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DETERMINANTS OF UNMET ORAL HEALTH NEED IN A POPULATION OF SECONDARY SCHOOL CHILDREN IN IBADAN, NIGERIA

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ABSTRACT
Children bear a huge burden of unmet oral health need which impacts them adversely. This study explored the determinants of unmet oral health need among children. The baseline data in an intervention study that assessed the impact of oral health education for caregivers on children's utilization of dental service was analyzed for this study. Children in registered secondary schools in Ibadan North West Local Government Area of Oyo State, Nigeria took part in the study. Interviewer-administered questionnaires and intra-oral examination by 2 dentists with good inter-examiner reliability (Cohen's kappa = 0.76, p<0.001) were employed. The questionnaires assessed parent's occupation, child's self-assessment of oral health status, previous history of dental service utilization and other possible determinants of unmet oral health need. Children who had any one of/or a combination of untreated dental caries, traumatized anterior teeth, sepsis and poor oral hygiene were deemed to have an unmet oral health need. There were 1,137 children with mean age of 12.3± 1.78 years. There were more girls (55.3%) than boys. On examination, 40% of the children had an unmet oral health need. Increasing age (OR: 1.13, 95% CI: 1.06 – 1.13), female (OR: 0.69, 95% CI: 0.54 – 0.88), self-assessment of oral health status as poor (OR: 2.01, 95% CI: 1.26 – 3.22) and attending a public school (OR: 1.40, 95% CI: 1.09 – 1.78) were significantly associated with having an unmet oral health need. Being an older male child attending a public secondary school with oral health self-assessed as poor were significant determinants of unmet oral health need in this study. Preventive efforts should therefore be targeted at these determinants.

Keywords: Unmet Oral Health Need, School Children, Adolescents, Oral Health

INTRODUCTION
Children bear a huge proportion of the burden of oral diseases. These oral diseases often go untreated translating to a high burden of unmet oral health need and the attending negative impacts. Unmet oral health needs in children are caused by individual, family and community level factors (Fisher-Owens et al., 2007).

At the individual level, the child's age, gender, genetic make-up and use of dental services determine his/her oral health status (Agbelusi & Jeboda, 2006a) (Al-

Omari & Hamasha, 2005). The family level factors include socio-economic status, family size and composition, parental knowledge, attitude and practice of oral health and parents' oral health literacy (Fisher-Owens et al., 2007) (Listl, 2011) (Castilho et al., 2013) (Vann et al., 2013). Oral health policy and the characteristics of the oral healthcare system are the determinants of unmet oral health need at the community level (Petersen, 2003) (Fox, 2011).

Nigeria's education sector has made great strides with more than half of her children enrolled in schools (The World Bank Group, 2015). Schools are therefore invaluable avenues for the prevention, detection and treatment of oral diseases in children. It is however important to identify the determinants of unmet oral health need in any target population in order to have a sound basis for effective planning and preventive strategies (Ramraj et al., 2012). Therefore, this study sought to identify the determinants of unmet oral health in a population of Nigerian secondary school children.

MATERIALS AND METHOD

Study Location

The study was carried out in secondary schools in Ibadan North West Local Government Area (LGA) –one of the 33 local government areas in Oyo State, Nigeria. It is an urban area with 12 government secondary schools and 22 registered private secondary schools. The principals/proprietors of the 12 government schools and 17 private schools agreed to participate in the study.

Study Design and Sample size determination

An analysis of the baseline data in an intervention study on dental service utilization among secondary school students in Ibadan North West LGA was done for this study. A total of 1137 secondary school students were screened for dental diseases in this study. The sample size was based on an estimate of 30 students from each school. This gave a minimum sample size of 870 students.

Data collection

A pre-tested semi-structured interviewer-administered questionnaire was used to assess the students' socio-demographic background. This included school, gender, age, father's occupation, mother's occupation and primary caregiver. The questions on father and mother's occupations were open ended. The students' responses were subsequently categorized as Skilled, Semi-Skilled or Non-Skilled. The student's self-assessment of oral health, experience of dental disease and history of dental service utilization were also assessed. An intra-oral examination

was carried out on the students by 2 dentists with good inter-examiner reliability (Cohen's kappa = 0.76, $p<0.001$). Children who had any one of/or a combination of untreated dental caries, traumatized anterior teeth, sepsis and poor oral hygiene were deemed to have an unmet oral health need. Dental caries was assessed according to the 2013 WHO guidelines (Petersen & Baez, 2013). Teeth with an unmistakable cavity as determined by visual examination were recorded as having untreated dental caries. An incisor or canine tooth was recorded as traumatized if there was a fracture involving enamel only, enamel and dentine or if it was discoloured. The Simplified Oral Hygiene Index (OHI-S) was used to determine if a child had poor oral hygiene (Greene & Vermillion, 1964). Lastly, sepsis was recorded as being present if a localized swelling and/or a draining sinus was observed adjacent to a carious or traumatized tooth (Pine et al., 2006).

Data analysis

The data were cleaned, coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 22.0. The level of significance was set at $p<0.05$. Univariate, Bivariate and Multivariate analyses techniques were employed. Univariate analysis was used to describe the socio-demographic characteristics of the participants (such as age, gender, and unmet oral health need status) with mean (sd) and proportions. For the bivariate analysis, chi-square statistic was used to assess the association between the characteristics of the participants and unmet oral health need- as a binary outcome variable. The multivariate analysis technique employed was Logistic Regression Analysis. The significant variables from the bivariate analysis were input into a Logistic Regression model.

Ethical consideration

Ethical approval was obtained from the Joint Ethical Review Committee of the University of Ibadan and University College Hospital Ibadan before commencement of the study. Permission to conduct the study was also obtained from The Commissioner for Education, Oyo State and the principal/proprietor of each school. The parents/guardians of the students gave their informed consent while the children gave verbal assent before being enrolled in the study.

RESULTS

A total of 1137 students participated in the study. Their ages ranged from 8 to 19 years with a mean age of 12.3 years$\pm$ 1.78. There were slightly more girls (55.3%) than boys (44.7%). Among the respondents, the most frequently occurring group for Father's Occupation was the Skilled Class (Fig. 1) while most mothers of the students were reported as belonging to the Non-Skilled Occupation

Class (Fig. 1). About 67% of the students reported that their mothers were their primary care-givers (Fig. 2). This was followed by fathers and either mother or father respectively. Of the 1137 students, 39.5% had an unmet oral health need. Dental Caries was the commonest cause of an unmet oral health need (32% of the students with unmet oral health need) followed by trauma to anterior permanent teeth in 23% of them (Fig. 3). Only 12% of the students reported that they had ever visited a dentist.

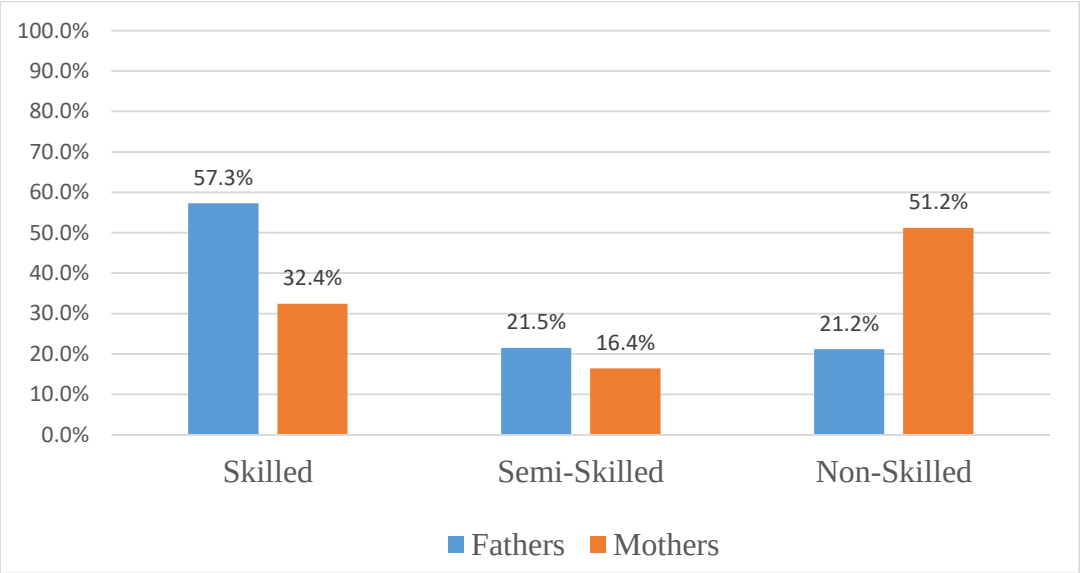

Figure 1: The distribution of occupational class amongst the students' parents

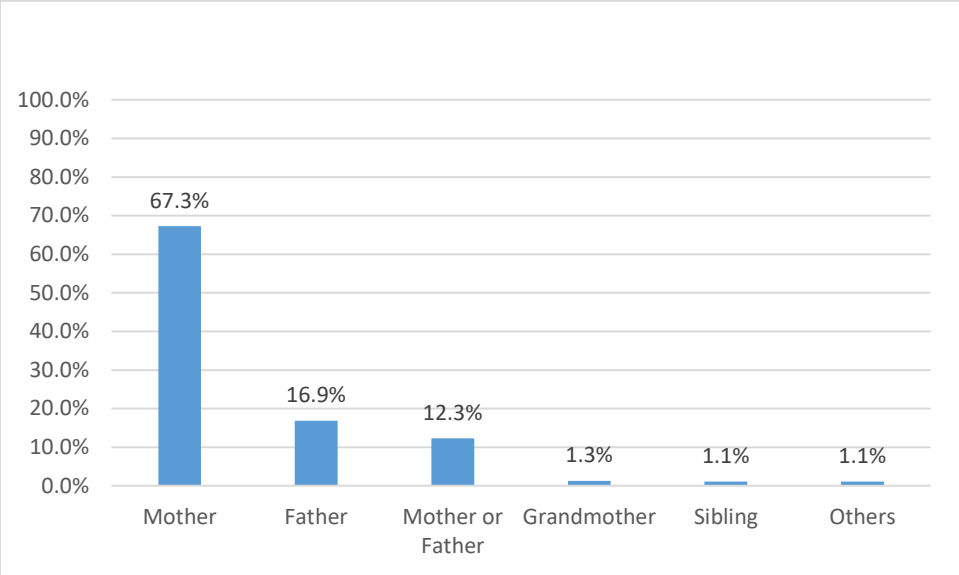

Figure: The distribution of the students by primary caregiver

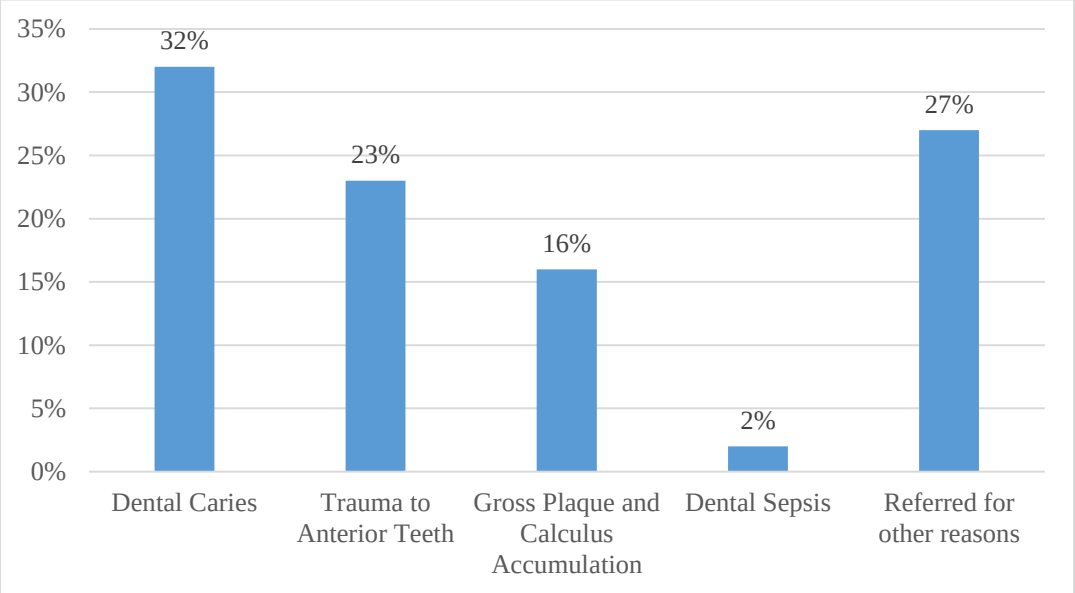

Figure 3: Cause of unmet oral health need among the students (N=449)

Bivariate analysis (Table 1) showed that age, gender, student's self-assessment of oral health, previous experience of toothache and type of school were the socio-

demographic variables significantly associated with having an unmet oral health need.

Table 1: Association between socio-demographic variables and unmet oral health need (N=1137)

Variable	Students with Unmet Oral Health Need % or Mean(SD)	Students with No Unmet Oral Health Need % or Mean (SD)	p-value
Age (years)	12.5(1.80)	12.1(1.75)	<0.001*
Female	50.0	59.2	0.003*
Father's Occupation (Skilled)	54.3	59.3	0.14
Mother's Occupation (Skilled)	31.2	33.4	0.73
Primary Caregiver (Mother)	70.4	65.2	0.14
Self-Assessment of oral health status as poor	16.0	7.6	<0.001*
Has previously experienced toothache often	19.9	12.5	0.01*
Has Visited the dentist before	13.4	11.0	0.23
Attends a Public School	53.2	44.8	0.01*

*variables significantly associated with having an unmet oral health need

Logistic regression analysis (Table 2) showed that age, gender, student's self-assessment of oral health and previous experience of toothache had significant effects. The type of school had a week statistical effect (p=0.07) but was left in the final model.

Table 2: Association between socio-demographic variables and unmet oral health need (N=1137)

Variable	OR (95% CI)	P value
Age	1.10 (1.02-1.19)	0.01
Female	0.64 (0.50-0.83)	0.001
Self-Assessment of Oral Health Status as poor	1.05 (0.69-1.58)	0.01
Has previously experienced toothache often	1.05 (0.69-1.58)	0.04
Attends a public school	1.28 (0.98-1.69)	0.07

The odds ratio for age indicates that after adjusting for all other variables, there is 10% increase in the chances of having an unmet oral health need with every year increase in age. The odds ratio for gender indicates that males are about 1.5 times

more likely to have an unmet oral health need than females holding all other variables constant. Similarly, the students who assessed their oral health status as poor were significantly more likely to have an unmet oral health need than those who assessed their oral health status as excellent. Those who occasionally, rarely or never had a previous experience were all less likely to have an unmet oral health need when compared to those who often had previous toothache. The odds ratio for type of school indicated that students in public schools, when all other variables were allowed for, had a 28% increase in chances of having an unmet oral health need when compared to those in private schools.

DISCUSSION

In this study, 39.5% of the 1137 children examined had an unmet oral health need. In a similar study conducted by Agbelusi and Jeboda in Lagos state, Nigeria in 2006, about 70% of the children they surveyed had an unmet oral health need (Agbelusi & Jeboda, 2006) . These figures are higher than a prevalence of 21.8% and 19.8% of unmet oral health need among children in the United States and South Korea respectively (Agaku et al., 2015; Ahn & Han, 2015). This may be explained by the fact that in the United States and South Korea respectively, approximately 70% and 50% of adolescents utilize dental services regularly (Ahn & Han, 2015; Okunseri et al., 2013) while dental service utilization rates among adolescents in Nigeria is about 20% (Ola et al., 2013).

The commonest untreated dental need was dental caries (32%), followed by trauma to anterior permanent teeth (23%). This distribution of unmet oral health need among the children in this study is supported in studies conducted by Agbelusi and Jeboda and by Davis et al., (Agbelusi & Jeboda, 2006; Davis et al., 2010). Agbelusi and Jeboda (2006) observed that dental caries was the commonest cause of unmet oral health need followed by mucosal diseases, malocclusion and traumatized teeth in a study of 1,600 12 year olds in Lagos State, Nigeria (Agbelusi & Jeboda, 2006). Davis et al.,(2010) reported that dental caries was the commonest unmet oral health need in 5 – 14 year olds followed by trauma to teeth, in the United States (Davis et al., 2010).

The significant determinants of the unmet oral health need among this study population were age, gender, self-assessment of oral health status and previous experience of toothache. Increasing age, male gender, self-assessment of oral health as poor and previous experience of toothache were associated with having an unmet oral health need in this study. These findings are similar to those

described in adolescents in South Korea and Uganda (Ahn & Han, 2015; Okullo et al., 2004).

In addition, Okullo et al., (2004) found that adolescents in an urban area were more likely to have an unmet oral health need than those in a rural setting (Okullo et al., 2004). This could be attributed to the fact that dental caries was their measure of unmet oral health need and dental caries is more prevalent in urban areas in developing countries. On the other hand, Aleksejuniene and Brukiene (2008) found no significant socio-economic determinant of unmet oral need among Lithuanian adolescents (Aleksejuniene & Brukiene, 2008). This may be due to the fact that they used a mean measure of unmet oral health based on relative ratios calculated from the costs of dental treatment (Aleksejuniene & Brukiene, 2008).

Age, gender, student's assessment of oral health status and previous experience of toothache were found to be statistically significant determinants of unmet oral health need among the adolescents in this study. Older male adolescents with previous experience of toothache and who rated their oral health status as poor were most likely to have an unmet oral health need. This is not entirely unexpected because it is documented that older male adolescents are more likely to conceal health problems and refrain from seeking help than younger males and female counterparts (Fägerstad et al., 2016). The situation is further complicated by the pervading low oral health awareness and poor dental service utilization behavior across all socio-economic strata in Nigeria (Olusile et al., 2014).

A limitation of this study is that the participants were from an intervention study which recruited volunteers. Therefore, the findings may not be representative of adolescents in the local government area. However, it remains important as an exploratory study which highlights possible determinants of unmet oral health need in adolescents and provides direction for future studies in this important area of adolescent health.

CONCLUSION AND RECOMMENDATION

Being an older male adolescent attending a public secondary school with oral health self-assessed as poor were significant determinants of unmet oral health need in this study. Preventive efforts should therefore be targeted at these determinants.

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