Deaf Child - Early Detection and Management
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Introduction: A child learns to speak by hearing and interpreting. Speaking language will not develop if the child is deaf. Deafness will persist if it is not detected early. If deafness detected early and treated or hearing is provided with hearing aid or by cochlear implant, then language can develop. We know that, one or two of every thousands of live born infants suffer from deafness. Prelingual deafness is very difficult to detect early and treat. If we detect deafness early, we can develop language to the child, because some deafness is curable. So early detection of deafness is necessary.

Cause: Although deafness is not common, some infants may have some hearing loss at birth. Hearing loss can also develop in children who had normal hearing as infants. The loss can occur in one or both ears. It may be mild, moderate, severe, or profound. Profound hearing loss is what most people call deafness. Sometimes, hearing loss gets worse over time or it may stay stable. Risk factors for infant hearing loss include: Family history of hearing loss, Low birth weight.

Hearing loss may occur when there is a problem in the outer or middle ear. These problems may slow or prevent sound waves from passing to the inner ear apparatus. They include: Birth defects that cause changes in the structure of the ear canal or middle ear, Build up of ear wax, Build up of fluid behind the eardrum (e.g., OME), Injury to or rupture of the eardrum, Objects stuck in the ear canal, Scar on the eardrum from many infections.

Another type of hearing loss is due to a problem within the inner ear. It may occur when the hair cells (nerve endings) are damaged. This type of hearing loss can be caused by: Exposure to certain toxic chemicals or medicines while child in the womb or after birth, Genetic disorders, Infections passed to the baby in the womb by transplacental route (such as toxoplasmosis, measles, or herpes), Infections that can damage the brain after birth, such as meningitis or measles create problems with the structure of the inner ear. Central hearing loss results from damage to the auditory nerve itself, or the nerve pathways that lead to the brain. Central hearing loss is rare in infants.

How to detect deaf child early: After birth, baby’s doctor or attendant can detect deafness of the new born baby. A new born baby with hearing loss may not startle by a sudden loud noise such as handclap or door slamming and will not blink.

By four month onward, mothers, doctors can detect deafness of the baby. At this age the baby should quieten or smile and turn head to the sound of voice even when he cannot see the source. But a deaf child shows no reaction when spoken to.

By nine month, the baby should listen to very familiar sound and it should show pleasure in babbling tunefully and try to copy the sound. By twelve month, the baby identifies sound at any plane and shows some response to its own name. Verbal comprehension develops for single word such as its name, no, bye-bye. If they do not reach these milestones, the cause may be hearing loss.

By twelve month to two years, children become uncooperative and to detect deafness becomes difficult. Quiet speech with expectation of comprehension is an appropriate stimulus for understanding words and questions like, where are your eyes, and response or search for the sound source during behavioural test is noted. By the age of two years, response on request and simple speech discrimination can be assessed. If the baby fails to attend the milestones, the baby may be deaf.

By the age of three years children are again cooperative. In addition to speech comprehension, pure tone audiometry is possible using free field sound, at this stage visual response audiometry and play audiometry can detect deafness in a child.

Pre school age (3-5 yrs) should be screened for deafness at health camps organised by voluntary or Govt. health organization and school health committee at the time of admission to Nursery school. Some children may not be diagnosed with hearing loss until they are in school. This is true even if they were born with hearing loss. Inattentive and failing behind in class work may be sign of undiagnosed hearing loss.

School going age (5 yrs onwards), many test can be done.
Pure tone audiometry and Impedance audiometry can detect deafness at this age.

Brainstem Evoked Response Audiometry (BERA) for hearing threshold estimation and Transient Otoacoustic Emission are used for hearing assessment of even very young infants. Otoacoustic emission test should be carried out as a screening test for all at risk pregnancy babies as early as possible after birth.

**How to Treat Deaf Child**: Treatment of deaf child starts from detection of risk factor for childhood deafness among children attending to the clinics. Any child whose mother believes her child to be deaf should be suspected. Mothers are rarely wrong in this suspicion.

Ear wax, Otitis media with effusion, Enlarged adenoid, Chronic suppurrative otitis media are curable and hearing can be improved if detected early in regular school health check up.

Deaf child with cerebral palsy, Down’s syndrome have delayed developmental milestone, indifferent attitude and behaviour. They should be referred to a neurologist and ENT specialist concurrently. It is found that majority cases of cerebral palsy and Down’s syndrome are associated with OME, which is curable.

Pre-lingual deafness can be treated with Hearing aid. It will improve hearing to some extent and language can be developed. Post-lingual deafness, the children are usually shy, socially indifferent. Poor performance in the school is noted and depression appears in such children ultimately leading to psychosis. In such cases cause of deafness should be detected and treatment should start as early as possible. Now-a-days cochlear implant surgery is gaining popularity to give hearing to deaf child though it is costly. More over regular screenings of deafness in school health programme should be done jointly by general Practitioner and otorhinolaryngologist.

It should be stressed here that cochlear implants are not alternative to conventional hearing aids. Cochlear implants are best suited for patients with profound bilateral cochlear defects (preferably post lingual) where conventional hearing aids alone are of no use.

In conclusion, regular screening for deafness should be included in school health programme. General practitioner and Otolaryngologist should take care to identify the risk factors of deafness and to detect deafness in the school going children early.

**Reference:**

2. Screening and surveillance for the hearing impairment in preschool children - Schott and Brown’s Otolaryngology, Sixth edition, page 6/6/1- 6/6/12.