



# Study of Hearing Impairment in School-Going Children of Ghaziabad

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## Abstract

**Introduction** Hearing is one of the traditional five senses that is also the fastest sense. Inadequate hearing acuity especially during early age has serious effects on the development of a child's personality. According to World Health Organization, around 466 million people worldwide have disabling hearing loss and of these ~34 million are children. Hearing loss in children may occur due to several reasons, but ~60% of childhood hearing loss occurs from preventable causes. An early detection of these conditions plays an important role in reduction in magnitude of this problem.

**Aims and Objectives** The motive of this study is to estimate the prevalence of hearing impairment among school-going children in Ghaziabad on the basis of otological findings and tuning fork tests.

**Materials and Methods** A random sample of 500 school-going children between the ages of 6 to 14 years was selected from children attending ENT OPD in Santosh Hospital, Ghaziabad, over a period of 8 months from July 2019 till February 2020.

**Results and Conclusion** Prevalence rate encountered in this study was 13%, with unilateral hearing loss being more common than bilateral. The commonest cause was found to be cerumen. A higher prevalence was found in children from semiurban and low socioeconomic background. Since the commonest cause is preventable and readily correctable by proper management, early detection can reduce the burden of this disability.

## Keywords

- ▶ hearing impairment
- ▶ children
- ▶ school-going children

## Introduction

Hearing is one of the five vital senses of humans; it enables us to communicate with others in the way that no other senses can. Hearing impairment is a problem that commonly affects people all over the world. Consequences of hearing loss include inability to appreciate speech sounds and therefore causing a reduced ability to communicate, delay in language acquisitions, economic and educational disadvantages, social isolation, and stigmatization.

The term “Deafness” means little or no hearing at all; the World Health Organization (WHO) recommends that the

term “Deaf” should only be applied to those whose hearing impairment is so severe that they will not benefit from any type of hearing amplification. The WHO estimates show that the number of people around the world with disabling hearing loss was around 466 million, of these ~34 million are children and with 75% of these residing in developing nations.

It is estimated that in India ~63 million people suffer from hearing impairment and according to the data by National Program for Prevention and Control of Deafness, four in every 1,000 children are suffering from hearing loss.

Inadequate hearing ability especially during an early age has serious repercussions on the development of a child's

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personality leading to poor psycholinguistic skills resulting in inferior school performance. Factors that affect the quality of speech and language development include date of diagnosis, age of onset of hearing loss, residual hearing, family support, and rehabilitative measures.

Hearing loss of even 15 dB can cause hearing disability in kids and consequently impairment in mental growth. A child with congenital deafness of severe to profound degree might never develop proper speech. Conductive hearing losses are amenable to timely intervention by conservative or surgical measures.

Most of the times mild and unilateral hearing losses remain undetected due to unawareness or reluctance of the child to express the problem in front of their folks and teachers. An early detection of these conditions plays an important role, as remedial steps can be initiated at the earliest before chronic pattern of disease sets in.

## Aim and Objectives

Following are the aims of this study:

- To adjudge the prevalence of hearing impairment in school-going children of Ghaziabad.
- To find the cause of hearing loss based on otological findings and tuning fork tests.

## Materials and Methods

A random sample of 500 school-going children between the ages of 6 to 14 years was taken for the study from ENT OPD of Santosh Hospital, Ghaziabad, over the period of 8 months from July 2019 till February 2020. The study protocol was cleared by institutional ethical committee. All the children included in this study were with the permission of their parents/guardians. Children with previous history of audiological intervention and children with chronic diseases who were on medication were excluded from the study.

A proper history was taken giving importance to any aural, nasal, and throat complaints; past history of any trauma, speech development, exposure to pathogens, and birth history was taken, and personal history in regard to their socio-economic status was taken from the parents and recorded.

Children were subjected to a detailed ENT examination, otoscopic examination, and tuning fork tests.

All children who were detected with clinical abnormality were counselled for further detailed examination and investigations.

## Observations and Results

Five-hundred school-going children aged between 6 and 14 years who attended ENT OPD at Santosh Hospital, Ghaziabad, were examined to assess hearing impairment.

Sixty-five children out of 500 were found having hearing loss indicating a prevalence rate of 13% among the school-going population (►Fig. 1).

A slightly higher percentage of male children (52.30%) was found to be affected than female children (47.69%) (►Table 1; ►Fig. 2).

It was observed that children belonging to lower socioeconomic class (64.61%) were significantly more affected than middle class (26.15) and higher socioeconomic class (9.23%) (►Table 2; ►Fig. 3).

Through tuning fork tests, it was found that conductive type (87.69%) of hearing loss was much more prevalent than sensorineural type (12.30%) (►Table 3; ►Fig. 4).

Among the affected children, bilateral hearing loss (46.15%) was more common than unilateral hearing loss (53.84%) (►Table 4; ►Fig. 5).

Most common presenting complaint was ear pain (32.30%) followed by ear discharge (24.53%) and ear itching (21.53%) (►Table 5; ►Fig. 6).

Most common finding in our study on the basis of otoscopic examination was found to be cerumen (36.92%) followed by otomycosis (30.76%) and tympanic membrane perforation (16.92%) (►Table 6; ►Fig. 7).

## Discussion

In the following study, a total of 500 school children were screened, out of these 65 were found to have hearing impairment due to various causes. Overall prevalence was 13%; these results are very similar to those of Olusanya et al,<sup>1</sup> Tuli et al,<sup>2</sup> and Mishra et al,<sup>3</sup> in which prevalence rate of 13.9, 12.25, and 11.7% was found, respectively. A slight difference in gender distribution was noted with male children being more affected (52.30%) than females (47.69%). The maximum number of cases of belonged to low socioeconomic strata.

The results (64.61%) are similar to those by Gupta et al<sup>4</sup> but inverse results have been stated by Mishra et al.<sup>5</sup>

Bilateral type of hearing loss was more common (53.84%) in our study than unilateral type of hearing loss (46.15%) similar to those of Hamida et al.<sup>6</sup>

Overall conductive hearing loss (87.69%) was significantly more than sensorineural hearing loss (12.30%). This closely agrees with the studies of Tuli et al<sup>2</sup> (99.59%), Elahi et al<sup>7</sup>, Rao et al (81.6%),<sup>8</sup> Maharajan et al<sup>9</sup> (87%), Sapra et al<sup>10</sup> (96.79%) who also noted a higher incidence of conductive hearing loss among children.

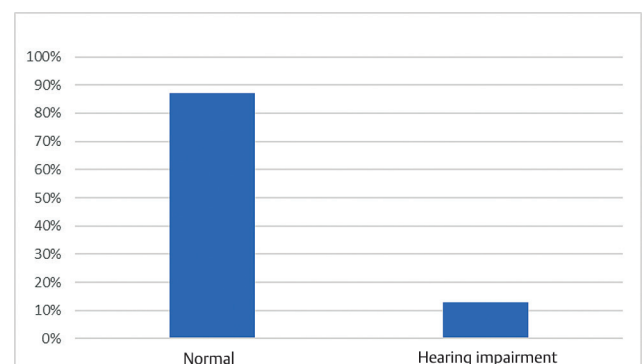
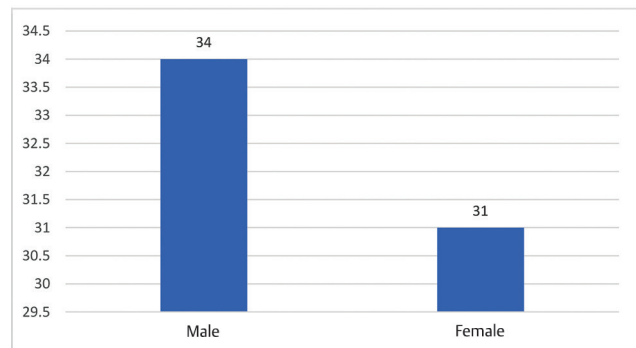


Fig. 1 Prevalence of hearing loss in school-going children.

**Table 1** Gender distribution

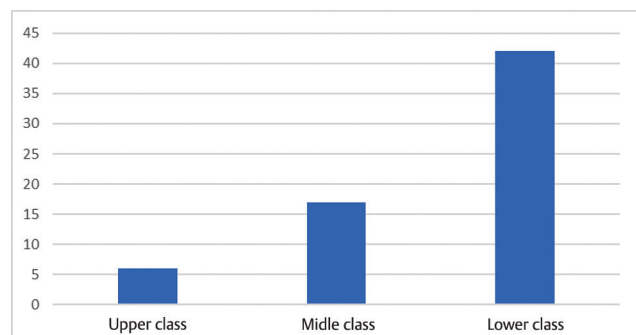
Gender	Total	Prevalence (%)
Male	34	52.30
Female	31	47.69



**Fig. 2** Gender distribution.

**Table 2** Socioeconomic distribution

Socioeconomic status	No. of children	Prevalence (%)
Upper class	6	9.23
Middle class	17	26.15
Lower class	42	64.61



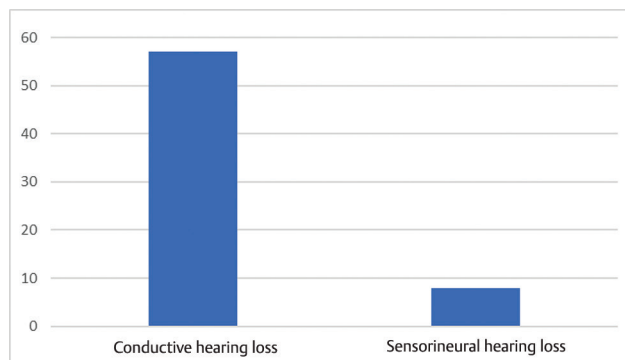
**Fig. 3** Socioeconomic distribution.

**Table 3** Type of hearing loss

Type of hearing loss	No. of children	Prevalence (%)
Conductive hearing loss	57	87.69
Sensorineural hearing loss	8	12.3

In this study of 65 patients of hearing impairment, most common accompanying complaint was of ear pain (32.30%) followed by ear discharge (24.61%).

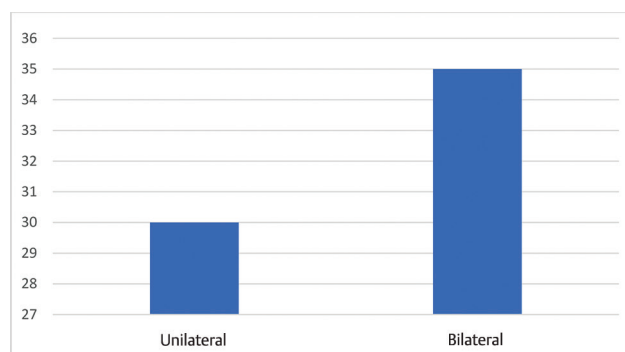
Most common cause as per otoscopic finding within this study was found to be wax (36.92%); this figure closely resembles the results of Mishra et al<sup>11</sup> who observed that out of all cases of hearing impairment, 45.2% of children were having wax, also similar to Thakur et al<sup>12</sup> (45.76%) and Olusanya<sup>13</sup> who documented 52.6% of school-going children having impacted wax in Lagos. Studies of Sapra et al<sup>10</sup>, Rao et al<sup>8</sup>, and Nogueira and Mendonça<sup>14</sup> also have similar results.



**Fig. 4** Type of hearing loss.

**Table 4** Laterality of hearing loss

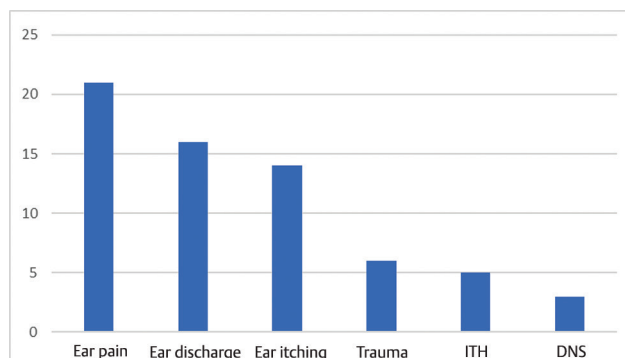
Type of hearing loss	No. of children	Prevalence (%)
Unilateral	30	46.15
Bilateral	35	53.84



**Fig. 5** Laterality of hearing loss.

**Table 5** Symptomatic distribution

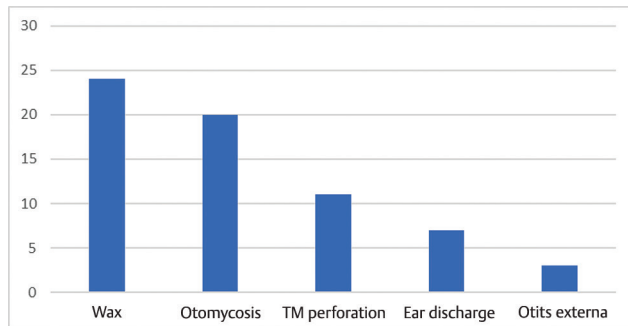
Symptoms/Predisposing factors	No. of children	Prevalence (%)
Ear pain	21	32.30
Ear discharge	16	24.61
Ear itching	14	21.53
Trauma	6	9.23
Inferior turbinate hypertrophy	5	7.69
Deviated nasal septum	3	4.61



**Fig. 6** Symptomatic distribution.

**Table 6** Examination findings

Otoscopic findings	No. of children	Prevalence (%)
Wax	24	36.92
Otomycosis	20	30.76
Tympanic membrane perforation	11	16.92
Ear discharge	7	10.76
Otitis externa	3	4.61

**Fig. 7** Examination findings.

Otomycosis was found to be the second most common (30.76%) cause for hearing loss in this study in comparison to the Sapra et al study<sup>10</sup> (7.63%).

Other nose and throat findings were rhinitis (inferior turbinate hypertrophy) in 7.69% of children and deviated nasal septum in 4.61%. About 9.23% also gave history of trauma followed by hearing loss.

## Conclusion

Hearing loss in children can mostly remain undetected due to unawareness or sometimes reluctance of children to express this disability in front of their parents and teachers. In our study, a prevalence of 13% was found in otherwise apparently healthy children.

Most of the causes of hearing impairment in school-going children are conductive in nature and an early recognition leads to reversal of the problem by a simple medical or surgical intervention. Majority of the causes like wax or mycosis that leads to hearing impairment are temporary in nature and once removed, hearing returns to normal without any permanent disability. Subsequently causes like otitis media if not early detected may lead to permanent damage if early corrective measures are not taken.

If hearing loss is noted at birth, it is most likely to be sensorineural in nature. This may accompany many other syndromes like Usher syndrome, Pendred syndrome, Waardenburg syndrome, Otosclerosis, Treacher Collins syndrome, and Alport syndrome. However, sensorineural hearing loss of acquired nature can be due to maternal use of ototoxic drugs, maternal rubella, birth trauma, and hyperbilirubinemia.

Inferences drawn from this study signify that early screening is of uttermost importance in spotting hearing loss in children; steps should be taken to extend screening programs in all the schools.

Otoscopic examination has been confirmed to be the most effective equipment time and again in preliminary screening of ear-related problems. It is less time consuming and all the more informative tool. Otoscopic examination combined with tuning fork tests was effective in detecting type of hearing loss, which is important for further evaluation of the type of lesion responsible for hearing impairment.

Lastly, it is important to advise parents of such children about remedial available for the reversal of their child's hearing impairment, also about the preventive measures that can be inculcated in daily routines.

Parents should be counseled to support and encourage their children dealing with permanent hearing disability thus helping them develop adequate speech and language skills.

## Conflict of Interest

None declared.

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