Prevalence of hearing loss among primary school children in Mbarara, Uganda

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Introduction

Hearing loss is a common cause of sensory disability worldwide. According to the World Health Organization (WHO), over 360 million people in the world suffered from moderate-to-profound hearing impairment (HI) in 2012, of whom 80% live in low- and middle-income countries, and 32 million of these are children.\(^1\)

Approximately 50% of HI is primarily preventable, whereas the remaining can readily be addressed by secondary or tertiary prevention.\(^2\) There is a relationship between hearing loss and lower income (see Figure 1).

Hearing impairment can limit a participant’s daily life, limit opportunities for employment, cause spiritual, social, and emotional problems and, early in life, it can delay child language and educational development. Economic burden of disease studies in the US have shown that, averaged across age at onset, severe to profound hearing loss is expected to cost society an additional $297,000 (1998 USD) over the life time of an individual.\(^3\)

Methods and Materials

The school was implemented in the Mbarara district in southwest Uganda with an estimated population of 83,700 (in 2011). The municipality has 39 primary schools (19 Government and 20 Private) with a total enrolment of 19,699 (in 2007). The school was implemented in the Mbarara district in southwest Uganda with an estimated population of 83,700 (in 2011). The school was implemented in the Mbarara district in southwest Uganda with an estimated population of 83,700 (in 2011). The school was implemented in the Mbarara district in southwest Uganda with an estimated population of 83,700 (in 2011).

A total of 639 children were evaluated. There were 258 (40.4%) boys and 381 (59.6%) girls screened (Figure 2). The total number of children who had a threshold greater than 30 dB for any of the frequencies tested for either ear was 35, or 5.5% (95% CI 3.7%, 7.2%, S.E. 0.868), of whom 14 (40.0%) were boys and 21 (60.0%) were girls. Two children were lost to follow up for confirmatory audiometry. One child was absent the day of the return visit to the school for confirmatory testing. Another child presumably gave the wrong name at the initial screening, as his name was not familiar to the staff upon return to the school for confirmatory audiometry. Out of the 33 remaining students, 21 students had true hearing loss, whereas 12 children had normal hearing, yielding a false-positive screening rate of 36.4%. The true rate of hearing amongst those screened was 3.3% (95% CI 1.9%, 4.7%; S.E. 0.696). Twelve (12 of 21) had unilateral hearing loss whereas nine (of 9 of 21) had bilateral hearing loss. Eight (1.3% of total) children had conductive hearing loss, twelve (1.9% of total) children had sensorineural hearing loss, and one (0.2% of total) child had mixed hearing loss. Using the strict WHO criteria for disabling hearing loss, disabling HL was present in 9 students, or 1.4% (95% CI 0.5%, 2.3%; S.E. 0.460) of children screened. See Table 1 for etiologies of HL in this study.

Table 1. Etiologies of hearing loss

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Number of Students (%)</th>
<th>Number of Ears</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductive HL</td>
<td>4 (50)</td>
<td>4</td>
</tr>
<tr>
<td>Chronic suppurative OM</td>
<td>1 (12.5)</td>
<td>1</td>
</tr>
<tr>
<td>Exostacous tube dysplasiam</td>
<td>2 (25%)</td>
<td>2</td>
</tr>
<tr>
<td>Sensorineural HL</td>
<td>1 (8.3)</td>
<td>1</td>
</tr>
<tr>
<td>Otoacoustic (Quinter)</td>
<td>11 (97.9)</td>
<td>19</td>
</tr>
<tr>
<td>Mixed HL</td>
<td>1 (100)</td>
<td>1</td>
</tr>
</tbody>
</table>

Results

Our 3.3% rate of hearing loss among primary school children is on the lower end but within range of previous studies evaluating school-aged children in Africa. Similar studies in Uganda, Zimbabwe, Kenya, Mozambique and Tanzania have yielded a prevalence of hearing loss among primary school children of 5.6%, 2.4%, 5.6%, 5% and 3%, respectively.\(^4\)\(^5\)\(^6\)\(^7\)\(^8\) A recent estimate published in 2012 by the WHO revealed a prevalence of disabling hearing loss in children in sub-Saharan Africa to be 1.9%, versus 0.5% in high-income countries.\(^9\) Our rate of 1.4% for disabling hearing loss is lower than the above estimate for sub-Saharan Africa, but still almost three-fold higher than the quoted rate for high-income countries. Many challenges occurred during performance of the study. Although the quietest room was requested for screenings, sometimes there was still a significant level of background noise that may have contributed to some false-positive screenings. Also, the study subjects may be biased towards those with normal hearing, as children with hearing loss may not actually attend school at all. It was difficult to assess the etiology of hearing loss outside the obvious causes such as suppurative otitis media, middle ear effusion, or tympanic membrane perforations. Although a survey had been designed to attain risk factors for sensorineural hearing loss such as febrile illnesses during childhood, consanguinity, or use of ototoxic medications, it was difficult to implement the survey in the boarding schools where the parents were not immediately available.

Conclusions

The prevalence for a failed hearing screening is in accordance with other published studies. Hearing impairment is a significant problem in Uganda and efforts should be made for primary, secondary, and tertiary prevention of hearing loss. An implementation of a universal screening program to detect HI as early as possible is optimal, since early intervention has been shown to be superior to delayed intervention regarding normal development in children.\(^10\) We highly recommend that children be screened for this potentially readily treatable condition, especially those who may be performing poorly in school. Western Uganda is in desperate need of a trained audiologist to fully address the need for comprehensive otolaryngologic care in the region.

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References: