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Correspondence

Mr. Jayandra Byanju,
Department of Physiology,
Patan Academy of Health
Sciences, Lalitpur, Nepal
Email:
jayandrabyanju@pahs.edu.np,
jayan.byanju@gmail.com
Phone: 9841130402

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Study of hearing impairment and chronic otitis media in school going children in Pokhara, Nepal

Jayandra Byanju,¹ Chhanchu Gopal Saha²

¹Lecturer, Department of Physiology, Patan Academy of Health Sciences, Lalitpur, Nepal

²Professor, Department of Physiology, Manipal College of Medical Sciences, Pokhara, Nepal

ABSTRACT

Introductions: Hearing loss and chronic otitis media among school-aged children in developing countries is reported to be a significant health problem. This problem in children influences the overall development of behavioral and communication skills. The main objective of this study was to study the hearing impairment and chronic otitis media in school going children in Pokhara.

Methods: This was a cross sectional study done in Pokhara district, Kaski, Western Region Nepal in two private schools and one government school of Pokhara, selected randomly. All these children were interviewed for history taking and the examinations included tuning fork examination (Rinne's, Weber's and absolute bone conduction tests) and examination of the ear using otoscope.

Results: A total of 215 school children were included in the study. The mean age was 12.04 (SD=1.108), male 48.4% and female 51.6%. Hearing impairment was found in 21.4% and chronic otitis media in 9.8%. Among hearing impairment, 71.7% had conductive and 28.3% had sensorineural type of hearing losses. Out of total number of children, 12.1% had tympanic membrane perforation.

Conclusions: The prevalence of hearing impairment was seen in one fifth and chronic otitis media in one tenth of local school children of Pokhara city, Nepal. Country wide prevalence and causes for preventive measures should be studied.

Keywords: chronic otitis media, hearing impairment, tympanic membrane perforation, Nepal

INTRODUCTIONS

Hearing impairment is a partial or total inability to hear.¹ Difficulty in hearing at an early age can affect on speech and language acquisition, academic performance subsequently impacting on education as well as future employment opportunities of the children.^{2,3} Otitis media, one of the most common causes of hearing impairment, is an inflammatory condition of the middle ear that results from dysfunction of the eustachian tube in association with a number of illnesses.⁴

It is the most common cause of childhood hearing impairment in developing countries in contrast to the developed countries or high-income countries.^{5, 6} In Nepal, study of hearing impairment and chronic otitis media is limited and fragmented.

This study was done to find out the prevalence of hearing impairment and chronic otitis media in school going children from grade five to seven in Pokhara, Nepal.

METHODS

This was a cross sectional study done during February 2012 to August 2012 from two private and one government schools in Pokhara district, Kaski, Western Region Nepal. All the students from grade 5 to grade 6 who were present on the day of data collection were first explained about our study and examination procedure. During primary selection, the name, age, sex, school and the classes of all the children were asked and were interviewed thoroughly to know their medical history and their usual habits. The questions regarding hearing impairment and ear discharge were presented to all the students. Before the examination, the purpose of the study was explained to all the children and written consent was obtained from their parent or caregiver.

The students not in good health due to any physical or mental problems were not included in the study. The students with excessive ear

wax or other factors that obscured the otoscopic examination were also excluded.

Hearing impairment was screened by trained personnel using 'Rinne, Weber and Absolute bone conduction tests' in a quiet room provided in the school. A tuning fork of 512 Hz was used for the test. The tests were repeated in all the positive cases found during the examination for confirmation.

Chronic otitis media (COM) was diagnosed on the basis of subject's history, duration of ear discharge, ear pain, a history of previous ear discharge, especially when accompanied by episodes of colds, sore throat, cough, information and otoscopic examination of the tympanic membrane (TM) which included the parameters like color, thickening, perforation of the tympanic membrane and also the ear discharge. All the students were interviewed and examined otoscopically. Perforation of the tympanic membrane with or without otorrhoea of more than three months duration was taken as evidence of chronic otitis media.⁷

Hearing impairment was categorized as conductive hearing loss and sensorineural hearing (SNHL) loss in both or one of the ears by use of Rinne, Weber and Absolute bone conduction tests. Conductive hearing loss was considered to be there if $BC > AC$ and Weber test lateralized to the poorer ear. Sensorineural hearing loss was considered to be present when $AC > BC$, Weber test lateralized to the better ear and absolute bone conduction shows reduced hearing than examiner with normal hearing.⁸

Microsoft Excel 2007 and Statistical Package for Social Services (SPSS) were used for data analysis. Frequencies of different parameters were calculated by using SPSS version 17. Chi-square test was used and P value < 0.05 was considered statistical significant.

RESULTS

A total 215 (out of 226) school children met inclusion criteria. Out of 215, private school

children were 118 and government school children 97. Male were 104 (48.4%) and female 111 (51.6%). Age group was 10-15 years, mean age 12.04 years (SD=1.108). Out of total 215 children, hearing impairment was found in 46 (21.4%) and COM in 21 (9.8%). The conductive hearing loss was seen in 19 (57.6%) female and 14 (42.4%) than in male. The SNHL was seen in 9 (69.2%) female, 4 (30.8%) male, (Table 1). The difference in hearing impairment in female and male was statistically insignificant (P = 0.285). Out of

total hearing impaired children 40 (87%) had unilateral hearing loss and 6(13%) were having bilateral hearing loss. Conductive hearing loss in left ear was seen in 18 (39.1%), right ear 9 (19.6%) and 3 (6.5%) both ear. The SNHL was seen in left ear in 6 (13%) and in right ear in 7 (15.2%). The TM perforation was seen in 26 children, (Figure 1). In children with COM, all 21 (100%) had conductive hearing, 19 (90.5%) unilateral and 2 (9.5%) had bilateral conductive hearing loss. None of the children with COM had SNHL.

Table 1. Frequency of types of hearing loss in private and government school

Type of hearing loss	Private school No. of children (%)	Government school No. of children (%)	P value
Normal	98 (83.1)	71 (73.2)	0.209
Conductive	14 (11.9)	19 (19.6)	
Sensorineural	6 (5.1)	7 (7.2)	
Total hearing loss	20 (16.0)	26 (26.8)	

Table2.Rinne test and Weber test results for total number of children

Rinne Test	No. of Children (%)	Weber Test	No. of Children (%)
Right Rinne -Ve	9(4.2)	Lateralizes left	28(13.0)
Left Rinne -ve	18(8.4)	Lateralizes right	18(8.4)
Rt. & Lt. Rinne +ve	182(84.7)	Central	169(78.6)
Rt. & Lt. Rinne -ve	6(2.8)		
Total	215(100)	Total	215(100.0)

Table 3. Absolute Bone Conduction (ABC) test result for total number of children

ABC test	No. of children	Percent
Left ear ABC reduced	6	2.7
Right ear ABC reduced	7	3.3
Total	13	6.0

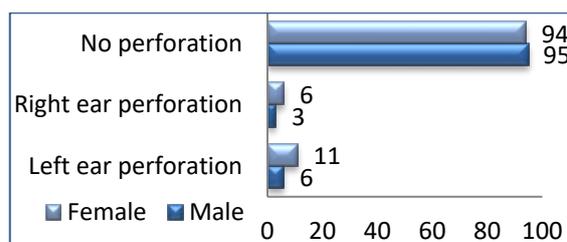


Figure 1. Frequency of tympanic membrane perforation according to ear symmetry and gender

DISCUSSIONS

One fifth, 46 (21.4% of 215) school going children of age group 10 – 15 years had hearing impairment, more common than the study by Khairi Md et al³ (15% of 234 children) and by Maharjan M, et al⁹ (12.47%) in eastern Nepal.

All 21 (9.8%) with COM were unilateral and had associated hearing impairment. Adhikari P et al¹⁰ reports 7.6% COM and Maharjan et al⁹ 13.2%. In our study out of total hearing impaired children 45% was due to COM and 55% due to other cause. Little P et al in a large sample size of 15,845 reports 55.2% hearing impairment associated with COM.¹¹

The reason for the COM and hearing loss might be the various factors- traumatic injury to the eardrum or other middle ear disorders, low socioeconomic condition, lack of health hygiene, carelessness in seeking hospitals for ear diseases, swimming in the pond or river, repeated untreated ear infections or lack of knowledge about COM by parents especially mother.¹²

Hearing impairment was found more in government school children, 26 (26.8%) than the private school 20 (16%). Conductive hearing loss was found more than sensorineural loss in both the schools. Children in government school mostly belong to low socioeconomic group, and may contribute to COM and hearing impairment.^{9,13} However these differences were not found to be statistically significant in our study which might be due to the small sample size.

The SNHL of 28.3% was less than conductive loss of 71.7% in our study, similar to Mozafar Sarafraz et al with CHL 59.7% and SNHL 40.3% were having.¹⁴ Lasisi AO et al¹⁵ and Jacob A et al¹⁶ have also reports relatively higher CHL in hearing impaired children.

Use of pure tone audiometry can give further information regarding severity of hearing impairment, which was one of the limitations in our study. Our findings of high hearing impairment in school going children is alarming, and a broader nationwide study may be needed to find out the ear pathology in different regions of Nepal. Creating awareness in the community for ear disease may help prevent COM and hearing loss. This can be done through teachers, guardians and students.

CONCLUSIONS

With one fifth prevalence of hearing impairment in school going children, there is a need of public awareness and nationwide study.

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