

The principle "earlier the better" should always be employed in the identification of the hearing loss of the hearing impaired children. The parents and the members of the family (as well as the staff of the day care centers) may play a significant role in the identification through the systematic observation of the behaviour of the infants. For this purpose, they must first have the knowledge of the expected normal hearing behaviour of the developing infants. Now through comparison and repeated observation, they can come to the conclusion about the hearing loss or impairments of their children. However in each case, they must show patience and not make hasty conclusion as there may be some delay in the development of hearing perception in some children. The following facts regarding the hearing behaviour of the normal and hearing impaired infants may work as a guideline for this purpose.

1. In general by the age of 6 months, normal babies usually start bubbling. A hearing impaired (including deaf) too babbles but his babbling is nothing but a chance vocalization as he is unable to imitate the voices of others due to his hearing impairments. In any case he is unable to vocalize when spoken to directly.
2. By the age of 9 months or at most up to 1 year a normal hearing child is expected to locate a sound source (at the side, above or below level) by turning his head after hearing his name or respond to other sounds and obey them, he can enjoy music or singing and attempt to imitation of sounds and words, but the hearing impaired (including deaf) is unable to do so. He can only imitate respond or obey the observed gestures.
3. By the age of 2 years, a normal hearing child exhibits signs of normal speech and language development. He can refer to himself/herself by name, has more than 50 words in his vocabulary and can use voices for specific purposes. He can play with a number of sound making objects and responds to the rhythm of music. The hearing impaired (including deaf) is quite unable to demonstrate such type of abilities. He suffers badly in terms of normal language and speech development.

In case hearing loss is suspected on the basis of the previous mentioned observable facts, then efforts should be made as promptly as possible to consult an otologist (a medical doctor specialized in ear problems) for having an audiological examination or testing of the affected child by adopting one or the other following testing techniques.

### *Pure-tone audiometry*

Pure-tone audiometry is a testing procedure for the formal assessment of the hearing losses with the help of an instrument known as audiometer. It can be employed for the children about 3 years of age and older. An audiometre represents an electronic device capable of generating pure tones (not speech), i.e., sounds at different levels of intensity or loudness (measurable in decibels) and frequencies or vibrations (measurable in cycles per second of hertz). The process of using audiometre for the

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purpose of testing hearing sensitivity is very simple. Each ear of the child is tested separately. The child is made to wear the earphones for hearing the pure tones generated by audiometre and is asked to say yes by raising his hand (or speaking into a microphone) if he is hearing the tone. The results of the test are then plotted on a graph called an audiogram for obtaining an assessment of the degree and range of hearing impairments.

### *Speech audiometry*

Speech audiometry is a testing procedure for assessing the hearing impairments in which we try to test an individual's ability to detect and understand speech. For this purpose, a list of one and two—syllable words may be presented to the child at different dB levels of the intensity of sound. The dB level at which he is able to understand half of the words is measured and recorded for each ear. In technical language, it is known as the Special Reception Threshold (SRT). Such measures of the child's SRT level can then be utilized for making an estimate of his hearing loss and impairments.

### *Special audiometric techniques*

These techniques stand for assessing the degree of hearing losses and impairments of those children who can not be tested through the conventional testing procedures. (Pure tone and speech audiometry). These may be the children who are very young (not more than three or four years) or who suffer from some other handicap disabling them to follow the instructions and respond by raising their hand as a sign of the hearing of the sound on their part. Such techniques may be briefly outlined as follows.

1. **Play audiometry:** In this technique, play activities like picking up a block, squeezing a toy, putting a ball into a cup are to be performed by the child in response to the hearing of a signal, either pure tone or speech by him. His level of performance then becomes a deciding factor for assessing his sensitivity to the heard sounds.
2. **Conditioning audiometry:** In this technique, we make use of the principles of operant conditioning for the assessment of the child's sensitivity to the heard sounds. As soon as the child indicating that he has heard the desired signals of the pure tone or speech he is presented with an appropriate reward, i.e., allowing him to play with the toy. Such type of play conditioning audiometry proves quite an effective technique for the assessment of the child's sensitivity to the heard sounds.
3. **Behaviour observation audiometry:** This technique is based on the instant action in terms of either reflex actions (like blinking of the eyes and movement of the face, body, arms and legs) or natural behavioural responses (like turning head and body towards the source of the sound, stop playing, etc.) made by the children as a reaction to the heard sounds of various increased levels of intensities.
4. **Evoked response audiometry:** In such type of audiometry technique, child is not required to provide voluntary responses for its hearing. For

evoking the desired responses, the child is required to bear the electrodes on his ear. As a result, all sounds heard by the child may result in the reception of electrical signals within the brain. These signals may then be recorded on an electroencephalograph (EEG). By comparing these graphs with the graphs of normal hearing children, then an estimate for the hearing loss can be chalked out.

## THE ROLE OF SCHOOL AND TEACHERS IN IDENTIFICATION OF THE LEARNING IMPAIRMENTS

Although it is the duty of the parents and members of the family to take care of the task of early identification of the hearing loss or impairments of their children, yet by one research or the other it may be possible that number of cases (particularly the slight and mild) may go unnoticed till their entry in the schools or the problems faced during their curricular or cocurricular performance. In such cases, here, the responsibility of their earliest detection invariably falls on the shoulders of school authorities, including teachers.

In fact, teachers have to face directly the typical problems generated by the hearing losses of their students. Thereby they are the better persons for the detection of the suspected hearing loss of their students by resorting to systematic observation of their hearing and learning behaviour. In general way, they may take the help of the following check list for the identification and detection of the possible signs and symptoms of hearing loss or impairments in a particular child.

- ◆ Does the child frequently request for the repetition of what has just been said?
- ◆ Does the child hear better when he is looking at you?
- ◆ Does the child try to watch lips of teacher or other speakers very closely?
- ◆ Does the child respond to noises or sounds as opposed to words and sentences?
- ◆ Does the child experience difficulties following oral presentations and directions?
- ◆ Does the child yell or scream to express pleasure?
- ◆ Does the child often have tantrums for attention getting?
- ◆ Does the child often complain of earaches, discomfort in the ear or strange ringing or buzzing noises or have frequent colds ear infections or ear discharge?
- ◆ Does the child constantly turn up radio/television too loud?
- ◆ Does the child demonstrate voice problem (like monotonal quality) or mispronunciation?
- ◆ Does the child use limited vocabulary?
- ◆ Does the child show delayed language development?
- ◆ Does the child withdraw from his age mates or other people?
- ◆ Is the child unable to respond when you call him from behind or from the other room and other distant places?
- ◆ Is the child reluctant to participate in oral activities?

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- ◆ Is the child unresponsive or inattentive when spoken to in a normal voice?
  - ◆ Does the child favour one ear for listening purposes?
  - ◆ Do you think that the child speaks too softly or too loudly?
  - ◆ Does the child answer your questions or respond to the sound stimuli quite irrelevantly?
  - ◆ Does the child turn head and lean towards the speaker for listening better.

In the light of the affirmative answers of the above queries, the teacher and school authorities should take a prompt lead for referring the child to a qualified ENT specialist, an audiologist, a speech therapist or psychologist as per need of the situation. However, for doing so, the parents of the child should always be taken in confidence as it may adequately help in sharing the expenses and cooperation for the needed diagnostic remedial, treatment and educational services to be rendered to the affected child.

The identification assessment and diagnostic attempts made for the anticipated hearing loss or impairments of the children in the manner listed earlier may then ultimately help in making a good estimate of the diagnosis and identification of their weaknesses in terms of their hearing loss or impairments which in turn may result in identifying

- (a) Whether their impairment is congenital (present at birth) or adventitious (acquired later in life).
- (b) Whether the hearing loss or impairment is pre-lingual or post-lingual meaning thereby whether it is sustained before or after the development of spoken language.
- (c) Whether the hearing loss or impairments are exclusively conductive or sensorineural impairments or a mixed one.
- (d) The degree of hearing loss described in terms of slight, mild, moderate, severe and profound or broadly categorized as hard of hearing and deaf.