

Hearing Loss in HIV-Infected Children in Lilongwe, Malawi

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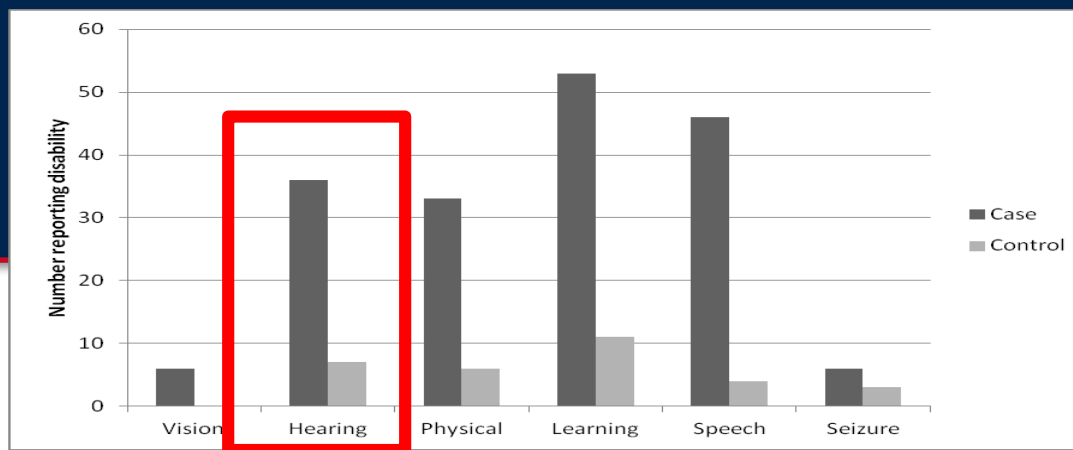


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BACKGROUND

- With improved access to ART, HIV has become a chronic illness and a variety of disabilities has been described
- A previous study at Baylor-Malawi found a high rate of disabilities by caregiver report in HIV-infected children when compared to their uninfected sibling (33% vs 7%)



BACKGROUND

- Previous studies in the US, Uganda, South Africa, Peru and Mexico have found a prevalence of hearing loss ranging from 20-38% in HIV-infected children
- This prevalence is higher than in uninfected children in these countries (4% in US, 6.9% in Peru)

Purpose of study

- Primary aim: Determine the prevalence of hearing loss through audiologic testing in HIV-infected children at Baylor
- Secondary aims:
 - Identify clinical and sociodemographic factors associated with hearing loss in HIV-infected children
 - Assess the association of hearing loss and quality of life

Methods

- Cross-sectional study from December 2013-March 2014
- HIV-infected patients aged 4-14 years old were recruited from Baylor clinic in Lilongwe, Malawi
- Surveys completed:
 - Sociodemographic questionnaire
 - PedsQL™
 - Electronic medical record (EMR) review

Methods

- Audiologic assessment at African Bible College
 - Otoscopy
 - Tympanometry
 - Otoacoustic emissions
 - Audiometry



Methods

- Hearing loss was defined as $>20\text{dB}$ on audiometry
- Children were fitted with hearing aids based on:
 - Severity of hearing loss
 - Unilateral vs Bilateral hearing loss
 - Impact of hearing loss on level of function



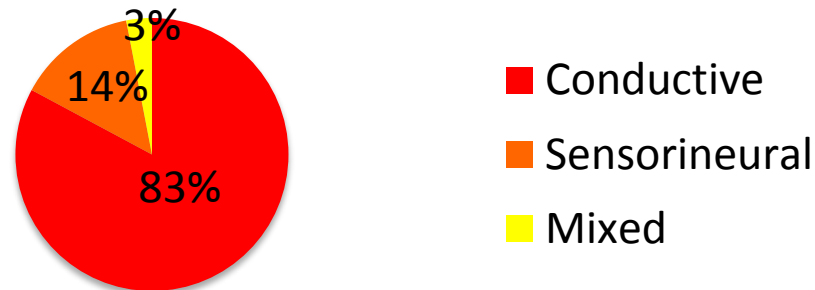
Methods: Data Analysis

- Factors thought to be associated with hearing loss were explored by regression analysis generating age- and sex-adjusted odds ratios comparing clinical and sociodemographic factors between those with hearing loss and those without hearing loss

Results: Prevalence of Hearing Loss

- 90/380 children (24%) had hearing loss in either ear
- 21/90 (23%) with hearing loss were referred for hearing aid fitting

Figure 1: Types of hearing loss



Results: Sociodemographic Factors



- There was no difference in age, gender, or family income between those with hearing loss and those without

Results: Caregiver perception

- Caregiver perception of hearing loss was related to hearing loss, OR= 5.9 (3.3-10.6)
- However, only 40% of caregivers accurately perceived that their child had hearing loss

Results: Screening questions



Results: Hearing in Relation to Other Health Conditions

- Hearing loss was associated with:
 - History of ear drainage, OR= 6.4 (3.6-11.6)
 - History of frequent ear infections, OR = 7.4 (4.2-13.0)
 - History of malnutrition recorded in the EMR, OR = 2.1 (1.3-3.5)
- Children with hearing loss tended to report experiencing other disabilities (OR 1.8, 95% CI 1.0-3.5)
- Hearing loss was not related to history of meningitis or current nutrition status (ie: BMI)

Results: Hearing in relation to HIV characteristics

- 98% of children with hearing loss were on ART, for an average of 4.6 years
- There was no significant difference between the age of ART initiation, duration of ART, or measures of CD4 in children with and without hearing loss.
- Children with hearing loss were more likely to have been WHO Stage 3 (OR 2.4, 1.2-4.5) or Stage 4 (OR 6.4, 2.7-15.2) at enrollment in clinic

Results: School-Related Factors

- Among children above 5 years, those with hearing loss tended to be less likely to be attending school (OR= 2.5, 1.0-6.0).
- However, if the child was attending school, hearing loss did not seem to affect school performance

Result: Quality of Life

- There was no difference in overall quality of life between those with hearing loss and those without
- Children with hearing loss reported poorer emotional ($p=0.02$) and school functioning ($p=0.04$)

Conclusions

- 24% of HIV-infected children tested had hearing loss $>20\text{dB}$ in either ear
- 5.5% of the 380 children tested qualified for a hearing aid
- Caregiver assessment of hearing loss was not reliable



Conclusions

- Significant associated factors include:
 - WHO Stage 3 or 4 at enrollment
 - perceived hearing loss by caregiver
 - history of frequent ear infections or ear drainage
 - positive screens for subtle signs of hearing impairment (need for repetition, not speaking clearly, and difficulty following instructions)

Limitations of the Study

- Etiology of hearing loss was not able to be determined
- Certain risk factors (ie: exposure to gentamicin and quinine) were not reliably documented
- No control group of HIV uninfected patients

Next steps

- Educate patients and caregivers
- Targeted screening of high risk patients if universal screening not available
- Better screening tools need to be identified for ART clinic settings

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