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EYE PROBLEMS IN CHILDREN WITH HEARING IMPAIRMENT

Ophthalmology

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ABSTRACT

Background: Ocular problems are more common in children with hearing problems than in normal children. Neglected visual impairment could aggravate educational and social disability.
Aim and Design: To detect and treat visual impairment, if any, in hearing-impaired children. Observational, clinical case series of hearing-impaired children.
Materials and Methods: Hearing-impaired children referred from ENT underwent detailed visual acuity testing, refraction, external ocular examination and fundoscopy. Ocular motility testing was also performed. Refractive errors and squint were treated as per standard practice.
Results: The study involved 100 hearing-impaired students between four and 20 years of age. A quarter of them (24%) had ocular problems. Refractive errors were the most common morbidity (18.5%), but only 12 children were using appropriate spectacle correction at presentation. Fifty children had visual acuity less than 20/80 at presentation. Other common conditions included strabismus in 12 (1.3%) children, and retinal pigmentary dystrophy in five (0.6%) children.
Conclusion: Ocular problems are common in hearing-impaired children. Screening for ocular problems should be made mandatory in hearing-impaired children, as they use their visual sense to compensate for the poor auditory sense.

KEYWORDS:

Hearing-impaired children, vision-impaired, refractive errors

INTRODUCTION

Available evidence suggests that ophthalmologic screening and detection of visual problems in deaf children is important because the vast majority of knowledge is obtained through the senses of sight and hearing, some through the tactile, kinesthetic and olfactory senses. When one of these is seriously impaired, the other is used to compensate the disability, so the deaf population may compensate by making greater use of visual-perceptual cues than their normal hearing peers, and thus even a mild refractive error may reduce the visual cues available to the deaf mute person. [1]

Secondly, many researchers have reported high incidences of ophthalmologic abnormalities among deaf children compared with the hearing population of the same age. [2],[3] A review of the literature suggests 35 to 57% visual defects among hearing-impaired children. [2],[3],[4],[5],[6],[7],[8] Therefore, particular attention must be paid to ocular abnormalities in deaf children, as their early detection and proper treatment are the best assurances for the maximum possible social and professional performance of these students. [1]

The aim of the study was to determine the nature and prevalence of ophthalmologic abnormalities in children.

Materials and Methods

Each child's hearing and speaking ability was recorded as reported by the ENT specialist along with the cause and type of deafness, where this information was available. The hearing ability had been measured in decibels. Hearing impairment was classified as mild, moderate, severe and profound deafness as per World Health Organization norms.

The ophthalmologic work-up included visual acuity assessment, pupillary evaluation, ocular motility examination, and alternate cover test and fundus examination.

Snellen's E-Chart was used for examining children over five years of age. Near-vision testing (33 cm) was done first, and then visual acuity at six meters was examined. The child was required to correctly match the direction of his fingers to the arms of the E. After the child responded easily, each eye was tested separately. Cycloplegic refraction was done where indicated. Myopia was defined as an error more than or equal to -0.5 diopter (D), hypermetropia as more than or equal to +1.0 D, and astigmatism as more than or equal to + 0.5 D. Amblyopia was defined as best corrected visual acuity of less than 20/200 in either eye resulting from anisometropia, strabismus or large astigmatic error. Extraocular muscle imbalance was noted when eye misalignment exceeded 10 prism diopter (>5 degree)

Results

One hundred children with hearing impairment who were referred to ophthalmology department of SKIMS medical college were examined. Males comprised (61.5%), and the age ranged from five to 20 years, averaging 12.7 years (SD 4.35). Hearing impairment had been certified by ENT specialist.

In this study (76.0%) had a normal ophthalmologic examination, (24.0%) children had ocular problems.

Results revealed (28.5%) children were profoundly deaf, (52.8%) were severely deaf, (10.4%) were moderately hearing-impaired and (8.2%) children were mildly deaf. The cause of deafness was known in (21.5%) children. The majority (42.4%) were not able to speak at all, 41.0%) were able to speak, and only (16.6%) children were verbally articulate.

Prevalence of refractive errors in the present study was (18.5%). Hypermetropia was found in (24.5%) children, while myopia was found in (67.7%) and astigmatism was found in (7.8%) children. Of these, ten were wearing spectacles at the time of examination, and 18 children with refractive errors had vision better than 20/40 before they were checked. With appropriate spectacle correction, had best corrected visual acuity better than or equal to 20/30. Visual acuity less than 20/60 on presentation was detected in (5.5%) children. All except three (0.3%) improved to better than or equal to 20/60.

Most children had never undergone any eye checkup previously.

Discussion

Hearing-impaired children rely almost entirely on their visual senses to learn about their environment. If a visual handicap is added to the

auditory handicap it would affect such a child more than it would affect a normal child. Refractive errors and amblyopia are easily treatable and it would be a shame if such a hearing-impaired child does not get proper eye care attention. Our study showed that 24.0% hearing-impaired children had eye problems as compared to 48 (43.6%) ophthalmic abnormalities in sensorineural deaf children in the UK, [2] 100 (35.8%) with ocular problems in deaf mute students in China, [6] 178 (33%) having minor ocular abnormalities in Australia [7] and 95/165 (57.6%) deaf mute children having ocular abnormalities in Malaysia. [4] [Table 1] compares the findings of this study with other similar studies in published literature. The percentage of ocular problems was more in some other studies as they may have considered children with severe hearing loss and perhaps additional handicap. An evidence-based review of ophthalmic disorders in deaf children done in Greece found that the overall quantity of evidence in the literature concerning deaf children and their ophthalmic problems was low. [9] The prevalence of ocular problems in deaf mute children was high and may remain undetected for years, having a serious impact on the development of their communication skills. Only 10 of the 167 children with refractive errors were using spectacles. Screening for ophthalmic problems amongst the deaf should be encouraged and their caretakers (parents and teachers) should be sensitized to the same.
Eye care professionals administering visual acuity tests should be sensitive to the communication needs of the deaf children. A comprehensive eye care examination is mandatory and should be repeated every few years as the child's visual and refractive status may change. Ophthalmologists should especially look out for retinal pigment abnormalities.

In the study group, the most common ocular abnormality was refractive error. Of the 100 deaf children examined, (18.5%) had one or more refractive errors. The frequency of refractive errors in the present study was twice that found in the normal hearing population. [10], [11] The next most common ocular abnormality was found to be strabismus, which has been determined at different rates in previous studies. The incidence of manifest strabismus has been cited as 1.3% and 3.7% from overseas studies. [8], [5] In our study, (1.3%) of the children had strabismus, which was significantly greater than in the normal population. Higher prevalence of refractive and strabismic errors in the hearing-impaired population, who may be amenable to spectacle, surgical or orthoptic treatment, makes early diagnosis essential because this population is especially dependent upon vision for their maximal cognitive, psychological and emotional development. The present study shows an increased prevalence of refractive errors and other ocular problems in deaf mute children.

Ophthalmologists play an important role in organizing such screening programs so that related diseases may be diagnosed and treated. Early ophthalmologic assessment of the hearing-impaired is advisable to detect any ocular visual impairment, followed by correction to help in the academic and social performance of these children.

Table 1 Comparison of ocular problems in hearing-impaired children

Name	Country	Year	Children examined	Ocular Problem	Refractive Error	Usher's	Fundus	Motility
Guy *et al.*[2]	United Kingdom	2003	122	110/122	43	6/122		
				(90.1)	(39.1)	(4.9)		
Hanioğlu-Kargi Se[3]	Turkey	2003	104	42/104	31/104		9/104	
				(40.4)	(29.3)		(8.6)	
Elango *et al.*[4]	Malaysia	1994	165	95/165	23		35.2 Rubella	
				(57.6)	(13.9)			
Siatkowski, *et al.*[5]	USA	1994	54	33/54	24/54		3/54	2/54
				(61.1)	(44.4)		(5.5)	(3.7)
Ma *et al.*[6]	China	1989	279	100/279	50/279	2/279	80/279	
				(35.8)	(17.9)	(0.7)	(28.6)	
Nicol *et al.*[7]	Australia	1988	78	26/78				
				(33)				
Regenbogen *et al.*[8]		1985	150	68				12
				(45.3)				(1.3

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