

## PREVALENCE OF HEARING IMPAIRMENT IN A RURAL PRIMARY SCHOOL IN KERALA

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### ABSTRACT

#### BACKGROUND AND AIMS

Hearing impairment and preventable ear diseases are found to be important health problems in children of school going age. This study was done to assess the prevalence of hearing impairment among school children of our area.

#### MATERIALS AND METHODS

A cross-sectional study was done in a local primary school where 741 students were screened for hearing impairment. Data was analysed to calculate the prevalence.

#### RESULTS

Prevalence of hearing impairment (excluding wax) in our study was 6.1%. Impacted wax was observed in 6.1% students. Commonest middle ear disease detected was chronic otitis media (2.7%) followed by Eustachian tube dysfunction (1.6%) and otitis media with effusion (1.4%).

#### CONCLUSION

Proper screening of school children helps to detect and correct majority of causes of hearing impairment, which offers a better life for them.

#### KEYWORDS

Hearing Impairment, Prevalence, Chronic Otitis Media.

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**INTRODUCTION:** Hearing loss is a handicap, which has been termed as the most desperate of all human calamities by Samuel Johnson.<sup>[1]</sup> Prevalence of deafness in India is fairly significant, about 63 million people (6.3%) suffering from significant auditory loss.<sup>[2]</sup> Impairment of hearing results in inability to interpret speech, delay in language acquisition, social isolation and stigmatisation.<sup>[3]</sup> Major proportion of childhood hearing impairment is due to preventable or modifiable cause. Early detection of these cases is of utmost importance as it helps the child to have a better future.<sup>[4]</sup> Widely employed tests for the detection of hearing loss includes tuning fork tests (Rinne test, Weber test and Absolute Bone Conduction test), pure tone audiometry, speech audiometry, tympanometry and Brainstem Evoked Response Audiometry (BERA). Hearing evaluation in school going children is necessary to detect and correct hearing loss at an early age. Children require normal or adequately corrected hearing to facilitate formal education process. We conducted this study to observe the prevalence of clinically detectable hearing impairment

among lower primary school children in our area and to delineate its aetiology.

**MATERIALS AND METHODS:** Ours was a cross-sectional study, which was conducted in a rural primary school of Alappuzha district, Kerala, South India. After getting permission from Research and Ethical Committee of Government T D Medical College, Alappuzha, we contacted the headmaster of the selected school explained about the research procedures and its merits for the students. Consent was obtained from the parents of students who were to be included in the project. Study population constituted 741 students, 361 boys and 380 girls ranging in age from 6-10 years. Procedure of examination was explained in detail and demonstrated to the children. A proper history of aural, nasal and throat symptoms was obtained from all students. Otoscopic examination was done in all cases to assess external ear and tympanic membrane. Rinne, Weber and Absolute Bone Conduction tests were done using tuning forks of frequency 256, 512 and 1024 Hz. Rinne test negative was taken as conductive hearing loss and reduced absolute bone conduction as sensory neural deafness. Children with suspected hearing defects were taken to the ENT Department of our hospital where they were reassessed clinically and by tuning fork tests after removing wax and ear discharge. Children who continued to have hearing loss were subjected to pure tone audiometry. In relevant cases, tympanometry was also done.

All data were entered in MS Excel spreadsheet and analysed. Prevalence of hearing loss before and after

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excluding wax in our locality was calculated. Different aetiologies of hearing impairment in our children were also noted.

**RESULTS:** Out of the 741 students examined, 361 (48.7%) were boys and 380 (51.3%) were girls. After initial screening, 90 children showed hearing deficit, which was conductive in 87 (11.7%) and sensorineural in three (0.4%). Prevalence of hearing loss was almost equal in both sexes (Table 1). Maximum prevalence of hearing impairment was observed in age group >8-9 (n=40, prevalence=5.4%) and minimum in 6-7 age group (n=10, prevalence=1.4%). 18 students belonged to the >7-8 age group while 22 were in the >9-10 group. Auditory impairment was previously noted by either parent or teacher in 39 (5.3%) students. Past history of ear discharge was obtained in 20 (2.7%) children. Impacted wax was observed in 45 (6.1%) students of which 29 had bilateral ear wax. Chronic otitis media was detected in 20 (2.7%) students followed by Eustachian tube dysfunction in 12 (1.6%) and otitis media with effusion in 10 (1.4%) students. Three children showed sensorineural hearing loss of which one showed profound bilateral sensorineural loss due to congenital rubella syndrome. Table 2 summarises the aetiology of hearing impairment in children in our area. All students with wax in external auditory canal were reassessed after wax removal. On excluding wax, 45 (6.1%) students showed hearing loss due to various middle and inner ear pathology, details of which are shown in Table 3. Twenty students had chronic otitis media while Eustachian tube dysfunction and otitis media with effusion were noted in 12 and 10 wards, respectively. Table 4 lists the prevalence of various aetiologies of hearing loss excluding wax in our study. Total prevalence of hearing loss before and after excluding wax in the present study was found to be 12.1% and 6.1% respectively details of which are shown in Table 5.

Sex	Number of Children Affected	Prevalence (%)
Male	44	5.9
Female	46	6.2

**Table 1: Sex and Prevalence of Hearing Impairment**

Aetiology	Number of Students	%
Wax (Rt) ear	12	1.6
Wax (Lt) ear	4	0.5
Wax (B/L)	29	3.9
COM (Rt)	10	1.3
COM (Lt)	9	1.2
COM (B/L)	1	0.1
OME (Rt)	1	0.1
OME (Lt)	0	0
OME (B/L)	9	1.2
ETD (Rt)	4	0.5
ETD (Lt)	1	0.1
ETD (B/L)	7	0.9
Sensorineural hearing loss	3	0.4

**Table 2: Aetiology of Hearing Impairment (n=741)**

COM-Chronic otitis media  
 OME-Otitis media with effusion.  
 ETD-Eustachian tube dysfunction.

Aetiology on Excluding Wax	Number of Students	%
COM	20	44.4
ETD	12	26.7
OME	10	22.2
Sensorineural Hearing Loss	3	6.7

**Table 3: Aetiology of Hearing Loss Excluding Wax (n=45)**

Aetiology	Number of Students	Prevalence (%)
COM	20	2.7
ETD	12	1.6
OME	10	1.4
Sensorineural Hearing Loss	3	0.4

**Table 4: Prevalence of Aetiology of Hearing Loss Excluding Wax**

	Hearing Loss	Number of Children	Prevalence (%)
With Wax	Conductive	87	11.7
	Sensorineural	3	0.4
	<b>Total</b>	<b>90</b>	<b>12.1</b>
Excluding Wax	Conductive	42	5.7
	Sensorineural	3	0.4
	<b>Total</b>	<b>45</b>	<b>6.1</b>

**Table 5: Hearing Deficit and its Prevalence**

Study	Prevalence (%)
Kalpna et al <sup>[1]</sup>	4.75
Ebenezer et al <sup>[4]</sup>	0.16
Jacob et al <sup>[5]</sup>	7.8
Agarwal et al <sup>[6]</sup>	5.93
Verma et al <sup>[7]</sup>	15.3
Shaheen et al <sup>[8]</sup>	5.63
Present Study	2.7

**Table 6: Comparison of Prevalence of COM in Various Studies**

**DISCUSSION:** Hearing loss in a child can remain unnoticed for long time and even mild degree of hearing impairment may affect proper learning in noisy atmosphere. Prevalence of hearing impairment in our study excluding wax was 6.1%. Jacob et al<sup>[5]</sup> and Kalpna et al<sup>[1]</sup> in their reports observed the prevalence of hearing impairment to be 11.9% and 11%, respectively. Another study from rural Pakistan recorded a prevalence of 7.9%.<sup>[9]</sup> The lower prevalence in our study could be due to increased health awareness among people and easy availability of healthcare in our state. Similar study from southern part of our state observed an even lesser prevalence (2.2%) of hearing loss.<sup>[4]</sup>

Impacted wax was the single most common cause of hearing impairment in our series (6.1%), which is in accordance with other studies.<sup>[4,5,10]</sup> Commonest middle ear pathology detected in our study was Chronic Otitis Media (COM), which showed a prevalence of 2.7%. Table 6 compares the prevalence of COM in various studies. Other middle ear diseases observed by us were Eustachian tube dysfunction and otitis media with effusion, the prevalence being 1.6% and 1.4%, respectively. These results are lower than many of the previous studies.<sup>[5,6]</sup> In the present study, all children with middle ear effusion showed conductive hearing loss on audiometry and tympanometry whereas Jacob et al observed normal audiogram in 46.4% of similar cases. Newer audiometry methods like tympanometry and Brainstem Evoked Response Audiometry (BERA) should be included in the screening programmes especially in uncooperative children and newborns.

Lower prevalence of hearing impairment in our area could be attributed to the better healthcare facilities available here and its proper utilisation by the people. Our study, highlights the need for including hearing assessment in school health programmes, which will further help to reduce the otological morbidities in our population. Parents and teachers should be motivated to detect hearing handicap in children at the earliest so that proper treatment can be offered. Conductive hearing loss is by far the commonest cause of hearing handicap, which is treatable in most cases if managed in time. In this era of cochlear implants, even sensorineural hearing loss is correctable if detected early, which emphasises the need for better community awareness of this handicap.

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