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CURRENT DEVELOPMENT, ISSUES AND CHALLENGES OF UNIVERSAL NEWBORN HEARING SCREENING PROGRAM IN MALAYSIA

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ABSTRACT

This concept paper highlights what is UNHS, aims of UNHS, current development, issues and challenges related to the UNHS's implementation in general and in Malaysia.It is discernible that UNHS aims at enhancing the process of timely detection of possible hearing loss. By going through the screening, there will be benefits not only to caregivers but also to the newly born babies. Though there are pressing issues and challenges, all need to be well addressed. Some of the possible solutions to overcome thoseissues and challenges could be: to intensify public awareness about the worth of UNHS and its aftermath; to hire dedicated medical workers who would laterprovide ongoing training;to enforce as well as to check the application and aftermaths of newborns screening; and to effectively communicate with caregivers.

Keywords: *Newborn Hearing Screening, UNHS, Issues, Challenges, Current Development, Malaysia*.

Introduction

Universal Newborn Hearing Screening (UNHS) program in Malaysia is still considered as new. Continuous evaluation is needed to ensure the objectives of the program are achieved successfully and the problem is dealt effectively. In Malaysia, specifically audiology services have made an attempt to implement the UNHS program since 2002. However, due to several issues and challenges, UNHS only came into practice in 2009. To ensure sustainability of the program, all these issues have to be well addressed. Thus, this concept paper highlights what is UNHS, aims of UNHS, current development, issues and challenges related to the UNHS's implementation in Malaysia and in other general context.

What is UNHS?

Screening is a term that denotes the method of employing some swift and simple procedures to a large number of persons that will recognize more likely of studied disease in the tested function (Campos *et al*., 2014). And the term 'newborn screening' defines several tests done in the early hours or days of a newborn's life that have the likelihood for avertingperilous health effect on newborns and their families when they are accurately timed and performed (Therrell& Padilla, 2014). Universal newborn hearing screening (UNHS) is a kind of screening that focus on abating and/or averting hearing lossconnected with impediments in language, social, emotional, and cognitive growth of newborns, irrespective of the presence of risk pointers (Kemp *et al*., 2015).

The advent of newborn hearing screening dated back todrafting of deaf education report which was doneby the advisory committee on the education of the deaf, the United States Secretary of Health, Education, and Welfare in 1965. Newborn hearing screening was then endorsed for the development and nationwide application of collectively applied measures for early detection and assessment of hearing loss. Subsequently, the challenge and the charge report was then drafted by the national advisory committee on the education of the deaf,the United States Secretary of Health, Education, and Welfare in 1967. The committeeproposed a public information campaign for high-risk register to enabledetection. The committee also proposed that testing of infants and children 5-12 months of age should be examined. Afterwards, the joint committee on Infant hearing (JCIH) Position Statement (1990)suggestedscreening of high-risk infants beforeleaving the hospital within a period no later than 3 months after the newborns are delivered.

Consensus development conference statement (1993), via the report on early detection of hearing loss in infants and young children which was drafted by national institutes of health (NIH),suggestedscreening of newborns for hearing loss before they are discharged from the hospital. This was supported by JCIH Position statement in (1994),given its recommendation which indicated diagnosis of infants with hearing loss prior to 3 months of age and intervention by 6 months of age. Then,report prepared by the American academy of pediatrics in 1999 summed up and indicated the group's support forUNHS which ensurediagnosis of hearing loss. In the year 2000, the JCIH's position statement involved the principles and guidelines for early hearing diagnosis and intervention programs report.

However, different countries implemented the UNHS programs in reports and studies (Vos, Lagasse, & Leveque, 2014). For example, UNHS applied in various US towns and cities involving Rhode Island in 1989, Hawaii in 1990, and Colorado in 1993 (Moeller *et al.*, 2006b; Morton & Nance, 2006). However, the literature shows that newborn hearing screening

must be universal and globally implemented as anapproach to avert hearing loss, also to become a standard of care by multidisciplinary cooperation and persistence across multiple agencies (Chan, Wong, Law, Chong, & McPherson, 2015; Kemp *et al*., 2015; Mauk, 1994; Moeller *et al.*, 2006a). In this regard, for UNHS program to be considered universal and effective,at least 95% of newborns in their first month of life must be screened for hearing loss(American Academy of Pediatrics: Task Force on Newborn and Infant Hearing, 2000; Campos *et al.*, 2014; Kemp *et al.*, 2015; Lima, Rossi, Françozo, Collela-Santos, & Correa, 2015; The Joint Committee on Infant Hearing (JCIH), 2007). Moreover, UNHS program shall be considered universalprovided all babiesare examined and diagnosed for possible hearing loss, unlike targeted screening approach which involves screening of only newborns with identifiable risk factors (Chan *et al*., 2015).

According to American academy of pediatrics task force on newborn and infant hearing 1999 the UNHS programs should established by clear guidelines performed by appropriate trained staff with full information to caregivers concerning the screening procedure, costs and the benefits of promptdiagnosis and intervention (American Academy of Pediatrics: Task Force on Newborn and Infant Hearing, 1999).

Initially, newborn hearing screening was focused at newborn that had a risk factor for hearing impairment and subsequently, it was comprehensive to all newborns (Piza, 2014; The Joint Committee on Infant Hearing (JCIH), 2007). The most important international guidelines proposedapplication of a universal screening program on all neonates including the newborns with increased risk factors(Lasisi, Onakoya, Lasisi, Akinola, &Tongo, 2014).

Aims and Advantages of UNHS

Early discovery and intervention of hearing loss is the main goal of the UNHS program. The program aim atassessing and diagnosing hearing capability of children with and without risk factors for congenital hearing loss (Clemens *et al*., 2000; Kemp *et al*., 2015; National Institutes of Health (NIH), 1993; The Joint Committee on Infant Hearing (JCIH), 2007). Moreover, given the fact that half of the newborns with permanent hearing conditions exhibit increased risk factors, the implementation of UNHS program must be applied on all newborns; it should not be applied on only newborns with risk factors as suggested by the most important international guidelines (Lasisi*et al*., 2014). The main recommended points come for the effective implementation of UNHS is to apply service to all newborns, by prioritizing newborns at highest risk of deafness and steadily apply the screening service to all newborns (Campos *et al*., 2014). Moreover, one of the aims of UNHS program is to early detection and discovery of hearing loss to lessen the age of hearing-impaired kids at the time of diagnosis allowing earlier intervention, as recommended by JCIH that comprehensive audio logical examination should be done prior to 3 months of age (The Joint Committee on Infant Hearing (JCIH), 2007; Vos *et al*., 2014).

The astonishing and successful spread of UNHS programs at global level indicate that the program is really a revolution in health care for numerous reasons, they significantly profit from the improvement of testing protocols, the direct examination of irregular screening tests, the initiation of an etiologic focus, and the better detection of newborns at risk for late-onset pre-lingual hearing loss (Morton & Nance, 2006). The core success of UNHS program effort hinges on detectedneonates having access toappropriate and effective interventions (Moeller *et al.*, 2006b).

The significance of universal early testing, diagnosis, and intervention in lessening the undesirable effect of inborn hearing loss has been broadlyand generally explained(Li *et al*., 2016). And the great advantages associated with UNHS are can be accomplished when newborn hearing screening is interconnected to opportune and efficient interventions (Moeller et al., 2006a). However, there are several advantages of implementing UNHS program such as enhancing rapid audio logical testing of newborns for a consequent further examination, based on the need (Campos *et al*., 2014). In addition, good implementation of UNHS programs involvesprior diagnoses of hearing loss and earlier intervention. It also involvesfitting of amplification and enhanced language, speech and social-emotional development of the newborns which in turn will become better results for the the caregivers(Yoshinaga-Itano, 2004). Also, UNHS program intervention increase the coverage rates and reducing the age at which newborns with hearing impairment are examined and treated (Molini*et al*., 2016), for example, studies in United States conclude that after UNHS start implementation the mean age of hearing loss identification reduced from 12-13 months to 3-6 months (United States Preventive Services Task Force, Agency for Healthcare Research and Quality, 2001).

Moreover, UNHS program can early identify and detect of hearing deficits in the first months of newborns life that reduces its possibility for future influence on newborns development (da Silva *et al*., 2015), and decline in the normal age of detection of newborns with hearing impairment offers the probable for proactive intervention measures that may inhibit or decrease the influence of hearing impairment on the knowledge of spoken language (Moeller *et al.*, 2006a). For example, decline in the normal age of diagnosis of infants with hearing impairment enhanced the receptive and productive vocabulary development in 5-year-old hearing-impaired neonates (Ohmori*et al*., 2015). However, the implementation of UNHS programs has participated in earlier detections of hearing disorders and best intervention of utmostperpetualinborn and early-onset hearing loss and thus earlier treatment (Lasisi*et al*., 2014), which would be better efficient and effective if the main genetic and etiologicsource of the hearing loss are known (Chu *et al.*, 2015).

Current Development of UNHS in Malaysia

In 2009, there were only four hospitals in Malaysia that offer UNHS program in which two of them were university hospitals: Hospital Universiti Sains Malaysia (HUSM) and Pusat Perubatan Universiti Kebangsaan Malaysia (PPUKM). The other two were private hospitals: Sime Darby Medical Center (SDMC) and Sunway Medical Centre (SMC). However, according to the latest development (Ministry of Health, Malaysia),majority of the hospitals with audiology services (19 hospitals) are now implementing the High Risk Newborn Hearing Screening (HRNHS) program. UNHS program has now becomes more important and significant to be offered

especially in public hospitals. This has led to the proposal for sum amount of budget to further develop and ensure sustainability of this program in Malaysia.

Three years later (i.e., after 2009), three public hospitals have introduced UNHS program in 2012 (i.e., Hospital Putrajaya, Hospital SultanahBahiyah, and Hospital Kuala Lumpur). In 2014, the number of hospitals implementing the program keep on increasing. Currently, there are 4 hospitals (Hospital Kuala Lumpur, Hospital Putrajaya, Hospital SultanahBahiyahand Hospital Taiping) that are able to offer the program to caregivers. However, based on the report of JKTA (Audiologist Technical Committee) on 12th June 2013 and 24th June 2014, the coverage rate for these four hospitals still inadequate (i.e., not achieved the international guidelines of JCIH 2007 whereby is has to be more than 95%). Summary of the development in Malaysian's context is shown in Figure 1 and Figure 2, below.

Figure 1: UNHS Development in Malaysian Public Hospitals 2002-2014

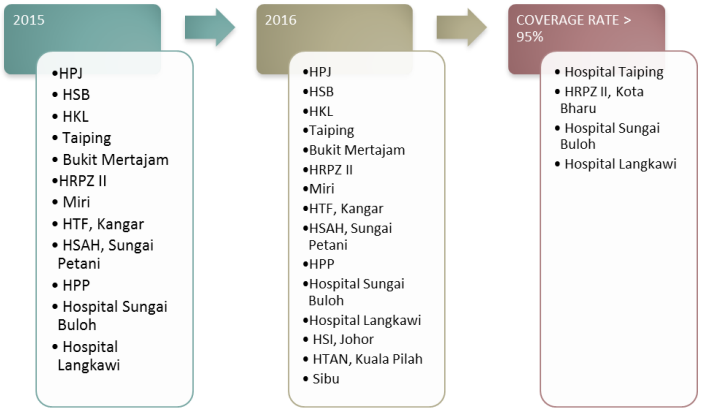

Figure 2: UNHS Development in Malaysian Public Hospitals 2015-2016

Issues and Challenges

There were two pilot studies on UNHS implementation which were carried out in 2007 and 2009. The first pilot study was carried out at Hospital AlorSetar which is called Hospital SultanahBahiyah in 2007 while the second pilot study was conducted at Hospital Raja Perempuan Zainab II, Kota Bharu in 2009. The results of the studies indicate that UNHS implemented is faced with certain challenges bordering ondearth of equipment and workers, less efficient baby management system, and dearth of awareness about the importance of the program among the hospital workers and caregivers. Thus, the studiesproposedinitiation of a new cost effective and efficient model for UNHS program. The proposed model should involve all issues relating to human resource, equipment, technique, and awareness program. Addressing the pressing issues would enhance UNHS program, especially in Malaysian public hospitals.

The daily application of UNHS program enhance the awareness of the problems of newborns hearing loss for healthcare workers, also significantly decreases the time before screeningfor hearing impairment in the neonates' population(Molini*et al*., 2016). Kidswho suffer hearing loss couldrecordbest developmental progress, if the awareness of healthcare workersis enhanced.Moreover,integrated strategies could also be of help in this regard. This includes effective newborns hearing screening based on sound and effective technology and criteria, enhanced caregivers' education and involvement in development progress, suitableproblem-solving testing, satisfactory follow-up services, and education of health care professionals (Mauk, 1994).

The awareness of the healthcare workers who involved in the UNHS program can be improved in the aspects relating to follow-up default which involves shortage of knowledge about hearing screening outcome and follow-up recommendations on the part ofhealthcare workers, and inadequate knowledge of newborns hearing screening and the newborns hearing screening process (Scheepers, Swanepoel, & Roux, 2014).

For this causes, to increase the awareness for healthcare staff around UNHS program the healthcare staff better to received written information about newborns hearing screening were more likely to have an accurate understanding of and positive associations with newborns hearing screening, also, support and education of health care professionals may best be facilitated if newborns hearing screening process (Scheepers et al., 2014).

Mauk (1994) suggest that to enhance both the professional staff and parental awareness and education its required first for professionals in the field of UNHS should personally contact relevant professionals (e.g. family practitioners, pediatricians) by telephone, with a follow-up letter outlining their concerns; to produce pamphlets that emphasis early identification of children who have hearing losses, and describe the behaviors that signal the presence of hearing impairment and to distribute the pamphlets to doctors' offices and to hospitals; also explain the need for early identification of children with hearing impairment; and advocate hearing impairment identification procedures in community programs. Secondary for parental education by develop public-service announcements for radio, television, and newspapers explaining the importance of early diagnosis of hearing impairment and by presenting information to community service.

The current developmentindicates several initiatives are discernibleandit (the initiatives) attempts to lessen some of the above-mentioned limitations. To illustrates this, World Health Organization (WHO) has released the guidelines for the advancement of audiological services to amplify capacity building at different stages of healthcare delivery. This was done with the aim to tackle the current resource gap (WHO, 2004). Having identified the limitationsrelating to high costs of hearing aids, WHO tookmany steps to encourage production of

affordable hearing aids. In addition, private sector has initiatedmanufacturing of solar powered hearing aids at reasonable running costs (McPherson &Brouillette, 2004).

Even though WHO has come out with the audiological service guidelines, hospitals (including public hospitals in Malaysia) are still in dilemma as there is unavailability and holistic or proper references / models to be benchmarked. Demand for a good and reliable UNHS program with good management and also cost effective remains an issue. The need of developing a new model for this reason is critical. Reasons and justifications have been made clear that a new holistic model of UNHS program is needed and would be of benefits in assisting and/or directing the way forward for a better and sustainable program. This shall include the information about the system and management values.

In developing the holistic model, allusion from established centers were made both from local and international references. It is believed that from such comprehensive review, it would help to enhance the system / model. Later, it may assist the implementation of UNHS program to be more cost effective; increase the efficiency in the workflow and at the same time can be of the best benchmark to all Malaysian Public Hospitals or other interested organizations.

Newborn hearing screening programs experienced an internationally challenges through poor in follow-up (de Kock, Swanepoel, & Hall, 2016; Olusanya, Emokpae, Renner, &Wirz, 2009). So, healthcare providersthat involved in UNHS program must provide more counselling to the caregivers in order to avoid loss to follow up for hearing examination (Li *et al.*, 2016). Healthcare providers displayed confidence in discussing about hearing screening outcomeswith caregivers, but they lack confidence to speak with caregivers about follow-up processes and intervention requirement (Moeller *et al*., 2006b). In addition, some challenges come from caregivers. These challenges include non-adherenceto thecurrent hearing screening program, poor parental education, poor family, misunderstanding between schedules and referrals after leaving the hospitals, mothers with many children, shortage of knowledge about the risk factors of hearing impairment for verbal language improvement (Lima *et al*., 2015).

Another challenge is to make newborn hearing screening tool better, it is necessary to re-screening all eligible newborns before hospital discharge and clear communication with families (Clemens *et al*., 2000). Initially, newborn hearing screening was focused at newborn that had a risk factor for hearing impairment and subsequently, it was comprehensive to all neonates, and during most of the time, one of the ultimate challenges was to persuade pediatricians regardingthe importance of applying newborn hearing screening test in children without any risk factors (Piza, 2014; The Joint Committee on Infant Hearing (JCIH), 2007). Causes such as an high noise level in inpatient units, the clinical situations of the newborn, or the existence of fatty tissue in the external auditory canal can cause a UNHS test failure, but in the re-screening, when test conditions are better, it is best to prove that the failure was because of a hearing deficiencies, and not to unrelated factors (da Silva *et al*., 2015).

Furthermore, there is also a challenge facingimplementation of newborn hearing screening programs particularly that serve societies with a lower socioeconomic status, included not attending to the re-screening date, deficiency of information of caregivers around the indications and the impacts of hearing impairment on the general growth of the newborns. This is a main idea among caregivers that their babies have no risk of complaining a hearing impairment, and anxiety generated by the knowing that their children are being tested (Kemp *et al.,* 2015; Onoda, de Azevedo, & dos Santos, 2011).

Concluding Remarks

It is clear that the aims of UNHS are very much to develop the process of early diagnosis of possible hearing impairment. By going through the screening there will be benefits not only to caregivers but also to the newly born babies in heading for their respective growth. Though there are pressing issues and challenges, all these need to be well addressed and empirically studied. Some of the possible solutions to overcome thoseissues and challenges could be: to increase the public awareness regarding the value of UNHS and its impacts; to hire dedicated related medical workers who would laterprovidecontinuing training; and to compel pediatricians to monitor the implementation and effects of newborns screening and to communicate with caregivers.

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