

Prevalence of Hearing Impairment in School Children in A Rural area of Lucknow- A Cross Sectional Study

Pankaj Kumar Verma¹, Deepak Chopra², Mariyam Khwaja³, Nidhi Jauhari⁴

¹Associate Professor, Department of ENT, Integral Institute of Medical Sciences and Research, Integral University, Lucknow, UP, India.

²Professor, Department of Community Medicine, Integral Institute of Medical Sciences and Research, Integral University, Lucknow

³Assistant Professor, Department of Community Medicine, Integral Institute of Medical Sciences and Research, Integral University, Lucknow.

⁴Senior, DRRMLIMS, Lucknow

Received: 05-01-2022 / Revised: 15-02-2022 / Accepted: 18-03-2022

Corresponding author: Dr. Deepak Chopra

Conflict of interest: Nil

Abstract

Background: Hearing loss in school going children causes behavioral complications and also it causes impact on childrens' academic achievement. It largely remains undetected; the aim of this study is to ascertain the prevalence of hearing impaired children in a school in a rural area of Lucknow district.

Methods: A Cross-sectional study was conducted to calculate the prevalence of hearing impairment in school children aged 6 years to 17 years in a school in a rural area in district Lucknow during month of July 2018 to December 2018. The students aural examination and audiological tests were performed by qualified Otolaryngologist and Audiologist respectively.

Results: This study was conducted among 597 school children of age group of 6 to 17 years. 95(15.9%) children were suffering from hearing impairment. Maximum 67 (70.5%) individuals had Wax, followed by 20 (21.0%) individuals had Chronic Otitis media, 7 (8.2%) individuals had Serous Otitis media and minimum number of individuals belongs to Post operative case of MRM (Modified Radical Mastoidectomy).

Conclusions: The hearing loss could lead to delay in the development in speech and language which leads to learning problems which in turn leads to poor academic achievements. As inference drawn from the present study that school screening is the most effective method of diagnosing deafness in school age children, this program should be extended to all school in all the areas to know the disease burden in society and early measure can be taken to avoid any disability.

Key words: Hearing impairment, Audiometry, Prevalence, Cross-sectional study.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Hearing is one of five basic senses and it aids in Communication with others. Most of the time unilateral hearing loss remains undetected. Hearing impairment effects child's ability to normally acquire the speaking skill. Even 15 dB Hearing loss is sufficient to create hearing disability in children and consequently impairment in their mental growth[1,2,3]. These disabilities further lead to behavioral complications in six functional areas: mental maturity, perception, speech, cognition and general intelligence, academic achievement and interpersonal behavior[4,5]. It also impacts academic achievement and it has been observed that 30% of children with unilateral hearing loss lag at least one to two years behind their normal peers in terms of academic achievement[6]. Adequate hearing acuity is of paramount importance and prerequisite in the personality development of a child. Hearing impairment especially during early age has serious ill effects on child's psycholinguistic skills as well. Definitive evidence is there to suggest that stimulation of auditory pathway from a very early age allows it and higher centers to mature properly and leads to optimum development of speech and language. The purpose of this study was to determine the prevalence and type of hearing loss amongst school going children and to evaluate the etiological factors of hearing loss and their distribution pattern.

Material and Methods:

Study design- Cross sectional study. Study Unit- School children aged 6 yrs to 17 yrs. Study place- An Intermediate school of village Dasauli , tehsil Baksi ka talab, district Lucknow, UP. Study period-July 2018 to December 2018. Sampling Methodology- Convenience purposive sampling. The school had 613 students in the age group of 6-17 years out of which 597 students consented to be the part of the study. The informed consent was taken from their parents. All the students were initially screened for Ear ,nose and throat examination. The students who were having any ear disease were checked for hearing loss by doing Tuning fork test. Those students who were having abnormal tuning fork test were called for audiometry test and tympanometry test, if needed at the departmental OPD.

Result:

Total of 597 subjects were studied in different age groups, with range from 6 years to 17 years (Mean age 12.52 ± 3.60). Maximum number of individuals were at the age of 15 years and 17 years i.e. 12.7%(76), followed by 10.9% (65) individuals in the age of 13 years, 10.2 % (61) individuals in the age of 14 years, 8.9% (53) individuals in the age of 16 years and 47 (7.7%) individuals in the age of 11 years. There were 390 (65.3%) males and 207 (34.7%) females in the study population (Table 1).

Table 1: Percent distribution number of children with respect to Age and Sex.

Age (Years)	Frequency (Number of Children)	Percent (%) Distribution
6	25	4.2
7	31	5.3
8	34	5.7
9	40	6.7
10	45	7.5
11	46	7.7
12	45	7.5
13	65	10.9

14	61	10.2
15	76	12.7
16	53	8.9
17	76	12.7
Sex Distribution		
Male	390	65.3
Female	207	34.7

Among 597 individuals, 502 (84.0%) subjects were having no hearing loss. Hearing loss was present in 95 (15.9%) individuals, out of which it is in right ear in 36 (6.0%) individuals and in left ear in 17 (2.8%) individuals and in both ears in 42 (7.2%) individuals. (Table 2).

Table No. 2: Percent distribution number of study subjects with respect to hearing loss (N=597).

Hearing Loss	Frequency (Number of Children)	Percent (%) Distribution
No Hearing loss	502	84.0
Right Ear	36	6.0
Left Ear	17	2.8
Both Ear	42	7.2

Out of 95 (15.9) individuals with hearing loss, maximum were in the age of 10 and 12 years ie (15.8%) individuals, followed by 12 (12.7%) individuals in the age of 9 years, 11 (11.5%) individuals in the age of 16 years, 9 (9.4%) individuals in the age of 14 years and 8 (8.4%) individuals in the age of 13 years and 15 years.

Out of 95 individuals with hearing loss, 55 (57.9%) individuals were male and 40 (42.1%) individuals were female (Table 3). Out of 95 individuals with hearing loss, maximum 93 (97.9%) individuals had Conductive hearing loss, only 2 (2.1%) individuals had mixed hearing loss (Table 3).

Table No. 3-Percent distribution number of age and sex of study subjects with hearing impairment (N=95)

Age (Years)	Frequency (Number of Children)	Percent (%) Distribution
6	4	4.2
7	2	2.2
8	3	3.1
9	12	12.7
10	15	15.8
11	3	3.1
12	15	15.8
13	8	8.4
14	9	9.4
15	8	8.4
16	11	11.5
17	5	5.4
Sex		

Male	55	57.9
Female	40	42.1
Types of Hearing Loss		
Conductive hearing loss	93	97.9
Mixed hearing loss	2	2.1

Out of 95 individuals with Hearing Loss, maximum 67 (70.5%) individuals had Wax, Followed by 20 (21.0%) individuals had Chronic Otitis media ,7 (8.2%) individuals had Serous Otitis media and minimum number of individuals belongs to Post operative case of MRM (Modified Radical Mastoidectomy) (Table 4).

Table 4: Percent distribution number of children with respect to Etiology of Hearing Loss (N=95)

Etiology of Hearing Loss	Frequency (Number of Children)	Percent (%) Distribution
Wax	67	70.5
Serous Otitis media	7	7.4
Chronic Otitis media	20	21.0
Post operative case of MRM (Modified Radical Mastoidectomy)	1	1.1

Discussion:

In our study a prevalence rate of as much as 15.9% was found in otherwise apparently normal school children. Prevalence of hearing loss in this study was found higher as compared to some previous studies like Mishra et al[7] and Tulli et al[8] who found a prevalence rate of 11.7% and 12.5% respectively . This may be due to that most of the study subjects belong to rural population who are having poor standard of living and ignorant about hearing loss in otherwise healthy children.

Conductive hearing was more prevalent having a prevalence rate of 97.9% as compared to mixed hearing loss which had a prevalence rate of only 2.1%, No case was found having sensorineural hearing loss. These results are similar to those of kalpana et al[9] who found a prevalence rate of conductive hearing loss of 96.22%.

Cerumen was the most common cause of hearing loss with prevalence of 67% followed by chronic suppurative otitis media 23.5% and serous otitis media 8.2%. all these are reversible causes which

can be cured by giving some awareness to the parents.

Awareness of this problem among the parents and school teachers is of utmost importance to detect this disability at an early age to provide the child the benefit of proper medical attention before the disability reaches serious proportions.

Since hearing loss is more prevalent in rural areas regular school health checkups and assistance of some voluntary organization for screening programs will reduce hearing handicap. Since conductive hearing loss is the commonest cause and it can be corrected by doing early intervention by trained medical staff.

Conclusion:

The hearing loss could lead to delay in the development in speech and language which leads to learning problems which in turn leads to poor academic achievements.

Hence simple measure like regular screening for ear diseases and hearing assessment done at the school level can prevent hearing loss. Health

education must be given to school children about the problems of hearing loss.

The early detection of ear diseases is essential as they are associated with hearing loss and these children are at increased risk. The parents must be made aware about the dangers of undetected hearing loss in school children during parents teachers meetings.

Otoscopic and audiological workup remains the main stay of detecting hearing impairment in school age children.

As inference drawn from the present study that school screening is the most effective method of diagnosing deafness in school age children, this program should be extended to all school in all the areas to know the disease burden in society and early measure can be taken to avoid any disability.

Funding: no funding sources Conflict of interest: none declared

Ethical approval : the study was approved by the institutional ethics committee.

Author contribution- MK, DC, PKV- Concept & Designing of study, Drafting of manuscript, Critical review & Finalization of manuscript. MK,DC, Acquisition, analysis and interpretation of Data.

References:

1. L. S. Eisenberg, K. C. Johnson, A. S. Martinez, L. Visser-Dumont, D. H. Ganguly, and J. F. Still, "Studies in pediatric hearing loss at the House Research Institute," *Journal of the American Academy of Audiology*. 2012 vol. 23, no. 6, pp. 412–421.
2. M. A. Islam, M. S. Islam, M. A. Sattar, and M. I. Ali, "Prevalence and pattern of hearing loss," *Medicine Today*. 2012 vol. 23, no. 1, pp. 18–21.
3. D. L. Sekhar, T. R. Zalewski, and I. M. Paul, "Variability of state school-based hearing screening protocols in the United States," *Journal of Community Health*. 2013 vol. 38, no. 3, pp. 569–574.
4. D. C. Byrne, C. L. Themann, D. K. Meinke, T. C. Morata, and M. R. Stephenson, "Promoting hearing loss prevention in audiology practice," *Perspectives on Public Health Issues Related to Hearing and Balance*. 2012 vol. 13, no. 1, pp. 3–19.
5. R. Müller, G. Fleischer, and J. Schneider, "Pure-tone auditory threshold in school children," *European Archives of Oto-Rhino-Laryngology*. 2012 vol. 269, no. 1, pp. 93–100.
6. L. Turton and P. Smith, "Prevalence & characteristics of severe and profound hearing loss in adults in a UK National Health Service clinic," *International Journal of Audiology*. 2013 vol. 52, no. 2, pp. 92–97.
7. S.C Mishra, H. Sharma, V. Bhusan, D. Dayal, "Preliminary study of hearing handicap in school going children". *Indian journal of Otolaryngology and Head and Neck Surgery*. 1992 Vol 1, 3.
8. B.S Tulli, T.L Parmar, S. Kumar, "Incidence of deafness in school going children". *Indian Journal of Otolaryngology*. 1988 40 (4) : 137.
9. R. Kalpana, P.C Chamyal, "Study of prevalence and aetiology of the hearing loss amongst school going children". *Indian journal of Otolaryngology and Head and Neck Surgery*. 1997 Vol. 49, No.2.