



## OAE SCREENING OF NEONATES: EXPERIENCE IN A NICU OF TERTIARY CARE HOSPITAL

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### ABSTRACT

**Background:** To study the incidence of hearing loss among neonates, determine and confirm the distribution of common risk factors in neonates with hearing loss.

**METHODOLOGY:** A prospective observational study which involved 60 neonates who underwent hearing screening in month of January 2018.

**RESULTS:** Hearing loss is the common disorder.

**CONCLUSIONS:** OAE screening of neonates at risk for significant hearing loss is a clinically efficient and cost effective approach for early detection of significant hearing loss.

### KEYWORDS :

#### INTRODUCTION

Hearing is one of the most important five senses. Normal speech and language development depend upon a child's ability to hear spoken language. Hearing impairment is one of the most critical sensory impairments. It is associated with much morbidity. Undetected children with congenital or acquired hearing loss may result in lifelong deficits in speech and language acquisition, poor academic performance and personal-social and behavior problems. Deficits in speech and language lead to lack of stimulation in development too. [1, 2, 3].

Significant hearing loss is the most common disorder, occurring in 1 to 2 newborns per 1000 in the general population, and 24% to 46% of newborns admitted to neonatal intensive care unit, signifying the need for hearing screening. It has been observed that practice of neonatal screening has dramatically lowered the age of diagnosis of deafness from 1 ½ - 3 years to less than 6 months of age. Screening should ideally be 'universal' i.e., everybody is screened and at a minimum, screening should be 'targeted' i.e., 'high risk' babies are screened. [4]

Electrophysiological methods are most commonly used for hearing assessment which include otoacoustic emission (OAE) which is generated by the biological activity of the outer hair cells of the cochlea and auditory brain stem response (ABR) which is the representation of electrical activity generated by the eighth cranial nerve and brainstem in response to auditory stimulation. [5]

The pathologic conditions that can cause absence of OAEs are:

- External ear pathology- stenosis of external auditory canal, wax, otitis-externa.
- Middle ear pathology-otitis media, serous otitis media, tympanic membrane perforation.
- Inner ear pathology – otosclerosis, ototoxicity, noise-induced hearing impairment and other cochlear pathology. The conditions like vestibulocochlear nerve pathology (if cochlear blood supply is not interrupted) and central auditory disorder do not affect OAEs.

#### MATERIALS AND METHODS

The present study was carried out in NICU of Department of Paediatrics in a tertiary care hospital in Maharashtra. The study was a prospective observational study which involved 60 neonates who underwent hearing screening in month of January 2018. All neonates having NICU admission were enrolled in present study. The aims and objectives were to study the incidence of hearing loss among neonates, determine and confirm the distribution of common risk factors in neonates with hearing loss and identify neonates with possible hearing deficits at the earliest possible stage in order to refer for diagnosis, treatment and rehabilitation, if required.

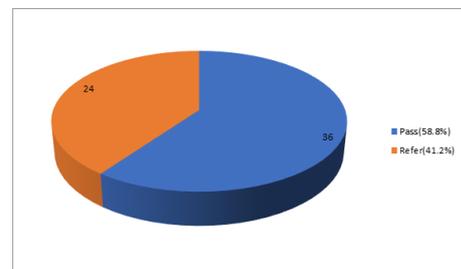
Informed consent was obtained from parents prior to the study. Only those babies whose parents were not willing for screening were excluded. Screening was done with OAE machine (Madsen Accu screen TE ) by same technician. Babies were labelled refer only if they

fail two tests one week apart. Refer babies were sent for BERA but details of BERA are not included in present study.

#### RESULTS

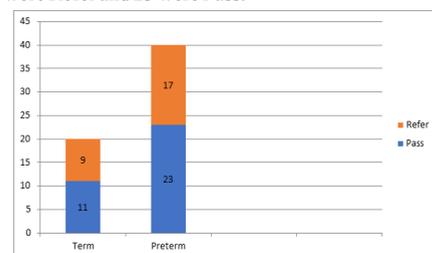
In present study, we screened 60 neonates with OAE.

Figure 1 shows the percentage of pass and refer in study subjects. Amongst them, 36 newborns were pass & 24 were refer as shown in figure 1.

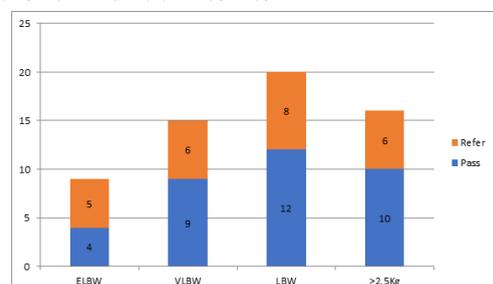


**Fig.1-** Pie chart representing the percentage of Pass and Refer neonates

OAE was done in 60 neonates, amongst them 20 neonates were Term and 40 neonates were Preterm. Amongst the Term neonates 9 neonates were Refer and 11 were Pass. Amongst the Preterm neonates 17 neonates were Refer and 23 were Pass.



**Fig-2-** Graph above representing the number of Pass and Refer with respect to Term and Preterm neonates

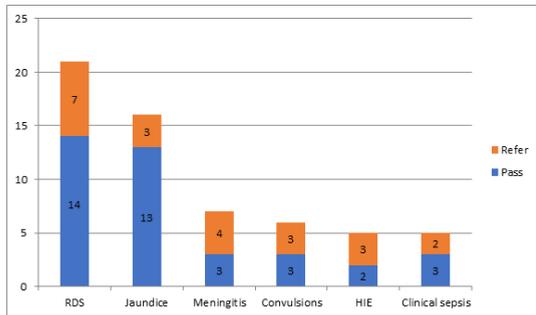


**Fig-3-** Above graph shows the Pass and Refer neonates with respect to their Birth weight

Amongst 60 neonates enrolled in the study, 9 were ELBW, 15 were VLBW, 20 were LBW and 16 neonates were >2.5 Kg.

Amongst ELBW neonates, 5 were Refer and 4 were Pass, while in VLBW neonates, 6 were Refer and 9 were Pass.

In LBW & > 2.5 kg neonates, 8 & 6 were Refer respectively and 12 & 10 were Pass respectively.



**Fig.4-** Above graph shows the Pass and Refer neonates with respect to their Diagnosis.

Among enrolled, 21 neonates having RDS out of which 7 were Refer and 14 were Pass. 16 neonates had Jaundice out of which 3 neonates were Refer and 13 were Pass. While 7 neonates had Meningitis of which 4 were Refer and 3 were Pass. 6 and 5 neonates diagnosed with convulsions and HIE respectively of which 3 & 3 were Refer and 3 & 2 were Pass respectively. Neonates diagnosed with clinical sepsis were 5 of which 2 were Refer and 3 were Pass.

## CONCLUSION

In present study, we enrolled 60 neonates in NICU over period of 30 days for screening with OAEs (otoacoustic emissions). 41.2% had “refer” results and 58.8% had “pass” results. Kumar et al [5] in his study found that 43.2% of screened children had OAE REFER. But they enrolled children in age group from birth to 2 yr.

The main aim of the study was to demonstrate the utility of OAES to be used as a rapid screening test for hearing impairment in suspected cases of jaundice, convulsions, fever, meningitis, ototoxic drugs, low-birth weight/neonatal intensive care unit (NICU) admission, etc. The OAE examination is a very rapid, highly sensitive, specific and objective test for the inner ear, especially the outer hair cells of the cochlea and form the basis of screening of newborns for early identification of childhood hearing impairment. Once a suspected impairment has been identified on screening further testing is done to confirm the suspected diagnosis so early intervention can be carried out for speech and language development of children.

## REFERENCES

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