

## **Newborn Hearing Screening Program**

**T U S U K U M A R A N**

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It is my pleasure and privilege to present before you one of my action plans for this year - Newborn Hearing Screening Program.(NBHSP)

The primary justification for early identification of hearing impairment in infants relates to the impact of hearing impairment on speech and language acquisition, academic achievement, and social and emotional development [1-3]. The first three years of life are most important for speech and language acquisition. Animal studies have shown that early auditory deprivation interferes with the development of neural structures necessary for hearing. The goal of early identification and intervention is to minimize the adverse effects. Neonatal and infant screening programs using test procedure like otoacoustic (OAE) emission and auditory brain stem response (ABR) have been established worldwide for this purpose.

The basic assumption of newborn hearing screening is that early detection followed by early intervention maximises the benefit the child, the family and the society will receive. Improved outcomes for children with congenital hearing impairment are associated with confirmation and intervention by six months of age [4]. Yet the median age of confirmation of congenital hearing impairment has exceeded 18 months even in regions of United Kingdom and United States with good audiology services. Universal neonatal hearing screening has the potential to reduce the age at confirmation of congenital hearing impairments. It is estimated that approximately 1.5 to 6 in every 1000 newborns suffer from permanent congenital hearing impairment [5-7]. It has been

estimated previously that 10 to 12% neonates have an established risk factor, and of this group with risk factors, 2.5 to 5% have a sensorineural hearing impairment [8].

In 1994, the Joint Committee of Infant Hearing recommended that all infants with hearing loss be identified before the age of three months and receive intervention by 6 months of age [4]. In their 2000 position statement, the principles and guidelines of implementing the screening program with appropriate intervention was stressed [9].

Studies have shown that children who received intervention have better language skills than those without prior to the implementation of hearing screen program, it was customary to only test those newborn that has significant risk factors for hearing loss. However despite the testing of infants who fell into this "high risk registry" over half of all newborn with hearing loss were missed. In order to identify this large group of hearing impaired infants not identified with current testing methods, it is now recommended that all newborn have a hearing test prior to discharge from hospital.

In a recent survey, 4 out of every 1000 children born in India were found to have severe to profound hearing loss [10]. It is indeed a big challenge to provide special education, vocational training and employment to this large population. 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 is yet to gain foothold in India. No dedicated national program has been carried out so far in India for early detection of hearing loss in children. NBHSP using oto acoustic emission was started at Kochi way back in 2000 by Abraham K Paul and now Kochi is the first city in India to have a centralised hearing screening program.

The relevance of a screening program is to provide effective treatment at the earliest, thereby reducing the sufferings due to the disorder. The value of screening may lie in the identification of mild to moderate hearing loss that are amenable to treatment. A variety of procedures are used in hearing screening programmes for infants and neonates. However any test whose purpose is to screen newborns for hearing loss should achieve certain goals: it must be non-invasive and pose no risk of injury to the infant; it should be sufficiently robust that the test performance will not be affected by the environment; it should be possible to perform the test in a minimal amount of time; and the test should correctly identify auditory status in both high risk and well baby population if it is to be used in universal hearing screening programs.

Auditory brainstem responses (ABR), transient evoked otoacoustic emissions (TEOAE), distortion product emissions(DPOAE) along with a recent addition of auditory steady state response are the currently available tests that meet many of the above needs. The sensitivity and specificity of TEOAE and DPOAE measured against an independent benchmark are 84 and 90 per cent, respectively. Children with a positive result should be referred for definitive testing and evaluation including a detailed family history for genetic causes.

### **Protocol for Newborn Hearing Screening Program**

[(Based on NHS (UK) Newborn Hearing Screening Program)]

- A trained person visits all major hospitals on a particular day of the week regularly.
- Babies are screened preferably before discharge from hospital.

- Babies are screened by portable handy equipment (OTOPOST, Otodynamics, UK). Time taken for test is 1-2 minutes.
- If abnormal result (no response), test repeated after 2 weeks.
- If again no response, BEARA test done for confirmation and quantification of hearing loss.
- If BERA abnormal, do comprehensive hearing evaluation.
- If confirmed, next step is hearing aid usage at the earliest. Hearing aids may be fitted for infants as early as 2 months of age. This should be followed with auditory training and speech therapy. Children with profound deafness who derive negligible benefit from conventional amplification with hearing aids may be considered for cochlear implants.

To conclude, it is necessary to secure holistic development of the child by detecting hearing loss at birth and providing remedial measures at the earliest. At present there are no national policies to this effect. We need to identify those with mild to moderate hearing loss that are amenable to treatment through a Universal Newborn Hearing Screening Program.

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