Comparison of Different School Screening Procedures

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In recent years, investigators like House and Glorig 1957, ASHA, 1975, Northern and Downs, 1978 etc., in the field of hearing screening and hearing conservation have suggested procedure that will more quickly and efficiently screen large number of subjects. Since there is no standard or recommended school screening procedure in India it is necessary to evaluate and compare some of the commonly used proce- dures to choose the one that is suited to Indian conditions.

AIMS

1. To compare four different pure tone and two impedance school screening procedures.

2. To do comparative study on impedance and pure tone screening in order to indicate which one (pure tone or impedance) or combination of the two is the best for school screening.

3. To evaluate each procedure for its pass/ fail criteria and find whether the results obtained are same.

4. To evaluate each procedure in terms of its cost effectiveness, reliability and validity.

5. To suggest guidelines for future screening procedure which are most suited to Indian conditions.

METHODOLOGY

In this study, 300 students in the age range of six to fifteen were screened using

Source	Test frequencies	Intensity level ANSI 1969	Fail/pass Criteria
louse and Glorig (1957)	4000Hz	at 25dB	Fail to respond in either of the ear.
itate pf Illinois Department of Public Health (1974)	500, 1000, 2000 and 4000Hz	25 or 35dB	Fail to respond to 1 tone at 35dB in cither ear or repond to any 2 tones at 25dB in the same ear
American Speech Language and Hearing Association 1975)	1000, 2000 and 4000Hz	20dBat 1000 and 2000Hz 25dB at 4000Hz.	Fail to respond at any frequency in cither ear.
Northern and Downs (1978)	1000, 2000, 3000 and/or 4000 and 6000Hz	25dB	Fail to respond to 1 tone at 1000 or 2000Hz o; fail to respond to 2 out of 3 tones at 3000, 40CK and 6000HZ.

340 ears were screened using impedance audiometers, Rexton Damplex tymp (DK 82).

Pass/fail criteria for the two procedures are given below:

ASHA (1979)

Classification		Initial screen	Disposition
I. Pass	Tympanogram	Normal or mildly positive negative.+ present +	Clear: on return
	Acoustic Reflex	+	
II. At Risk	Tympanogtam: and	Abnormal* +	Retest after 2-3 hours. a) If results fall into class-I, pass
	Acoustic Reflex Tympanogram:	Present + (or) Normal* (or) Mildly positive negative+	b) If results fall into class II, fail and referred,
	Acoustic Reflex	Absent.	
III. Fail	Tympanogram Acoustic Reflex	Abnormal* Absent.	Referred

NASHVILLE (1980)

Classification	Initial screen	Retest (after 2-3 hours)	Subject outcome
1.	Tympanogram: Normal* and not Acoustic reflex present	Not required	Cleared
2.	Tympanogram: abnormal # and or acoustic Reflex: absent	Tympanogram: abnormal + and/or acoustic reflex absent	Referred
3.	Tympanogram: Abnormal and /or acoustic reflex absent	Tympanogram: Abnormal* and Acoustic reflex present +	At risk recheck.

pure tone audiometers (two Rexton Damplex DK AS 51). And the criteria of fail/pass for different procedures are given below.

Type-I: The subject was considered passed since the results of tympanogram and reflex were normal.

Type-II: In Type-II, both the results tympanogram and reflex were abnormal. The subject was considered failed if he failed in rescreening and referred for threshold test.

Type-Ill: Both of the results were abnormal. Abnormal tympanogram and acoustic reflex present on the resereening was considered at risk and rechecked. In type-Ill the subject was considered fail if he failed in the

rescreening.

And 340 ears were screened for both pure tone and impedance audiometers. The instruments were calibrated according to ANSI 1959 standard. The screening was conducted in a room meeting the following conditions:
1. Well lighted
2. Low ambient noise
3. Well ventilated.

Rescreening was done after 2-3 hours for those who failed in the first screening.

Referral for diagnostic test:
The student or subject was referred for diagnostic test when she/he failed in

rescreening using the modified Hughson and Westlake procedure (Carhart and Jerger, 1959).

The following conclusions have been drawn from the results obtained:

(1) The results of four different pure tone screening procedures were found to be different. The satistical analysis using chi-square test showed that there was significant difference among the results of the different procedures.

(2) There was no significant difference between the two impedance screening procedures.

(3) A combination of pure tone and impedance screening is more effective in identifying children with hearing loss.

(4) Since many of the subjects did not come for threshold or diagnostic test and due to limitation of time for further investigation it was difficult to calculate the effectiveness of each procedure in terms of their sensitivity, false positive, specificity and false negative. The question of suggesting the best school screening procedure for Indian condition would be adequately answered only with the help of further investigation.

As the number of subjects in the threshold or diagnostic test were very low, further investigations are suggested to verify the results obtained in the present study with larger number of subjects.