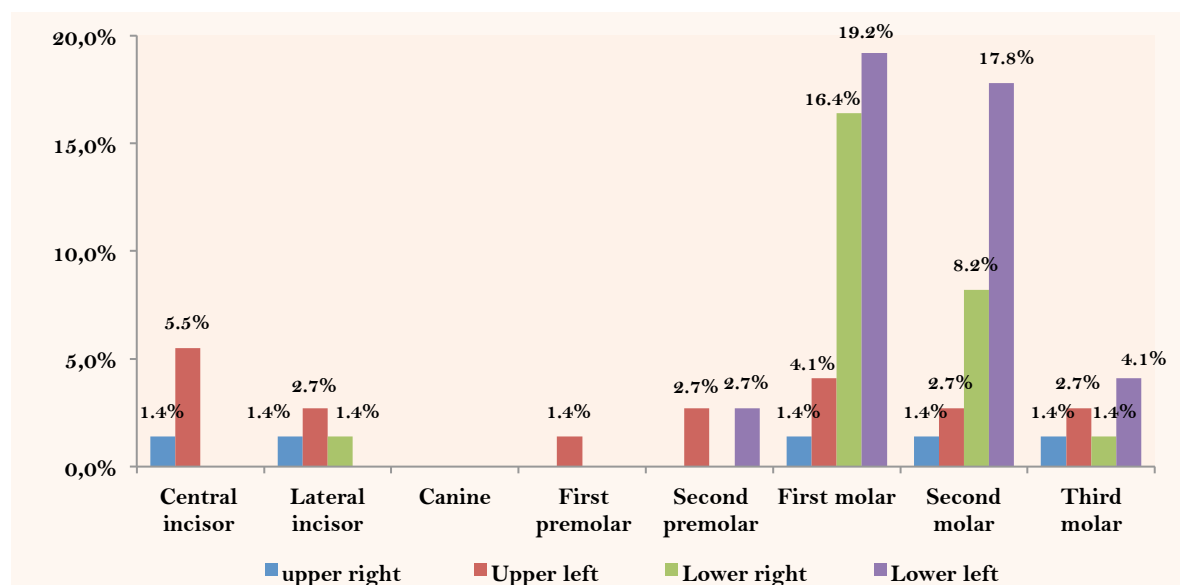
Figure 1. Tooth specific prevalence of dental caries.

Table 4 shows that those with fair oral hygiene had 84% decreased odds of dental caries occurrence than those with poor oral hygiene, which was statistically significant (CI=0.001-0.265; OR=0.16; p=0.004). Also, those whose education level was below tertiary level had 92% decreased odds of dental caries infection compared to those with a tertiary level of education (CI=0.018-0.368; OR=0.081; p=0.001).

Table 4. Logistic regression analysis of factors associated with dental caries.

Variables	N (%)	OR	95% CI	p-value
Oral Hygiene				
Good	2 (4.4)	0.04	0.001−1.381	0.075
Fair	42 (93.4)	0.16	0.001−0.265	0.004
Poor	1 (2.2)	1.00		
Past Dental Visit				
Yes	23 (51.1)	0.918	0.303−2.783	0.88
No	22 (48.9)	1.00		
Level of Education				
Below Tertiary	12 (26.7)	0.081	0.018−0.368	0.001
Tertiary	33 (73.3)	1.00		

Discussion

In this study, the prevalence of dental caries was 11.0%. A significant association occurred between education level, past dental visits, and occurrence of dental caries among nursing mothers in the study population. The left mandibular first and second permanent molars had the highest occurrence of dental caries. The Missing (M) component of the DMFT index was the highest, while the care index was low. The predictors of dental caries were poor oral hygiene and tertiary level of education. However, a major limitation in this study is the reliance on mothers' ability to recall the reason for tooth extraction.

The prevalence of dental caries in the study population is lower than that (25.3%) obtained from a previous study involving females in Nigeria [6]. It is also lower than that (21.1%) from another study among pregnant women [14]. This difference may result from the different geographical locations in which the studies were carried out (south-west and south-south Nigeria, respectively). A larger number of mothers with a tertiary level of education had caries, compared to those with a primary and secondary level of education. In developing countries such as Nigeria, attaining a tertiary education level indicates that the individual is financially empowered. This implies that such women can afford cariogenic diets, which will eventually result in dental caries if proper care is not taken. The study also showed that those who had visited the dental clinic in the past had more occurrences of carious lesions than those who had never visited the dental clinic. This is not surprising because most people only make symptomatic visits to dental centres in developing countries [7,9,23]. These nursing mothers would have visited the dentist because of pain emanating from carious teeth. Asymptomatic visit is preferred because it gives room for preventive dental care. However, age was not significantly associated with dental caries in nursing mothers, unlike the study in Hungary [10], which found a significant association between nursing mothers' age and dental caries experience.

Also observed in this study is that parity was not associated with occurrence of dental caries, although prior studies had linked parity with tooth loss from caries [11-13]. The missing component was highest in the DMFT index. There is a belief by some nursing mothers that a tooth is usually lost during each pregnancy. This may be linked to the depletion of calcium from the teeth, which occur during pregnancy, making them prone to caries, as seen in a prior study [24].

Dental caries occurred on the mandibular teeth more than the maxillary teeth, probably because of gravity that enhances food debris's stagnation on the occlusal surface. The left side was more affected as seen

in a prior study in the study area [25]. Another finding from this study is that the mean DMFT index was lower than that (12.57) seen in a prior study in Hungary [10], although the restorative care index was also quite low.

A few nursing mothers had visited the dental clinic with the missing component (M) of their DMFT index being the highest compared to other components. Patients' late presentation to the dental clinic with grossly carious teeth and their inability to finance some restorative/endodontic treatment would have necessitated tooth extraction [26]. Poor oral hygiene and being educated up to tertiary level were predictors of dental caries occurrence in the study. There is high bacteria load in the mouth with poor oral hygiene, resulting in caries formation, as seen in a prior study in India [27].

We recommend the promotion of dental visits among nursing mothers. This will help prevent dental conditions such as dental caries, and if already in existence, it can be treated. Such measures will prevent tooth loss and eliminate the transfer of cariogenic bacteria from mothers to their babies.

Conclusion

The prevalence of dental caries was low in the study population and the restorative care index was also low. Tertiary level of education and poor oral hygiene were significant predictors of dental caries in the study population. There is a dire need to increase dental awareness among nursing mothers in the study population.

Authors' Contributions

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All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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