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Etiology of Hearing Impairment in Children

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Abstract: ***Hearing impairment substantially affects child's ability to normally acquire the spoken language. Hearing represents the main source for acquisition of language and speaking skills in childhood. In the first months of life, the hearing impaired child is deprived of sound stimulation in the most important period of development, and consequently, might present emotional, social and linguistic disorders. Therefore, it is of utmost relevance to learn about the main etiological factors that cause the auditory damage to trace a reliable nosological profile, and to take the appropriate measures to prevent and guide the family on the repercussions of hearing impairment in childhood. Aim: To study the Etiology of hearing impairment for hearing impaired children. Methodology: An interviews, speech, examination and hearing screening and analyses of medical charts of 60 hearing impaired children was done trying to define etiology, gender distribution, age at diagnosis, level of hearing loss Results: Among the 60 children and adolescents who had undergone speech and hearing screening, we select a sample of 45 subjects, whose parents had come for multiple sessions of anamnesis and assessment. The main responsible etiological factor for hearing loss in the evaluated population was pyogenic meningitis (31%), idiopathic cause (22%), prematurity (18%), heredity (9%) maternal rubella (7%), neonatal jaundice (7%) and chronic otitis media, measles, and ototoxicity (7%). Conclusion: The present study demonstrated the causes of hearing impairment, and its main causes and there is a need of appropriate hearing screening protocol and program in every setting and preventive measures must be taken to promote health care.***

1. Introduction

Hearing loss of even 15 dBHL can create hearing disability in children and consequently impairment in their mental growth [1–2].

The ear is a marvelously complex and sensitive organ. Unfortunately, damage to the organ, whether through disease, physical insult, long term exposure to excessive noise, some drugs or simply the effects of aging, can cause the ear to malfunction. The result of malfunction is usually to produce some degree of deafness.3

Disease of the ear have profound effect on the health and quality of life of millions of people around the globe.4 In India, 63 million people (6.3%) suffer from significant auditory loss. A lack of skilled manpower and human resources make this problem a huge challenge.5 These disabilities can cause behavioral complications in six functional areas: mental maturity, perception, speech and speaking, cognition and general intelligence, academic achievement, and interpersonal behaviors 6. According to the WHO, 42 million people above the age of three bear some sort of moderate to profound hearing loss. Over 4% of the children considered to beat high risk are diagnosed with moderate to profound hearing loss7.The identification of the main etiologic factors surrounding infantile deafness is an important diagnostic tool to allow the proper implementation of public health procedures and, consequently, of effective prevention measures.

2. Methods

This community based observational cross sectional study was carried out at Urban health centre-Nishat, department of SPM, Government Medical college, Srinagar and Department of Otorhinolaryngology - Head and Neck Surgery, SKIMS-MCH, Bemina, Srinagar, over a period of 2 year from July 2015 to June 2017.

All selected children and their parents were interviewed. The protocol adopted comprised interviews, local examination (ENT) and speech and hearing evaluations. The items analyzed were distribution by gender, age of diagnosis, hearing loss severity and speech. All persons who were willing to participate were enrolled into study after taking informed written consent. Information was obtained by a structured questionnaire, clinical ENT examination and audiological tests.

3. Results

Total of forty five subjects were chosen from the original sample of sixty. Their parents attended all interview, examination and evaluation sessions. The main etiologic factor responsible for hearing impairment in the assessed population was pyogenic meningitis with 31%, idiopathic reasons with 22%, premature birth with 18%, inheritance 9% - (deaf father or mother) mother's rubella with 7%, neonatal jaundice with 7% and chronic otitis media accounted, measles, ototoxicity, and mumps were also present, each with 7%. Twenty four (53%) of the 45 subjects were males and 21 (47%) were females. Ages varied between 3 and 18 years. In the speech and hearing evaluation the main causes for hearing loss onset on the prenatal, perinatal, and postnatal periods were addressed, the age of diagnosis, and the subjects' ability to use either oral language. Results are described below

Chart 1: Hearing Impairment Etiologic Factors

Etiology of hearing loss	Distribution
Pyogenic meningitis	14 (31%)
Idiopathic	10 (22%)
Premature birth	8 (18%)
Inheritence	4 (9%)
Neonatal jaundice	3 (7%)
Rubella	3 (7%)
COM, Measeles, Mumps	3 (7%)

Chart 2: Sex distribution

Sex	Distribution
Male	24 (53%)
Female	21 (47%)

Chart 3: Age of presentation in the centre

Age	Distribution
3-6 Years	22 (49%)
6-10 Years	10 (22%)
10-14 Years	8 (18%)
14-17 Years	5 (11%)

4. Discussion

Hearing loss in the first years of life can cause delays in speech, language, and cognitive development [8]. Speech and language delays secondary to hearing loss are often preventable [9]. Thus, early identification of hearing loss, whether it is permanent (usually sensorineural) or temporary (usually conductive), is the key to a child's success with communication [10].

The biggest cause of hearing impairment is meningitis, a disease that may lead to profound hearing loss. About one out of every one thousand newborns present hearing loss, and two out of every one thousand children begin to experience deafness within the first three years of life. These facts by themselves justify audiologic investigation in children not only when they are born, but also throughout their first years of life [8]. One of the biggest challenges in pediatric audiology lies in the cases of hearing losses of unknown etiology in childhood. Parents must be thoroughly interviewed.

Information coupled with data from audiologic tests can lead to the development of an etiologic diagnosis of the patient's hearing impairment. It is also recommended to include non-audiologic tests such as serology, imaging, ophthalmologic examination, and genetic evaluation. A broad interdisciplinary approach may offer valuable insight into uncovering unknown etiologies. [11]

5. Conclusion

Hearing loss and its consequent difficulties on speech and language might be controlled and treated via appropriate hearing screening protocol and program in every educational setting. The occurrence of diseases such as measles during pregnancy and infectious contagious diseases such as meningitis, must be minimized so as to mitigate the impact of infantile hearing impairment.

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