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Polish Universal Neonatal Hearing Screening Program—4-year experience (2003–2006)

Witold Szyfter [a], Maciej Wróbel [a,*], Marzanna Radziszewska-Konopka [b], Joanna Szyfter-Harris [c], Michał Karlik [c]

[a] *Department of Otolaryngology and Oncological Laryngology, Poznan University of Medical Sciences, Ul. Przybyszewskiego 49, 60-355 Poznan, Poland*
[b] *Children's' Memorial Health Institute, Al. Dzieci Polskich 20, 00-730 Warszawa, Poland*
[c] *Department of Phoniatrics and Audiology, Poznan University of Medical Sciences, Ul. Przybyszewskiego 49, 60-355 Poznan, Poland*

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Summary

Objective: The aim of this paper is to share our experience and observations in running the Universal Neonatal Hearing Screening Program on a national level, present results and indicate some problems that have arisen during these 4 years.
Methods: Polish Universal Neonatal Hearing Screening Program started back in 2002 in all neonatal units in Poland. Implemented testing methods consisted of test of transient evoked otoacoustic emission (TEOAE) performed in all new born children in their first 2–3 days of life and auditory brainstem response testing (ABR) conducted on children, who did not meet the TEOAE pass criteria. Additional questionnaire registered information on ototoxic drugs and family history of hearing impairment in every newborn. Diagnosed children were further referred for treatment and rehabilitation.
Results: After 4 years of running the program (between 2003 and 2006) a total number of 1,392,427 children were screened for hearing impairment, what stands for 96.3% of all delivered babies, registered in Poland. The screening program enabled to identify and refer for further treatment 2485 children with various types of hearing loss, 312 with profound (0.02% of population) and 145 with severe sensorineural hearing loss (0.11% of population).
Conclusions: Our results indicate the accuracy of newborn hearing screening which remain an issue. Although improvement is needed in both intervention systems and diagnostic follow-up of hospitals, the Polish Universal Neonatal Hearing Program fully has achieved the main goal, the identification and treatment of hearing impaired children.

* Corresponding author. Tel.: +48 61 8561 387.
E-mail address: wrobmac@amp.edu.pl (M. Wróbel).

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1. Introduction

Owing to the initiative of the Polish citizens and support of the Great Orchestra of Christmas Charity Foundation—a charitable organization, the National Universal Neonatal Hearing Screening program in Poland was introduced. The program began in the end of 2002 in all neonatal units in Poland and screened all newborn children. After 4 years of running the program (between 2003 and 2006) a total number of 1,392,427 children were screened for hearing impairment, what stands for 96.3% of all delivered babies, registered in Poland.

The Polish program was created to meet three general purposes: first, to detect hearing impairment in neonates and to identify children from risk groups with a higher susceptibility of hearing loss; second, to diagnose—verify positive results, establish final diagnosis of hearing impairment, refer patients for treatment; and third — to act — fit with hearing aids, introduce surgical treatment including cochlear implants and rehabilitation. The general purpose of the project is to prevent the adverse consequences of a delayed diagnosis not only on speech and language, but also on cognitive development.

To our knowledge the Polish National Universal Neonatal Hearing Screening Program is the only one worldwide to have been introduced to the whole country to include all newborn children. This approach has turned out to be a success in terms of identification and treatment. However, the organization of the program increases the number of patients that need to be evaluated in consultation centers, this, subsequently, impairs the normal function of consultation centers by overloading the system.

The aim of this report is to share our experience in running the Universal Neonatal Hearing Screening Program on a national level, present our results and indicate some problems that have arisen during these 5 years.

2. Materials and methods

The main structure of the project consists of three levels. The basic level comprises of 448 neonate departments registered in the program. These departments are responsible for single test of Transient Evoked Otoacoustic Emission (TEOAE) in all newborn children in their first 2—3 days of life. Additionally, all infants are analyzed for high audiologic risk factors. In order to reinforce the accuracy of screening, the Neonatal Hearing Screening Program, by the decree of Ministry of Health was written down on the list of obligatory testing for neonates the same way as phenylocetoruria and typothyroidism testing. Children, who did not meet the TEOAE pass criteria and those infants at high risk for hearing loss are registered in the central database and referred to the second level.

The second level of the structure consists of 57 council centers — otolaryngology departments — responsible for the verification of positive TEOAE results, of risk factor impairments, observation of children's hearing behavior and the implementation of preliminary treatment. Children at about 3 months of age undergo an OAE and auditory brainstem response testing (ABR). Similar to the first level, obtained data is referred to the central computer.

The top, third level is build up of 14 audiological centers. They are responsible for ultimate treatment and rehabilitation of deaf and hearing-impaired children.

3. Results

Between 2003 and 2006 the total number of children covered by the National Universal Neonatal Hearing Screening Program reached 1,392,427. This number stands for 96.3% of children delivered in Poland. During that time, except for 3 months at the beginning of the program in 2002, the number of children screened annually was stable, ranging between 341,250 and 357,237 neonates in 2003 and 2006, respectively. The total number of children that did not meet the requirements for pass criteria was 4.4% during the evaluated period of time and ranged between 3.3% and 5.4% in 2006 and 2003, respectively. Within the group of children registered in our database with positive results (including risk factors and not screened), only 62.7% were consulted at the second level. This percent ranged and was 54.5%, 60.5%, 66.3%, 71.3% in 2003, 2004, 2005, 2006, respectively. Nevertheless, the screening program enabled to identify and referee for further treatment 2485 children with various types of hearing loss.

4. Discussion

The majority of children in Poland are delivered in hospitals. This gives a great control of the total number of deliveries and can be easily used to implement population-screening programs, especially when supported by low regulations [1]. This approach results in a great number of data which has to be processed and interpreted. The Polish UNHSP covered 96.3% of all neonates, between 2003 and 2006 that total number of children covered by the program is close to 1,500,000. In comparison to