World Health Organization

Newborn and infant hearing screening

CURRENT ISSUES AND GUIDING PRINCIPLES FOR ACTION

OUTCOME OF A WHO INFORMAL CONSULTATION HELD AT WHO HEADQUARTERS, GENEVA, SWITZERLAND, 09–10 NOVEMBER 2009

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List of abbreviations

AABR automated auditory brainstem response

ABR auditory brainstem response

AOAE automated otoacoustic emissions

ASSR auditory steady-state response

BCG Bacille de Calmette-Guérin (immunization)

DALY disability-adjusted life year

dBnHL decibel normal hearing level

DPOAE distortion product otoacoustic emissions

EHDI early hearing detection and intervention

ENT Ear Nose and Throat

IALP International Association of Logopedics and Phoniatrics

IGCH International Working Group on Childhood Hearing

JCIH Joint Committee on Infant Hearing

NICU neonatal intensive care unit

NGO nongovernmental organization

OAE otoacoustic emissions

OB-GYN obstetrics and gynaecology

PDH WHO Prevention of Deafness and Hearing Impairment programme

SCBU special care baby unit[1]

TEOAE transient evoked otoacoustic emissions

USPSTF United States Preventive Services Task Force

[1] In some countries the term "SCBU" is equivalent to "NICU". However in many developing countries, SCBU denotes a hospital facility that lacks the more-sophisticated equipment required in a NICU.

Preface

To progress its activities in reducing the global burden of hearing loss, the World Health Organization (WHO) convened an informal consultation on newborn and infant hearing screening. A group of leading experts were invited to share their broad range of experiences of national and multi-country newborn and infant hearing screening activities, and to identify and reach consensus on the key principles required to guide the development of WHO recommendations and technical guidance in this area.

By convening this consultation, WHO is responding to calls from Member States for improved guidance in the conducting of newborn and infant hearing screening to detect potential hearing impairment in full accordance with the overall aim of the WHO Prevention of Deafness and Hearing Impairment programme (PDH):

To assist Member States to reduce and eventually eliminate avoidable hearing impairments through appropriate preventive and rehabilitative measures.

During the course of the consultation, different national and multi-country approaches, methodologies and experiences were shared and reviewed; major related issues discussed; and a number of guiding principles for action formulated. It is intended that this process will help lead to a clear consensus emerging on the most effective, cost effective and appropriate approaches to newborn and infant hearing screening, especially in resource-limited countries.

All WHO strategies in the areas of hearing impairment and deafness are integrated into the overall chronic-diseases prevention and control strategy of the Department of Chronic Diseases and Health Promotion. The objectives of this strategy are to advocate for health promotion and the prevention and control of chronic disease; promote health (especially for poor and disadvantaged populations); slow and reverse the adverse trends in common chronic-disease risk factors; and prevent premature deaths and avoidable disability due to major chronic diseases. These objectives are based upon the guiding principles of comprehensive and integrated public health and intersectoral action, a life-course perspective, and stepwise implementation based on local considerations and needs.

Although the convening of this consultation represents only the beginning of the efforts that will be required to develop the policies and actions needed in this area, the level of commitment and enthusiasm shown by participants and others working in this field is highly encouraging.

The participants of the WHO informal consultation wish to acknowledge the generous financial support provided by CBM for the completion of this work.

1. Introduction – issues in newborn and infant hearing screening[2]

Hearing impairment in children across the world constitutes a particularly serious obstacle to their optimal development and education, including language acquisition. According to a range of studies and surveys conducted in different countries, around 0.5 to 5 in every 1000 neonates and infants have congenital or early childhood onset sensorineural deafness or severe-to-profound hearing impairment. Deaf and hearing-impaired children often experience delayed development of speech, language and cognitive skills, which may result in slow learning and difficulty progressing in school.

Congenital and early childhood onset deafness or severe-to-profound hearing impairment may affect the auditory neuropathway of children at a later developmental stage if appropriate and optimal interventions are not provided within the critical period of central auditory pathway development. Therefore, early detection is a vitally important element in providing appropriate support for deaf and hearing-impaired babies that will help them enjoy equal opportunities in society alongside all other children.

In May 1995, the World Health Assembly adopted Resolution WHA48.9: Prevention of hearing impairment (**ANNEX A**). This resolution sets out an agenda for action by WHO and Member States and creates a global mandate underlying the work of WHO technical units working in this area. Subsequently, a WHO Informal Consultation[3] in 2000 produced a number of recommendations including:

> **5.1 Epidemiology of Deafness and Hearing Impairment**
> ***5.1.1 Epidemiological data***
> *There is lack of epidemiological data in most countries. The prevalence of the problem should be assessed in various age groups (**neonates** if appropriate audiological services available…), in urban and rural communities, and in communities with special needs.*
>
> **5.2 New Strategies for Prevention**
> ***5.2.1 Universal neonatal hearing screening:***
> *It is recommended that a policy of **universal neonatal screening** be adopted in all countries and communities with available rehabilitation services and that the policy be extended to other countries and communities as rehabilitation services are established.*

In 1999, the United States Preventive Services Task Force (USPSTF) concluded that there was insufficient evidence for or against the routine screening of neonates for hearing loss during postpartum hospitalization:

> *The USPSTF found good evidence that newborn hearing screening leads to earlier identification and treatment of infants with hearing loss. However, evidence to determine whether earlier treatment resulting from screening leads to clinically*

[2] Based upon plenary discussion of the presentations given by: Dr Rajiv Bahl, WHO; Dr Ivo Kocur, WHO; Dr Young-Ah Ku, WHO; and Ms Alana Officer, WHO.
[3] *Future programme developments for prevention of deafness and hearing impairment*. Report of the 4th Informal Consultation, WHO, Geneva, 17–18 February 2000 (WHO/PDH/02.1).

important improvement in speech and language skills at age 3 years or beyond is inconclusive because of the design limitations in existing studies.

However, in a recent update to this conclusion, the USPSTF recommended in 2008 that all neonates be screened for hearing loss.[4] Other relevant declarations already made in this area include the 1993 National Institutes of Health Consensus Statement[5] and the 1998 European Consensus Statement on Neonatal Hearing Screening.[6]

In some countries, newborn and infant hearing screening[7] has become a widespread tool for the early detection of hearing impairment, while in other countries such screening is considered to be too costly and its value is questioned. Even when it is available, there is no consistent approach to newborn and infant hearing screening, and there is often great variation within individual countries. The reasons for this are not always financial – some wealthy countries have fragmented and ineffective programmes while a number of less-wealthy countries have very successful programmes.

Nor is it necessarily about technology either – equally, if not more, important is the building of capacity, and the creation of the required infrastructures, services and support for individuals, families and care providers. In some cases, for example, groups will culturally reject cochlear implants or other technologies – preferring instead to learn and use sign language. Before such choices can be properly made, information needs to be provided to parents. If there is to be a transition from the situation today (rather than an immediate move to technology), then a strong information and education element must be put in place alongside screening. Information and education are needed to inform parental choice, and to keep pace with any cultural shifts in perceptions and preferred choices. A focus will also be needed on the point of entry of hearing-impaired individuals into schools to ensure that they do not fall behind. Progress can also sometimes be as much about political will. In some countries, great progress has been made in a very short time, while in others 10–20 years have passed before intention has become reality.

In countries where newborn hearing screening is conducted it is assumed that the vast percentage of babies born deaf can be helped and their futures immeasurably improved. However, issues such as quality control, screening methods, follow-up and cost effectiveness need to be thoroughly discussed and reviewed. Quality assurance issues in particular are vital to successful newborn and infant hearing screening and related interventions – in some settings it is estimated that the poor training and performance of screeners renders up to 80% of screening useless