



Profiling the Outcomes of Hearing Screening in Preschool Children attending Balwadis in Mumbai

Dr. Gayatri Sirur

Associate professor, Hashu Advani College of Special Education
Email - gs.hacse@gmail.com

Abstract: *Hearing screening in preschoolers can lead to early identification of hearing loss, which can have a significant impact on their developmental outcomes. There are various hearing screening techniques available to rule out hearing loss in preschoolers, however one needs to establish a protocol more relevant and applicable in the Indian context. This study explores a questionnaire based method to identify the 'high-risk' children. 1067 Balwadi children were screened for hearing loss by their class teachers with a validated questionnaire. The children identified as 'high-risk' were further administered objective hearing screening test to confirm the hearing loss. 49 children were identified as high risk and were asked to report for further testing in the audiology Centre. Only seven preschoolers were brought in by their parents for the further audiological testing. None were confirmed to have hearing loss but did show signs of speech and language disorders. Considerable number of children identified as 'high-risk', did not report for further audiological testing. Though balwadi teachers could identify high-risk children with use of the questionnaire, the 'lost to follow up cases' was a major challenge faced in carrying out screening for hearing loss.*

Key Words: *Hearing loss, Hearing screening, High-risk, Preschoolers, Balwadi teachers.*

**Balwadi is a term used in Marathi for preschools in Maharashtra*

1. INTRODUCTION:

The role of hearing is vital in the lives of human beings. If the ability to hear and process auditory information is affected then several areas of development including the (verbal) language development gets affected. The age of identification and age of intervention have great significance on language outcomes. Evidence points out that the probability of appropriate language development drops from 80% to 35% with late identification of hearing loss and enrollment in age inappropriate early intervention services at a belated stage (NECAP, 2009). If not detected early, the long term effects of hearing loss can cascade from delayed language development into inadequate literacy skills, decreased academic success, limited job opportunities, social emotional challenges, lowered career opportunities, reduced quality of life (Hayes, 2008). It is utmost important to initiate intervention immediately after identification of hearing loss to tap the critical period of language development.

2. Early identification of hearing loss :

WHO estimates that in India there are approximately 63 million people, who are suffering from Significant Auditory Impairment (World Hearing Day 2023, 2023). In children the prevalence of HL is 6.6% to 16.47%. Otitis media the most common cause of HL in children (Verma et al., 2022).

Universal Newborn Hearing Screening (UNHS) is the most desired procedure for identification of hearing loss in babies (JCIH, 2007). UNHS means hearing screening of each newborn before their discharge from the hospital. Revolutionary changes in technology has led to availability of advanced audiological assessment equipment such as Auditory Brainstem Response Audiometry (ABR), Oto Acoustic Emission (OAE); which allow identification of hearing loss even in newborn babies. These advanced technologies are very much available in India, however, the resources available for identification of hearing loss in babies are certainly inadequate compared to the rate of births, also new



born hearing screening is not yet mandatory and has not emerged as a national policy in India. UNHS still looks a distant dream in Indian context, thus babies born with hearing impairment in India are at risk of being identified comparatively late, sometimes as late as when they enter the preschool. According to a statement issued by SSA (2002), about 70% of children with disabilities have still not been identified after more than 10 years of implementation of the 'Education for All' programmes. To facilitate early identification of children who have missed hearing screening immediately after birth or who have developed hearing loss later, hearing screening could be performed as a routine for all the preschoolers.

Hearing screening tools:

Although OAEs are considered an acceptable screening tool, pure-tone screening remains the gold standard and is ideally accomplished by the time the child is 5 years old (ASHA, 2016a). While Kreisman et al (2013) have quoted the advantages of using OAE protocol, there are others who vouch for screening with behavioral testing for better results.

Though hearing screening currently is done predominantly with instruments such as pure tone audiometer /OAE/ABR, this type of screening still requires ample time, energy, trained professionals, calibrated instruments and suitable space. In a vast country like ours it could be desirable to have more economical, and viable and at the same time reliable and valid method of hearing screening. One of the methods for carrying out such screening could be separating high risk children from those who are not having high-risk for hearing loss with the help of check list or questionnaires. There are few advantages of using this method such as, it is inexpensive, requires only copying costs, minimal training is required for the personnel who will carry out hearing screening. There are also some drawbacks in using this method, such as, it may fail to identify or differentiate between mild or moderate hearing loss cases. This method does not meet the requirement for professionally objective assessment criteria (Anderson, 2011)

3. Role of preschool teachers in hearing screening:

Preschool teachers can be involved in hearing screening for separating at risk from no risk children, the biggest advantage for them as the screener is that they spend lot of direct time with the children which gives them opportunity to observe their student's behavioral responses. This exploratory study capitalizes on these advantages of using services and expertise of preschool teachers to screen 'High risk' children for hearing loss from the typically developing children. This study has explored the facilities of balwadis which predominantly enroll children from lower socioeconomic class and two private preschools which catered to children from middle /upper socioeconomic class.

Origin of the research problem

This study attempted to find a solution to the research question- how to facilitate early detection of hearing loss in preschoolers?

Need

Though the need for early identification of hearing impairment is very well understood by professionals working in India, the practices followed in western world may not be feasible and practical for the Indian families. It is important for us to evolve a model for early detection of hearing impairment which suits our cultural diversity, vastness at the same time which is economical and easily implementable on the huge population.

Rationale

A large number of children with hearing impairment are born to parents who are of normal hearing or who have little or no awareness about hearing impairment. The teachers of such children may not have sufficient training or experience in suspecting hearing impairment in such children. Under the circumstances, it is necessary to develop simple tools to suspect and screen children with hearing impairment so that further tests are performed to confirm or rule out hearing impairment. There is dearth of research in the areas of early identification of hearing loss or hearing screening in India and an empirical study like this could throw some light on issues which need to be addressed for better outcomes.

The objective of this study was to profile the outcomes of the hearing screening after administration of the validated tool on preschool children attending Balwadis established in M Ward, Mumbai.

4. Methodology :

The type of research method utilized in this study was predominantly quantitative type. This is a cross-



sectional, descriptive study and research design used for this was a survey. A validated researcher developed tool for hearing screening was administered with the help of Balwadis teachers.

Data collection

The study mainly aimed to target children attending Balwadis in and around Chembur area. All the 33 Balwadis except 6 came under the purview of Brihan Mumbai Mahanagar Palika. Six other Balwadis under the purview of lok seva sangam and 2 private preschools of Wonderland preschools also were contacted and consent was obtained. A validated tool for hearing screening of the preschool students was developed after rigorous review of literature, taking in to account developmental milestones of 3 to 6year old children and in length discussion with experts from the field. Each preschool teacher was given the validated questionnaire. An orientation and training was given to all the Balwadi teachers prior to filling the questionnaire to facilitate their understanding about administration of the questionnaire. A total 1067 filled questionnaires (hearing screeningtools) were collected from all the teachers by visiting their respective schools. The data collected through the questionnaire was tabulated and coded wherever necessary. Individual score for each item was calculated as per the teacher’s response. Data of ‘High Risk children’ was filtered out. Parents of children at risk were contacted and asked to report to an Audiology center for further audiological testing. Further audiological testing was offered free of cost to all the children identified as ‘high risk’.

5. Results and discussion :

Total 1067 filled questionnaires were collected from 33 preschools. Out of the 1067 responses, 51 questionnaires were disqualified due to incomplete /incorrect responses. Thus, total 1016 forms were considered for data analysis.

Out of these, 16 children due to history of middle ear infections, 8 children due to familyhistory of deafness, 29 children due to concern about speech and hearing shown by the family and 15 children who had inappropriate responses to speech /sound were categorized as ‘High risk’.

Table:1 Total number of ‘high-risk’ children and category they belonged to

At risk category 1	Ear infections	16
At risk category 2	family history	8
At risk Category 3	family concerns	29
At risk category 4	Inappropriate responses to speech /sounds	15
Total		68

Out of these 68 students, since 19 students belonged to more than one high risk category, actually in total 49 students needed to be further tested to rule out hearing loss with some audiological test. Out of 49, two parents refused to get their children for further testing as their children were already under the care of another hearing professional. One child could not report for hearing testing due to heavy ear discharge and was expected to report for the assessment after taking treatment from an ENT surgeon. This screening and further audiological testing was offered free of cost and appointments were given as per convenience of the parents. In total, only seven parents reported for further audiological testing at the centre with their children. None of these children had significant peripheral hearing loss and were declared pass in both the ears with the help of OAE testing, however, all the seven children appeared to have speech and language impairment and were referred for further intervention. All the other parents who did not get their children for further audiological testing, believed that their child did not need hearing testing.

Table 2-Profiling of ‘High-Risk’ children

Total ‘high- risk’ children identified with hearing screening tool	49
Parents refusing testing at the Audiology Centre as children were already under care of some other health care professionals	2
Willing for Audiological assessment but pending assessment	1
Came for further hearing screening at the audiology centre	7
Children did not report for further testing in audiology centre	39

**6. Conclusion :**

This Hearing screening project effectively identified 'high risk children for hearing loss' through administration of a validated questionnaire. The Balwadi teachers successfully carried out hearing screening of preschool children with the help of a questionnaire. However, the biggest challenge faced later was to convince the parents the need for further audiological testing for their child and considerable number of students were lost to follow up.

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