

Prevalence and distribution of caries in the 12-15 year urban school children in Enugu, Nigeria.

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Citation

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Abstract

Aim: To investigate the prevalence and distribution of dental caries among 12 to 15 year old urban school children in Enugu, South-East, Nigeria. **Methods:** A multistage sampling technique was used to select the 353 school children that were studied. Presence of caries was identified by using semi structured interviewer administered questionnaires, mouth mirror and blunt probe under natural illumination. Data on presence of caries were recorded using WHO criteria of 1997. **Results:** Caries were diagnosed in 85 (24.1%) of the 353 children. The total mean DMFT for the 353 children was 0.45 ± 0.53 . The mean DMFT for boys was 0.35 ± 0.33 and for girls it was 0.54 ± 0.86 . There was a general increase in mean DMFT with age. Caries was most prevalent in first molars (46.5%) while canines and first premolars were caries free. Caries were also observed more in the mandibular molars (23.29%). **Conclusion:** Caries prevalence was low compared to those obtained from previous studies. The prevalence gets worse with increasing age. To sustain the low prevalence, a cost effective preventive approach to caries should be used especially by the older children.

INTRODUCTION

Dental caries is a chronic infectious disease, generally believed to be caused by acid producing mutants – Streptococci and Lactobacilli bacteria (Beighton et al. 2004). There is a rapidly changing global disease pattern and this is said to be closely linked to changing lifestyles which include diet rich in sugars, widespread use of tobacco and consumption of alcohol (Peterson, 2004). The distribution and severity of dental caries vary in different parts of the world and within the same country or region (WHO, 1997). An estimated 90% of school children worldwide and most adults have experienced dental caries with the disease being most prevalent in Asia and Latin American countries and least prevalent in African countries (WHO, 2003). In the United States, dental caries is the most common chronic childhood disease and it is at least 5 times more common than asthma (Health People Online, 2006).

While data from developed nations demonstrate reductions in the numbers of decayed, missing and filled teeth (Woodmansay, 1995 and 2004), the incidence of caries has been predicted to increase in several developing nations (Peterson, 2004). The DMFT index of 1.5 has been reported for Africans while that for Americans and Europeans were 3.5 and 2.5 respectively (Peterson, 2004). Similarly, a

DMFT of 0.70 is reported in Nigerian females and 0.59 in males (Okeigbemen, 2004).

Dental caries experience is strongly age related. There is often an increase in severity and prevalence with increased age (WHO 1997). In the deciduous dentition caries is slightly more prevalent in the boys than in girls but in the permanent dentition caries is at first slightly more prevalent in girls than in boys but evens out later in life (WHO 1997). A South African study on 6, 12 and 15 year olds found that mandibular molars were most affected. Brekhus (1931) reported that 60% of all dental caries were in the maxilla while 40% were in the mandibular arch.

Dental caries is irreversible at the cavitation stage. It is the primary cause of tooth morbidity and mortality in children. Furthermore, it causes severe pain and suffering and hence impacts on both function and quality of life (Peterson, 2004).

MATERIALS AND METHOD

This study was conducted in Enugu North Local Government Area of Enugu, Southeastern Nigeria. It is inhabited mostly by the Igbo tribe and the commonest occupations include civil service and trading. Ethical approval was obtained from the local Ethics Committee. Two schools were then selected from a sample frame of 20

High schools. The total population of the students aged 12 to 15 years in the 2 selected schools was 2249 males and 1074 females. Using table of Random numbers 223males and 130 females were selected. Informed consent was then obtained from the Principals and caregivers of these selected children.

Semi structured interviewer administered questionnaires were then administered to the selected children to obtain information on sociodemographic variables and dental hygiene. Dental examination was then done and classified using the WHO criteria of 1997. Caries diagnosis was done by visual and tactile examination in a classroom setting with a plane mouth mirror and a blunt dental probe under natural illumination. Study setting made the use of radiographic equipment or fibre optics impracticable. The decayed, missing and filled teeth were scored with DMFT index.

Data were analyzed using Statistical Package for Social Science (SPSS) version 14.0 and Microsoft Excel. Categorical variables were analyzed with chi square while means were compared with Student t-test. A p-value of less than or equal to 0.05 was considered statistically significant. The entire result was done with Confidence Interval of 95%.

RESULTS

Figure 1

Table 1: Sex distribution of caries among the 12-15year olds

Variable	Boys (N=223)	Girls (N=130)	Total (%)
Dental caries present	48 (21.5%)	37 (28.5%)	85 (24.1%)
Dental caries absent	175 (78.5%)	93 (71.5%)	268 (75.9%)
Total	223 (100.0%)	130 (100.0%)	353 (100.0%)

$$\chi^2 = 2.16, df = 1, P = 0.141$$

Figure 2

Table 2: Age and sex distribution of Mean DMFT

Variable	Number	Mean DMFT \pm SD
<u>Gender</u>		
Boys	223	0.35 \pm 0.33
Girls	130	0.54 \pm 0.86
Total	353	0.42 \pm 0.53
<u>Age (years)</u>		
12	77	0.17 \pm 0.21
13	102	0.47 \pm 0.62
14	79	0.35 \pm 0.47
15	95	0.98 \pm 0.20

Figure 3

Table 3: Caries Distribution Among the Different types of tooth

TOOTH TYPE	PREVALENCE (%)
6	46.7
7	44.2
8	2.3
4	-
5	5.4
3	-
1	0.8
2	0.8
Total	100.0

Mandibular molars = 69.8%

Maxillary molars = 23.2%

Figure 4

Table 4: Percentages of intra arch distribution of dental caries

Maxilla

Tooth No.	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Caries (%)	0	3.1	3.9	0	0	0	0.8	0.8	0	0	0	0	1.6	7.0	8.5	0.8

Mandible

Tooth No.	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
Caries (%)	0.8	14	22.5	0	0	0	0	0	0	0	0	0	0.8	13.2	18.6	0.8

A total of 353 school children aged 12 to 15 years were studied. Of this number, 223 (63.2%) were boys and 130 (36.8%) were girls. Also of the 353 children, 85 (24.1%) had caries. Sex distribution of caries showed that 48 (13.6%) were boys while the remaining 37 (10.5%) were females. There was no significant difference in the sex distribution of caries ($P = 0.141$) (Table1). The population's mean DMFT was 0.42 \pm 0.53. The mean DMFT for boys was 0.35 \pm 0.33 and for girls it was 0.54 \pm 0.86. The mean DMFT increased with age, though a drop was observed at age 14. (Table 2).

Dental caries was most prevalent in the first molars (46.5%), followed by the second molars (44.2%). There was no caries in the central and lateral incisors, canines and the first premolars (Table 3). Dental caries occurred more often in the mandibular molars (69.8%) than in the maxillary molars (23.2%). In the maxilla, caries was more prevalent in the left half (17.9%) than in the right half (8.6%) and this was statistically significant ($P < 0.05$) (Table 4).

DISCUSSION

The limitation of this study includes the impracticability of using radiographs to detect interproximal caries. As a result, caries experience figure may be an underestimation of the

true caries prevalence if radiographs were to be used. Furthermore, the DMFT values did not show the number of teeth at risk of developing caries. These limitations notwithstanding, DMFT has been found to be a rapid and universally applicable instrument that has been in use for decades.

The prevalence of caries (24.1%) in this study is low compared to the report of a previous study (Okeigbemen, 2004). The difference in both studies may be due to the differences in socioeconomic backgrounds, pattern of dental visit, oral hygiene practices, parent's education and job. Data from other studies observed that prevalence of caries is least in African countries when compared to Asia and Latin America (WHO, 2003).

The significantly higher values of DMFT seen in girls (DMFT: 0.54 ± 0.86) when compared to boys (DMFT: 0.35 ± 0.33) are similar to those observed by Okeigbemen (2004). Some researchers however did not obtain any significant difference between the sexes (Brekhus, 1931; Daneshkazemi et al, 2005). In the study by Hahn et al (1999) there was no gender specific differences with regard to DMFT when assessed by Student t-test but when assessed by multiple regression, women showed significantly higher DMFT than men. Despite initial sex differences in prevalence of caries that might occur in early age studies have shown that caries prevalence in both sexes tend to be similar in later life (WHO, 1997).

Using WHO's DMFT scale of severity and 12-year-old indicator age group, the findings in present study fell within very low scale of between 0.0 to 1.1. The current findings of gradual increase in DMFT with increasing age was similar to the report of Okeigbemen (2004) who reported mean DMFT values of 0.51 and 0.66 for 12 and 15-year-olds respectively. These two reports are also in agreement with those of other studies (WHO, 1997; Alvares-Arenal et al, 1998). The drop in DMFT values noticed at 14 years may be an incidental finding. It may however be that ages 12, 13 and 15 are high risk age groups for caries development, which may be due to inefficient oral hygiene control, increase in plaque index, etc (Alamondi and Mosoud, 1995).

On the other hand, the drop at 14 years may be due to transient decrease in the number of cariogenic bacteria and increase in the immunoglobulin A (Tenovou, 1986). This reduction in number of cariogenic bacteria has been shown to accompany the transition between late mixed dentition (Schlagehauf and Rosendhal, 1990). Overall, because the

DMFT score of an individual cannot decrease overtime, a direct relationship exists between DMFT index and age (Woodmansay, 2005).

A marked variation noted in caries distribution in the present study agreed with the report of Brekhus (1931) in which the first molars, second molars and premolars are predominantly affected. Furthermore, the current work observed that the D component of the DMFT index accounted for 91.3% of all caries. These findings are also in agreement with the report of Okeigbemen (2004). The high D component is an indication of a high percentage of untreated caries and a high treatment need (Akpata and Shammery, 1992). High DMFT in certain tooth types has been ascribed to similarity in genetic, morphological, structural and ecological features of each type (McDonald and Avery, 1985).

Involvement of more mandibular teeth than maxillary teeth agrees with the report of Bajonio et al in USA but not with that of Brekhus (1931) who reported both greater prevalence in the maxillary arch and equal involvement of both halves of the maxillary arch by dental caries. Higher prevalence of caries in the mandibular molar in the current study may be related to faster caries progression in the mandibular molar teeth, relatively abundant saliva and its anticaries effect to the maxillary molars than to the mandibular molars, greater food packing and plaque accumulation potential in the mandibular posterior region than in the maxillary region (Kleinberg and Jenkin, 1964).

CONCLUSION

Within the limitations of the study, the overall caries prevalence in the study population was low. Notwithstanding, ages 12, 13 and 15 constitute the ages at greater risk. It is recommended that this low level be sustained or even brought lower by adopting cost-effective preventive measures directed particularly at these age groups.

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