

## Research Article

# An institution based cross-sectional study on medical rehabilitation of deaf and dumb children in Ahmedabad

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**Received:** 20 April 2015

**Accepted:** 08 May 2015

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## ABSTRACT

**Background:** Hearing loss continues to be one of the most common birth defects in the world. But recent technological advances allow for identification of hearing loss soon after birth and management with various hearing aids. Present study gives baseline information on use and impact of hearing aids in deaf and dumb children.

**Methods:** It was an institution based cross-sectional study covering 687 children from 3 deaf and dumb institutes in Ahmedabad. Pre-design proforma was used to collect information on their grades of hearing loss, use of hearing aid, cochlear implant, etc. Data was analysed in Epi-info 7.

**Results:** Out of Total 687 deaf and dumb children there were 415 (60.41%) boys and 272 (39.59%) girls. All children had gone through audiometry. 513 (74.67%) children were visiting ENT specialist at regular interval. Most of the children 610 (95.61%) uses hearing aid machines and few of them 49 (7.44%) gone for cochlear implants. 549 (97.86%) children improved their skill after use of hearing aid.

**Conclusion:** Use of hearing aid improves attention and confidence among deaf children. Regular follow up is also necessary in these children. Collective efforts from government, ENT specialists and community are much needed for rehabilitation of deaf and dumb children.

**Keywords:** Deaf and dumb children, Hearing aid, Audiometry, Cochlear implant

## INTRODUCTION

According to WHO A person who is not able to hear as well as someone with normal hearing – hearing thresholds of 25dB or better in both ears – is said to have hearing loss. As per WHO fact sheet, February 2013 360 million people worldwide have disabling hearing loss.<sup>1</sup> While WHO-SEARO, February 2013 report state that The problem of deafness is disproportionately high in the Southeast Asia region with a prevalence ranging from 4.6% to 8.8%.<sup>2</sup> A significant number of persons with hearing impairment, even those with good intelligence and abilities are in great disadvantage in developing social and personal adjustment. Early detection and

intervention are believed to be critical steps toward proactive management of these children. Early intervention is the key feature of management of deaf children. Early intervention leads to better chances of improvement and development of speech. Today many diagnostic technology available like audiometry, Brainstem evoked response audiometry (BERA)<sup>3</sup> etc. Use of hearing aids and cochlear implant is increasing. Good results have been demonstrated in many studies related to usefulness of these instruments. Recent evidence indicates that many children with sensorineural hearing loss achieve language abilities similar to hearing peers if comprehensive intervention services are provided by 6 months of age.<sup>4</sup>

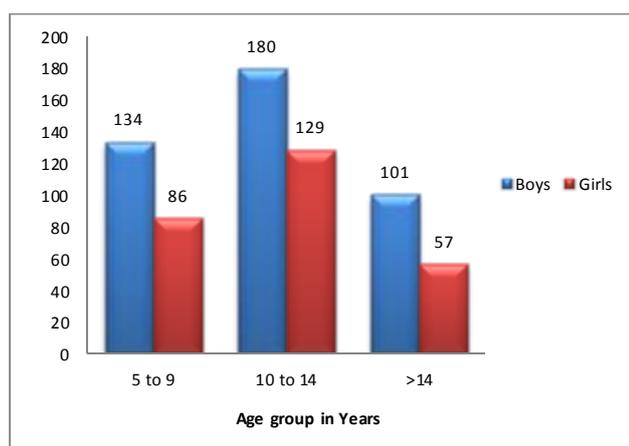
**Objectives**

- To know about the various rehabilitation methods used for deaf and dumb children.
- To assess the improvement in deaf and dumb children using hearing implants.

**METHODS**

This Institute based Cross – Sectional study was carried out during the period September 2012 to August 2013 at 3 deaf and dumb institutes in Ahmedabad. All available students were selected as study subjects during visit period from these three deaf and mute institutes. Thus total 687 children formed the sample size for this study. Study was carried out using the pre-designed standard questionnaire regarding their grades of hearing loss, use of hearing aid, cochlear implant, etc. All the information collected in this study was strictly used for research purpose and confidentiality was maintained at all stages. Data entry was done in Microsoft Office Excel Database. Data were validated and analysed on Epi info software version 7.

**RESULTS**



**Figure 1: Age and sex wise distribution of deaf and dumb children.**

Figure 1 shows that out of total 687 deaf and dumb children were studied; there were 415 (60.41%) boys and 272 (39.59%) girls. Majority of the children 389 (56.62%) were in the age group of 10 to 14 years. Boys: Girls ratio is 1.53:1 in the present study. Mean age was 11.10 ± 2.45 years.

Table 1 depicts grade wise distribution of the deaf and dumb children. 295 (42.94%) children had grade 4 deafness, 373 (54.29%) children had grade 3 deafness, while 19 (2.76%) children had grade 1 and grade 2 deafness. 177 (42.65%) boys were in grade 4, 228 (54.94%) boys were in grade 3. 118 (43.48%) girls had grade 4 deafness, 145 (53.30%) girls had grade 3 deafness. Difference between boys and girls regarding grade of deafness was found statistically not significant.

**Table 1: Sex wise distribution of grade of hearing loss among deaf and dumb children [n = 687].**

Grade of hearing loss	Boys	Girls	Total
Grade 1	4 (0.96)	3 (1.10)	7 (1.02)
Grade 2	6 (1.44)	6 (2.20)	12 (1.75)
Grade 3	228 (54.94)	145 (53.30)	373 (54.29)
Grade 4	177 (42.65)	118 (43.48)	295 (42.94)
Total	415 (100.00)	272 (100.00)	687 (100.00)

Note: Figures in parenthesis show percentage.

$X^2 = 0.3$ ,  $df = 3$ ,  $p > 0.05$

Grade 1 = 26-40 dBHL, Grade 2 = 41-60 dBHL,

Grade 3 = 61-80 dBHL, Grade 4 = 81 dBHL or more

**Table 2: Audiological care attended by deaf – dumb children.**

Audiological care	Boys	Girls	Total
Counselling done	368 (88.67)	248 (91.17)	616 (89.67)
Audiometry done	415 (100)	272 (100)	687 (100)
Visit ENT specialist for regular check up?	312 (75.18)	201 (73.89)	513 (74.67)
Taking speech therapy?	266 (64.10)	112 (41.18)	378 (55.02)

Note: Figures in parenthesis show percentage.

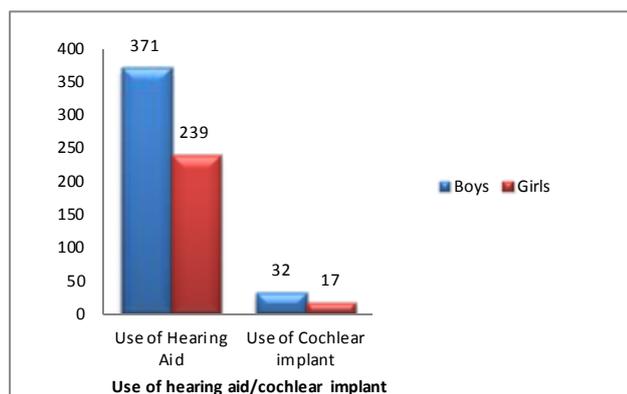
Table 2 shows audiological care received by deaf and dumb children. 616 (89.67%) children were having counselling routinely. All children had gone through audiometry. 513 (74.67%) children were visiting ENT specialist at regular interval. 378 (55.02%) children were taking speech therapy.

368 (88.67%) boys were having counselling routinely, 415 (100%) boys had audiometry done. 312 (75.18%) boys were visiting ENT specialist regularly and 266 (64.10%) boys were taking speech therapy. 248 (91.17%) girls were having counselling routinely, 272 (100%) girls had audiometry done. 201 (73.89%) girls were visiting ENT specialist regularly and 112 (41.18) girls were taking speech therapy.

Figure 2 shows 371 (92.06%) boys and 239 (93.36%) girls were having hearing aid while 32 (7.94%) boys and 17 (6.64%) girls were having cochlear implant. Total 49 (7.44%) children had gone for use of cochlear implant.

Table 3 reflects the effect of hearing Aid on education of the deaf and dumb children. 549 (97.86%) children with hearing Aid had improvement in their studies while 61 (79.22%) children with hearing Aid had no visible

improvement in studies. Impact of use of hearing aid on study of deaf and dumb was found highly significant.



**Figure 2: Use of hearing aid/ cochlear implant among deaf and dumb children.**

**Table 3: Effect of hearing aid on study [n = 687].**

Hearing Aid	Improvement in study and skills	No improvement	Total
Present	549 (97.86)	61 (79.22)	610 (95.61)
Absent	12 (2.14)	16 (20.78)	28 (4.39)
Total	561 (100.00)	77 (100.00)	638 (100.00)

Note: Figures in parenthesis shows percentage.

$X^2 = 51.71, df = 1, p < 0.05$

**Table 4: Effect of hearing aid on attentiveness [n = 687].**

Hearing Aid	Good	Poor	Total
Present	536 (97.63)	74 (83.15)	610 (95.61)
Absent	13 (2.37)	15 (16.85)	28 (4.39)
Total	576 (100.00)	111 (100.00)	638 (100.00)

Note: Figures in parenthesis shows percentage.

$X^2 = 34.92, df = 1, p < 0.05$

Table 4 shows 536 (97.63%) children with hearing aid had increased attentiveness while 74 (83.15%) children with hearing aid had no improvement in their attentiveness. Impact of use of hearing aid on attentiveness of the deaf and dumb children was highly significant as seen by chi square test.

**DISCUSSION**

Earlier diagnosis of hearing impairment is necessary for the proper medical treatment of the deaf and dumb children. Suitable audio-visual aids were provided under National programme for prevention and control of deafness to deaf and dumb institution for imparting proper education and training.<sup>5</sup>

Sex ratio in present study was 1.53:1 while a cross sectional study by Cremers et al<sup>6</sup> in Netherland the sex ratio was found to be 1.18:1. The genetic factor is responsible for deafness most of the time. There may be involvement of any of the gene from autosomal dominant, autosomal recessive and sex linked type. So any gender can be affected equally by these genetic mutations and hence there is no significant difference for gender is seen.

In present study 7.44 children were having cochlear implant while in study conducted by Hintermair et al<sup>7</sup> 9.1% children had cochlear implant. 92.56% children were using hearing aid in present study. Osberger et al<sup>8</sup> claims that the cochlear implant has had a dramatic impact on improving the acquisition and use of spoken language by deaf children, with positive ripple effects socially and psychologically. But in present study more impact of hearing aid is seen. 549 (97.86%) children improved their skill and became attentive after use of hearing aid. Similarly Tomblin et al<sup>9</sup> showed the improvement in skills among the children with hearing aid and cochlear implants.

Regular medical follow up is going on in these deaf and dumb institutes. Most of the children 610 (95.61%) got their hearing aid machines and few of them 49 (7.44%) gone for cochlear implants. Use of hearing aid greatly improved overall performance of the deaf and dumb children in these institutes. But collective efforts from government, ENT specialists and community are much needed for rehabilitation of deaf and dumb children.

*Funding: None*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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DOI: 10.18203/2320-6012.ijrms20150168

**Cite this article as:** Varia1 KG, Talsania NJ. An institution based cross-sectional study on medical rehabilitation of deaf and dumb children in Ahmedabad. *Int J Res Med Sci* 2015;3:1462-5.