Al Ameen J Med Sci 2022;15(2):173-176 ● US National Library of Medicine enlisted journal ● ISSN 0974-1143

ORIGINAL ARTICLE CODEN: AAJMBG

Prevalence of ear disease in semi-urban and rural school going children

Tanya Agnihotri[1], Ratan Medhi[1*], Abhijeet Bhatia[1] and Star Pala[2]

[1]Department of ENT and [2]Department of Community Medicine, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Mawdiangdiang, Shillong-793018, Meghalaya, India

Received: 01st September 2021; ***Accepted:*** 17th March 2022; ***Published:*** 01st April 2022

Abstract: *Introduction*: Hearing loss is the most common sensory deficit in humans today which is more prevalent during the school going years, due to late onset and identification, affecting a child's educational, cognitive and social development. *Aims and Objectives*: This study was conducted to determine the common causes of hearing loss among the school going children. *Methodology*: This cross-sectional study done in two state government schools of Meghalaya and 108 students were assessed for the presence of hearing loss using preformed questionnaire. Otoscopic examination was done on all students. *Results*: Through this study the prevalence of hearing loss in the students studied was found to be 17.6% and the prevalence of ear disease (with or without hearing loss) was 22%.The prevalence of hearing loss was significantly higher in rural school than the semi urban school. The most common ear disease was ear wax, Chronic suppurative otitis media (CSOM) and Otitis media with effusion (OME). *Conclusion*: The hearing loss present in our study population was due to either preventable or treatable causes and its prevalence can be brought down with proper care of the ear and with adequate treatment.

Keywords: Hearing Loss, School Going Children, Meghalaya

Introduction

Nearly 34 million children have disabling hearing loss worldwide [2]. In India, one per 1000 children suffer from severe to profound hearing loss [3-4] 60% of this cases are due to preventable causes includes ear wax, otitis externa, otitis media, otomycosis, use of ototoxic drugs, noise induced hearing loss etc. Early detection and screening camps, timely and appropriate medical advice with referral, rehabilitative services and IEC activities for creating awareness, are crucial for preserving normal hearing [1].

This study, therefore attempts to analyze the incidence and causes of ear disorders and hearing loss in school going children.

Material and Methods

This school based cross sectional study was carried out in the school going children of age group 6-12 years in East Khasi Hills district, in the state of Meghalaya, India after obtaining clearance from the Institutional Ethics Committee (NEIGR/IEC/M5/S2/18) over a period of two months from July to September 2018.

The study was initiated with the permission and assistance from the school authorities. The study was conducted by the Dept of ENT, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, India.

Study was conducted in two state government aided schools, one semi-urban near Shillong and one rural around 60 kms from Shillong. Meghalaya (25° 02' - 26° 07' N and 89° 49' - 92°50' E) is located in the north eastern part of India. It is a plateau and its elevation ranges from 100 m to 1961 m. The average temperature throughout year lies between 2° to 33° C and the average annual rainfall from 4,000 mm to 11,436 mm [7].

The students between 6 and 12 years of age present on the day of inspection were included in the study. The teachers and the school authorities were acquainted with the objectives and methodology of the study and were requested to inform the parents or guardians of the students about the ear health screening. The school authorities were notified about the dates of visit.

The study was conducted using a pre-designed proforma comprising of the particulars of the student, including age, sex and address, along with any ENT complaint with special emphasis on Ear. Following this, ear examination along with a comprehensive ENT examination was done. History of hearing loss was elicited using the suitably modified questionnaire for risk assessment by the Minnesota Department of Health [8]. Tuning fork tests were done where required. Otoscopy was conducted to identify any disorder. The languages used were Khasi and English. Any identified disorder was noted.

The school teachers were present during the study and were acquainted with ear disorders that the students were suffering from. Written instructions for medication and further follow up were given to each student in the form of a referral slip.

No drugs were provided to the children during the study. No invasive procedures were done as a part of the examination. Prescriptions were given to those requiring treatment, with advice to follow up with an ENT specialist for further management. The data so collected was compiled on MS Excel 2007 worksheets and was analyzed using the Pearson Chi square test using IBM SPSS version 23 software.

Results

In this cross- sectional study 108 students were examined, including 53 (49%) boys and 55 (51%) girls. Age ranged from 6 to 12 years with mean age 10.6 ± 1.8 years and a median age of 11 years. Eighty-two students (76%) were from the semi urban school and 26(24%) from the rural school.

A total of 24 (22%) gave a history of hearing loss. Among them, 14 (58%) were boys and the rest 10 (41%) were girls (Table 1). Hearing loss was more common in semi urban school (15; 62%) than rural school (9; 38%) (table 2).

Table-1: Hearing loss in different gender

Gender	Total no. of children	No. of children affected
Boys	53(49%)	14(26%)
Girls	55(51%)	10 (18%)
Total	108	24 (22%)

Table-2: Hearing loss in rural and semi-urban areas

Areas	No of children	No of children affected
Semi urban	82(76%)	15(18%)
Rural	26(24%)	9(35%)

The most common cause of hearing loss was found to be ear wax (15; 62%) followed by chronic suppurative otitis media (CSOM) (5;21%) and Otitis Media with Effusion (OME) (3;13%). The prevalence of each disorder was higher in semi urban school than the rural school (figure 1) Prevalence of wax and OME was more in boys compare to girls where as CSOM was more in girls (figure 2).

Fig-1: Prevalence of Ear disease in semi-urban and rural school going children

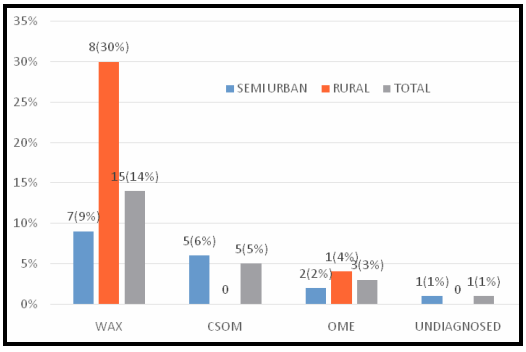
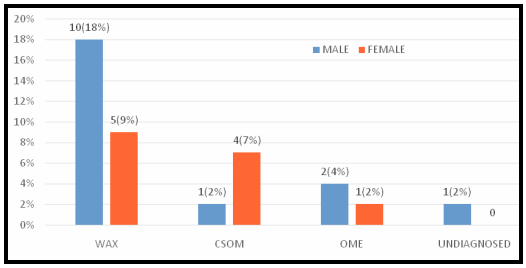


Fig-2: Prevalence of Ear Disease in boys and girls



Discussion

This cross-sectional study consisting predominantly of students from semi- urban school had an almost equal number of boys and girls. Hearing loss was found to be more prevalent in boys and in students from semi urban school. The most common disorder was ear wax followed by CSOM and OME. Ear wax was more common in boys, and in the rural school. CSOM was more common in girls, and in the semi urban school, whereas, OME was more common in boys and in the rural school.

In our study, 24 (22%) students gave history of ear disorders, all of whom reported hearing loss. Similar studies have reported highly variable results, with hearing loss in children varying from 9% in a study conducted in Iran, to 34% in a Brazilian study by Noguiera et al [12]. In Indian studies, the rates varied from 9% in a study conducted by Kumar A et al. [18], to 17% in a study conducted in Jaipur, Rajasthan by Gaurav sapra et al. [6]. However, the sample size in these relevant studies was more than that in the current study.

The prevalence of hearing loss in the children from rural area was higher as compared to those from semi urban area. This finding is along expected lines as has been reported by several other studies [5, 9]. The prevalence of hearing loss is observed in populations from lower socioeconomic status, which leads to poor nutritional status in children from rural areas and overcrowding. Also, poor follow up among such populations coupled with poor health facilities aggravates the situation. Such conditions are present in the Indian rural areas.

In most of the studies Pure Tone Audiometry (PTA) and/or Tympanometry was used to detect the presence of hearing loss. In our study we did not perform an audiological investigation, since the aim was to screen the children suspected of suffering from hearing loss and were advised to follow up for further management.

Ear wax was found to be the most common ear disease. Various studies globally, and in India have also reported similar incidence [6, 10-12]. Ear wax may cause hearing loss up to 40 db if impacted along with tinnitus and ear ache, discomfort, balance disorders, even otitis externa [13]. It may lead to poor performance in school [14]. It might also mask underlying diseases of the middle ear. Early diagnosis and its removal therefore, reduces avoidable morbidity. In our study the incidence of wax is higher in boys than girls, in rural areas. These are likely to be incidental findings on account of low sample size. Significant gender and rural- urban variations have not been reported in previous studies [13-16].

Our study reports a higher incidence of middle ear diseases in semi urban school as compared to rural school. However, most studies report a higher incidence in rural areas due to poor nutritional status of the children, poor hygiene practices, lack of awareness about healthy ear care habits, overcrowding in the winter season [11, 16-18]. Middle ear diseases like CSOM and OME are more likely to occur in children due to a higher incidence of causative factors like recurrent upper respiratory tract infections and adenoid hypertrophy. Such diseases are more likely to go undetected or untreated in rural areas due to the factors listed earlier [16-17].

Our study reports a higher incidence of middle ear diseases in girls similar to study [19]. Overall prevalence of OME is more in boys because of greater amount of occupational and environmental exposure [20].

Financial Support and sponsorship: Nil

Conflicts of interest: There are no conflicts of interest.

References

1. National guidelines for prevention and control of deafness [Internet]. [Cited 2021 Oct 29]. Available from: *https://main.mohfw.gov.in/sites/default/files/5189275161902525838 3.pdf*
2. World Health Organization. Deafness and hearing loss [Internet]. WHO 1st April 2021 [cited 2021 Oct 29]. Available from: *https://www.who.int/en/news-room/fact-sheets/detail/deafness-and-hearing-loss*

3. Varshney S. Deafness in India. *Indian Journal of Otology.* 2016; 22(2):73.
4. Garg S, Chadha S, Malhotra S, Agarwal AK. Deafness: burden, prevention and control in India. *Natl Med J India.* 2009; 22(2):79-81.
5. Kavitha AK, Jose AP, Anurudhan A, Baby JA. Hearing assessment of kindergarten children in manglore. *Journal of Clinical and Diagnostic Research* [serial online] 2009; 3:1261-1265.
6. Sapra G, Srivastava SP, Modwal A, Saboo R, Saxena G, Gyanu J. Hearing Assessment of School Going Children of Various Schools in Jaipur, Rajasthan. *Sch. J. App. Med. Sci.,* 2015; 3(2B):638-645.
7. About Meghalaya, Official website of Meghalaya Biodiversity Board, Government of Meghalaya, India [Internet]. [cited 2021 Oct 29]. Available from: *http://megbiodiversity.nic.in/about-meghalaya*
8. Minnesota Department of Health & Maternal Child Health Section. Hearing Screening Training Manual (Revised 12/2018). [Internet]. [cited 2021 Oct 29]. Available from: *https://www.isd318.org/cms/lib/MN50000512/Centricity/Domain/33/Hearing%20Screening%20Manual%202018.pdf*
9. Parvez A, Siddiui AR, Khan Z, Hasmi SF, Khan MS. Prevalence of hearing impairment among primary school children in rural and urban areas of Aligarh, Uttar Pradesh, India. *International Journal of Community Medicine and Public Health.* 2017; 3(5):1273-1277.
10. Hussain T, Alghasham AA, Raza M. Prevalence of Hearing Impairment in School Children. *Int J Health Sci (Qassim).* 2011; 5(2 Suppl 1):46-48.
11. Chishty S, Hamid S, Esbahi Lateef E, Chishty M, Wani A, Najeeb Q. A prospective study of hearing impairment in school going children of Ghaziabad city attending a tertiary care hospital. *Int J Res Med Sci.* 2014; 2(3):1127.
12. Nogueira JCR, Mendonça M da C. Assessment of hearing in a municipal public school student population. *Brazilian Journal of Otorhinolaryngology.* 2011; 77(6):716-720.
13. Clegg AJ, Loveman E, Gospodarevskaya E, Harris P, Bird A, Bryant J, Scott DA, Davidson P, Little P, Coppin R. The safety and effectiveness of different methods of earwax removal: a systematic review and economic evaluation. *Health Technol Assess.* 2010; 14(28):1-192.
14. Eziyi JAE, Amusa YB, Nwawolo CC, Ezeanolue BC. Wax Impaction in Nigerian School Children. *East and Central African Journal of Surgery,* 2011; 16(2):40-45.
15. Subha ST, Raman R. Role of impacted cerumen in hearing loss. *Ear, Nose, & Throat Journal.* 2006; 85(10):650, 652-3.
16. Minja BM, Machemba A. Prevalence of otitis media, hearing impairment and cerumen impaction among school children in rural and urban Dar es Salaam, Tanzania. *International Journal of Pediatric Otorhinolaryngology.* 1996; 37(1):29-34.
17. Mukara KB, Lilford RJ, Tucci DL, Waiswa P. Prevalence of Middle Ear Infections and Associated Risk Factors in Children under 5 Years in Gasabo District of Kigali City, Rwanda. *Int J Pediatr.* 2017; 4280583.
18. Kumar K, Pulikkottil Jose A, Anurudhan A, Baby JA. Hearing Assessment of Kindergarten Children in Mangalore. *Journal of Clinical and Diagnostic Research.* 2009; 3:1261-1265.
19. Chung JH, Lee SH, Woo SY, Kim SW and Cho YS. Prevalence and associated factors of chronic suppurative otitis media: Data from the Korea National Health and Nutrition Examination Survey, 2009–2012. *The Laryngoscope,* 2016; 126:2351-2357.
20. Santoshi Kumari M, Madhavi J, Bala Krishna N, Raja Meghanadh K, Jyothy A. Prevalence and associated risk factors of otitis media and its subtypes in South Indian population. *Egyptian Journal of Ear, Nose, Throat and Allied Sciences.* 2016; 17(2):57-62.

Cite this article as: Agnihotri T, Medhi R, Bhatia A and Pala S. Prevalence of ear disease in semi-urban and rural school going children. *Al Ameen J Med Sci* 2022; 15(2): 173-176.

*All correspondences to: Dr. Ratan Medhi, Junior Resident, Department of ENT, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Mawdiangdiang, Shillong-793018, Meghalaya, India. Email: ratan.medhi91@gmail.com