

## **SCREENING PROGRAMME FOR HEARING IMPAIRMENT IN NEWBORNS: A CHALLENGE DURING REHABILITATION FOR ALL**

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### **ABSTRACT**

*Reduced hearing acuity during infancy and early childhood not only interferes with development of speech and language skills, but also adversely affects the developing auditory nervous system. It can be harmful for social, emotional and cognitive growth, and continues to plague the individual for the rest of his/her life. Current clinical methods to identify hearing loss are convenient, cost-effective, accurate and valid and can be easily employed for early identification and intervention of hearing loss. This paper attempts to convince public health experts, administrators and policy makers that hearing loss is a public health issue. It also discusses the relevance of screening criteria for screening hearing loss in new-born babies.*

### **INTRODUCTION**

Hearing impairment has a devastating, detrimental and an invariably adverse impact on the development of new-borns and the psychological well-being of their families. Neonates having mild to profound hearing loss bilaterally or unilaterally, hearing loss of varying degrees above 1000Hz, or auditory deprivation due to recurrent otitis media, develop significant and long term effects on speech and language skills. Reduced auditory input also adversely affects development of the central auditory nervous system, and can negatively impact speech perception that interferes with growth in social, emotional, behavioural and cognitive spheres, academic achievement, vocational options, employment opportunities and economic self sufficiency. Indeed, such problems may trouble these individuals for the rest of their lives, if not attended in time.

In a recent survey, 4 out of every 1000 children born in India were found to have severe, to profound hearing loss (1). It is indeed a big challenge to provide special education, vocational training and employment to this large population. There are only 540-550 special schools that cater to 3% of children with hearing impairment. There are also only 17 vocational rehabilitation centres, 22 special employment exchanges and over 40 special cells in ordinary employment exchanges, catering to their needs. At present, only blue collar jobs are available to hearing impaired persons. The gravity of this problem can only be tackled if available infrastructure is used to mainstream hearing-impaired people in regular education, vocational training and employment, by attending to hearing loss on time and instituting appropriate remedial measures.

The concept of early identification and intervention though not new, is yet to gain a foothold in India. Nikam and Dharamraj attempted infant hearing screening in 1971 (2). Basvaraj et al. (3) carried out screening for hearing impairment in Bangalore in 1984. AYJNIHH (4), Mumbai, in 1985, conducted a 3 year project on screening pre-school children for early identification and intervention of hearing loss, using the high risk register (HRR) approach. Hearing screening of neonates admitted in neonatal intensive care units (NICU) are also under way at the Wadia Children's Hospital, Mumbai (5) and AIIMS, New Delhi (6). The effectiveness of these techniques, to identify early hearing impairment is however, questioned. Literature reveals that 50% of hearing impaired children are likely to be missed in HRR. and NICU approaches (7). Moreover, their application requires a team of specialised professionals and adequate time to record risk indicators, making the process expensive.

Professionals agree that hearing loss in infants should be recognised in time and appropriate otological and audiological rehabilitation should be instituted early, to take advantage of the plasticity of developing the sensory system (critical period is 0-3 years). This effort can lead to normal speech and language development, social, emotional and cognitive growth, and academic achievement in the child. In addition, identifying hearing loss before it is clinically apparent, provides a baseline on which subsequent evaluation can be made and compared. Also, medical and surgical treatment can be initiated for conductive hearing loss and progression can be controlled. Timely information also provides acceptance of hearing impairment and improves the parents' readiness to initiate a family centred rehabilitation programme. Moreover, early identification and intervention is guaranteed by the People with Disabilities Act (8).

### **NATION-WIDE NEWBORN HEARING SCREENING**

Hearing loss causes severe developmental damages. But surprisingly, no dedicated national programme has been carried out so far, in India, for early detection of hearing loss in newborns. Screening is a process of applying certain rapid, accurate, valid and simple tests to a large population, to identify individuals with a high probability of having the target condition. It should have least requirement of time, cost and should be convenient to carry out. The condition to be screened should have serious and/or long-term consequences. The occurrence of the condition should be sufficiently frequent. It could be diagnosed on clinically established signs and symptoms. Preventive measures and effective treatment for the condition must be available. It must respond to appropriate interventions. There should be an advantage with early identification.

Normal auditory integrity within the early years of life is essential for quality development of the child. Hearing loss of any degree, results in substantial and long term damages in all spheres of human life. The prevalence and incidence rate in India is quite alarming. Studies

show varying prevalence rates from 1%, to as high as 40%. The Indian Council of Medical Research (9) in 1983, reported the incidence of conductive hearing loss of about 48% in rural areas. However, the National Sample Survey Organisation (NSSO) reports of 1986, showed that India had a 3.02 million deaf population, and in 1991 showed 3.24 million in the age group of 5-14 years (10,11). The Human Development report of 1999, estimates a 0.3 million hearing impaired population between 0-4 years age group and 1.5 million in the age range of 5-12 years (12). WHO in 1998, estimated 123 million people in the world with a hearing loss of 41 dB or more, in the better ear, and a majority of them were living in Asia.

The signs and symptoms of auditory deficit and otological pathology can be clinically established in new-borns and infants. Otoacoustic Emission and Auditory Brain Response Audiometry (ABR) are the diagnostic auditory assessments in infant hearing screening. These electro-physiological methods are efficient, cost effective and accurate for identifying any degree of hearing loss. ABR is the method of choice for hearing screening in infants less than 5 months of age, as it does not require child participation and can be done without sedation (13). Hall et al. (14) have reported specificity and sensitivity rate in excess of 96% for ABR screening in new-borns. Automated ABR screener (AABR) has high sensitivity and low failure rate, and it is more time and cost effective also. Otoacoustic emission (OAE) represents another promising, quick, cost effective and valid method of testing cochlear function. The most direct application to date, is the use of OAE for screening sensory loss in new-borns. Wherever these instruments are not available, behavioural observation audiometry can be employed for screening.

**Table 1. Summary of hearing screening approaches and their rationale**

APPROACH	SCREENING RATIONALE
1. AUDITORY BRAIN RESPONSE	<ul style="list-style-type: none"><li>·It is objective measurement of auditory system.</li><li>·It provides ear specific information.</li><li>·It is independent of subject's state (sleeping, awake).</li><li>·It does not require sound booth for evaluation.</li><li>·ABR is independent of cerebral status.</li><li>·ABR has a valuable contribution to cross check principle.</li><li>·AABR and innovative analysis is cost effective.</li></ul>

APPROACH	SCREENING RATIONALE
2. OTOACOUSTIC EMISSION	<ul style="list-style-type: none"><li>· Normal OAE is recorded in normal cochlea.</li><li>· OAE can be recorded reliably from new-borns.</li><li>· OAE is abnormal even in person with mild hearing loss.</li><li>· Non-audiologic person can perform it.</li><li>· OAE recording requires relatively brief time.</li><li>· OAE provides frequency specific information.</li><li>· Helps in identifying Auditory neuropathy along with ABR</li></ul>

The obvious objective of any screening programme is to provide appropriate treatment. Fortunately for hearing loss, ranges of effective treatment modalities are available. Hearing losses resulting from bacterial or viral diseases, due to otitis media with effusion or congenital defects of head and neck, can be prevented and treated medically and surgically. The most common intervention in congenital hearing loss is audiologic rehabilitation, such as hearing aids with well-structured auditory stimulation. Technologically advanced hearing aids are available to suit individual needs. With the use of computerised probe mike, real ear measurement, selection and evaluation, fitting of hearing aid in new-borns has become easier. Advances in ear mould technology, like the use of non-shrinkable material for impression and soft material for casting, has made it possible for local people to take an impression and send it, to distant labs for casting.

The relevance of a screening programme is to provide effective treatment at the earliest, thereby sufferings due to the disorder can be alleviated or minimised. The value of screening may lie in identification of mild to moderate hearing losses that are amenable to treatment. Furthermore, otitis media with effusion, bacterial and viral diseases can also be prevented and treated at primary health centres. In a longitudinal study of 10 years, Markides (15) reported that children identified with hearing loss between 0-6 months of age with immediate audiological and family centred programmes, have achieved significantly higher developmental function than those with delayed identification, in terms of increased expressive vocabulary and language. They have also improved syntactic comprehension / receptive vocabulary. They gained good speech intelligibility and acquired larger number of vowels and consonants.

Children who received early intervention, demonstrated significantly better language, speech, social and emotional development, than children who were identified late. They had language

development similar to non-verbal cognitive development and it was maintained in the low average range through 1-5 years of life. It resulted in better speech intelligibility, better personal-social development, less parental concern and stress. Four-fifths of the identified neonates with hearing loss had language development in the low average range through 1-5 years of life, as compared with one-fifth of the number of children identified later. In general, children identified early, tend to have better communication skills that lead to better academic performance, better career opportunity, psycho-social adaptation, a better quality of life and increased life time earnings, as compared to children identified late.

## **CONCLUSION**

A substantial number of new-born babies suffer from congenital hearing loss, which results in severe difficulties to both infants and families. Hence, it is necessary to secure normal, social and holistic development of the child by detecting hearing loss at birth and providing remedial services at the earliest. Unfortunately, there are no national policies for early identification of hearing loss as yet. Neonatal-screening for hearing loss can yield high returns. Moreover, the screening programme is cost effective, as, the child who receives early interventions for hearing loss requires less of expensive special education later. The true value of screening may lie in identification of mild to moderate hearing losses that are amenable to treatment and if left unattended, may manifest like a severe impairment. Hence, detection of hearing loss in the first month of life as well as mild hearing losses is necessary, through a 'Newborn Hearing Screening Programme'. Some suggestions to implement this process are given below:

- Each District Hospital should run a programme and the Audiologist should function as programme co-ordinator.
- All children born in the district should be screened at birth, or, within a month's time. Primary health centres and community health centres should make arrangements for referral.
- New-borns who fail on screening, should be given a diagnostic test and proper interventions within 3 months.
- Those who have high-risk for hearing loss should be followed up at intervals of 6 months even if they are cleared at the screening.

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## ACKNOWLEDGEMENT

I would like to express my thanks to Dr R. Rangasayee, Director, AYJNIHH, Mumbai, for his constant support and encouragement in all my endeavours. I would also like to express my gratitude to Dr Ujjawal Bhattacharya, ISI, Kolkatta, for his kind support, suggestions and feedback on article. I express my gratitude towards my parents and my wife Dr. Sameera Ansari for their patience and best wishes.

## REFERENCES

1. Rehabilitation Council of India. *Status of Disability in India - 2000*. New Delhi, 2000. pp- 172-185.
2. Nikam S, Dharamraj. *School Screening Program in Mysore City*. Journal of All India Institute of Speech and hearing 1971; 1: pp 28-32.
3. Basvaraj V, Kumudavalli S, Kamakshi V. et al. *Newborn Hearing Screening in Nursing Homes of Bangalore City*, Unpublished Report of Institute Speech and Hearing, Bangalore, 1984.
4. *Annual Report of Ali Yavar Jung National Institute for the Hearing Handicapped* (1991-92): AYJNIHH, Bandar Reclamation, Mumbai, 1992.
5. Basvaraj V, Kacker S K, Decker R C. (Eds): *Paediatric Audiology in India; Proceeding of the International Seminar on Paediatric Audiology*. Department of Otolaryngology, AIIMS, New Delhi, 1997.
6. Baquer A, Sharma A. *Disability: Challenges Vs Response*. CANS Publication, New Delhi, 1997; pp, 87-90.
7. Yoshinaga - Itanoc. *The evidences for universal Newborn Hearing Screening Program*. American Journal of Audiology 2001; Vol 10: 62-64.
8. Government of India. *Persons with Disabilities (Equal opportunities, Protection of Right and Full Participation) Act-1995*. Ministry of Law, Justice and Company Affairs; New Delhi, 1996.
9. ICMR. *Collaborative Study on Prevalence and Aetiology of Hearing Impairment*. Indian Council of Medical Research and Department of Science and Technology; New Delhi, 1983.
10. Programme of Action-1992. *On National Policy of Education*. Ministry of Human Resource Development, Department of Education, New Delhi, 1986.
11. National Sample Survey Organisation. *A Publication of Department of Statistics*, Government of India, New Delhi. 1991
12. Abusaleh S. *Human development Report 2000*. National Council of Applied Economic Research; New Delhi:Oxford University Press, 2000.
13. American Speech –Language Hearing Association. *Guidelines For Audiologic Assessments of Children from birth through 36 months of age*. ASHA 1991; 33: (Supple.) 37-43.

14. Hall J W. (Eds): *Newborn Auditory Screening; Handbook Of Clinical Audiology*. University of Florida; U.S.A., Allyn and Bacon Publication.1992; 445-447.
15. Markides A. *The Speech Of Deaf And Partially Hearing Children With Special Reference To Speech Intelligibility*. The British Journal Of Disorder Of Communication 1986; 12 (5):56-67.

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