

A Retrospective Study of New Born Hearing Screening at CRC Rajnandgaon, Chhattisgarh, India

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Abstract: Hearing impairment is one of the most critical sensory impairments. Newborn Hearing Screening is a standard practice in most developed countries. However, in developing areas like Chhattisgarh many obstacles like unawareness, inaccessibility, lack of infrastructure reduce the sustainable rate of screening for early identification and intervention.

Keywords: Neonates, High risk, NICU, OAE, TORCH, APGAR.

1. INTRODUCTION

Worldwide reporting of hearing loss finds that the prevalence of moderate and severe bilateral hearing deficit (> 40 dB) is 1-3 per 1,000 live births in well baby nursery population [1,2] and 2 - 4 per 100 infants in a high risk/NICU babies [3-7]. These numbers signify that hearing impairment is one of the most common potentially disabling conditions in infancy and most frequent congenital anomalies which usually goes undiagnosed [8-10]. Current recommendation by WHO is to screen all infants for hearing loss preferably at birth and hearing augmentation by 6 months of age [11,12]. In the general population, 1 newborn every 500–1000 births present permanent hearing impairment, a greater incidence than the incidence of diseases routinely screened at birth. In certain – higher risk – populations, this incidence could increase 10- to 50-fold. The risk factors of hearing loss in neonates, which were first documented in 1994 and then revised in 2000 by the Joint Committee on Infant Hearing (JCIH), are: premature birth (gestational age ≤ 34 weeks); low birth weight (<1500 g); children from hearing impaired families; TORCH infections; neurological disorder; hyperbilirubinemia; craniofacial anomalies; syndromes known to be associated with hearing loss; and severe birth asphyxia (APGAR < 7 at 5 min). Other risk factors have been tested, such as maternal drug abuse, persistent high pulmonary pressure, intra-ventricular hemorrhage, high C reactive protein levels but were not proven to be significant. Between 3 and 5% of the “at-risk” newborns suffer a permanent hearing loss.

Typically, the UNHS programs are a two-stage approach. First stage: New born babies are screened for hearing loss before discharge from the hospital within first few days of life. This involves one or two-step OAE testing or OAE and AABR in high risk infants. Second stage: Children who fail in-hospital screening test are referred for a repeat testing between 2 and 8 weeks after discharge and are examined by means of OAE followed by AABR. Positive second stage results should be validated by otolaryngologist and audiological consultation, diagnostic ABR testing and other electrophysiological testing performed by the third month of age. Once diagnosed, all infants identified with hearing loss should receive appropriate early intervention by 6 months of age.

2. METHODOLOGY

Both the normal and high risk will go for screening of hearing loss during their neonatal or infant period using a screening DPOAE as the screening tool. Neonates or infants who failed the initial screening were subjected to repeat testing with screening DPOAE. The automated OAE system gives a ‘pass’ or ‘refer’ result. Absence of emissions using repeat DPOAE was tested before they were discharged from the hospital. The OAE provides with ‘pass’ or ‘refer’ outcome. Screening was

done by trained screeners under the supervision of an experienced audiologist specialized in pediatric audiometry. Subjects who failed re-screening by OAE were scheduled for a re-examination with ABR three months later, for confirmation of diagnosis and further intervention. Data as results of the tests were entered in Microsoft office excel and analyzed in excel or using Statistical Program for Social Science (SPSS).

Procedure: The selected population included every newborn presenting one or more of the risk factors defined by the JCIH: premature birth (gestational age ≤ 34 weeks), low birth weight (<1500 g), hyperbilirubinemia, children from hearing impaired families, craniofacial anomalies, syndromes known to be associated with hearing loss, and those hospitalized in the neonate’s unit, will be screened by DPOAE.

3. RESULT AND DISCUSSION

The total number of 431 neonates were undergone through Oto Acoustic Emission (OAE) screening test from May 2022 to April 2023 i.e., in 1 year.

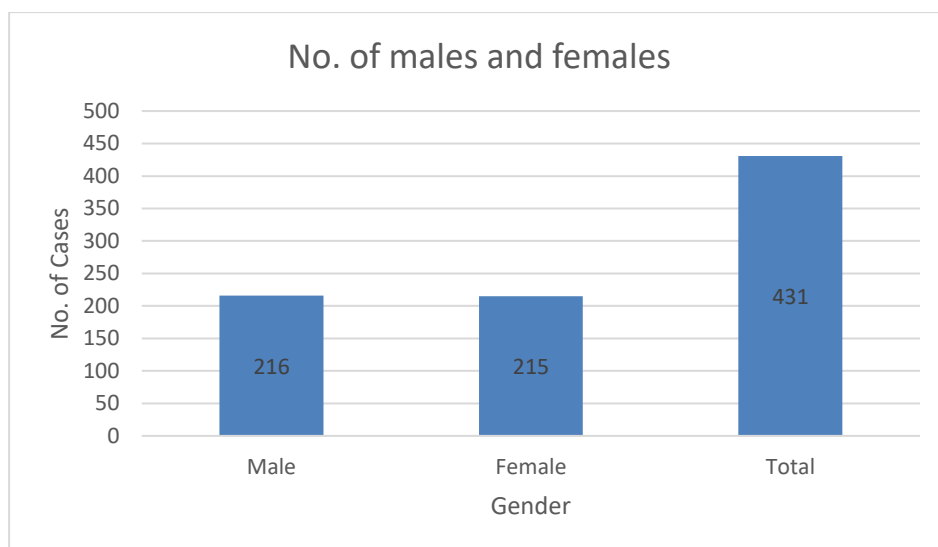


Figure 1: Number of males and females for OAE screening test

In which 216 neonates were male and 215 were female. Furthermore, all the neonates were divided into their categories of caste like General, Other Backward Caste (OBC), Schedule Caste (SC) and Schedule Tribe (ST). All 431 neonates were screened using OAE screening test protocol.

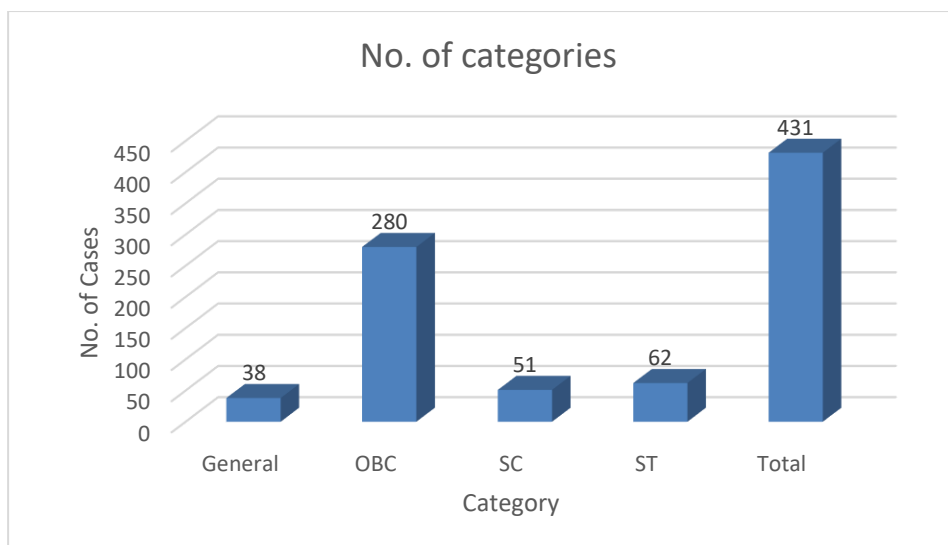


Figure 2: Caste categories of neonates like General, OBC, SC, ST

A total 431 neonates in which 38 were belongs to general categories and 280 were from OBC and 51 from SC and 62 were from ST category. That means 8.82% neonates from general category, 64.97% neonates from OBC category, 11.83% neonates from SC category and 14.38% neonates belongs to ST category.

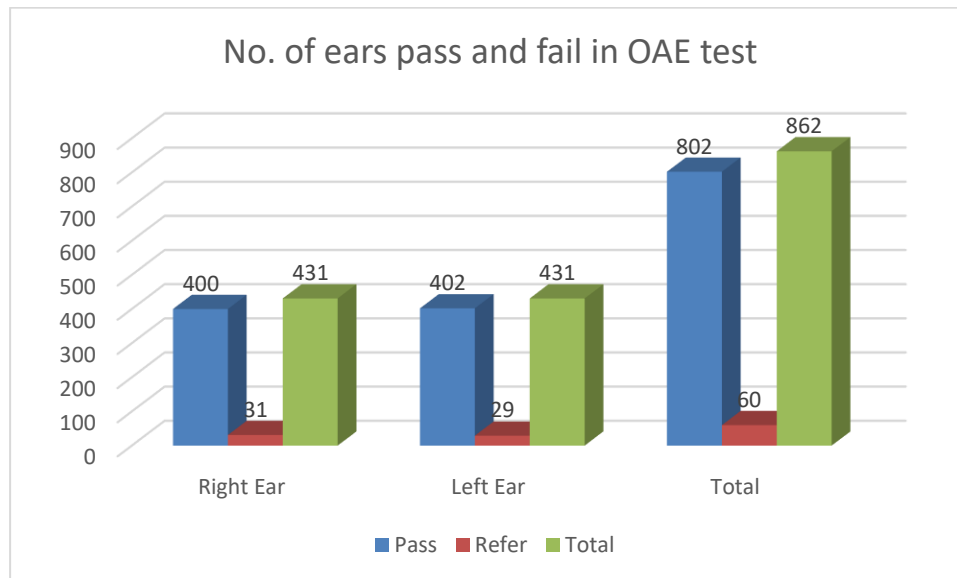


Figure 3: Total number of ears pass and fail in OAE test

A total 431 neonates were there in 1 year from May 2022 to April 2023 for OAE screening test. So total 862 ears can be considered for this study i.e., 431 right ears and 431 left ears. In this study 31 right ears were found refer that is 7.19%, 29 left ears were found refer that is 6.73%. In total 862 ears 60 ears were found refer that is 6.96% and the rest 93.04% were pass in OAE screening test.

4. CONCLUSION

Hearing Screening was done via DPOAE for High Risk Newborn of Neonatal Intra Care Unit of District Hospital, Basantpur, Rajnandgaon. In which it was found that only 31 right ears were found refer that is 7.19%, 29 left ears were found refer that is 6.73%. Even with High Risk Factor, High Risk Register referrals are very less suggest that high risk factor does not affect hearing ability seriously. The rest 802 ears that is 93.04% were pass in OAE screening test.

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