Original Research Article

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Prevalence of hearing impairment in school children (aged 8-14 years) in the villages of Vadamavanthal, Tamil Nadu, India

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ABSTRACT

Background: Children with hearing loss, congenital or acquired, have minimum or no schooling. There are lots of school dropouts in children who have hearing impairment due to trouble keeping up with their peers. This not only affects the economic development but also the social development in communities and countries. The importance of hard of hearing is often largely underestimated since it is an invisible disability. It is mostly asymptomatic, and thus easily overlooked .Not many parents understand about it, till the child's teacher mentions it to them.

Methods: A cross sectional study was conducted to estimate the prevalence of hearing impairment in school children aged 8 years to 14 years in the schools in Vadamavanthal area during the months of January 2013 to July 2013. The students were interviewed through pre-tested questionnaire and aural examination was done by a qualified otolaryngologist.

Results: This study was conducted among 700 school children of age 8 to 14 years. 216 (30.9%) school children were suffering from hearing impairment. It was more prevalent in the age group of 8 years followed by the age group of 14 years.

Conclusions: Simple measures like regular screening for ear diseases and hearing assessment done at the school level can help identify hearing impairment. Hearing impairment leads to poor academic achievement and affect the child's vocational choices in future.

Keywords: 8 years, 14 years, Hearing loss, School children

INTRODUCTION

Around 360 million people of the world population suffer from disabling hearing loss. Out of which 32 million are children. Disabling hearing loss refers to hearing loss greater than 40dB in the better hearing ear in adults and a hearing loss greater than 30dB in the better hearing ear in children. The overall development of a child is determined on how healthy a child is. It determines his/her ability to acquire knowledge and skill. Though

there are various reasons, a child is to be labeled as challenged, one of the most important reason is disruptive functioning of the five basic senses (to see, to hear, to smell, touch and to taste).

Hearing loss is one of the conditions that affect a larger number of individuals at any given moment. As per Global Health Estimates 2012, in south East Asia region, out of 184,899 children in the age group of 5 years to 14 years, 162,547 children suffer from sense organ diseases.

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Out of which 61,813 suffer from refractive errors and 55,230 suffer from hearing loss.²

Hearing, one of the five basic senses, is what makes us understand, and socialize. Our ears never sleep, not even when we sleep. Hearing gives us access to the world of spoken language and therefore to direct communication with other people. Hearing impairment is defined by IDEA [Individuals with Disabilities Education Act] as "an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but is not included under the definition of "deafness.". Deafness is defined by IDEA [Individuals with Disabilities Education Act] as "a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification that adversely affects a child's educational performance."

WHO states that chronic otitis media is the leading cause of hearing loss among children. Wax, self-induced trauma with twigs or ear buds and any growth in the external auditory canal or middle ear are the other causes worth mentioning. Beside these conditions, foreign body in ear is typically evident in children. Only one third of the community with symptoms seeks for primary care. Most of them are treated with homemade remedies, over the counter drugs and finally meet a qualified physician or otolaryngologist when none of the remedies have worked.

The above mentioned causes when left untreated or ignored for a long time could lead to a residual illness in the child that could affect the hearing indirectly.

Most of the studies done pertaining to hearing loss in children are hospital based. The clinical cases that the physician gets to treat in a hospital represent the floating tip of an iceberg and in no way comparable to the latent, in apparent undiagnosed cases in the community³. Hence this study was undertaken in primary schools situated in Vadamavanthal ward area.

METHODS

A cross sectional study was conducted to estimate the prevalence of hearing impairment in school children aged 8 years to 14 years Study was conducted in the schools in Vadamayanthal ward area.

Vadamavanthal ward is a gram panchayat in Cheyyar sub district, Thiruvannamalai District, Tamil Nadu. Students from the Schools in the ten villages (namely Namandi, Vadamavanthal, Hariharapakkam, Vellakolam, Thalikkal, Ozhugavakkam, Chettithangal, Arasankuppam, Thiruppanangadu and Pillanthangal) in the ward were selected for this study.

Study was conducted during the months of January 2013 to July 2013. Students aged 8 years to 14 years were

included in this study. Students with congenital defects like cleft palate, Students with congenital hearing loss, Students who are or were using hearing aids, Students who had undergone cochlear implant surgery, Students not willing to participate in this study were excluded from the study.

School children till the age of fourteen were selected since as per the gazette of India august 27 2009, chapter two "Every child of the age of six to fourteen years shall have a right to free and compulsory education in a neighbourhood school till completion of elementary education. The age group of eight years was selected because in this age, voluntary threshold could be easily measured; it is the age when middle ear problems should have resolved and is the age when education starts to require more cooperation and input from children.

There are six elementary schools and four higher secondary schools functioning. For this study all the ten schools were included. Numbers of children in the age group of eight to fourteen in these six elementary schools were 47, 44, 45, 48, 45, and 44. Numbers of children in the age group of eight to fourteen in these four higher secondary schools were 123, 82, 113, and 131.

All the children in the age group of eight to fourteen from these ten schools were included in this study. The students were briefed about the study. And after getting oral assent the questionnaire was administered. This was followed by examination of the ear with an Otoscope and hearing assessment using a 512 tuning fork by a qualified Otolaryngologist. To administer the interview schedule and ear examination, three to five days were spent in each primary school and eight to ten days in every higher secondary school.

A pilot study was conducted among eighty two students of both sexes in the age group of eight years to fourteen years from one higher secondary school.

Three rooms were selected for individual questioning of the students. Each room had a teacher from the respective schools to help organize and make a comfortable environment for the students. The questionnaire was administered to each student by the investigator. All students were explained about the study individually and questioned in the three separate rooms to prevent inhibitions. Every question was read out to the student from the questionnaire in his/her local dialect (Tamil) and doubts raised by the student were cleared. The answers given by the students were marked in the questionnaire by the Investigator. It took around ten minutes to fifteen minutes for a student to finish a questionnaire. Then the students were led to another room where a qualified Otolaryngologist examined their ears with an Otoscope. The procedure of tuning fork tests was explained to the students. The tests were conducted in an almost silent room using a 512 Hz tuning fork. Examination of the ear and conduction of three basic tuning fork tests on each student took around ten to fifteen minutes. On the whole it took around twenty five to thirty minutes to complete the questionnaire and examine a single student. The same procedure was followed all through the study. After appropriate modifications in the questionnaire were made the final version of the questionnaire was prepared.

Numbers and codes were assigned to each variable. Data entry was done in Excel spread sheet (Microsoft Office 2010). Data was later transformed to SPSS (Statistical Package for Social Sciences) software (version 21.0). Descriptive statistics was used to present the data.

RESULTS

Majority of children in our study were in the age group of thirteen years (Figure 1). In this study 52% of the children were males (Figure 2).

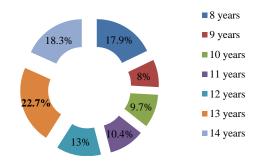


Figure 1: Age-wise distribution (in years).

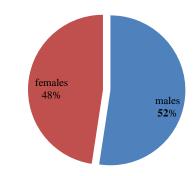


Figure 2: Sex-wise distribution.

Out of 700 students only 94 students (13.4%) have visited a doctor for ENT related illness (Table 1).

Table 1: Consultation for ENT related illness.

Doctor Consultation	Frequency (%)
Consulted	94 (13.4%)
Not consulted	606 (86.6%)
Total	700

In this study 95 (13.6%) of the students have experienced hard of hearing in classrooms (Table 2).

Table 2: Hearing impairment.

Hearing impairment	Frequency (%)
Present	95 (13.6%)
Absent	605 (86.4%)
Total	700

Out of 700 students who participated in this study, 484 (69.1%) of the students had normal hearing and 216 (30.9%) had hearing impairment. Of those who had hearing impairment, 132 (18.9%) had hearing impairment in both the ears and 84 (12%) had hearing impairment in either of the ears (Figure 3).

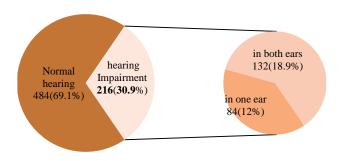


Figure 3: Hearing impairment.

Among the students who had hearing impairment, the occurrence was equal among both sexes (Figure 4).

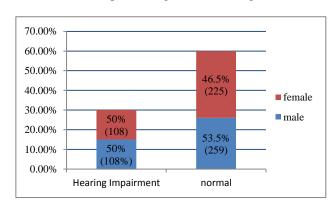


Figure 4: Sex-wise distribution of hearing impairment.

Among the students with hearing impairment, 63.2% gave history of hearing impairment and 25.8% students with normal hearing gave history of hearing impairment (Figure 5).

Of the 700 students who participated in this study, hearing impairment was more in the age group of 10 years followed by the age group of 11 years (Table 3).

History of decreased hearing in classrooms was more 48 (22.2%) among the students suffering from hearing

impairment and less 32 (6.6%) among students with normal hearing which is statistically significant (Table 4).

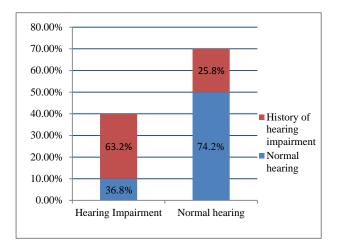


Figure 5: Hearing impairment and history of hearing impairment.

Table 3: Age wise distribution of children with hearing impairment.

Age	Normal hearing (%)	Hearing impairment (%)	Total (%)
8	82 (65.6%)	43 (34.4%)	125 (100%)
9	44 (78.6%)	12 (21.4%)	56 (100%)
10	40 (58.8%)	28 (41.2%)	68 (100%)
11	47 (64.4%)	26 (35.6%)	73 (100%)
12	63 (69.2%)	28 (30.8%)	91 (100%)
13	120 (75.5%)	39(24.5%)	159 (100%)
14	88 (68.8%)	40 (31.3%)	128 (100%)
Total	484 (69.1%)	216 (30.9%)	700 (100%)

Table 4: Hearing impairment and decreased hearing in the class room.

History of decreased hearing in class room.	Hearing impairment (%)	Normal Hearing (%)	Total
Yes	48 (22.2%)	32 (6.6%)	80
No	168 (77.8%)	452 (93.4%)	620
Total	216 (100%)	484 (100%)	700

Chi square-35.955, df-1, p<0.001].

DISCUSSION

The objective of the study was to estimate the prevalence of hearing impairment in children aged 8 to 14 years in the schools in Vadamavanthal area.

In this study a total of seven hundred school children participated. Among them 216 (30.9%) students were found to be suffering from hearing impairment. In a study

conducted in Nigeria by Nduka, Ijeoma, out of 802 children who participated, 523 children had otologic diseases leading to hearing impairment. This could be because of poor standard of living among the children in Nigeria. Here 50.5% of the participants were male when compared to the 52% of male children who participated in this study. In another study in south east Iran 8.2% of students suffered from hearing impairment and hearing impairment in males and females was 8.8% and 7.1%, respectively. In this study hearing impairment in male and female school children was 46.5% and 50% respectively. This higher prevalence in the Nigerian study may be due to lack of awareness about the problems of hearing loss and the need for audio logical assistance

In a study conducted in south Sinai, Egypt, 19.3% of the participants had hearing impairment. This is less when compared to this present study.⁶

In another study conducted in Jaipur, Out of 1500 school children examined incidence of hearing impairment was 31.91 percent.⁷ It was observed that younger age group was more affected. All the above mentioned findings correlate with this study results.

In another study conducted in Nigeria, 162 children had hearing impairment in right ear and 54 children had hearing impairment in left ear. In this study, 132 children suffered from hearing impairment in the right ear and 84 children suffered from hearing impairment in the left ear.

In a study which was conducted in Malaysia, 53% were boys and 47% were girls. The prevalence of hearing loss in that school population was 15%. The students who have poor academic performance have been shown to be significantly associated with mild hearing impairment.

Limitations

Confirmation of hearing loss using audiometric equipment was not done because of logistic difficulties.

CONCLUSION

This 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 achievement. This leads to social isolation and poor self-esteem. This may have an effect on vocational choices in future.

Hence simple measures 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 need for regular hearing assessment must be made clear to both the students and school authorities The early detection of ear diseases is essential, as they are associated with hearing loss, and children with hearing loss may be at increased risk. The parents must be made aware about the dangers of undetected hearing loss in school children in parent's teachers meetings. Delay in identification and management of hearing impairment may impede the child's ability to adapt to family and school activities and community life. Parents and teachers should be educated on how to identify symptoms for ear diseases in children.

Early identification and management through hearing screening programs can improve the linguistic and educational outcomes for the child.

Teachers should be given proper health education on how to identify ear diseases and to refer the students if need arises to health facilities

School Health Program is as an important tool for the provision of preventive and curative health services to the population. This program is functioning well in states like Tamil Nadu, Kerala, Gujarat and West Bengal. The components of school health program are screening of general health, assessment of Anemia/Nutritional status, visual acuity, hearing problems, dental checkup, common skin conditions, heart defects, physical disabilities, learning disorders and behavior problems .More emphasis should be given for screening hearing disorders.

The Speech and Language Association of America (ASHA) has provided the following guidelines for screening of school children for hearing deficits

- The program should be run annually for children aged 3–9 years.
- After nine years of age, the program should be performed annually for children at risk.

Such guidelines can also be followed in our country too. Yearly screening for ear diseases can be done on children from the age of school entry to a minimum of ten years of age .The children at risk can be reviewed annually after the age of ten and referred to higher centers if necessary.

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