Original Article

PREVALENCE OF DENTAL CARIES AMONG DENTAL PATIENTS PRESENTING AT A SECONDARY HEALTHCARE FACILITY IN SOUTHERN NIGERIA: A FIVE-YEAR RETROSPECTIVE STUDY

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Abstract

Background: Dental caries is the most prevalent oral disease. It affects both sexes, all races, all socioeconomic ranks and all age groups.

Objective: To determine the prevalence of dental caries among dental patients presenting at a secondary healthcare facility in Southern-Nigeria.

Materials and Methods: A 5-year retrospective descriptive study was conducted at the dental department, Central Hospital Oleh, Delta State. Variables of interest extracted from the records included age, sex, decayed teeth, missing/extracted teeth, filled teeth, tooth type, jaw type and oral hygiene status. Cases with incomplete data were excluded. Analysis of data was done using the IBM® SPSS® Statistics version 25 software. Association between variables was tested using Fisher's exact, independent t-test and one-way analysis of variance.

Results: A total of 847 cases containing the variables of interest were retrieved from the hospital records. The mean age of patients was 38.94 $\pm$ 20.44 years. The prevalence of dental caries was 43.2% (*n* = 366). The mean deft was 0.62 $\pm$ 1.60, and the DMFT, 1.04 $\pm$ 1.70. Dental caries occurred more significantly on the mandible (57.8%) than the maxilla (42.2%) and was significantly more prevalent on the first molars (32.9%).

Conclusion: The number of untreated dental caries was high, and the restorative index was low among the patients. The overall caries prevalence was high; however, the mean DMFT/deft was low compared to other Nigerian studies.

Keywords: Dental caries, Dental patients, Health care, Prevalence.

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INTRODUCTION

Dental caries is the most prevalent oral disease and possesses a high morbidity potential. There is no geographic area in the world where inhabitants do not exhibit some signs of dental caries. It affects all age groups, sexes, races and cuts across socioeconomic classes.[1] Dental caries contributes to the global burden of oral diseases, and it restricts activities in school, at work and at home, causing millions of school and work hours to be lost each year.[2] When associated with pain in children, it interferes with food intake, affects physical development in the form of malnutrition, limits the ability to communicate and learn, reduces school attendance and academic performance, and places a financial burden on the parents.

Dental caries remains a common oral health challenge facing most people in the world, with Andegiorgish et al[3]

reporting a prevalence of 78% among 12-year-old students in Eritrea, and Youssefi & Afroughi[4] reporting a prevalence of 89.8% among primary school children in Iran, it can easily be called the most prevalent disease in children. In Nigeria, Braimoh, et al[5] reported a caries prevalence of 15.4% and a mean Decayed, Missing and Filled Teeth (DMFT) score of 0.25 ± 0.66. Okoye and Ekwueme[6] documented a prevalence of 35.5% and a mean DMFT of 0.85 ± 1.50 among 11 – 16-year-olds in Enugu, Nigeria.

This study aims to determine the prevalence of dental caries among dental patients presenting at a secondary healthcare facility in Southern-Nigeria.

MATERIALS AND METHODS

This was a retrospective descriptive study of patients who presented at the Dental department, Central Hospital Oleh, Delta state over five years (January 2015 – December 2019). Oleh is the Isoko South Local Government Area headquarter, one of the two administrative units in the Isoko region of Delta State, southern Nigeria. Case records for all the patients within the study period were identified, and the variables of interest extracted from the records included age, sex, decayed teeth, missing/extracted teeth, filled teeth, tooth type, jaw type and oral hygiene status. Cases with incomplete information were excluded from the study.

The decayed, missing and filled teeth (DMFT/dmft) index was used to assess the patients' caries experience; its decayed component (D/d) assessed the number of decayed teeth (or carious lesions) in an individual. It numerically expressed the caries prevalence by calculating the number of decayed, missing teeth due to caries, and filled teeth.[7] The sum of the three figures obtained gave the DMFT/dmft value. Restorative index, a measure of restorative care of those who had experienced dental caries, was also calculated. It represented the number of filled teeth divided by the sum of filled and decayed teeth, expressed as a percentage.[8]

The oral hygiene status was assessed using the simplified oral hygiene (OHI-S) index.[9] The OHI-S index is made up of debris and calculus components. The OHI-S score was obtained by summing the debris index and calculus index scores of a patient after examination of the buccal and lingual surfaces of the six index teeth (the upper first molars, lower first molars, upper right central and lower left central incisors). A score of 0 – 1.2 indicates good, 1.3 – 3.0: fair and 3.1 – 6.0: poor oral hygiene.

Ethical clearance was sought and obtained from the ethical committee of the Delta State Hospitals Management Board. Statistical analysis was carried out using the IBM® SPSS® Statistics version 25 software. Descriptive data were expressed as frequencies and percentages; the difference in proportion was tested using Fisher's exact test at a 95% confidence interval. The difference in means was also tested using an independent sample t-test for two groups and a one-way analysis of variance (ANOVA) for more than two groups. The level of significance α was set at 0.05.

RESULTS

A total of 847 cases containing the variables of interest were retrieved from the hospital records. The ages of the patients were from 1 – 103 years, with a mean of 38.94 ± 20.44 years. 471 (55.6%) patients were female, with a mean age of 37.81 ± 21.24 years; meanwhile, 376 (44.4%) were male with a mean age of 39.84 ± 19.76 years.

Over half of the patients were caries-free $n = 481$ (56.8%), giving a dental caries prevalence of 43.2%. Caries experience was noticeably more prevalent among females ($n = 239$) than males ($n = 127$) [Table 1]. The mean deft for patients at the deciduous and mixed dentition stage was 0.62 ± 1.60. The mean prevalence (30.8%) was higher in females; however, the mean deft (0.51 ± 1.12) was lower than in males (21.3%, 0.83 ± 1.49). There was a non-significant difference in mean deft in relation to gender ($p > 0.587$) and age ($p > 0.754$). Decayed teeth (dt) were a major contribution to deft; the proportion of decayed, extracted and filled teeth was 96.2%, 3.8% and 0%, respectively. Among the individuals who had a deft ≥ 1, caries accounted for 96.2% and, of these, 54.6% had only one carious lesion dt = 1 [Figure 1].

Meanwhile, the DMFT for patients at the mixed and permanent dentition stage, ≥ 6 years, was 1.04 ± 1.70. The mean prevalence (49.5%) and DMFT (1.21 ± 1.83) were higher in females than males (31.8%, 0.83 ± 1.49). According to age groups, the mean DMFT among patients was highest in the ≥ 70 age group (1.17 ± 2.55) [Table

2]. There was a significant difference in mean DMFT in relation to gender ($p < 0.002$) and age ($p < 0.001$).

Decayed teeth (DT) were a major contributor to DMFT; the proportion of decayed, missing and filled teeth was 68.9%, 29.1% and 2.0%, respectively. Among the individuals who had a DMFT ≥1, caries accounted for 68.9% and, of these, 53.7% had only one carious lesion DT = 1 [Figure 2]. Significantly more carious teeth were recorded on the mandible (57.8%) than the maxilla (42.2%), and caries was significantly more prevalent on the permanent first molars (32.9%) [Table 3].

Concerning oral hygiene, the distribution of patients across the three oral hygiene status categories was very similar; however, more patients were in the poor oral hygiene category (35.9%) [Table 1]. Furthermore, females had poorer oral hygiene than males. Oral hygiene and dental caries experience had a non-significant relationship (Fisher's exact = 19.38, $p > 0.217$). The restorative index among the patients in this study was estimated to be 2.5% [Table 4].

Table 1: Distribution of dental caries and oral hygiene status categories according to sex among patients

Variable	Male *n* (%)	Female *n* (%)	Total *n* (%)	Fisher's exact (*p*-value)
Dental caries				
Present	127 (33.8)	239 (50.7)	366 (43.2)	34.57 ($p < 0.001$)
Absent	249 (66.2)	232 (49.3)	481 (56.8)	
OHS* category				
Good	119 (31.6)	150 (31.8)	269 (31.8)	0.028 ($p < 0.989$)
Fair	131 (32.2)	153 (32.5)	274 (32.3)	
Poor	136 (36.2)	168 (35.7)	304 (35.9)	

*OHS: Oral Hygiene Status

Table 2: Mean DMFT scores according to age (≥ 6 years) and sex of the patients.

Variable	Frequency (%)	Mean DMFT ± SD
Age group (in years)		
6 – 9	50 (6.0)	0.08 ± 0.34
10 – 19	83 (10.0)	0.95 ± 1.36
20 – 29	178 (21.4)	1.24 ± 1.49
30 – 39	123 (14.8)	1.14 ± 1.43
40 – 49	134 (16.1)	1.16 ± 1.64
50 – 59	105 (12.6)	0.95 ± 1.82
60 – 69	83 (10.0)	0.93 ± 2.08
≥ 70	75 (9.0)	1.17 ± 2.55
Total	**831 (100.0)**	**1.04 ± 1.70**
Sex		
Male	368 (44.3)	0.83± 1.49
Female	463 (55.7)	1.21± 1.83
Total	**831 (100.0)**	**1.04 ± 1.70**

Table 3: Distribution of caries between jaws and among different teeth in patients

Variable	Frequency (%)
Tooth type	
Deciduous Central incisors	1 (0.15)
Deciduous Lateral incisors	5 (0.8)
Deciduous Canines	1 (0.15)
Deciduous First molars	20 (3.1)
Deciduous Second molars	26 (4.0)
Permanent Central incisors	4 (0.6)
Permanent Lateral incisors	4 (0.6)
Permanent Canines	5 (0.8)
Permanent First premolars	25 (3.8)
Permanent Second premolars	47 (7.2)
Permanent First molars	214 (32.9)*
Permanent Second molars	189 (29.1)
Permanent Third molars	109 (16.8)
Total	650 (100.0)
Jaw type	
Maxilla	274(42.2)
Mandible	376 (57.8)*
Total	**650 (100.0)**

***p* < 0.001

Table 4: Estimation of the restorative index among patients.

Variable	Frequency
Decayed teeth	650
Filled teeth	17
Decayed + Filled teeth	667
Restorative index $= \frac{Filled\ teeth}{Decayed\ teeth+Filled\ teeth} = \frac{17}{667} = 2.5\%$	

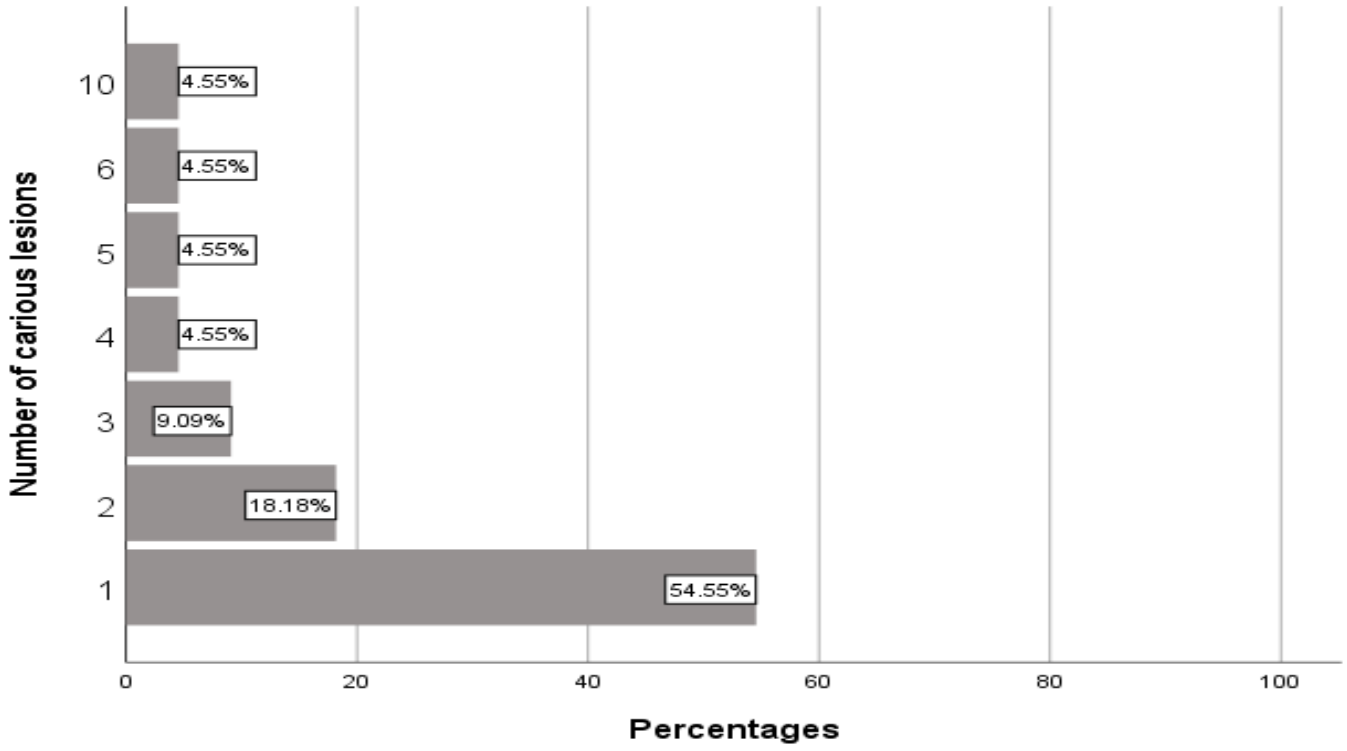

Figure 1: Distribution of numbers of carious lesions among DEFT patients

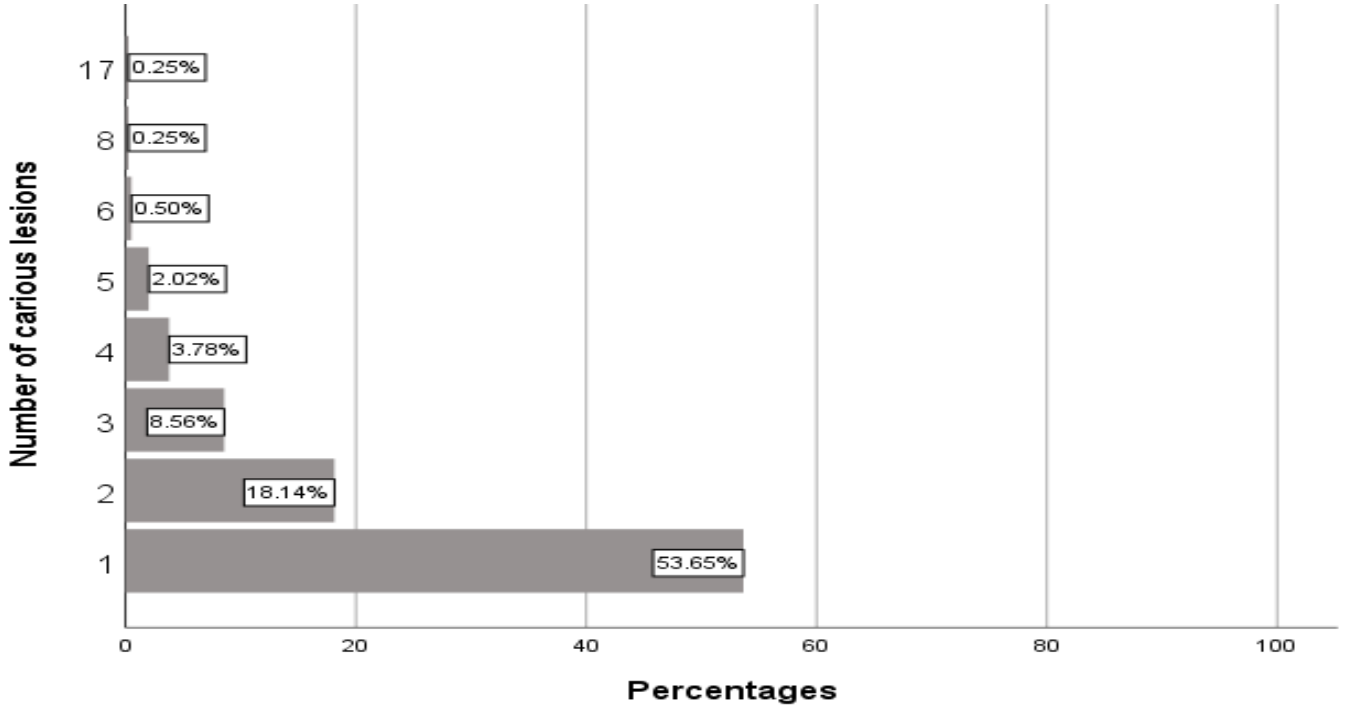

Figure 2: Distribution of numbers of carious lesions among DMFT patients

DISCUSSION

This study presents the caries experience among dental patients presenting at the Dental department, Central Hospital Oleh, Delta State, Southern-Nigeria. Caries prevalence in this study was 43.2%, which is more than the 22.6% recorded by a study[10] among adult attendees at the University of Port-Harcourt Teaching Hospital, Nigeria. This variation may be due to differences in the study population and the disparity in accessing dental care between the studied environments. Anent sex, caries prevalence was higher among females than males, which correlated with a similar study report.[6] The explanation for this finding is that females erupt their teeth earlier than males; thus, they are exposed earlier and longer to the risk of attack by caries.

Dental caries was significantly more prevalent in the first molars when compared to other tooth types, a finding that was in agreement with some previous studies,[11-13] the early exposure of the first molars to cariogenic diet as they erupt into the mouth could play a role. Exposure to a highly cariogenic diet promotes the colonisation of the pits and fissures of first molars, making them more susceptible to caries.[14] Also, mandibular teeth were significantly more often found to be decayed than maxillary teeth. This finding was in tandem with that of a similar study,[5] and could be attributed to the greater tendency for food packing and plaque accumulation in the mandible compared to the maxilla and the faster rate of caries progression in the mandibular molar teeth.

The mean deft was lower in females than males, though not significant. Mean DMFT was, however, significantly higher in females. The number of carious lesions observed in each subject varied from at least one to seventeen. The majority of the subjects had one carious lesion. In a similar study,[10] the majority of patients had at least one carious lesion. Epidemiological studies have reported the D/d(decayed) part of the DMF/def index responsible for most of all caries observed in study populations. In this study, the D/d component was the predominant component of the DMFT/deft, similar to observations from previous studies.[6,15,16] The high percentage of untreated teeth is consistent with findings from other underdeveloped and developing countries[17,18] and could be the product of low utilisation of dental services, which can be ascribed to limited access to dental care in terms of cost and availability.[19]

A restorative index is a measure of those with dental caries who had received previous restorative dental care. Only a tiny percentage of the patients in the current study had received restorative treatment, indicating a high need for restorative care in the study's locality. The result gotten from this study was lower but comparable to the 3.5% and 6.3% reported in similar studies.[5,20] Thus, in the present study, the distribution of dental caries was not modified by the provision of dental care; this makes the patients suitable for studying caries patterns.

Regarding oral hygiene, poor oral hygiene was more in females than males, though not significant. This finding was in contrast to that of a previous study,[11] and could be the result of the differences between the studied populations.

This study's findings may have been limited by its retrospective nature, which prevented further elaboration on abstracted information. However, this will in no way lessen the relevance of this study's report and desire to accentuate the burden of dental caries in the studied community.

CONCLUSION

The number of untreated dental caries was high, and the restorative index was low among the patients. The overall caries prevalence was high; however, the mean DMFT/deft was low compared to other Nigerian studies. Efforts should, therefore, be made to reduce the high prevalence and further reduce the DMFT/deft through an effective prevention programme.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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