

# Early Hearing Aid Fitting – Key to Better Education for School going Special Children with Hearing Impairment

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## ABSTRACT

**INTRODUCTION:** 10% of the world population has hearing impairment. The most common association for this neurological impairment is considered to be consanguineous marriages. Our study aim is to find the Impact of late advice and fitting of hearing aid on the level of schooling of special children and the rate at which consanguinity is related to congenital hearing loss.

**MATERIALS & METHODS:** This is a cross sectional survey conducted on special children participating in a free ENT examination camp conducted for the special children. 50 children with hearing impairment as the single disability were selected for the questionnaire based survey.

**RESULTS:** Fifty six percent children were fitted with hearing aid at the ages of 1-2 years, only twelve percent (6 participants) were able to communicate verbally; this is when speech therapy was also received along with a hearing aid. This had a p-value of 0.001. They also had the most age appropriate school years. Thirty eight of the participants gave a history of consanguineous marriage which is seventy six percent.

**CONCLUSION:** The children who had the diagnostic workup completed and hearing aid fitted at 2-4 years, not only did well in developing verbal communication. They also did better at school. Another important factor in speech development is speech therapy after the fitting of Hearing Aid. Without speech therapy the maximum benefit cannot be achieved from the hearing aid device. The frequency of hearing impairment being associated with consanguineous marriage in our study is seventy six percent which is even higher than the regional figures for this problem.

**KEY WORDS:** Hearing Aid, Consanguineous marriage, Hearing impairment, Speech therapy.

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## INTRODUCTION

Hearing impairment is the most common neurological impairment the world over. 10% of the world populations have hearing impairment<sup>1</sup>. This neurological impairment is associated, most commonly, with consanguineous marriage.

In our society the consanguineous marriage in many families is an accepted way of life. It has been shown that these cousin marriages are strongly associated with the occurrence of congenital diseases like thalassemia and congenital hearing loss; these are also implicated in many other familial disorders<sup>2-4</sup>. Sahar&lobna<sup>5</sup> has shown that consanguineous marriages are associated with sensorineural hearing loss as 71%. In Iran the association of consanguineous marriage with hearing impairment is around 61.4%<sup>6</sup>. The national figure for this problem has been reported to be around 40%<sup>7-10</sup> which is higher than other countries of the sub-continent where it is reported to be 30%<sup>6, 11</sup>. The late diagnosis of hearing impairment has a huge economic impact not only on the family but on the country as well<sup>7</sup>. It is therefore of immense importance that the disability must be diagnosed early, corrected

appropriately and all supportive measures started as early as possible<sup>12,13</sup>. It has been shown that when hearing loss is corrected before 4 years of age than these children can attend regular school rather than requiring special school<sup>14,15</sup>. Those got opportunity to go to regular school have better prospect for higher education and better job placement later in life<sup>16</sup>. The aim of present study is to identify age when hearing aid applied and its impact on schooling of the special children; and to determine the association of consanguineous marriage to congenital hearing loss.

## METHODOLOGY

This cross sectional survey is done using convenient sampling technique. Sampling population was the special children participated in a free ENT examination camp. Special children from Karachi and lower Sindh attended the camp. Total 356 special children attended this ENT camp. The camp conducted once a week for four months from March 2013 to June 2013. During camp, a complete ENT examination was conducted and appropriate tests/management was advised. Only those having a documented hearing impairment of moderate to severe degree and

already using hearing aids were asked to complete the survey questionnaire. Although 57 special children were identified as having hearing impairment/loss as a single handicap, only 50 agreed for interview. Their parent/guardians were invited for the interview using the questionnaire. Data was collected after taking consent for this study.

Data analysis was done using SPSS 16. The variables including age, type of impairments, consanguineous marriage, type of schooling received and the number of years in school were studied. Frequencies were calculated and chi-square test applied when applicable.

**Inclusion criteria**

Children studying in schools with hearing impairment only.

**Exclusion criteria**

No hearing impairment.  
Children having multiple disabilities.

**Sample size:** 50

**RESULTS**

The age of participants ranged from 5 to 9 years with an average age of 3.8 years (mean 6.5, SD ± 2.93). Twenty participants were female and thirty males participated in our study. For 36 participants the interview was given by parents while guardians were respondents for 14 cases.

Table I shows the age at which hearing loss was first suspected. Once suspected the problem of hearing loss, in majority of the cases (42%) was discussed only with family physician, in 38% cases it was discussed with family members only. In 20% of cases opinion of ENT consulted was sought.

Table II gives the ages when the child was first fitted with a hearing aid (HA). Although 56% were fitted with hearing aid at the ages of 1-2 years, however none of these children ever had a re-evaluation of hearing benefit after using HA and the need to upgrade their devices if required. After fitting HA, speech therapy is indicated. When asked for speech therapy received or not, only 38% received some speech therapy following fitted with a HA. Although 28 (56%) special children were having HA fitted at most appropriate age (between 1-2 years) yet only 6 (12%) were able to communicate verbally. Those fitted with HA between age 1-2 years and received speech therapy when compared with those who were fitted HA between 1-2 years of age but do not received speech therapy using chi square test showed statically significant result (p= 0.02) Table III shows the relationship of the age of

**TABLE I: AGE WHEN FIRST SUSPECTED OF HEARING LOSS (n=50)**

Age	Number
1-2 years	30
3-4 years	14
> 5 years	5

**TABLE II: THE AGE WHEN CHILD FIRST FITTED WITH HEARING AID (n=50)**

Age	Number	Percentage
1-2 years	28	56%
3-4 years	12	24%
> 5 years	10	02%

**TABLE III: RELATIONSHIP OF HEARING AID FITTING WITH SCHOOLING**

		Years in School											Total	
		1	2	3	4	5	6	7	8	9	10	12		
When was the hearing Aid first fitted *Age in years	1	0	0	0	0	0	1	0	0	0	0	0	0	1
	2	1	6	0	1	3	4	7	1	1	2	1	27	
	3	0	0	1	0	0	1	0	0	1	0	0	3	
	4	0	2	1	3	0	1	0	1	1	0	0	9	
	5	0	0	0	1	1	0	1	0	0	0	0	3	
	6	0	0	0	0	1	0	0	0	0	0	0	1	
	7	0	0	0	0	0	1	0	0	0	0	0	1	
	8	0	2	0	1	1	0	0	0	0	0	0	4	
	9	0	0	0	1	0	0	0	0	0	0	0	1	
<b>Total</b>		<b>1</b>	<b>10</b>	<b>2</b>	<b>7</b>	<b>6</b>	<b>8</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>50</b>	

fitting hearing aid with the number of years in school. The children who were fitted with HA between 1-2 years and also had speech therapy given to them; had the most age appropriate years in school.

The history of consanguineous marriage found positive in 19 (38%) special children with hearing loss.

## DISCUSSION

The children who were diagnosed early and fitted with hearing aid have a better chance of having age appropriate schooling in schools<sup>14</sup>. This is also evident in our 28 participants who were fitted with hearing aid by the age of two years, did well at school. Identical results have been reported by Robinshaw HM; and showed that earlier the children are fitted with a hearing aid, perform substantially better at developing communication skills as compared to those who are not fitted with hearing aid or even if fitted but at ages of more than 6 months<sup>17</sup>.

Interestingly, the results of current study showed that all those special children having HA applied and also received speech therapy did not benefited fully from the HA fitting. Speech therapy followed by application of HA was received by 19(38%), however only 6(12%) participants were able to communicate effectively. All of these 6(12%), had speech therapy done for at least 2 years. For those who did not develop effective verbal communication despite speech therapy is the late age (3-5 years) at which HA applied and shorter duration of speech therapy. The time taken for appropriate speech training of a child; to have a effective verbal communication ranged from 2-5 years. Nicholas and Geers reported better language and cognitive skills development at ages of 3.5 years in children who had been fitted with Cochlear implants between the ages of 12- 38 months<sup>18-19</sup>. The reason for this low response of HA benefit of better communication may be the lack of speech therapy support or these patients needed a cochlear implant rather than a regular HA. Speech therapy support is available in very few centers, even in metropolitan cities of Pakistan. Another reason could also be the lack of guidance and information in the families of such children, most belonging to a low socioeconomic background.

Hearing impairment is the most prevalent disability worldwide approximately 10%<sup>1</sup>. Out of this 10%, two third of this population is living in the developing countries<sup>1</sup>. In the western world cousin marriages are uncommon<sup>18</sup>. In the Arab countries and in the Asia sub-continent cousin marriages are very common and some families are reluctant to marry outside their families. The frequency of hearing impairment associated with these cousin marriages is 61.4%, the rate in first cousin marriage is 43.6% ,while in second cousin marriages it is 17.9%<sup>6</sup>. In our study the rate is seventy six

percent (76%) which is higher as compared to the previously reported studies. For Pakistan the rate of non-syndromic hearing loss is 1.6/ 1000 individuals which is higher than the world average which have a rate of 1/1000 births<sup>16,20</sup>. The reason for this high rate is probably the very tight family bonds preferring cousin marriages and monetary obligations linked with these marriages.

## CONCLUSION

The early diagnosis of hearing loss, application of HA with speech therapy and re-evaluation regarding appropriateness of the HA used or the requirement of a cochlear implant must be the goal if schooling of these special children is to be made appropriate. The frequency of hearing impairment being associated with consanguineous marriage in our study is seventy six percent which is alarmingly high. This needs counseling of families which are already at high risk to avoid cousin marriages. The use of electronic media and medical practitioners can be effective tool.

### Limitations:

This is a single center study over a short time period with convenient sampling. Multi center study with random sampling is needed.

## REFERENCES

1. Bob Traynor. Hearing health matters blog [Internet]. 2011. Available from: <http://hearinghealthmatters.org/hearinginternational/2011/incidence-of-hearing-loss-around-the-world/>
2. Shawky RM, Elsayed SM, ZakiME, Nour El-Din SM, Kamal FM. Consanguinity and its relevance to clinical genetics. *The Egyptian Journal of Medical Human Genetics*. (2013);14(2):157–64
3. Hamamy H .Consanguineous marriages. Preconception consultation in primary health care settings. *J Community Genet* (2012); 3(3):185–92.
4. Selvarajan, Ganapathy H, Arunachalam, Kumar R, Bellur, Rajashekar, et al. Association of family history and consanguinity with permanent hearing impairment. *Indian Journal of Otology*. 2013;19 (2):62-5
5. Nour El-Din SM and Hamed L. Sensorineural Hearing Impairment is a Common Feature of Consanguineous Marriage. *Egypt J Hum Genet*. 2008;9(1):121-7
6. Reyhaneh A, Mahmood K. Consanguineous marriage among the parents of hearing impaired students in Mashhad. *Iranian Rehabilitation Journal*2010;8(12):36-39
7. Primary health care approaches for the prevention and control of congenital and genetic disorders: report of a WHO meeting, 1999 Dec 6-8, Cairo, Egypt. Geneva: World Health Organization, 2000.

- (Document no.WHO/HGN/WG/00.1).
8. Alwan A, Modell B. Community control of genetic and congenital disorders. EMRO technical publication series 24. Alexandria, Egypt: WHO Regional Office for the Eastern Mediterranean, 1997.
  9. Ghazanfar A. Genetic deafness in Pakistani population. J Pak Med Assoc 2010; 60( 6) :418-9
  10. Sajjad M, Khattak AA, Bunn JEG and Mackenzie I. Causes of childhood deafness in Pukhtoonkhwa Province of Pakistan and the role of consanguinity. The Journal of Laryngology & Otology. 2008;122(10);1057-63.
  11. Bittles AH. The Impact of Consanguinity on the Indian Population. Indian Journal of Human Genetics. 2002; 8(2);45-51.
  12. Cunningham RF. Protocols for fitting infants and young children with Amplification.[Internet] Available from: <http://www.audiologyonline.com/articles/protocols-for-fitting-infants-and-941>
  13. Yoong SY, Feltbower R, Spencer N, McKinney PA. Families affected by deafness: hospital services uptake in a multiethnic population. Arch Dis Child 2005;90:454–9.
  14. Järvelin MR , Mäki-Torkko E, Sorri MJ, Rantakallio PT. Effect of hearing impairment on educational outcomes and employment up to the age of 25 years in northern Finland. Br J Audiol. 1997 Jun;31(3):165-75.
  15. Moeller MP. Early intervention and language development in children who are deaf and Hard of hearing. Pediatrics.2000;106(3):1-9.
  16. Nachttegaal J, Festen JM, Kramer SE. Hearing ability and its relationship with psychosocial health, work-related variables, and health care use: the National Longitudinal Study on Hearing. Audiol Res. 2011;1(1):e9
  17. Robinshaw HM. Early intervention for hearing impairment: Differences in the timing of communicative and linguistic development. British Journal of Audiology.1995;29:315–34.
  18. Nicholas JG and Geers AE. Effects of Early Auditory Experience on the Spoken Language of Deaf Children at 3 Years of Age.Ear Hear. 2006;27(3):286–98.
  19. Vos B, Senterre C, Lagasse R, Surdi Screen Group and Levêque A. Newborn hearing screening programme in Belgium: a consensus recommendation on risk factors. BMC Pediatrics 2015;15:160.
  20. Riaz A and Iqbal M. Non-syndromic Autosomal Recessive Deafness in Pakistani Population: Epidemiology and Genetics. Pakistan J. Zool 2012;vol.44(6):1431-8.



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