

# Oral, Otorhinolaryngologic and Ophthalmic Health of Primary School Children in a Sub-urban Population in Nigeria

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## ABSTRACT

**Background:** Good vision, adequate hearing, speech and optimal oral health are essential parts of children's health, and these may negatively impact the academic performance of the children if adequate attention is not given.

**Objective:** To determine the prevalence of oral, otorhinolaryngologic and ophthalmic health of children of primary school age in this study location

**Methods:** This was a cross-sectional study involving primary school children in selected public and private schools in Ikenne Local Government area, Ogun State, Nigeria. Ethical clearance was obtained from the Babcock University Health Research Ethics Committee. Informed consent was distributed through all the children to their parents/legal guardians. All children who returned signed informed consent by their legal guardians were enrolled in the study. Oral, eye and otorhinolaryngological examinations were carried out by the investigators. Data were analyzed using STATA (Stata/MP 13), descriptive analysis was done for all the discrete variables, and P value was set at  $P > 0.05$ .

**Results:** A total of 465 children participated in the study; the mean age of the study participants was  $9.34 \pm 2.28$  years. Only 9.7% of the study participants had good oral hygiene, 32.3% had gingivitis, and 22.2% had dental caries. Over 20% of the children had one form of ophthalmic condition, with conjunctivitis and optic disc abnormality accounting for the highest ophthalmic findings. In addition, 40.0% had aural wax, 11.6% had allergic rhinitis, and 2.6% had Chronic Suppurative Otitis Media (CSOM).

**Conclusion:** This study showed that the majority of the children in these rural communities had poor oral health, poor otorhinolaryngology health and fair ophthalmic health.

**Keywords:** Chronic suppurative otitis media, disc pathology, aural wax, dental caries, gingivitis, allergic rhinitis.

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## INTRODUCTION

Good health and a safe school environment enhance children's successful learning in school.<sup>1</sup> Good vision, adequate hearing, speech and optimal oral health are essential parts of children's general health, and these may negatively impact the children's performance if adequate attention is not given. Hearing loss in the school-age group has been put at 11.3%<sup>2</sup>, and a study in Swaziland revealed a high prevalence of middle ear problems with associated hearing loss.<sup>3</sup> Surapaneni and Sisodia<sup>4</sup> showed that otitis media, rhinitis and pharyngitis were the most common otorhinolaryngological diseases among the children studied. In a Nigerian study<sup>5</sup> among primary school children, cerumen auris was found in 43%, abnormal tympanic membrane in 11%, and 20% had tonsillitis. This goes to show that otorhinolaryngological diseases are common among school children.

In addition, good vision is essential for a child's educational success as 80% of learning is visual.<sup>6</sup> Studies showed that the prevalence of visual impairment among preschool and school-aged children was between 2.4% and 6%, respectively with refractive error being the most common visual problem in the pediatric age group.<sup>7</sup> It is also estimated worldwide that 285 million people have visual impairment, of which 19 million are children and with 12 million cases due to refractive errors, and 1.4 million cases have irreversible conditions that need visual rehabilitation for full psychological and personal development.<sup>8</sup> Previous Nigeria studies<sup>9,10</sup> showed the prevalence of ocular disorders to range from 6.1% to 19.9%, with refractive error and allergic conjunctivitis being the most common causes. Other reported causes of visual impairment are amblyopia, glaucoma, congenital anomalies, trauma, and retinal disorders<sup>11-15</sup>; majority of these causes of visual impairment are preventable and can be treated if adequate medical treatment is sought.

Oral health, on the other hand, is part of general health. Optimum oral health is also essential for a child's learning. It can result in pain, and discomfort and negatively impact the quality of life.<sup>16</sup> In addition, it is a major cause of absenteeism from school in children and a major reason parents take permission from their workplace in order to take their children to the clinic.<sup>17</sup> Some of these oral diseases in children can also prevent them from getting adequate nutrition and may greatly impact their psychology and self-esteem.

The most commonly reported oral findings in children are dental caries, poor oral hygiene and

gingivitis.<sup>18</sup> The prevalence of dental caries can be as high as 55%, while 15-58% prevalence of periodontal disease has been reported in Nigeria among children aged 15 years above.<sup>19</sup> However recent studies have shown that developmental defects of enamel, especially molar incisor hypomineralisation, are also major oral health problems among children.<sup>20</sup>

Because of the impact of poor oral health on the education of children, which include but is not limited to absenteeism, pain that affects their concentration during classes, and quality of life, it is essential to carry out regular oral health survey among the children to establish baseline oral health problem for policy implementation and appropriate actions. Similarly, the problem created by hearing and visual impairments on the performance of these children calls for adequate data generation for adequate planning and policymaking. In addition, the lack of up-to-date and representative epidemiological data on oral health, ophthalmic health, and otorhinolaryngology health in Nigerian children has been observed as undermining effective advocacy prevention initiatives.

The main objective of this study was to determine the prevalence of oral, otorhinolaryngology and ophthalmic health of primary school-aged children in this study location. This study is expected to provide relevant data for effectively planning school eye, oral and Otorhinolaryngology programs.

## METHODS

**Study population:** This is a prospective cross-sectional study that involved primary school children aged 3-13 years in a sub-urban population, Ikenne Local Government Area, Ogun State, South Western Nigeria.

**Selection of study participants:** a multi-stage sampling technique was used to select the study participants. The principle of equal representation was employed by selecting participants from private and public primary schools. Altogether, there were 22 public and 62 private schools in the local government area. Four schools were randomly selected from public schools and six from private primary schools. This was based on the number of registered students in public and primary schools to have equal representation. In the second stage of the sampling process, all the pupils in the selected schools were eligible to participate. Still, an arm of each class was selected by simple random sampling and in each class, selected participants were selected from the class register using the systematic random

sampling technique until the required number was obtained.

**Sample size calculation:** The sample size was determined using the Lesli-Kish formula for situations where the population is >10,000, using a prevalence of 50%, a degree of accuracy or tolerance margin of error was set at 0.05, and a confidence interval of 95% (1.96) was used. The sample size calculated with a 10% attrition rate was 423. However, 465 participants were examined for the study.

**Collection of data:** Data was collected using a self-administered and interviewer-administered questionnaire. The questionnaire was in two parts, the first part was given to the study participants to take home along with informed consent to their parents/guardian, and the part relating to the demographic variables, information about the guardian's level of education, was filled by the legal guardian. Only children with adequately filled forms and informed consent were recruited into the study.

**Examination of the study participants:** A pediatric dentist, an otorhinolaryngologist and an ophthalmologist carried out the clinical examination.

**Oral examination:** The oral hygiene was assessed using the Simplified Oral Hygiene Index (OHI-S) by Greene and Vermillion.<sup>21</sup> The oral hygiene was classified as good, fair, or poor when the score ranges were 0.0–1.2, 1.3–3.0, and >3.0, respectively.

Caries diagnosis was determined according to WHO Oral Health Survey methods<sup>22</sup>. The caries status was assessed using the decayed, missing, and filled teeth/Decayed, Missing, and Filled Teeth (dmft/DMFT) index. Children were classified as having caries present when a tooth was identified as decayed, missing (due to caries), or filled (due to caries).

The gingival index (GI) by Loë and Silness<sup>23</sup> was used to assess the presence and severity of gingivitis. GI was obtained based on six numerical determinations representing the debris or calculus found on facial or lingual surfaces of index teeth. Gingivitis was classified in this study as present when there was mild, moderate and severe gingival inflammation and as absent when there were no clinical signs of gingival inflammation.

**Ophthalmic examination:** Visual acuity was checked unaided and with a pinhole using a Snellen visual acuity chart. In contrast, the anterior segment examination was done using a flashlight and simple loupe and the posterior segment examination was done using a direct ophthalmoscope. Participants

requiring further examination were referred to a nearby Teaching Hospital (Researchers' Institution) for a more comprehensive examination to determine ocular pathology. Both eyes were examined, but only data from the right eye were used for data analysis, as there was no statistically significant difference between both eyes.

**Otorhinolaryngologic examination:** This was done using a battery-powered headlight, otoscopes and disposable sterile wooding spatula. The following pathologies were checked; aural wax, otitis media and otitis external, allergic rhinitis, enlargement and inflammation of the tonsils and any other pathology present.

**Data analysis:** Data analyses were conducted using STATA (Stata/MP 13). Descriptive analysis was carried out for all the discrete variables. For the purpose of this analysis, the age of the study participants was grouped into 3-6 years, 7-10 years and >10 years, and the parental level of education was grouped into three; No Formal Education (NFE), Primary/Secondary Education (PSE) and Post-Secondary Education (PS). Prevalence of dental caries, gingivitis, dental abscess, swelling and oral hygiene as well as the prevalence of ophthalmic diseases and otorhinolaryngologic diseases determined. Association between age, sex, and parental level of education and oral findings, ophthalmic findings and otorhinolaryngologic findings was determined using chi-square analysis. The predictors for dental caries, oral hygiene, gingivitis, ophthalmic disease and otorhinolaryngology diseases were determined using logistic regression. The reference groups in the model were females, age group 7-10 years, >10 years, PSE and PS. Statistical significance was established at p-values equal to or less than 0.05.

#### **Ethical considerations**

The protocol for this study was approved by the peer review committee of Babcock University Health and Ethics Committee (BUHREC335/16). Approval was also obtained from the State Ministry of Education and the heads of all the schools that participated in the study. A written and duly signed informed consent was also received from the parents of selected participants, and any child without duly signed informed consent was not allowed to participate in the study.

The study benefited the participants through free oral health education, Ophthalmic and Otorhinolaryngological examination at no cost to the participants. Pupils with any detected abnormality

were referred to the nearest Teaching Hospital for further evaluation.

## RESULTS

A total of 484 children were recruited into this study, but only 465 responded adequately, given a response rate of 96.1%. Two hundred and forty (51.6%) of the study participants were males, while 225 (48.4%) were females. The mean age of the study participants was 9.34 ( $\pm 2.28$ ) years.

Table 1 shows oral health concerning age and gender, with only 9.9% of the study participants having good oral hygiene and a larger percentage of the participants having gingivitis (32.3%). The prevalence of dental caries was 22.2%, while gingival abscesses and soft tissue swelling were found in 0.9% of the study participant. Oral hygiene was found to be poorer in children aged greater than 10 years (50.4%), and in males, (42.6%), dental caries was found to be more prevalent among age group 7-10 years (24.5%) and in male's participants (22.3%).

Table 2 shows ophthalmic and ENT findings among the study participants concerning age and gender. The most common finding in relation to otorhinolaryngology findings was aural wax, which was present in 40.0% of the study participants. This was followed by allergic rhinitis (11.6%) among the study participants. Aural wax was found to be more in males than in females (40.4% vs 39.6%) and in age group 7-10 years compared to other age groups. The most common finding concerning ophthalmic findings was a refractive error, which was present in 17.2% of the study participants, with others accounting for 3.2%. Refractive error was found to be more in females than in males (18.2% vs 16.3%) and in the age group >10 years compared to other age groups.

Four hundred and fifty (96.8%) had visual acuity (VA) equal to or better than 6/18, while only 15 eyes (3.2%) had vision worse than 6/18 to nil light perception. Those with vision worse than 6/18 had pathologies ranging from Measles keratopathy, Phthisis bulbi secondary to ocular injury and complicated traumatic cataract. Three hundred and sixty-six eyes (78.7%) had no ocular pathology, 80 (17.2%) had uncorrected refractive errors, and allergic conjunctivitis was found in 4 (0.9%), while other findings such as disc atrophy, measles keratopathy, Phthisis bulbi secondary to ocular injury and complicated traumatic cataract was found in 15 (3.2%). There however, was no significant difference in the ophthalmic findings between males and females and among the age groups (Table 2).

The most common finding concerning otorhinolaryngology findings was aural wax, which was present in 40.0% of the study participants. This was followed by allergic rhinitis (11.6%) among the study participants. Aural wax was found to be more in males than in females (40.4% vs 39.6%) and in the age group 7-10 years compared to other age groups. Table 3 shows the association between oral, ophthalmic and otorhinolaryngologic findings and the mother and father's level of education. There was no significant finding between the father's level of education and otorhinolaryngologic findings ( $X^2=4.58$ ,  $p=0.80$ ), but there exists a significant association between the mother's level of education and otorhinolaryngologic findings ( $X^2=17.87$ ,  $p=0.02$ ). In addition, there was no significant association between the mother's level of education, the father's level of education and ophthalmic findings among the study participants. The result also showed that there is a significant association between dental caries and mothers' level of education ( $X^2=5.99$ ,  $p=0.05$ ); dental caries and fathers' level of education ( $X^2=7.25$ ,  $p=0.03$ ); oral hygiene and fathers' level of education ( $X^2=15.36$ ,  $p=0.00$ ); oral hygiene and mothers' level of education ( $X^2=15.40$ ,  $p=0.00$ ); gingivitis and mother level of education ( $X^2=32.09$ ,  $p=0.00$ ); gingivitis and fathers' level of education ( $X^2=14.69$ ,  $p=0.001$ ).

Table 4a shows the determinant of ENT and ophthalmic health among the study population. There were reduced odds of having otorhinolaryngologic pathology in children whose mothers had some form of education (primary, secondary and post-secondary education) compared to children whose mothers did not have any formal education. This is more significant with children whose mothers had primary/secondary education (OR: 0.59; 95 % CI: 0.34-1.01;  $P = 0.05$ ). For ophthalmic diseases, children whose mothers had primary/secondary and post-secondary education have reduced odds of having ophthalmic diseases compared with those whose mothers do not have any formal education. However, this was not statistically significant. In contrast, children whose fathers have primary/secondary and post-secondary education have increased odds of having ophthalmic diseases compared to children whose fathers do not have formal education, but this was not statistically significant.

Table 4b shows the determinants of oral health among the study participants. There are significantly increased odds of having dental caries in children

whose mothers had primary or secondary education compared to children whose mothers did not have any education (OR: 2.03; 95 % CI: 1.00-4.15; P = 0.05). The fathers' level of education, age and gender were not significant determinants of dental caries in this study participant. The mothers' education level, fathers' education level, age and gender were not significant predictors of oral hygiene in this study participant. However, there was an increased odd in having good oral hygiene in children whose mothers have formal education compared to children whose

mothers did not have any formal education. In addition, there were reduced odds of having gingivitis in children from mothers with formal education compared with children from mothers without any form of education, but these were not statistically significant. But children whose father had post-secondary education have reduced odds of having gingivitis compared to other children, this was found to be statistically significant (OR: 0.39; 95 % CI: 0.18-0.86; P = 0.02).

**Table 1** shows oral health in relation to the age and gender of the study participants

Variables	Age			Gender		Total
	3-6 years	7-10 years	>10 years	Male	Female	
<b>Oral hygiene</b>						
Good	8(19.5)	26(9.5)	12(7.5)	22(9.2)	24(10.7)	46(9.9)
Fair	25(61.0)	155(56.8)	56(42.1)	114(48.2)	122(54.2)	236(50.8)
Poor	8(19.5)	92(33.7)	83(50.4)	104(42.6)	79(35.1)	183(39.4)
<b>Gingivitis</b>						
Present	7(17.1)	75(27.5)	68(41.2)	88(35.5)	62(27.6)	150(32.3)
Absent	34(82.9)	198(72.5)	83(58.8)	152(64.5)	163(72.4)	315(67.7)
<b>Dental caries</b>						
Present	8(19.5)	67(24.5)	28(16.7)	54(22.3)	49(21.8)	103(22.2)
Absent	33(80.5)	206(75.5)	123(83.3)	186(77.7)	176(78.2)	362(77.8)
<b>Gingival abscess</b>						
Present	0	2(0.7)	2(0.9)	2(0.8)	2(0.9)	4(0.9)
Absent	41(100.0)	210(99.3)	226(99.1)	238(99.2)	231(99.1)	480(99.1)
<b>Soft tissue swelling</b>						
Present	0	4(1.5)	0	2(0.8)	2(0.9)	4(0.9)
Absent	41(100.0)	269(98.5)	151(100.0)	238(99.2)	223(99.1)	461(99.1)
<b>Total</b>	<b>41(100.0)</b>	<b>273(100.0)</b>	<b>151(100.0)</b>	<b>240(100.0)</b>	<b>225(100.0)</b>	<b>465(100.0)</b>

**Table 2** shows ophthalmic and ENT findings among the study participants,

Variables	Age			Gender		Total
	3-6 years	7-10 years	>10 years	Male	Female	
<b>Otorhinolaryngologic findings</b>						
Normal	20(48.8)	108(39.6)	83(55.0)	111(46.3)	100(44.4)	211(45.4)
Aural wax	15(36.6)	118(43.2)	53(35.1)	97(40.4)	89(39.6)	186(40.0)
CSOM	-	7(2.6)	4(2.6)	5(2.1)	6(2.7)	11(2.4)
Allergic rhinitis	5(12.2)	39(14.3)	10(6.6)	27(11.2)	27(12.0)	54(11.6)
Others	1(2.4)	1(0.4)	1(0.7)	0	3(1.3)	3(0.6)
<b>Ophthalmic findings</b>						
Normal	36(87.8)	218(79.8)	112(74.2)	190(79.1)	176(78.3)	366(78.7)
Refractive error	2(4.9)	50(18.3)	28(18.5)	39(16.3)	41(18.2)	80(17.2)
Conjunctivitis	-	1(0.4)	3(2.0)	3(1.3)	1(0.4)	4(0.9)
Others	3(7.3)	4(1.5)	8(5.3)	8(3.3)	7(3.1)	15(3.2)
<b>Total</b>	<b>41(100.0)</b>	<b>273(100.0)</b>	<b>151(100.0)</b>	<b>240(100.0)</b>	<b>225(100.0)</b>	<b>465(100.0)</b>

CSOM: Chronic Suppurative Otitis Media

**Table 3** Association between oral, ENT, ophthalmic findings and the level of education of the father and mother

Variables	Father's level of education			Mother's level of education			Total
	NFE	PSE	PS	NFE	PSE	PS	
<b>ENT FINDINGS</b>							
Normal	47(47.0)	96(45.7)	68(43.9)	66(41.8)	86(43.2)	59(54.6)	211(45.4)
Aural wax	40(40.0)	82(39.0)	64(41.3)	71(44.9)	76(38.2)	39(36.1)	186(40.0)
CSOM	3(3.0)	7(3.3)	1(0.6)	0	9(4.5)	2(1.9)	11(2.4)
Allergic rhinitis	9(9.0)	24(11.4)	21(13.5)	19(12.0)	28(14.1)	7(6.5)	54(11.6)
Other	1(1.0)	1(0.5)	1(0.6)	29(1.3)	0	1(0.9)	33(7.1)
	$\chi^2=4.58, p=0.80$			$\chi^2=17.87, p=0.02$			
<b>OPHTHALMIC FINDINGS</b>							
Normal	75(75.0)	160(76.2)	131(84.5)	130(82.3)	153(76.9)	83(76.9)	366(78.7)
Refractive error	21(21.0)	39(18.6)	20(12.9)	23(14.6)	37(18.6)	20(18.5)	80(17.2)
Conjunctivitis	1(1.0)	3(1.4)	0	1(0.6)	2(1.0)	1(0.9)	4(0.9)
Others	3(3.0)	8(3.8)	4(2.6)	4(2.5)	7(3.5)	4(3.7)	15(3.2)
	$\chi^2=6.02, p=0.20$			$\chi^2=1.84, p=0.76$			
<b>ORAL FINDINGS</b>							
<b>Dental caries</b>							
Present	22(22.0)	37(17.6)	44(28.4)	44(27.8)	44(22.1)	15(13.9)	103(22.2)
Absent	78(78.0)	173(82.4)	111(71.6)	114(72.2)	115(77.9)	93(86.1)	362(77.8)
	$\chi^2=5.99, p=0.05$			$\chi^2=7.25, p=0.03$			
<b>Oral hygiene</b>							
Good	10(10.0)	16(7.6)	20(12.9)	20(12.7)	18(9.1)	8(7.4)	46(9.9)
Fair	46(46.0)	97(46.2)	93(60.0)	95(60.1)	89(44.7)	52(48.1)	236(50.8)
Poor	44(46.0)	97(46.2)	42(27.1)	43(27.2)	92(46.2)	48(44.4)	183(39.4)
	$\chi^2=15.40, p=0.00$			$\chi^2=15.36, p=0.00$			
<b>Gingivitis</b>							
Present	35(35.0)	91(43.3)	24(15.5)	33(20.9)	73(36.7)	44(40.7)	150(32.3)
Absent	65(65.0)	119(56.7)	131(84.5)	125(79.1)	126(63.3)	64(59.3)	315(67.7)
	$\chi^2=32.09, p=0.00$			$\chi^2=14.69, p=0.001$			
Total	100(100.0)	210(100.0)	155(100.0)	158(100.0)	199(100.0)	108(100.0)	465(100.0)

CSOM: Chronic Suppurative Otitis Media

**Table 4a** Determinant of otorhinolaryngology and ophthalmic health among the study population

Variables	Odd Ratio	95% C.I	P-value
<b>ENT</b>			
<b>MLE</b>			
NFE	1		
PSE	0.59	0.34-1.01	0.05
PS	0.53	0.27-1.05	0.07
<b>FLE</b>			
NFE	1		
PSE	1.27	0.73-2.19	0.40
PS	1.49	0.75-3.99	0.26
<b>Gender</b>			
Male	1		
Female	0.97	0.67-1.42	0.88

<b>Age (years)</b>			
3-6	1		
7-10	0.68	0.35-1.33	0.26
>10	1.21	0.58-2.52	0.60
<b>Ophthalmology</b>			
<b>MLE</b>			
NFE	1		
PSE	0.87	0.46-1.63	0.66
PS	0.82	0.37-1.82	0.63
<b>FLE</b>			
NFE	1		
PSE	1.13	0.61-2.10	0.70
PS	1.81	0.79-4.16	0.16
<b>Gender</b>			
Male	1		
Female	0.92	0.58-1.45	0.72
<b>Age (years)</b>			
3-6	1		
7-10	0.61	0.23-1.65	0.33
>10	0.48	0.17-1.35	0.16

MLE: Mother's level of education; FLE: Father's level of education; NFE: No formal education; PSE: primary/secondary school; PS: post-secondary school.

**Table 4b** shows determinants of oral health among the study population

Variables	Odd Ratio	95% C.I	P-value
<b>DENTAL CARIES</b>			
<b>MLE</b>			
NFE	1		
PSE	2.03	1.00-4.15	0.05
PS	2.09	0.91-4.83	0.08
<b>FLE</b>			
NFE	1		
PSE	0.54	0.28-1.06	0.07
PS	0.92	0.42-2.04	0.84
<b>Gender</b>			
Male	1		
Female	0.96	0.61-1.50	0.85
<b>Age (years)</b>			
NFE	1		
PSE	1.61	0.70-3.71	0.27
PS	1.34	0.53-3.38	0.54
<b>ORAL HYGIENE</b>			
<b>MLE</b>			
NFE	1		
PSE	1.49	0.56-3.97	0.42
PS	1.60	0.50-5.06	0.43
<b>FLE</b>			
NFE	1		
PSE	0.65	0.26-1.65	0.37
PS	0.92	0.31-2.75	0.88
<b>Gender</b>			
Male	1		

Female	1.14	0.61-2.13	0.68
<b>Age (years)</b>			
NFE	1		
PSE	0.49	0.20-1.20	0.12
PS	0.46	0.16-1.31	0.14
<b>GINGIVITIS</b>			
<b>MLE</b>			
NFE	1		
PSE	0.75	0.43-1.31	0.32
PS	0.97	0.47-2.00	0.93
<b>FLE</b>			
NFE	1		
PSE	1.62	0.92-2.85	0.09
PS	0.39	0.18-0.86	0.02
<b>Gender</b>			
Male	1		
Female	0.66	0.43-0.99	0.05
<b>Age</b>			
NFE	1		
PSE	1.29	0.53-3.15	0.57
PS	2.17	0.86-5.47	0.10

MLE: Mother's level of education; FLE: Father's level of education; NFE: No formal education; PSE: primary/secondary school; PS: post-secondary school

## DISCUSSION

This was a cross-sectional study in a sub-urban population with the main objective of finding the prevalence of oral, ophthalmic and otorhinolaryngologic diseases common among primary school-aged children. The study also focused on the associated risk factors of some of the major diseases found in the study population.

This study showed a high prevalence of dental caries, poor oral hygiene and gingivitis in relation to oral health, a high prevalence of aural wax and allergic rhinitis was found among the study participants in relation to otorhinolaryngologic health, while a significant number of the study participants had ophthalmic problems mainly refractive errors.

The prevalence of dental caries reported in the present study is high (22.2%) compared to other reported prevalence among primary school children in the same country.<sup>24, 25</sup> The caries prevalence is also higher than that reported in an urban and sub-urban community in Southwestern Nigeria.<sup>26, 27</sup> The reason for high caries prevalence in this study environment may be due to lack of oral health awareness and lack of access to oral healthcare.

Dental caries was found to be more prevalent among age group 7-10 years and more in males than females' participants. There was a significant association between the mother's level of education, father's level of education and dental caries. There was two-

fold increase in the chances of having dental caries in children whose mothers have a low level of education compared to those whose parents have a higher level of education. This was similar to a study by Crocombe et al.<sup>28</sup> where it was shown that children whose parents had higher educational status have approximately half the relative risk of dental caries compared with those whose parents had low educational status.

Despite increased general awareness of oral health and oral hygiene measure, this present study showed that the oral hygiene of the study participants was very poor, as only 9.9% had good oral hygiene, while the remaining had either fair or poor oral hygiene. This result was close to that reported by Arigbede et al.<sup>29</sup> where majority of the study participants had fair oral hygiene, and only 12.5% had good oral hygiene but higher than that reported by Oyedele et al.<sup>30</sup> where over forty percent had good oral hygiene. The degree of poor oral hygiene here may reflect a lack of adequate care from the parents of these children or a lack of adequate information on oral hygiene measures. There was a strong association between oral hygiene status, age, mothers' level of education and fathers' level of education. There was over one fold increase odds of having good oral hygiene in children whose parents have primary, secondary or post-secondary school education compare to children whose parent did not have any formal



education. Likewise, male and older age group among the study participants have increase odds of having poor oral hygiene. These findings on oral hygiene are similar to that of Oyedele et al.<sup>30</sup>

In the present study, a large number of the study participants presented with gingivitis (32.3%). This is so because of the level of poor oral hygiene found among the participants, as an accumulation of bacterial plaque causes inflammation of the gingivae. The odds of having gingivitis were higher in males and in children whose parents have low level of education.

In addition, this study showed that aural wax impaction was found in 40% of the study participants. The reason for this may be due to poor personal hygiene and habitual cleaning of the ear with any available objects, which is a common practice, especially among the low socioeconomic group, and the use of cotton buds among the middle and high socioeconomic class. This high percentage of aural wax impaction was also reported by Ukaegbe et al.<sup>5</sup> and was the most common finding in their study. Other studies<sup>31, 32</sup> also supported this high prevalence of aural wax impaction. This finding is important because aural wax impaction can have severe consequences on the quality of life of these children, such as otalgia, hearing impairment, tinnitus, vertigo, and otitis external, among others. Allergic rhinitis was also a significant finding in this study. This agreed with the findings of Surapaneni and Sisodia<sup>4</sup>, which showed that rhinitis was among the most common otorhinolaryngology diseases among children studied. There was a significant relationship between otorhinolaryngologic diseases found and parental level of education. Children whose mothers had one form of education or the other had almost 50% reduction in odds of having otorhinolaryngologic diseases compared to children whose mothers did not have any formal education. The impact of education may mean access to information and, thereby, change in practice among educated parents.

While a majority of the study participants had normal ophthalmic health a significant number also presented with some eye problems, among which are impaired visual acuity, disc atrophy, conjunctivitis and uncorrected refractive error. These findings underscore the need for early eye screening for the prevention of visual impairments.

One of the limitations of this study was a lack of assessment of the impact of oral health, ophthalmic health and otorhinolaryngologic health on the

academic performance of these children. Also, this study did not determine whether those with one form of disease or the others have regular school attendance as compared to those with no disease.

#### **CONCLUSION**

This study showed that a significant number of the study participants have oral diseases, otorhinolaryngologic and ophthalmic diseases.

It also showed that parental level of education plays a major role in the overall health status of these children.

There is a need for action in addressing the health conditions of these children by policy maker using generated data as a baseline

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#### **Conflict of interest**

None declared.

#### **REFERENCE**

1. Implementation guidelines on National School Health Programme. Federal Ministry of Education, Federal Republic of Nigeria. December 2006. Accessed September 18, 2019
2. Bess FH, Dodd-Murphy J, Parker RA. Children with minimal sensorineural hearing loss: prevalence, educational performance, and functional status. *Ear Hear* 1998; 19: 339-354.
3. Swart SM, Lemmer R, Parbho JN, Prescott CAJ. A survey of ear and hearing disorders amongst a representative sample of grade 1 school children in Swaziland. *Int J Paed Otorhinolaryngology* 1995; 32: 23-34.
4. Surapaneni H, Sisodia SS. Incidence of ear, nose and throat disorders in children: a study in a teaching hospital in Telangana. *IntJ Otorhinolaryngol Head Neck Surg* 2016; 2: 26-29.
5. Ukaegbe OC, UmedumNG, Chime EN, Orji FT. Assessment of common otolaryngological diseases among children in rural primary schools in southeastern Nigeria. *Int J Pediatr Otorhinolaryngol* 2016; 89: 169-172.

6. Vision. United Health Care 2012. [www.aoa.org/ children-vision](http://www.aoa.org/children-vision). (Accessed 29/9/2018).
7. Bolger PC, Stewart-Brown SL, Newcombe E, Starbuck A. Vision screening in preschool children, comparison of orthoptist and clinical medical officers as primary screeners. *BMJ* 1991; 303: 1291-1294.
8. Visual Impairment and blindness. [www.who.int/media centre/ fact sheets/ fs282/en](http://www.who.int/media centre/ fact sheets/ fs282/en). (Accessed 24/9/2018).
9. Ajaiyeoba AI, Isawunmi MA, Adeoye AO, Oluleye TS. Prevalence and causes of eye diseases amongst students in South Western Nigeria. *Annals of African Medicine* 2006; 5: 197-203.
10. Ayinni A, Mahmoud AO, Olatunji FO. Causes and prevalence of ocular morbidity among primary school children in Ilorin Nigeria. *Niger J Clin Pract* 2010; 13: 248-253.
11. Vision. United Health Care 2012. [www.aoa.org/ children-vision](http://www.aoa.org/ children-vision). (Accessed 29/9/2015).
12. Visual Impairment and blindness. [www.who.int/media centre/ fact sheets/ fs282/en](http://www.who.int/media centre/ fact sheets/ fs282/en). (Accessed 24/9/2015).
13. Donahue SP, Johnson TM, Leonard-Martin TC. Screening for amblyogenic factors using a volunteer by network and the MTI photo screener. *Ophthalmol* 2000; 107: 1637-1644.
14. Preslan MW, Novak A. Baltimore vision screening project phase 2. *Ophthalmol* 1998; 105: 151-153.
15. Revision of visual impairment definitions in the international -classification of diseases. *BMC Med* 2006; 4: 7
16. Esan A, Folayan MO, Egbetade GO, Oyedele TA. Effect of school oral health education programme on use of recommended oral self-care caries risk reduction measures by school children in Ile-Ife, Nigeria. *Int J Paediatr Dent* 2014 DOI:10.1111/ipd.12143
17. Gopalan T, Asokan S, John BJ, Priya GPR. School absenteeism, academic performance, and self-esteem as proxy measures of oral health status: A cross-sectional study. *J Ind Soc Pead and Prev Dent* 2018; 36: 339-346