

Early Detection of Deafness & Neonatal Hearing Screening

Dr. Abdul Monem Alshaikh

Consultant of Otorhinolaryngology Otology & Cochlear implant

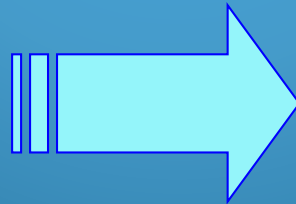
Jeddah - KSA

Screening

It is the process of applying to a large number of individuals certain rapid, simple measurement that will identify those individuals with high probability of hearing loss.

Preliminary information about hearing function is acquired by applying certain measures to large numbers of individuals.

Measures



- Rapid
- Simple
- Reliable
- Economic

Why neonatal hearing screening?

- **Serious** birth deficit.
- Early & appropriate intervention before **6 months old**; children will develop speech, language & social skills as **normal peers**.
- Later identification and /or intervention lead to language delay.
- **Availability** of acceptable technologies for effective screening.

Developed Countries

Screening rates have increased significantly over time.

According to the Centers for Disease Control and Prevention , of the nearly 4 million infants born in **United States** in 2005 , 91.5 % were screened for hearing loss.

- In **France** , the median age at diagnosis of hearing impairment decreased from 17 months to 10 weeks with Universal Newborn Hearing Screening
- (**UNHS**) implementation . (Leveque M , et al . 2007) .

- Commission for the Early Detection of Hypoacusis (CODEPEH), **Spain**
Early Hearing Detection and Intervention: 2010
CODEPEH Recommendation
Trinidad-Ramos, G., de Aguilar, V. A., et al.
(2010).
- Infants in NICU for > 5 days "should mandatorily be explored with ABR to prevent a diagnostic error of neural hearing losses" .

In Developing countries ?

Prevalance of hearing loss

- **Singapore**: 1 in 1000 “severe HL” & 5 in 1000 “lesser degrees” (Low et al., 2005).
- **Malaysia**: 4/1000 (Abdullah et al., 2006).

Deaf Population in Saudi Arabia

Zagzoog & Al-Shaikh et al; (2002)

- A comprehensive random sample survey of 9540 Saudi children below the age of 15 years was carried out bet. Sept. 1997 & May 2000.
- The main objective of this study was to screen these children with HI with special emphasis on the prevalence of SNHL.
- Survey team included, Otorhinolaryngologist, an audiologist, a nurse and a social worker.

Results of Survey

- Total population was 9540.
- The overall prevalence of HI: 1241 (13%).
- The overall prevalence SNHL : 142 (1.5 %).

7: unilateral SNHL

135: Bilateral SNHL

- Severe to profound SNHL: 68 (0.7 %) {

36: Severe SNHL

32: Profound deafness

Types of Neonatal Hearing Screening

1. Universal: all live births.
2. Targeted: high risk population.

Joint Committee on Infant Hearing (2000)

1. Universal screening within **1 month** of age.
2. Complete diagnostic evaluation by **3 months**.
3. Intervention maximally by the age of **6 months**.

Tools Needed for Neonatal Hearing Screening

- Knowledge and Will
- Qualified Personnel
- Equipment
- Referral center
- Filing system

Methods of Neonatal Screening

1- Equipment

2- Staff



Newborn Hearing Screening Program Outcomes in **Turkey**

- A total of 15323 newborns and NICU infants were tested, 94.7 % passed the 1st screening step (TEOAE), while(5.2%) neonate failed.
- The false positive rate for the 1st step with TEOAE was 4.9 %, second step with TEOAE (after 10 days) was 1.85% and 3rd step with ABR was 0.25%.
- They concluded that 3 step screening program is an accurate and non- invasive method to determine the congenital hearing loss.

Newborn Hearing Screening in Malaysia

- No of infants screened: 3762.
- 1st Screening (TEOAE), before discharge: (19.7%) failed.
- 2nd Screening (TEOAE) 39 pts. only tested: 10 passed, 29 failed.
- Brainstem evoked response (BSER):13 normal 16 failed.

Conclusion: the high no of false positive results in this study requires fine tuning to minimize theses problems.

Neonatal Screening in USA

Newborns were classified into 2 groups, one group was screened by (TEOAE), The other group screened by ABR.

(TEOAE) group: About 15 % failed

ABR: 8% when the study began, the rate reached 4% at the completion of the study.

Results of Study Done in Saudi Arabia

BY

Ministry of health in collaboration with Saudi
Association of hearing Impairment

- Through the national committee for early detection and management of hearing impairment.

Results of Study Done in Saudi Arabia

- 40,000 newborns were screened over the years 2007 up to 2009.
- 4% of the screened newborn failed the first step in screening and were referred to more specialized centers.

- Saudi High Authority Approved National Neonatal Hearing Screening at 2014.
- As well as National Hearing Registry.

- Several rehabilitation centers geographically distributed in the kingdom (North, South, East, West & Middle regions) opened.
- These centers provide the following:-
 - Advanced diagnostic services.
 - Hearing aids and Cochlear Implant
 - rehabilitation services.
 - CME for the staff and care givers.

- By the end of year 2018:-
 - Implementation of the National Neonatal Hearing Screening in Saudi Arabia Reach to 60%.
 - Planning to reach Implementation to 90% by the end of 2019.

Conclusion

- It is no longer a question of whether to detect hearing loss at birth, but rather, how best to do it.

(Mehl and Thompson, 2002)



Thanks for attention