

A Preliminary Report of the Audiological Profile of Hearing Impaired Pupils in Inclusive Schools in Lagos State, Nigeria

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ABSTRACT

Purpose: *The programme to enrol hearing impaired pupils in inclusive schools in Lagos State, Nigeria, has been endorsed recently and is at a transitional phase. The study assessed the audiological profile of the enrolled pupils with hearing impairment.*

Methods: *After a random selection of 7 designated inclusive primary schools in Lagos State, a two-stage study was conducted. First, a questionnaire documenting audiological history was administered to the pupils with hearing impairment. This was followed by pure tone audiometry.*

Results: *Study participants were between 4 and 26 years of age (mean 12.8±4.1). About 158 (96.9%) of them had bilateral profound hearing loss. Method of communication for 132 (81%) was by sign language, followed by lip reading for 56(34.4%).*

Conclusion: *Severity of hearing impairment was profound among this category of enrolled students. Most of them had probably been transferred from schools for the Deaf to inclusive schools. Less severe degrees of hearing impairment may have been detected if audiological assessment had been mandatory for all the school children.*

Key words: *hearing impairment, inclusive education, audiology, pure tone audiometry, sign language*

INTRODUCTION

The World Conference on Special Needs Education (1994) proposed the establishment of inclusive education programmes aimed at promoting integrated

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systems of learning for all school pupils with or without disabilities (UNESCO, 1994). The Nigerian National Policy on Education adopted this principle of inclusive education in 2004, while the Lagos State Ministry of Education endorsed the policy in May 2015. Following this, the educational model (designated inclusive schools) has been implemented in the 36 Local Council Development Areas (LCDA) of Lagos State, replacing the previous special schools educational model (NERDC, 2004; c21stnigeria, 2015).

The adoption of this inclusive education model has been accompanied by a major challenge, namely the potential impact of the degree of the disability on the learning of pupils with disability integrated into these schools. There have been diverse views on the implementation of inclusive education. A popular view is that special schooling should occur when the nature and severity of a child's disability is such that education in regular schools cannot be accomplished. Thus, the severity of the disability is an important factor in determining the beneficial effect of placement of a child in inclusive schools. For children with hearing impairment, this is more important because the severity of the hearing loss plays a very significant role in the ability to learn. Children with greater extent of disability will, of necessity, require more complex instructional methods that may not be available in the inclusive schools. Therefore, in planning inclusiveness, it is important to determine the degree of disabilities that predominate among prospective pupils. In order to achieve this, it is imperative to review the profile of current enrollees in the programme.

Hearing impairment is one of the major indicators for placement in inclusive schools. Assessing the severity of hearing impairment in the setting of inclusive schools provides an opportunity to develop intervention strategies and guide policies that will ensure capacity building for special education teachers. The burden of need for interventions such as hearing aids, and specialised instructors such as sign language teachers and interpreters, can also be determined following such assessments.

The main objective of this study was to assess the audiological profile of pupils admitted into inclusive primary schools as students with hearing impairment. Specifically, the study examined the severity of hearing impairment and means of communication among these pupils.

METHOD

Study Design

A descriptive cross-sectional study of pupils in inclusive schools in Lagos State, Nigeria, was conducted between August 2015 and July 2016. Lagos State is located in south-western Nigeria and has a mixed income, urban/peri-urban population estimated to be 21 million in 2016 (World Population Review, 2017). Prior to commencement, approval of the study protocol was obtained from the Lagos University Teaching Hospital Health Research Ethics Committee. Written permission was also obtained from the Lagos State Ministry of Education.

Setting

The database of the 36 inclusive schools was obtained from the Lagos State Education Board (c21stnigeria, 2015). Seven of the 36 designated inclusive primary schools were selected using a table of random numbers. The school authorities in each of the seven schools gave authorisation to perform the study. Community participation was improved by engaging the teachers via a pre-study briefing at which the study objectives and design were explained. The teachers were trained to administer sections of the study questionnaire to the pupils (those requiring explanation with the use of sign language). The study questionnaire was used to obtain medical history, otologic, speech and communication information. In each school, all students enrolled as pupils with hearing impairment were recruited into the study.

Sample

Using national guidelines for non-therapeutic research involving minors, informed consent was obtained from participants aged ≥ 13 years via proxies, using sign language. Parental consent was obtained for participants aged ≤ 9 years, while consent from both parents and minors was obtained for participants between 10 – 12 years of age. Parents were also invited to accompany their wards on the day of the actual evaluations, in order to provide background early life / developmental history and to receive counselling and feedback regarding the participant's hearing status. The clinical aspects of the study questionnaire were administered by the otorhinolaryngology team comprising of one consultant and five resident doctors. General examination, ear examination and otoscopy were carried out by the otolaryngology team. All participants with ear wax or debris had ear syringing done, while those with ear discharge had aural toileting done.

Procedure

Manual pure tone audiometry (PTA) was performed by an audiologist according to recommended standards, in a quiet room using an Amplivox® model 2150 audiometer (American National Standards Institute, 2004). None of the participants came with hearing aids so all PTA was done without amplification. Participants were instructed (through their sign language teachers when necessary) to respond to the faintest tone by raising and lowering their finger or arm. An initial test run was performed to establish that participants understood the instructions. Pure tones were presented to each ear via a headphone, starting from 1000Hz at 30dB - 50dB and 10dB increments till a response was obtained. Threshold for hearing the pure tone at respective frequencies was the lowest decibel level at which two responses out of three presentations occurred at each frequency. The specific frequencies tested were 500Hz, 1000Hz, 2000Hz, 4000Hz and 8000Hz. The audiometric ISO values were calculated as an average of the PTA thresholds obtained at 500Hz, 1000Hz, 2000Hz and 4000Hz. The World Health Organisation (WHO) Grades of Hearing Impairment (2008) classification system was used to categorise degree of hearing impairment as follows: 0 – no impairment (25dB or better), 1 – slight impairment (26 – 40dB), 2 – moderate impairment (41 – 60dB), 3 – severe impairment (61 – 80dB), and 4 – profound impairment including deafness (81dB or greater) (World Health Organisation Grades of Hearing Impairment, 2008).

Data Analysis

Data was analysed using the 21st version of IBM Statistical Package for the Social Sciences (SPSS-21) (IBM Corp, 2012). Normally distributed data was summarised using mean (\pm SD), while categorical data was represented as proportions. Descriptive statistics like means, frequencies and percentages were used to analyse the data. A p-value <0.05 in two-tail was considered statistically significant.

RESULTS

A total of 172 pupils from the seven participating inclusive schools were recruited. While 163 pupils completed the study, 9 were excluded due to non-performance of audiology test. The demographic data of the participants is shown in Table 1. There were 95 (58.3%) males and 68 (41.7%) females, with a male versus female ratio of 1.4:1. Age range of the pupils was 4 – 26 years, mean age 12.8 ± 4.1 and median age of 13 years. Positive family history of deafness in a first degree relative was noted in 19 (11.7%) of the pupils.

Table 1: Demographic Characteristics and Family History of Participants

Variable	Value
Female, n (%)	68 (41.7)
Male, n (%)	95 (58.3)
Male: Female ratio	1.4 : 1
Age range, years	4 – 26
Age groups	
≤ 11 years	62 (38.0)
12 – 17 years	85 (52.2)
≥18 years	16 (9.8)
Mean age ± standard deviation (median), years (all)	12.8 ± 4.1 (13.0)
Mean age ± standard deviation (median), years (females)	12.3 ± 4.1 (12.0)
Mean age ± standard deviation (median), years (males)	13.2 ± 4.1 (13.0)
Family history of hearing loss (first degree relative), n (%)	19 (11.7)

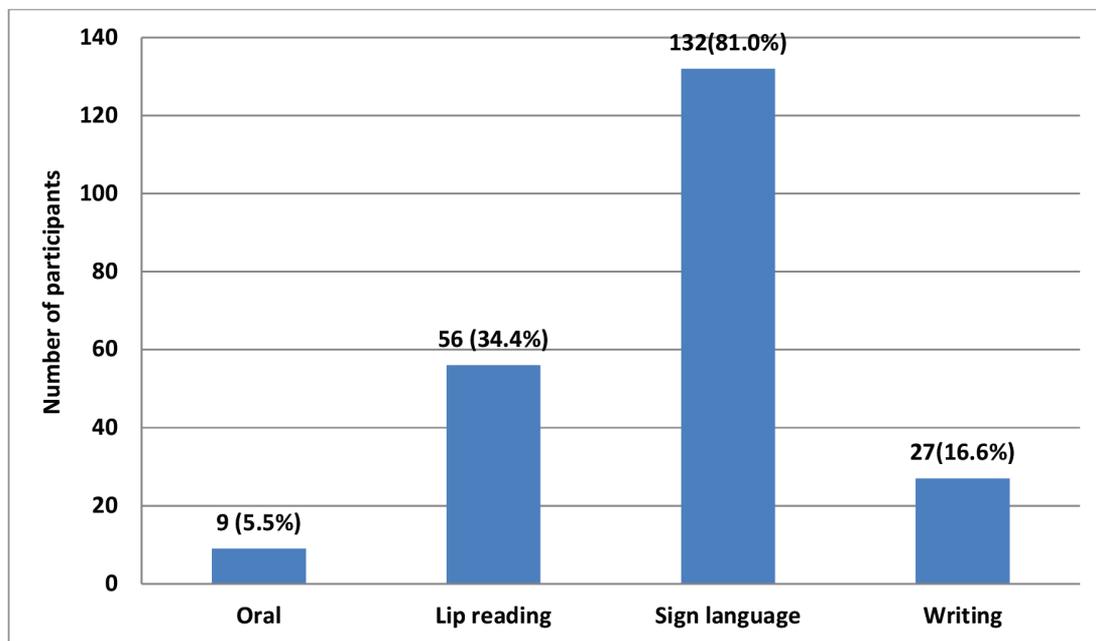
The pure tone average ranged from 30 – 115dB, with a mean of 96.69 ± 13.04 dB in the right ear and 98.28 ± 14.67 dB in the left ear. The difference between the mean of the two ears was not statistically significant ($p > 0.05$). Using the WHO grading system (as shown in Table 2), 158 (96.9%) were found to have profound hearing loss bilaterally. Nine (5.5%) of the pupils had oral communication while 20 (12.3%) had some form of speech but could not understand spoken language. Sign language was the method of communication for 81% and lip reading for 34.4% of the pupils (Figure 1). Only 25 (15.3%) of the parents could communicate with sign language.

Table 2: Comparison of Grades of Severity of Hearing Loss in the Right and Left Ears

Grade of hearing impairment	Right ear	Left ear
	Frequency n (%)	Frequency n (%)
0 – No impairment (25dB or better)	0 (0)	0 (0)
1 – Slight impairment (26 – 40dB)	1 (0.6)	1 (0.6)
2 – Moderate impairment (41 – 60dB)	0 (0)	2 (1.25)
3 – Severe impairment (61 – 80dB)	4 (2.5)	2 (1.25)
4 – Profound impairment including deafness (81dB or greater).	158 (96.9)	158 (96.9)

The subject who had slight hearing impairment had congenital aphonia, hence his enrolment in the scheme

Figure 1: Methods of Communication employed by Participants



Footnote: Multiple responses in view of more than one means of communication in some pupils

DISCUSSION

The results from this study highlight the profound severity of hearing impairment among the pupils enrolled as hearing impaired at inclusive schools in Lagos. It also shows the high probability of non-recognition of other severities of hearing impairment among school-age children in the community.

These findings have important implications. First, pupils with profound hearing impairment cannot be offered hearing aids as an intervention to improve communication. Other means of effective communication are required when these students are placed in inclusive schools. Special education teachers and interpreters are required to communicate and deliver the curriculum via sign language. Furthermore, other innovative methods need to be developed and adopted to rapidly build the workforce of educators. Other technical assistance such as FM systems, C-prints, speech synthesiser and personal amplification systems

that improve communication are needed to enhance learning. However, data from studies on the inclusion of deaf people in mainstream schools in Nigeria have indicated a trend of none or inadequate provision of required educational materials, unavailability of support personnel, lack of resource teachers and near absence of personnel to provide important advisory services to regular teachers on how to teach learners with special needs (Anumonye, 1991; Eleweke, 2002; Ewa, 2014).

Secondly, the low prevalence of moderate and severe hearing impairment among the study population may be attributed to the period of this study which coincides with the transitional phase of inclusive education policy implementation in Lagos, Nigeria. The hearing impaired pupils were transferred from the special schools to the inclusive schools. It may also be associated with non-recognition of milder forms of hearing impairment as a handicap by the populace. Studies have shown that the prevalence of severe to profound hearing impairment among the hearing impaired population is less than 10% (Blanchfield, 2001; Turton & Smith, 2013), which makes it likely that a greater percentage of hearing impaired pupils may not have been enrolled as hearing impaired in the inclusive schools and were thus not available for recruitment. As the concept of inclusive schools is relatively new, no local data was available with which to compare these findings, or to address the severity of hearing loss documented in this study.

The enrollees in this study were older than the median age for primary school attendance (Olaniyan, 2011). The median age compared favourably to that of children in exclusive schools for the deaf (Ahmad et al, 2012). This supports the assertion that, the hearing impaired pupils in the inclusive schools in Lagos were probably those transferred from the special schools.

Oral communication was possible for only 5.5% of the study population, which also supports the finding that the majority of pupils had profound hearing impairment. Communication methods for most of the pupils was by sign language (81%), followed by lip reading (34.4%). It was noted that the mean age of the study population was 12.8 years, with an age range of 4 - 26 years. Most of the pupils had learnt sign language from special schools before their enrolment into the inclusive schools. In addition, those who could not sign were taught sign language in the first one year of enrolment into inclusive schools. It is not surprising that sign language was the major method of communication in the study as it is the first language and the linguistic identity of the deaf (World Federation of the Deaf, 2016).

In this study, 15.3% of the parents were able to communicate by using sign language. It has been documented that 95% of deaf children are born to normal hearing parents, majority of whom either do not know sign language or have little skill in that domain (Mitchell & Karchmer, 2004). The communication gap between normal hearing parents and deaf children has been known to affect both family relationships and academic progress. Age-appropriate social and emotional development in deaf children is generally inversely related to the degree of hearing loss when parents depend on spoken communication (Vaccari & Marschark, 1997). Further study is needed in this area. Families of children with severe to profound hearing impairment should be encouraged and supported to learn sign language for effective communication with their wards and to enhance academic support.

CONCLUSION

This study clearly noted the profound severity of hearing impairment in pupils enrolled as hearing impaired at inclusive schools in Lagos. Less severity of hearing impairment among the study population was minimal. This could be attributed to the period of the study, which coincided with the transitional phase of inclusive education in Lagos. The result may not be representative of the audiological profile of the hearing impaired in an established inclusive school education programme. Pre-enrolment hearing screening is recommended, to identify the true hearing pattern of pupils in inclusive schools in Lagos, Nigeria.

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