

# Prevention of Otologic disorders in Nigeria: The Case of Primary School Children in Rivers State, South South of Nigeria

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## ABSTRACT

**Introduction:** Common ear diseases in children are preventable. In developing countries like Nigeria, most health care programmes concentrate on secondary school pupils to the disadvantage of those in primary schools. This has delayed reduction of preventable ear diseases. Ear diseases among children can lead to disabilities especially permanent hearing loss. The question is to what extent are otologic disorders prevented among primary school children? The researchers carried out school health programmes to identify common ear diseases in primary school children so as to contribute a quota in prevention of otologic diseases among them.

**Materials and method:** This was a cross-sectional descriptive study. Random sample of 1,200 pupils from primary 1-6 between 5 to 13 years were selected for study from 13 primary schools. Only 802 pupils whose parents gave consent eventually participated in this study. Administered semi-structured questionnaire was used to obtain information on participants from parents. Also, otoscopic examination of respondents was carried out by the researchers after being trained in use of otoscope by a specialist. Complete physical examination of the 802 children was done. Cerumen was recorded if no part of tympanic membrane was visible.

Thereafter, cerumen, other debris and foreign bodies were removed in such children. External canals and tympanic membranes were inspected for likely abnormalities. Data analyses were done using SPSS version 17.0 statistical software. Results were presented on tables using frequency and percentages.

**Results:** Findings showed that out of 802 children studied, only 279(34.8%) were found normal. The common Otologic diseases found among the respondents were impacted cerumen 319(39.7%), chronic suppurative otitis media 95 (11.8%), debris 55 (6.9%), Otitis media with effusion 28 (3.5%), and acute otitis media 10 (1.3%).

**Conclusion:** Based on the proportion of children identified with otologic problems, there is need for periodic and well coordinated school health programmes.

**Key words:** Otologic disorders, school children, otitis media, hyperemic.

## Introduction

The importance of prevention of ear diseases as an organ of hearing cannot be overemphasized. Disorders of the ear among children in developing countries have been widely reported as a major public health problem [1-6]. Delayed speech, cognitive, emotional, social and academic developments have been reported as some of the direct effects of hearing impairment in children [7]. Studies have shown that a good proportion of children with ear diseases have difficulties in learning and as a result, their academic performances are negatively affected [8,9]. It is a well known fact that with early medical intervention, disability from diseases of the ear can be prevented. However, most times children with ear problems are not diagnosed early and as a result, the diseases progress to profound deafness.

Ear disorders in children can arise from congenital problems such as Crouzon's disease, Down's syndrome, Achondroplasia or Marfan's disease and others [10-12]. Ear disorders in children can also result from acquired causes like otitis media with effusion (OME), otitis externa, trauma leading to perforation of the tympanic membrane or impacted cerumen [13,14]. There have been various views regarding the effect of removing impacted cerumen (wax). Some researchers argue that removing impacted cerumen (wax) prevents hearing loss [15,16], while others emphasize that there will be persistent hearing loss even after the wax has been removed [17].

Studies have recommended a high index of suspicion in the diagnosis of ear diseases among children. This is necessary because most studies are of the view that Otitis media constitute the main ear disorder in children living in developing countries including Nigeria [18-20]. Some authors further argue that most ear disorders present with or without symptoms and that only a thorough history and physical examination of children with ear problems would guarantee effective diagnosis, treatment and prevention of disability. Such authors recommended that physicians should conduct thorough examination of the head and neck area of a child for a possible predisposing factors to developing ear diseases when a history of high grade fever, pain in the ear, ear discharge, pre or post auricular swelling, hearing impairment, deep seated headache, dizziness, tinnitus and vertigo is reported [21-25]. WHO (2000) recommended that periodic screening for hearing impairments in schools will ensure early diagnosis and treatment for children with ear diseases especially those in developing countries. This is necessary because some ear diseases are gradual in onset, painless, without signs and symptoms and at times invisible (26). Therefore, without routine screening of school children especially in places where there is no working national guidelines, the likelihood of detecting children with ear disorders could go unnoticed until later in the child's age when prevention becomes difficult [27-29]. In developed countries, where neonates were screened for diseases of the ear, studies have reported a high proportion of neonates with hearing impairment [30]. Prevention of ear diseases in children requires follow-up for the purposes of repeat audiology test and for intervention after definitive diagnoses (31,32).

The benefits of screening school children for disabilities especially hearing loss should not be underestimated. In developing countries, like Nigeria, children with disabilities are totally dependent on others and as such, have little or no contribution towards the economic development of the country where they reside. The need to ensure that youths live satisfying and fulfilled lives devoid of disabilities and dependence motivated the researchers to conduct this study. This research enabled the researchers to contribute a quota to the recent call for the prevention of disabilities among school children in Nigeria. In this study, the researchers emphasized the need to strengthen routine ear screening from neonatal period to school period, periodic physical examinations and health education in schools. The study will help to complement the limited studies on childhood ear diseases in Nigeria.

## Materials and Methods

This cross-sectional descriptive study was carried out to identify common otologic disorders among primary school children in Rivers State. The sample was made up 1,200 pupils in primary 1-6 within the ages of 5 to 13 years randomly selected from 13 primary schools. This study was conducted in Port-Harcourt City (PHC). Port-Harcourt was chosen for the study because it is the capital of Rivers State and the major oil-producing State in Nigeria. It attracts lots of investors and tourists from all parts of the country and beyond. Moreover, Port-Harcourt has the largest number of highly populated primary schools among the 23 local governments in the State and therefore afforded enough sample for the study. The thirteen (13) schools selected for study were based on the fact that their populations were made up of both boys and girls (co-educational). The sample size was calculated at a 95% confidence level for a 13.9% proportion of hearing loss among primary school children in Lagos, Nigeria [20]. To get the sample for study, simple random sampling by balloting was used to select 1200 pupils from classes 1-6. Only 802 pupils whose parents gave consent eventually participated in this study. Semi-structured self administered questionnaire was used to obtain information on the participants from the parents. Also questionnaire was used to explore the social status of the parents of the respondents. The social status of the respondents' parents was graded into five ( 1-5) categories based on their monthly income. In addition, otoscopic examination of the respondents was carried out by the researchers after being trained on the use of otoscope by a specialist. Also, complete physical examination on the 802 children was done and cerumen was recorded if no part of the tympanic membrane was visible. Thereafter, cerumen, other debris and foreign bodies were removed in such children. The external canals and tympanic membranes were later inspected for likely abnormalities. Children were classified as having abnormal ear drums or having otitis media if the drums were perforated, hyperemic, retracted or showed evidence of scarring with or without fluids. Data analyses were done using SPSS version 17.0 [21] statistical software. Results were presented in tables using frequency and percentages.

### Limitations to the study

The population studied was school children therefore, the observed prevalence of ear diseases would not reflect the actual picture in the general population because institutional based study may not give a clear picture of the situation outside the school.. Also children not in school as well as those whose parents refused to consent to the study might have epidemiological characteristics different from those who took part in the study. The cross-sectional descriptive design of the study could not allow causality to be determined.

### Results

The mean age of the respondents was 8.6 years  $\pm$  2.3 years with median 8.0 years. About 405(50.5%) males and 397(49.5%) females were studied. The age of the respondents was evenly distributed. About 281 (35.0%) pupils were between the age of 5-7 years and 253 (31.6%) were between 11-13 years. See Table 1 for more details As contained in Table 2, the social class of the parents of the study group was classified into 5 categories using their monthly income. Those in category 1 were on monthly income of USD 2890, category 2, USD 2312, category 3 on USD 1692, category 4 on USD 867 and category 5 were on USD 289. The social status of 48(6.0%) of the respondents , could not be ascertained because enough information was not provided by their

parents/guardians. Study showed that a good proportion of the respondents 268 (33.4%) came from social class category 3.

The social class of the parents of the respondents who had more otologic disorders than others was noted. From the result of the study, respondents from social status category 5 had the highest incidence of otologic disorders. This is statistically significant  $P < 0.001$  see Table 3 (next page) for more details. The types of otologic diseases seen among the respondents were noted. From the findings, impacted cerumen 319(39.7%), Chronic suppurative otitis media 95(11.8%), debris 55(6.9%), Otitis media with effusion 28(3.5%), and acute otitis media 10(1.3%) were noted. See Table 4 for more details.

### Discussion

From the result of this study, several otologic diseases were identified among the respondents after the otologic examination. The most common otologic diseases was impacted cerumen. The fact that impacted cerumen was the most common otologic disease among the population studied showed the extent to which the tympanic membranes of the respondents were occluded as well as the extent they are exposed to hearing loss. Impacted cerumen occluding the tympanic membrane has been widely reported by several researchers as the major cause of hearing loss in children

**Table 1: Age and Sex Distribution of Study Population**

Age group (years)	Males (%)	Females (%)	Total number (%)
5-7	144(51.2)	137(48.8)	281(35.0)
8-10	133(49.6)	135(50.4)	268(33.4)
11-13	128(50.6)	125(49.4)	253(31.6)
<b>Total</b>	<b>405(50.5)</b>	<b>397(49.5)</b>	<b>802(100.0)</b>

**Table 2: Social Class of the Study Population**

Social class	Total (%)
1	74 (9.2)
2	222 (27.7)
3	268 (33.4)
4	167 (20.8)
5	23 (2.9)
Unknown	48 (6.0)
<b>Total</b>	<b>802 (100.0)</b>

**Table 3: Social status of the parents of respondents and Otologic disorders**

Social class	Normal Ear (%)	Ear disorder (%)	Total (%)	X <sup>2</sup> /P
1	54(73.0)	20(27.0)	74(100.0)	X <sup>2</sup> =159.4 P<0.001
2	127(57.2)	95(42.8)	222(100.0)	
3	68(25.4)	200(74.6)	268(100.0)	
4	23(13.8)	144(86.2)	167(100.0)	
5	3(13.0)	20(87.0)	23(100.0)	
Unknown	4(8.3)	44(91.7)	48(100.0)	
<b>Total</b>	279(34.8)	523(65.2)	802(100.0)	

**Table 4: Respondents and types of Otologic diseases noted**

Types of Otologic diseases	Frequency	Percentage
Impacted Cerumen	319	39.7
Chronic suppurative Otitis media	95	11.8
Debris	55	6.9
Otitis media with effusion	28	3.5
Mucoid discharge	12	1.5
Acute Otitis media	10	1.3
Foreign body	4	0.5
Normal	279	34.8
<b>Total</b>	802	100

[12, 26]. This finding is similar to studies conducted in other parts of Nigeria [20, 23], Turkey [24] and Swaziland [25] where impacted cerumen was identified as the main otologic disease among the population studied. Usually impacted cerumen in children is asymptomatic and can easily be missed by parents and caregivers. This could possibly lead to hearing impairment in the affected children. Identifying foreign bodies as the least otologic disease among the respondents (0.5%) is comparable to that identified by some other studies [26, 27]. It is not surprising that foreign bodies constitute the least otologic disease among the group studied. This is because foreign bodies usually present some discomforting symptoms that will demand immediate attention for their removal.

Chronic suppurative otitis media (CSOM) has been implicated as the major risk factor for ear diseases in children [28]. It has been seen as the major health challenge in several parts of the world [22, 28, 29]. The finding in this study reveals a CSOM prevalence of 11.8%. This is low compared to a study conducted by Akinpelu et al [30] in which a prevalence as high as 33.9% was seen among the population studied. This high prevalence noted in the previous studies could be attributed to the wider age group interval (6months to 18years) that participated in the study as against the present study which used (5 years to 13 years).

Social status was an important factor in the occurrence of otologic diseases among the group studied. The lower the respondents' social status the more otologic diseases they presented with. In this study, chronic suppurative otitis media was high among social status categories 4 and 5 which had monthly income of USD 867 and USD 289 respectively. Chronic suppurative otitis media has been linked to poor hygiene, nutrition, and housing conditions and these poor conditions encourage viral and bacterial infections [29]. This finding is comparable to previous studies which found higher prevalence of chronic suppurative otitis media among African-Americans than Caucasians [31]. This difference in the prevalence was attributed to poor standard of living among African-Americans. Most individuals in the low socio-economic class avoid living in places where they will be expected to pay high house rent and as a result, they tend to prefer living in suburbs where house rents are low but the environmental conditions are poor. The fact that the respondents from the lowest social status categories 4 and 5, whose monthly income was poor presented with more otologic problems than others, showed that low social status constitutes a major risk factor for otologic diseases among school children. The prevalence of otologic diseases of 65.2% among school children as identified in this study, is lower than that reported by other researchers in a study conducted in Nepal where a prevalence of 75.7% was noted [22]. The observed difference in the two studies conducted could be influenced by the socio-demographic variations in the two populations studied.

In ranking the prevalence of acute otitis media (AOM) among the respondents, AOM with 1.3% was the sixth otologic disorder. This ranking is comparable to a study conducted in Nepal [22] in which AOM with 1.4% prevalence was ranked as the 4th otologic disorder seen among the group studied. In another study [32] the prevalence of AOM was 28% and ranked higher than the two studies above. The difference in this ranking might be in the population studied. The sample studied here comprised children with febrile illnesses. AOM is an acute illness that commonly presents with other febrile illnesses in children [8]. Most often, in developing countries where malaria is endemic, children who present with feverish conditions with no other symptoms suggestive of any ear disease are treated for malaria, thereby making clinicians miss AOM, except if the clinician has a high index of suspicion for ear disorders and this often will lead to further delay in making the diagnosis. The fact that some ear diseases are asymptomatic and could be missed or given late diagnosis when prevention may be unattainable, periodic physical examination as well as health education is needed in primary schools.

Since cerumen impaction which was associated with low social status and poor environmental condition was the commonest otologic problem seen in this study, the need to prevent it by routine examination, aural toileting or simple cleaning with cotton buds to check reaccumulation is necessary. Parents, care givers, and teachers should be health educated on how to identify symptoms for ear diseases in children. During health programmes in school, clinicians should examine every child's ear for a possible ear disease.

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