

Original Research Article**Prevalence of Visual Impairment among deaf and mute schools Children****Abstract**

Background: Particular attention must be paid to ocular abnormalities in deaf children, as their early detection and proper treatment will greatly affect their social and professional performance.

Objectives: To determine the prevalence and causes of visual impairment in deaf and mute children.

Methods: A cross section study was done including two schools for deaf and mute children (435 students from 6 to 18 years old). A screening test using Landolt broken ring chart was done to evaluate the visual acuity of each child. Children with visual acuity 6/12 or less in one or both eyes underwent detailed ophthalmic examination.

Results: The study revealed 39 students (9%) had visual acuity $\leq 6/12$ in one or both eyes. 19 children had astigmatism (4.4%), while 4 were myopic (0.9%) and 9 were hypermetropic (2.1%). Strabismus was found in 2 children (0.5%) and 2 children were amblyopic (0.5%). 3 children suffer from retinitis pigmentosa and associated disorders.

Conclusions: The prevalence of visual impairment was recorded to be 9% in two schools for deaf and mute children aged from 6 to 18 years.

Introduction

The visual impairment is both medical & social problem especially among children. In Egypt, a preliminary national survey in Helwan area, Cairo reported that 34 % of the recorded disabilities were visual disabilities.(1)

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 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.(2)

This study aims to stand on the causes of visual impairment and its prevalence in hearing impaired children. It included 2 schools for deaf and mute children in 2 cities (Shebin El-Kom and Menouf) in Menoufiya governorate in Egypt.

Methods

A cross section study was done from December 2011 to April 2012. It included two schools for deaf and mute children in Shebin El-Kom and Menouf. The total number of the students in the two schools is 435. Their ages range from 6 to 18 years.

A screening test using Landolt's broken ring chart was done to evaluate the visual acuity (VA) of each child.

Ophthalmic Examination:

Children with VA 6/12 or less in one or both eyes were referred to Menoufiya University Hospital – Ophthalmology department for detailed ophthalmic examination.

This included:

VA measurements (uncorrected and best corrected), slit lamp examination of the eye, ocular motility evaluation, fundus examination and cycloplegic refraction.

Statistical analysis:

The collected data were analysed using SPSS, statistical package.

Results

There are 435 students in the two schools aged from 6 to 18 years who were included in the study. 20 students recorded repeated absence, 6 students refused to participate in the study and 2 students were uncooperative.

Age and sex distribution among the whole screened group is shown in Table 1.

The study revealed 39 students (9%) had visual acuity $\leq 6/12$ in one or both eyes (Table 2). They were 10 males (25.6%) and 29 females (74.4%).

The study revealed that astigmatism was the most common refractive error founded in 19 cases (48.7% among cases and 4.4% among the whole group) (5 males and 14 females).

Hypermetropia comes in the second place founded in 9 cases (23.1% among the cases and 2.1% among the whole group) (8 females and 1 male). Myopia was founded in 4 cases (10.2% among the cases and 0.9% among the whole group) (3 females and 1 male). There were 2 cases who suffer from amblyopia cases (5.1% among the cases and 0.5% among the whole group) (1 male and 1 female). Strabismus was founded in 2 cases (5.1% among the cases and 0.5% among the whole group) (1 male and 1 female). Retinitis pigmentosa and associated disorders were founded in 3 cases, one case of retinitis pigmentosa without other associated disorder (2.6% among the cases and 0.2% among the whole group) , second case of retinitis pigmentosa associated with keratoconus

(2.6% among the cases and 0.2% among the whole group) , third case of retinitis pigmentosa associated with high myopia (2.6% among the cases and 0.2% among the whole group) . (Table 3).

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 attention.

In India, a study involved 901 hearing-impaired students. A quarter of them (216/901, 24%) had ocular problems (3)

The present study was done in two schools for deaf and mute children. From 435 students aged from 6 to 18 years, 39 students have visual acuity $\leq 6/12$ representing 9% prevalence of visual impairment among those students. Among the whole group, there were 19 cases of astigmatism representing 4.4%. Hypermetropia represents 2.1% founded in 9 students, while myopia was founded in 4 students representing 0.9%. Retinitis pigmentosa and associated disorders represents 0.7% and founded in 3 cases. Strabismus was founded in 2 cases representing 0.5%. Amblyopia also was founded in 2 cases and represents 0.5%.

Results from other studies are shown in table 4

The prevalence of visual impairment in the present study (9%) is less than the other studies which may be due to inclusion of other ocular abnormalities not affecting the visual acuity in some of these studies. Other studies included children with severe hearing loss and perhaps additional handicap.

On the other hand, there are a lot of studies included normal hearing children show different results.

In Malaysia, a study including normal hearing primary school children showed that the prevalence of visual impairment was 7.7%. The main cause was refractive error which represented 90.7% of cases and 7% of the whole group.(11)

In Egypt, a study showed that the prevalence of refractive error (visual acuity $\leq 6/12$) among normal hearing children was high 22.1% and the prevalence of low vision (visual acuity $\leq 6/18$) was 12.5%. (12)

In comparison with normal hearing children, our study gives higher prevalence rates than the Malaysian study, but lower rates than the Egyptian study.

Giving less prevalence rates does not exclude that hearing-impaired children are at a higher risk of ocular abnormalities than normal hearing children. During the study, we noticed that a lot of hearing-impaired children can hardly read and write. This may be because they are less interested in learning or a defect in the learning way. This may result in the lower rates of refractive error in comparison with the Egyptian study.

Conclusions

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.

Recommendations

It is recommended for those children to receive:

- 1- Regular screening programs for their vision.
- 2- Detailed ocular examination for those with visual impairment.
- 3- Regular follow up, at least annually, for the visually impaired children.
- 4- Rehabilitation programs to the children with poor visual prognosis.
- 5- Low vision aids for those in need.
- 6- The social care concerning their vision. Awareness of the school teachers and family to the importance of observing any vision problem in the child and not to neglect it.

References

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Tables

Table 1 Age and sex distribution among the whole screened group:

Variable:	No	%
Age:		
6-13 years (primary stage):	255	58.6
14-16 years (preparatory stage):	92	21.1
>16 years (secondary stage):	88	20.2
Sex:		
Male:	247	56.8
Female:	188	43.2

Table 2 Prevalence of visual impairment among the whole screened group:

	No.	%
Normal:	396	91.0
Cases with visual impairment:	39	9.0

Table 3: distribution of the final diagnosis among cases with visual impairment (n=39) and among the whole group (n=435):

	Among cases (n=39)		Among the whole group
	No.	%	(n=435) in %
Amblyopia:2	2	5.1	0.5
Astigmatism:	19	48.7	4.4
Myopia:	4	10.2	0.9
Hyperopia:	9	23.1	2.1
Strabismus:	2	5.1	0.5
Retinitis pigmentosa (RP)	1	2.6	0.2
Keratoconus with RP:	1	2.6	0.2
Myopia with RP:	1	2.6	0.2

Table 4 Comparison of ocular problems in hearing-impaired children(3)

Name of study	Country	Year	Children examined	Ocular Problem	Refractive Error	Usher's	Fundus	Motility
Guy et al(4)	United Kingdom	2003	122	48/122 (43.6%)	43 (39.1%)	6/122 (4.9%)	-	-
Hanioğlu-Kargi Se(5)	Turkey	2003	104	42/104 (40.4%)	31/104 (29.8%)	-	9/104 (8.6%)	19/104 (18.2%)
Elango et al. (6)	Malaysia	1994	165	95/165 (57.6%)	23 (13.9%)	-	(35.2%) Rubella	-
Siatkowski, et al. (7)	USA	1994	54	33/54 (61.1%)	24/54 (44.4%)	-	3/54 (5.5%)	2/54 (3.7%)
Ma et al. (8)	China	1989	279	100/279 (35.8%)	50/279 (17.9%)	2/279 (0.7%)	80/279 (28.6%)	-
Nicolet al. (9)	Australia	1988	78	26/78 (33%)	-	-	-	-
Regenbogen et al. (10)		1985	150	68 (45.3%)	-	-	-	12 (1.3%)
Gogate et al. (3)	India	2008	901	216/901 (24%)	167/901 (18.5%)	5/901 (0.6%)	10/901 (1.1%)	12/901 (1.3%)