INFANT SCREENING—REPORT ON A PRELIMINARY STUDY

SHAILAJA NIKAM AND SHYAMALA DHARMARAJ

Though a number of studies have been reported elsewhere, none so far have been reported about infant screening in India, and it is not known what would be the personnel requirements and problems associated in carrying out such a programme.

A study was planned with the following purposes in view:

1. To facilitate the study of the development of the hearing function in the human infant.
2. To determine the type of response to sound in the various age groups.
3. To advise the mothers to bring the children for examination at the institute should the child or any of the siblings develop speech and/ or hearing problems later on.
4. To study the percentage of hearing loss in the high risk group and in the normal group.
5. To educate the mother with regard to proper care of the child's hearing.
6. To take habilitative procedures like auditory training and use of hearing aids as early as possible which would also minimize the behavioural problems associated with hearing loss.

It was decided to carry out the study in the Cheluvamba Hospital, Mysore as a number of new born infants were available in one place. This hospital serves people in and around Mysore and more number of cases from middle and the lower socio-economic groups.

Methods and Results

At the outset letters were sent to the Dean of the Mysore Medical College and its associated hospitals, emphasizing the importance of early identification of hearing loss and soliciting the co-operation of the hospital staff. On hearing of their willingness to participate in the programme, the hospital staff concerned were acquainted with the goals and procedures of the programme.

A proforma was prepared to collect information regarding consanguinity, pre-natal, natal and post-natal abnormalities, information about the parents' age, occupation and family history for speech and hearing problems was also obtained. This information was later coded and transferred to Index Cards to reduce the bulk and to facilitate easy identification. These cards also contain the follow up information. Since the infants are not given a name until after they go home, they were identified on the cards by their birth order, the name was substituted either when the medical social worker made a home visit or when the parents reported to the Institute. At the time of taking case history, attempts

Miss Shailaja Nikam is Reader in Speech Pathology at A.I.I.S.H.
Miss Shyamala Dharmaraj is Lecturer in Speech Pathology at A.I.l.S.H.

were made at educating the mothers regarding speech and hearing problems; they were encouraged to visit the institute whenever they suspected a speech and/ or hearing problem. An identity card was given to the mother with the serial number on it for identification.

The infants were screened in the maternity wards using a squeaker and vocal sounds whose frequency characteristics and intensity were:

250—500, 65 dB
500—1000, 65 dB respectively.

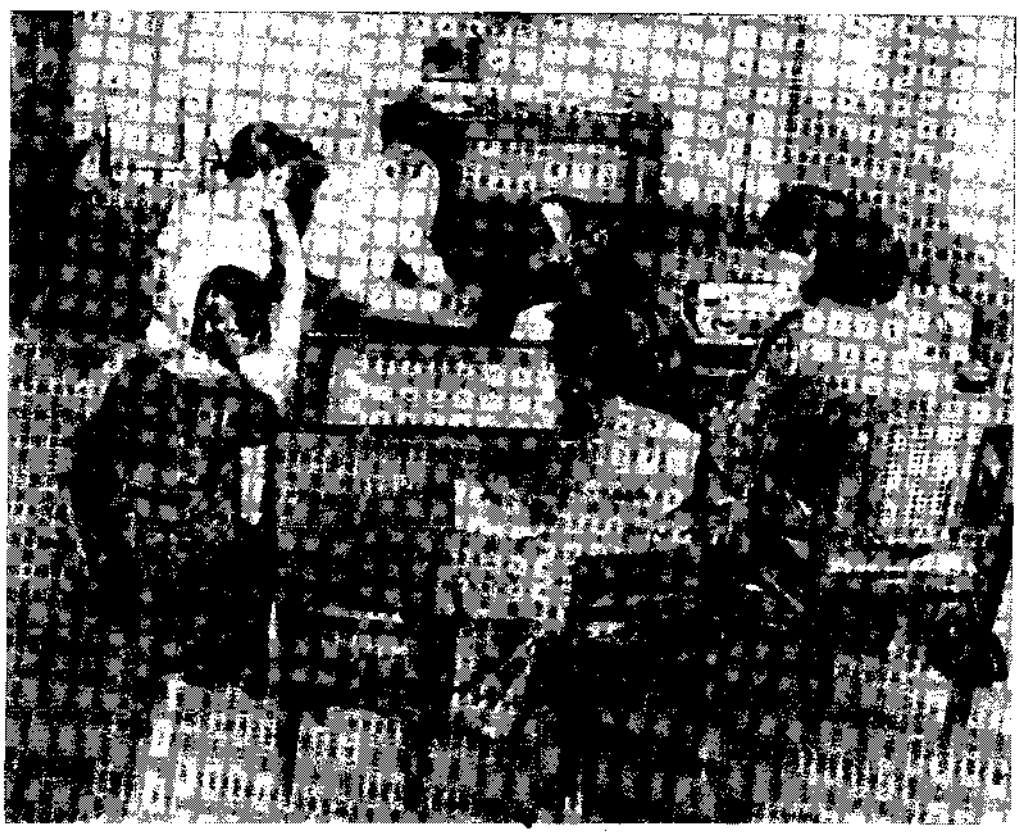
Testing and observations were done by two of the staff members from the All India Institute of Speech and Hearing who had experience in testing infants. The stimuli were presented 18" away from the ear. At this distance the sound reaching the ear was found to be 65 dB SPL as measured by a Bruel and Kjaer Sound Level Meter (2203). Responses observed for a pass were Moro reflex (Downs M.P. 1962, 1964, 1967 Richmond J. B., Grossman H. j. and Lustmen S. L. 1953). Eye lid movement (Downs 1964, 1967) Movement of the eyes (Downs 1967, Froding S. 1966, Floeschels E. and Beebe H. 1946, Haul Block K. H. 1962, Richmond J. B. Glossman and Lustman S. L. 1953, Wedenberge 1956). Alteration of the rate of Respiration (Wedenberge E. 1956) Limb movement (Clark F. M. Hunt W. A. and Hunt E. B. 1937 Downs M. P. 1967) Cessation of activity (Downs M. P. 1967, Forber H. S. and Forber H. B. 1927) Head turns (Downs M. P. 1967) attempts at localization (Westheimer M. 1961) Sucking (Downs M. P. 1967). Failure to respond to any stimuli used was recorded as 'no response'. Using this procedure 941 infants ranging in age from 1 hour to 1 week, with a few as old as 21 days were tested. The results showed that 650 (68.8 per cent) passed the screening and 291 (31.2 per cent) had failed.

When an infant had failed the screening test,, the mother was advised to bring the child to the All India Institute of Speech and Hearing, Mysore, where follow up tests were done in the sound treated room which met the ASA specifications. If the mother failed to bring the child within the specified time, a reply paid card was sent. If this failed to bring a response, the medical social worker made a home visit. This procedure brought seven infants for re-tests. Of these 3 failed the free-field test and are under observation. The medical social worker visited 9 homes and found 4 infants' hearing to be within normal limits. One infant failed the re-test and has been advised to visit the Institute. Among the remaining four one child had died and the other three had changed residence. Those infants who passed the initial screening test were also visited by the medical socialworker who made observations of the child's current status and determined whether the development was within normal limits. Circumstances dictated that this follow-up procedure be limited only to those infants residing in Mysore.

This pilot project proved that the screening programme could be successfully conducted, with both the hospital authorities and mothers appreciative of

the efforts and giving their full co-operation. However, the study would have been more worthwhile if proper address could be obtained and if followup information about more children were available. The pilot study also showed that the test environment was far from satisfactory. The beds in the ward were so close that it was difficult to isolate the child who was being tested; the infants in the adjacent beds were getting adapted to the test stimuli. In addition it was felt that high percentage of failure might be due to the masking effect of the environmental noise.

It was thought that a quieter test environment was most desirable to make the screening worthwhile. To meet this requirement a sound treated box was constructed in which the infants could be placed and screened individually. At the time of sending this article to press, such a box is in use (a picture of which is reproduced below) and the followup information will be published in a subsequent article.



The following observations are made from this **study:**

1. **Acoustically treated** environment is much **more suitable than the maternity wards.**
2. The minimum personnel equipment would be two trained observers and a tester. Greater accuracy can be ensured by using 100 per cent agreement between two observers as the criteria for pass or fail.
3. Followup should be done both through reply paid cards as well as home visits, rather than just advising the mother to visit the All India Institute of Speech and Hearing.

Summary

A pilot project was conducted to screen the new born infants at the Cheluvamba Hospital, Mysore, which served the purpose of identifying infants in need of aural habilitation at an early age and educating the mothers regarding speech and hearing problems.

From this study a blue print was drawn up to conduct an on-going infant screening programme.

Acknowledgement

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REFERENCES

1. **Clark** F. M., Hunt W. A. and Hunt, 'Plant as Responses in Infants following a startle stimuli' *J. Gent. Psych,* 50, 1937, 458, 461.
2. Downs M. P., Auditory in children (infants) *Int. Audio,* 1, 1962, 268, 270.
3. Downs M. P. and Sterrit G. M., Identification audiometry for *J. Auditory Res.,* 1964, 69-80.
4. Downs M. P., 'Organisation and procedures of a new born infant screening programme'. 'Eye blink, Eye widen, Cessation of activity, Limb movement, Head turns. Sucking, no stirring on the overall body'.
5. Forber H. S. and Forber, H. B. Fetal sense reaction: The Hearing *J. Comp. Psych,* 7, 1927, 353-355.
6. Froding S., Acoustic investigations of new born infants—*Acta Otolaryngol,* 52, 1960, 31-40.
7. Floeschels E. and Beebe H., Testing the hearing of new born infants'—*Arch Otolaryng;* 44, 1946, 710-714.

Hahl Block K. H., Auto palpebral reflex audiometry *Int. Audio,* 1, 1962, 261-264.

Richmond J. B., Express H. J. and Lustman S. L., 'Hearing test for new born infants', *Pediatrics* 11, 1953, 634-638.

Rosenan H., 'Sound stimulation during sleep' *Laryngol, Rhinol; Otol.* 41, 1962, 194-208.

Susuki T., Sato I., Freefield, 'Startle response audiometry: A quantitative method for determining hearing, threshold of infant children', *And. Otol Rhinol Laryngol,* 70, 1961, 997-1007.

8. Wedenberge E., 'Auditory test in new born infants', *Acta Otolaryngol,* 46, 1956, 446-461.
9. Westheimer, M., 'Psycho motor coordination of auditory and visual space at birth', ***Science,* 134, 1961, 1962.**