



INTRODUCTION

Partial Universal Hearing screening was implemented in our centre since year 2012. Our “REFER” rate (i.e. infants that did not pass their hearing screening) was higher compare to the benchmark rate of $\leq 4\%$ set by Joint Committee of Infant Hearing (JCIH) [1]. This is a burden not only to Audiology Department but also to caregivers as many required a second outpatient screening. The objective of this audit is to reduce the “REFER” rate of first hearing screening of neonates admitted to neonatal ward. We also aim to identify the factors leading to high “REFER” rate and standardized our hearing screening guidelines within the department.

METHOD

Data for analysis were obtained from all the neonatal wards. Data from year 2021 was analysed and it was noted that the “REFER” rate was above the set standard. Discussions were held among the medical staffs involved in screening to identify possible factors leading to high “REFER” rate with implementation of new steps starting September 2022. Data was collected after each audit cycle and re-audit was carried out in cycles till set standards achieved.

Hearing screening results:

- **PASS** – hearing loss not detected at birth
- **REFER** – further test is required to verify if hearing loss present. It does not indicate that there is a hearing loss.

RESULT

The workflow from various neonatal wards were obtained and compared. We noticed there were variation in practice among the two main neonatal wards and the “REFER” rates were above the set benchmark – 7.35% in year 2021 and 8.3% from January to August 2022. (Table 1 and 2) The hearing screening workflows were compared among the wards and few issues were identified – a standardized workflow was implemented on September 2022 and trained personnels were encouraged to perform bedside screening rather than bringing babies to a separate room (Figure 1). After the first cycle, “REFER” rate was still high at 8.5% from September 2022 to March 2023. Hence, we started on a second audit cycle with new steps implemented including allocating specific timeslots and to perform a repeat screening prior to discharge since April 2023 (Figure 2). There is a significant drop in the “REFER” rate after second audit cycle (since April 2023) as shown in Table 2. The average “REFER” rate from April to December 2023 was 4%.

DISCUSSION

To detect permanent hearing impairment and allow early intervention, universal newborn hearing screening (UNHS) has become part of standard neonatal care in many countries around the world [2]. Early detection and intervention leads to longstanding benefits in speech and language development [1].

In our center, partial UNHS was implemented since year 2012 – aiming to screen all neonates admitted to neonatal wards. As part of our effort to move towards UNHS, we first aim to reduce our “REFER” rate to the benchmark of $\leq 4\%$ as set by JCIH. [1]

Study has shown that screening when infant is calm helps to reduce “REFER” rate.[3] In our audit, screeners are encouraged to perform bedside screening whenever possible to avoid the possibility waking up the infants when transferring them to a room (Figure 1). Unfortunately, this has failed to improve our referral rate – possible factors are that ward environment was not suitable at time of screening or there were too many infants in the ward from September 2022 to March 2023 as evident by the high numbers of total infants screened during that time frame.

Previously in our center, if an infant’s first screening was “REFER”, they will be given an outpatient appointment date for second screening. Since April 2023, those who “REFER” their first screening will be rescreen prior to discharge (Figure 2). This measure was proven to reduce the referral rate since implementation. (Table 2)

A study published in 2001 showed that rescreening before hospital discharge reduced the false-positive rate from 3.9% to 0.8% and that 80% of newborns who failed the initial screening passed on rescreening prior discharge [4]. A recent systematic review also shows similar finding [3]. Rescreening prior to discharge is also recommended in multiple international hearing guidelines [5,6]

After the second cycle, there was significant reduction in the “REFER” rate of first hearing screening. These results may help to improve the quality of hearing screening guidelines in our clinical practice. Regular review of the screening program is required to ensure sustainability of the results and also to further identify factors contributing any unsatisfactory performance so that early identification of hearing loss can become a reality.

Table 1 – Total Number of Patients Screened in Year 2021 to 2023

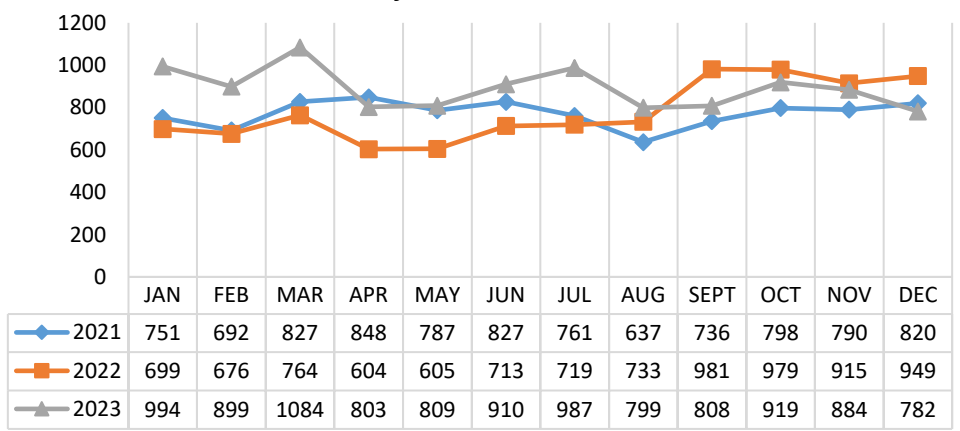


Figure 1 – Flowchart for 1st Audit Cycle

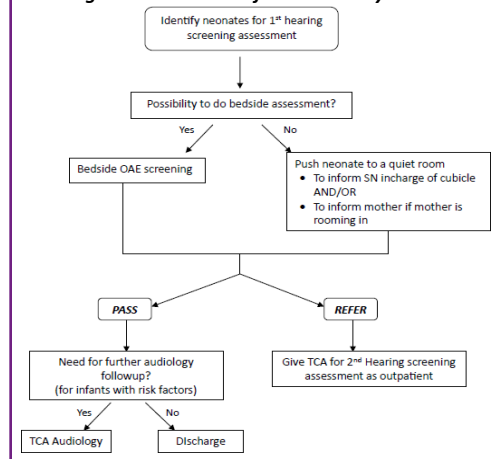


Table 2 – Monthly “REFER” Rate for Year 2021 to 2023

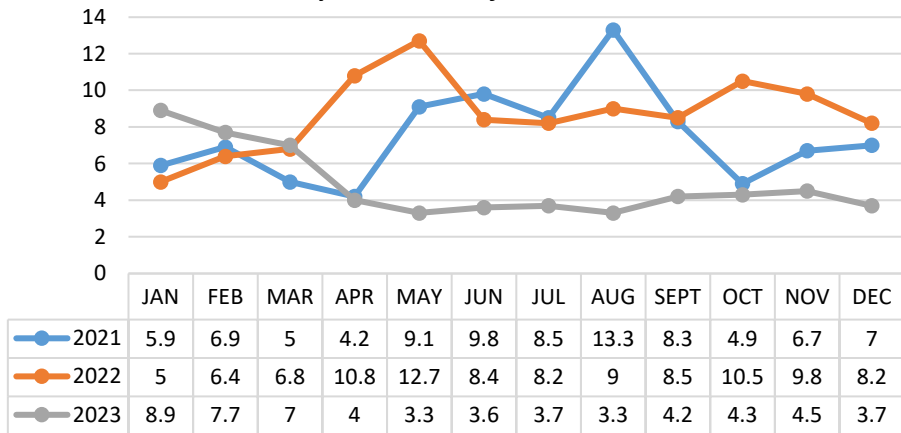
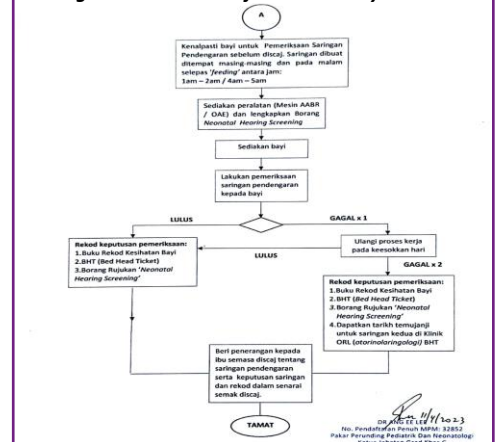


Figure 2 – Flowchart for 2nd Audit Cycle



REFERENCE / ACKNOWLEDGEMENT

1. Joint Committee on Infant Hearing (JCIH) (2019) Year 2019 position statement: principles and guidelines for early hearing detection and intervention programs.
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 3. Mackey AR, Bussé AML, Del Vecchio V, Mäki-Torkko E, Uhlén IM. Protocol and programme factors associated with referral and loss to follow-up from newborn hearing screening: a systematic review. BMC Pediatr. 2022
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 5. Berrettini S, Ghirri P, Lazzerini F, Lenzi G, Forli F. Newborn hearing screening protocol in Tuscany region. Italian J Pediatr. 2017
 6. Hearing Screening: Consideration for Implementation (2021), WHO.
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