SCHOOL SCREENING PROGRAMME IN MYSORE CITY

SHAILAJA NIKAM

This is an interim report on the screening tests done for hearing **loss in the school children of** Mysore city. In a parallel study which is a collaborative **project with the Junior** Jaycees of Mysore, school going children in the **rural areas are tested. The results** of the rural screening programme will be reported **separately.**

The project under report served several purposes: (1) case finding; (2) arriving **at a 'blue print' for an efficient** and economic school screening procedure **as a beginning towards a programme** of hearing conservation; (3) providing **a** training **ground to the student trainees** at the Institute; (4) creating greater awareness **in the community regarding** speech and hearing **problems.**

Method

At the outset, letters were sent to the school principals emphasising **the importance of early identification** of hearing loss and **soliciting** their **co-operation in the screening programme.** Of the ten schools **that** received the letters, **nine informed of their willingness** to participate in the project. Positive response **at later stages has been one** hundred per cent.

The children were brought to the All India Institute of Speech and **Hearing in groups varying in number** from 25-60, as a 'reasonably quiet' room **could not be provided in the schools** for the purpose. This practice had **the** advantage **of getting the threshold tests done** immediately after the screening. This **procedure had to be followed to** prevent the children from missing their classes **for a second time even though** further tests after a failure are recommended **only after a time interval.**

On their arrival at the Institute the children were made familiar with **their task, giving a few practice** sessions with a drum and/or a whistle. **Often this practice was sufficient to** proceed with the screening at the set levels, **but on several occasions it** was necessary to condition the **children** once more with **the pure tones.**

The frequencies 500, 1000, 2000, 4000 Hz. were presented at the levels 30, 20, 20 **and** 20 dB *(re.* **ISO)** respectively. (These levels were decided **upon after a validating threshold study** on **50** children with **normal** ENT. and **hearing findings). The high frequency** tones were presented **first** and then the **low**

Miss Shailaja Nikam is Reader in Speech **Pathology.**

frequency tones. The children were taken to the room in groups of five so that when one child was being tested those awaiting their turn could observe. The seating arrangement was such that the children were seated comfortably without being able to observe the audiometric manipulations and movement of chairs was not necessary throughout the test period.

The children were instructed to raise their right or left hand corresponding to the ear in which they heard the 'sound' and to put the hand down just as soon as the 'sound' disappeared. In the case of children under 5 years, play audiometric techniques were used—the child responded by sliding a ring down a peg. Those who did not respond at the predetermined level at more than one frequency in either or both ears were considered to have failed. Such children were taken for a threshold test done in acoustically treated rooms. Diagnosis of hearing loss was made when the threshold at more than one frequency was beyond 25 dB *(re.* ISO), unless the single frequency with elevated threshold was 4000 Hz. or above.

On completion of a day's screening and threshold testing, the school principals were informed of the results, requesting them to direct the child and the parents to the Institute for advice. This procedure turned out to be not so effective. Therefore, in later stages, a letter informing the parents of their child's problem was sent with the child. This measure has been more effective in bringing the cases for follow-up. With those who have passed the screening it was planned to send a pamphlet to the parents on prevention of hearing loss and to bring the child for a hearing test at a later date.

Test environment: The testing was done in a room considered reasonably quiet. As the programme continued, the site of testing was shifted to another part of the building. This new spot proved to be slightly more noisy than the old one. But no attempt was made to shift to the original testing spot as the time consumed in moving for ENT, screening and thresholds were considered out of proportion to the advantage of having a slightly quieter test environment. The ambient noise level as measured by a sound level meter (GR type 1551-C) was 56 and 60 dB on the C scale in the old and new rooms respectively.

Equipment: The screening programme was begun with the Amplivox 83 audiometer. Later two Beltone 12-D audiometers were used so that two children could be screened simultaneously, the threshold testing was done on Beltone 15 CX, Amplivox 83 and 103 and the Arphi audiometers.

Audiometers were checked for proper functioning before each screening and biological calibration was done periodically. On acquiring the Bruel and Kjar calibration equipment, instrumental calibration was substituted.

ENT examination: The screening was always done after an ENT examination for the presence of wax, middle ear infection etc. In the early stages of the programme, wax, when present, was removed before the screening. This practice had to be abandoned later as more cases turned up with impacted wax and caution

had to be exercised not to frighten the children of any instruments. So the screening was done in spite of pathological ENT findings, unless there was ear discharge. Note was also made of associated conditions like hypertrophied tonsils and adenoids.

Results

In all 2086 children ranging in age from 2-14, from 12 schools came for the testing. Of this number, 38 could not be tested—refusal to wear earphones and ear discharge, being some of the reasons. Of the remaining, 247 children failed the screening test, but only 82 of these were found to have hearing loss—64 with bilateral conductive loss, 14 with unilateral conductive loss and the remaining 4 being equally divided between unilateral and bilateral sensori-neural loss. The incidence of hearing loss was found to be 3.9 per cent.

The number of false-positives was rather high, constituting 67.6 per cent of the total failures. This may be due to either the ambient noise masking the test tone or due to stringent criteria for failure or both. Though the high false-positives lead one to believe that perhaps no child with a hearing loss was missed, it is possible that some children with losses at the frequencies at either extreme not included may have been missed. The data analysed for the incidence of loss in the various age groups showed that the highest percentage was found to be among the 3 year olds (26.66) the 14 year olds coming next (12.5). However, as the number tested in both these age groupswere not comparable to those in the other groups, the obvious conclusion that two groups are severely hit is withheld.

The following table gives the number tested, percentage of hearing loss with or without abnormal ENT findings, percentage of normal hearing with or without abnormal ENT findings for each school.

Name of the School	*No. tested*	*%Hg. loss*	*Normal ENT+* ***Normal Hg. in%***	***Abn.ENT +normal Hg.in%***	*Normal* ***ENT +*** *Hg.loss* ***in %***	***Abn.ENT + Hg. loss in %***
Avila Convent	354	6.3	49.5	50.75	54.4	44.4
Railway workshop colony	295	2.7	65.2	40.8	57.1	41.2
Sadvidya Patasala	146	1.0	57.2	40.3	50	50
St Mary's Boys' Middle School	287	14.6	56.4	42.2	36	64
Maharani's N.T.M.S.	229	2.2	50.0	50.0	33.3	66.6
C.K.C. Convent	489	1.84	53.2	46.9	77.7	22.2

Note: Figures in columns 4 and 5 calculated for the number with normal hearing.
Figures in Col. 6 and 7 calculated for the number with hearing loss. Figure in col. 3 calculated for the total No. tested for that group.

Data for only 5 schools is presented, as for the other schools, the information, though gathered was not available for tabulation.

The incidence of hearing loss was maximum (14.6 per cent) in the children of St Marys Boys' Middle School. (Approximately the same percentage in Rotary School was overlooked because of the small number tested). This school, it was reported, has more pupils from the lower socio-economic strata, where malnutrition, lack of medical care prevail to a greater extent. The high percentage (64.0 per cent) of abnormal ENT findings with hearing loss for the same group indicates that medical follow-up is needed for more than half of the children with hearing loss. The same holds good for the children of the Maharani's NTM School.

As the main purpose of this programme was case finding and as no sampling procedures were employed in selecting either the school or the children for the tests, an attempt to estimate the prevalence of hearing loss was not hazarded. However, as we plan to test all the children in all the schools in Mysore city, we would be able to make statements of prevalence of losses in that population at a later time. A glance at the table would reveal that depending on the school tested the incidence of hearing loss may be low, high or moderate.

Conclusions

The following conclusions are warranted from this study.

1. That a school screening programme can be carried out successfully, the school authorities being aware of the importance.

2. That the incidence of hearing loss depends on the population studied. Hence unless a carefully selected sample is studied, it would be misleading to arrive at a figure supposedly a true indicator of the incidence.

3. That close to 50 per cent of the children with normal ENT findings may have hearing loss. This may reflect a previously existing pathological condition or conditions not evident through an otoscope.

4. That the group with abnormal ENT findings inclusive of hypertrophied tonsils and adenoids, should be followed up to monitor their hearing.

It is suggested that the following steps be taken to make the screening programme more effective:

1. Reduction in the number of false-positives and also threshold test at random for those who pass the screening to find out the number of false negatives.
2. Extension of the test frequencies at either end to detect those with very low and very high frequency losses. As more number of children with hearing losses show low frequency losses, inclusion of 250 Hz. may very well be justified.
3. More effective follow-up procedures. This may be achieved more readily when more members of the community become aware that

reversible hearing loss may become irreversible if not attended to promptly.

4. Priority should be given to those schools which are likely to have more children from the lower socio-economic strata.
5. Attempts should be made to extend the programme to include these students at high school and pre-university level. The possibility of screening in the school premises itself should be explored once again, so that the number tested per day may be increased.

Acknowledgment

This study is a part of a Research Project supported by the VRA-IND-38-68.