Factors Associated With Delayed Detection Of Profound SNHL in Rural Children

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Abstract: Introduction: profound hearing loss in children may cause cognitive deficits leading to delayed or non-development of speech. This essentially converts a deaf child into a deaf and mute one. As maturity of auditory pathway takes place before 2 years the rehabilitative efforts need to be started as early as possible. However it is often noted that confirmatory diagnosis of profound hearing loss is delayed in children despite clear signs depriving these children of any meaningful rehabilitative efforts particularly in rural set up. The factors responsible for same may be poverty or lack of facilities. Objective: To identify the age of diagnosis of hearing loss and socio-demographic factors responsible for delayed diagnosis of profound hearing loss. Material and Methods: A prospective cross sectional study was designed with approval form ethical committee. All Children with up to 12 years presenting to ENT OPD with Profound SNHL were included in study. The hearing loss was confirmed by BERA. The age at detection of hearing loss was established. Detailed socioeconomic history of parents was noted and an attempt was made to establish effect of various sociodemographic factors on age at detection of hearing loss. Results: 138 deaf mute children were assessed. Majority were from low SE status. M:F ratio was 2.07:1. Mean age at detection of hearing loss was 3.9±1.5. There was no difference in age at detection among different genders, occupation of parents, socioeconomic status however there was significant difference in it according to educational status of parents. Conclusion: Age at detection of hearing loss is high in rural area. Education of parents and awareness regarding possibility of rehabilitation is necessary to detect hearing loss at early age so that conversion form profound deafness to Deaf mutism does not occur.

Keywords: Deaf-mute, Profound SNHL

Introduction: Hearing is necessary to learn language, speech and to develop cognitive skills. It helps developing child to learn recognize sounds, identify objects, events and internalize concepts. Hearing is important for normal educational and social development. Since exposure to a normal acoustic environment is required for maturation of peripheral and central auditory pathways, significant reduction of sensory input induces both anatomical and physiological alteration of auditory pathways. Harmful effects of hearing loss on the development of child's ability to learn, to communicate and to socialize can be devastating.¹)

Early diagnosis of hearing loss is the most important factor affecting outcome of the rehabilitative methods. The age at detection of hearing loss amongst hearing impaired children in India is reported to be 6.7 to 9.2 years whereas the same is 2.32 years in western countries.²,³,⁴

Delayed diagnosis of hearing loss may be explainable when it is mild however when the child has profound hearing loss it manifests as problems in speech development and should become obvious prompting consultation and confirmation however this does not seem to occur especially in rural areas. Non availability of expert consultation for early diagnosis may be a reason for the same adequately distributed. However Sociodemographic factors like education and economic status of parents are also likely to be the causes.

With these facts in mind present study was planned to study age of detection of hearing loss in Children with profound SNHL and its variation among various socioeconomic parameters.

Materials and Methods: The present Prospective cross sectional study was carried out in the outpatient department of otorhinolaryngology of a teaching hospital. Approval from the ethical committee has been taken.

All prelingually deaf mute children with profound SNHL from 3-12 years were included in the study. Postlingual deafness was exclusion criteria. The speech development and hearing assessment was carried out. The hearing loss was confirmed by brainstem response audiometry. The age at which the child was first diagnosed as having profound SNHL. Confirmatorily by ENT surgeon was
taken to be age at detection of hearing loss.

Detailed family history relating to sociodemographic factors like education, income etc were noted. An attempt was made to find relation between age at detection of hearing loss and parental socioeconomic factors. Socioeconomic status was according to BG Prasad classification. Statistical analysis was done with ANOVA test.

Results and Discussion
Present study constituted of 138 Deaf mute children in the age range of 4-12 years. With mean age of 76±2.92 years. There were 93 boys (67.3%) and 45 girls (32.6%) with male female ration of 2.07:1. Statistically significant male predominance was seen. Majority of children were from low socioeconomic status. Majority of them were Hindu by religion.(80.65%)

Most of the patients visited Hospital for handicap certificate (72.46%), while only 9.42% visited hospital with hope of further treatment or rehabilitation. The age at detection of hearing loss varied between 0-10 yrs. The age at which hearing loss was confirmed was considered as age at detection. The commonest age group at which deafness was detected was 4-6 years in male in 47.31% whereas it was 0-2 years in female 31.33%.

The mean age at detection of hearing loss in present study was 3.9±1.5 years. It was 3.90±1.5 in males and 3.99±1.69 in females. There was no statistically significant difference in mean age at detection between male and female. (z=0.30)

The earliest age at which hearing loss was first confirmed

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Age at detection</th>
<th>No. of patients</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
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<td>2</td>
<td>2-4 yrs</td>
<td>44</td>
<td>47.31</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>4-6 yrs</td>
<td>35</td>
<td>37.63</td>
<td>21</td>
</tr>
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<td>4</td>
<td>6-8 yrs</td>
<td>02</td>
<td>02.15</td>
<td>00</td>
</tr>
<tr>
<td>5</td>
<td>8-10 yrs</td>
<td>01</td>
<td>1.07</td>
<td>00</td>
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<tr>
<td>6</td>
<td>TOTAL</td>
<td>93</td>
<td>100</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Mean age</td>
<td>3.9+/1.5</td>
<td>3.99+/1.69</td>
<td>3.9+/1.5</td>
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</tbody>
</table>
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in present study was 7 month while the highest age at which hearing loss was first confirmed was 10 years.

Age at detection of hearing loss was compared in respect to various groups like socioeconomic status, education and occupation of parents. It was found that there was no statistically significant difference in age at detection of hearing loss in relation to socioeconomic status or occupation of parents.

However there was statistically significant difference in age at detection in relation to education of parents. The mean age at detection in children with graduate or post-graduate parents was lowest 3.07±1.08 as compared to children of uneducated parents with mean age at detection 4.32±2.08 and 38.41% of children had received no efforts at rehabilitation while 57.25% were enrolled in Deaf mute school. Only 3.52% had proper hearing aid trial.

Ignorance, Monetary considerations, assurance by relatives, general practitioners regarding delayed speech development, distance from hospital were reported as reasons for delayed consultation with specialist.

Discussion:
It is a commonly held belief that profound sensorineural hearing loss leads to non development of speech. However Cordanus in 16th century believed that deafness is principal and primary phenomenon in deaf mutism and he also declared that deaf mutes ought to read and write setting the stage for rehabilitation of the Deaf.

Still in 21st century Deaf children became mute and the term deaf mutism though under criticism still describes effects of prelingual hearing loss.

In India the prevalence of deaf mutism is reported to be 5.59per Lakh. Deaf mutism is more common in males. In present study significantly more Deaf mute children were male (z test) with male to female ratio of 2.07:1. Male preponderance in deaf mutism has reported in literature. The male children are more susceptible to adverse factors acting in prenatal, natal and postnatal life though reasons for the same have not been identified.

Majority of patients visited hospital for want of hearing handicap certificate with only 9.42% came looking for treatment options. The monetary and other advantages of having Handicap certificate is the reason for the same but the fact that monetary support schemes are more widely known while rehabilitation possibilities are nearly unknown is a disturbing one. With start of National deafness control program widelypublicizing rehabilitation options for deaf children is need of hour.

Auditory pathway matures by age of 18 months. The development of language proceeds rapidly in first 2 years of life with vocabulary of nearly 272 words. If child is deprived of auditory stimulus in this dynamic period he may not develop language at all. Rehabilitation of child as early as possible is necessary. Western countries have already adapted hearing screening procedures for all new born as a result the age at detection of hearing loss has decreased greatly. Average age at detection of profound hearing loss is 2.32yrs in western countries whereas same has been reported to be 9.73 in 20022 and 6.7 yrs in 2004 in India. The age at detection in present study is 3.9± 1.5 which lower in comparison with indian standards but still higher as compared western countries.

The age at detection of hearing loss in deaf mutes may depend on many factors. Delayed diagnosis of hearing loss can be explained on basis of community practices of neglecting delayed speech, lack of social awareness and partly due to absence of any active health surveillance in this aspect in many places and absence of any high risk registry.

Monetary considerations, assurance by relatives, general practitioners regarding delayed speech development, distance from hospital were reported as reasons for delayed consultation with specialist. Government of India has program of Maternal and child health where hospital deliveries are advocated if new born screening is made compulsary at hospital level at least early detection of hearing loss will become reality. Parental belief and awareness seem to main obstacles to this. Improvement in educational status and awareness campaigns regarding early evaluation and probably screening programs may be the solution for early detection.

The decision makers in young children are parents. Parental socioeconomic factors might affect the age of detection of hearing loss. Children with parents from higher socioeconomic group, parents with fixed income should at least be detected early. Surprisingly there was no statistical difference in age at detection of hearing loss in relation to SE status or occupation of parents. However parental education status affected age at detection of hearing loss. Mean age at detection of hearing loss in children of educated parents was statistically significantly low than the age of children from uneducated parents. The higher educational status of parents might have affected the correct decision making amongst these children.

The fact that only 3.5% children received hearing aid trial ever in life and 38.41 children having no efforts at rehabilitation speaks lot about resignation of parents, and non availability of any program for these children.
Conclusion:
Despite advances in rehabilitative measures profound deafness still manifests as deaf mutism. Majority of deaf mutes are from poor family. The age at detection of hearing loss is close to 4 yrs. Making rehabilitation efforts more unsuccessful. The high age at detection was independent of sex, socioeconomic status or occupation. Only parental education has some effect on age at detection. Implementation of neonatal screening program and free of cost rehabilitation by government is necessary to prevent a possible healthy child getting into trap of deaf mutism.

References:

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