

## CHAPTER 3

# INFANT HEARING SCREENING: A PRACTICE RELEVANT FOR THE DEVELOPING WORLD?

**Aim:** This chapter will evaluate the justification for and the current status of IHS in developing countries to provide an argument for IHS in this context

### 3.1. INTRODUCTION

A continuous influx of reported data regarding the growth of universal newborn hearing screening (UNHS) and the benefits of early intervention for infants with hearing loss has characterised the audiology literature over the last number of years (Moeller, 2000:1). These reports, however, have primarily originated from developed countries such as the USA and UK, and have revealed a dearth of information regarding hearing screening and intervention in the developing world (Mencher & DeVoe, 2001:20). Apart from a small number of recent exceptions, NHS has been a practice almost exclusively reserved for the developed world (Mencher & DeVoe, 2001:19; Chap-Chap & Segre, 2001:34; Rouev et al., 2004:805; Olusanya et al., 2004:288). Fortunately a growing global awareness is currently shedding more light on this hidden health concern in the developing world. There has been an increased focus, particularly in the last decade, on the development of effective prevention programmes in developing countries (Prasansuk, 2000:208; Mencher & DeVoe, 2001:19).

The introduction of Infant Hearing Screening (IHS) programmes in developing countries is, however, still widely viewed as unattainable due to numerous socio-economic, cultural and healthcare barriers (Olusanya et al., 2004:288). Recently a renewed call was made upon developed nations to assist developing countries

with the introduction and implementation of IHS programmes (Downs, 2000:293; Swanepoel et al., 2004:634). *The question that arises is whether such a practice will be relevant for developing nations in the light of the many barriers inherent to the developing world.* This chapter therefore aims to evaluate the relevance of IHS to the developing world.

A critical evaluation of the relevance of IHS requires that it be considered within the framework of IHS principles and current practice in the developed world as discussed in Chapter 2. In a theoretical sense, it is necessary that IHS in the developing world adhere to the philosophy and principles of screening to ensure its validity as a societal practice. In a more practical sense it is important to consider the current status and accountability of IHS programmes in developed nations such as the USA, in order to develop appropriate benchmarks that may steer the process in developing countries to benefit the infants with hearing loss. A general overview of the developing world in Chapter 3 will serve as the background to Chapter 4, which will provide an in-depth evaluation of IHS in the developing context of South Africa.

It is the purpose of Chapter 3, therefore, to evaluate the justification for and the current status of IHS in developing countries. The chapter starts off with an overview of hearing loss within a healthcare perspective that is familiar to the developing world. This immediately places IHS in developing countries within a global perspective. A consideration of the challenges to and assets available for implementing such programmes is provided, followed by a concluding argument toward the implementation of IHS in developing countries.

### **3.2. HEALTHCARE PERSPECTIVE IN DEVELOPING COUNTRIES**

The developing world consists of 164 countries with an estimated population of 5 billion people spread over six major regions (World Bank, 2004:251; Olusanya et al., 2004:289). These regions and the number of countries in each are presented in Table 3.1.

**TABLE 3.1 Developing regions and countries of the world (World Bank, 2004:251)**

<b>REGION</b>	<b>NUMBER OF COUNTRIES</b>
Sub-Saharan Africa (SSA)	46
Middle East & North Africa (MEN)	21
South Asia (SOA)	8
East Asia & Pacific (EAP)	29
Latin America & Caribbean (LAC)	33
Central/Eastern Europe & Baltic State Countries (CEE)	27

The countries in these regions are classified according to various indicators of development such as per capita income, immunisation up-take and under-5 mortality rates. It is important to note therefore that this is not a homogenous group of countries. Although two-thirds of the least developed nations are situated in sub-Saharan Africa (McPherson & Swart, 1997:2), there are significant differences in development between these countries and even within the same country in different geographical regions (Olusanya et al., 2004:289). Despite these differences, this categorisation provides an objective basis for comparing various economies of the world.

Only 20% of the global population live in the developed countries, compared to 80% in developing countries. However, there is a gross misdistribution of wealth and healthcare expenditures between the developed and developing world. The developed world, 20% of the global population, controls 80% of the gross domestic product and this same 20% spends 87% of the total global healthcare funds (Alberti, 1999:1). In comparison, developing countries such as China and India, which comprise 40% of the global population, spend only 2% of the global healthcare budget (Alberti, 1999:3). In a survey of hearing aid possession in

different countries this discrepancy was obvious, as the possession of a hearing aid was directly related to the wealth of that particular country as reflected in the per capita Gross National Product (Stephens et al., 2000:184).

It is clear that this misdistribution of resources is due to and creates many challenges in developing countries, including low socio-economic levels and high child mortality and morbidity rates (McPherson & Swart, 1997:2). Healthcare priorities of developing countries are clearly focused on saving lives rather than on improving quality of life (Olusanya, 2000:167). This has led to a general neglect of non-life-threatening conditions such as hearing loss and deafness (Olusanya, 2000:167; Madriz, 2001:91), despite the fact that at least two-thirds of the world's population of persons with disabling hearing loss reside in developing countries (Olusanya, 2000:167; WHO, 2001a:1).

It is therefore not surprising that hearing loss is referred to as the silent and overlooked epidemic of developing countries. It may be viewed as an epidemic, because even though hearing loss is not a life-threatening condition, failure to intervene in time renders it a severe threat to essential quality of life indicators. The adverse affects of hearing loss on language and cognitive development, as well as on psychosocial behaviour are widely reported against the established benefits of early intervention (Moeller, 2000:5; Yoshinaga-Itano, 2003:199-206; Davis & Hind, 2003:194). Society is also severely burdened by hearing loss due to the huge economic costs associated with it. A recent study in the USA suggests that the cost of communication disorders in that country (due to rehabilitation, special education and loss of employment) is almost 3% of the gross national product (WHO, 2001a:1). Hearing loss affects an individual's ability to obtain, perform in and keep a job, and it causes people to be isolated and stigmatised during the entire course of their lives.

The World Health Organisation (WHO) has in recent years recognised that deafness is not only one of the most neglected disabilities, but also that it is worse in developing countries (Kumar, 2001:219). This realisation emerged in 1981 when the WHO adopted a new health perspective declaring that health is

not simply the absence of disease or infirmity but a state of complete physical, mental and social well-being (Olusanya, 2000:168). This change in healthcare perspective has shifted the emphasis from disease management to total well-being. According to Olusanya (2000:168) this new perspective justifies good hearing as a fundamental human right. Thus, intervention for an individual with hearing loss is an important health concern, since it impacts severely on quality of life.

Following this change in emphasis, the WHO has increased its efforts to stimulate action plans for the prevention and management of hearing loss in developing countries (WHO, 1997:5). In 2001 the organisation published guidelines related to hearing aids and services for developing countries that provide detailed requirements for the manufacturing of affordable and appropriate hearing aids, provision of services and training of personnel in developing countries (WHO, 2001b:2). The WHO estimates that developing countries need more than 32 million hearing aids per year and at present they are receiving only three-quarters of a million (Kumar, 2001:219). It is reported that current hearing aid manufacturers provide less than 10% of the annual need for hearing aids and that only one in 40 hearing aids needed in developing countries is actually supplied (WHO, 2001a:1). For this reason, the WHO is joining forces with hearing aid manufacturers, charities and aid agencies in an attempt to drastically reduce the price of hearing aids (WHO, 2001b:7; WHO, 2001a:1).

Despite these efforts, progress has been slow and doubts have been voiced about the feasibility of implementing large-scale hearing detection programmes such as IHS in developing countries (Olusanya, 2001:142; Mencher & DeVoe, 2001:19). Objections have been raised against the enthusiastic spread of IHS programmes from developed to developing countries due to a lack of reliable follow-up services once the children are identified with hearing loss. Failure to deliver the services may produce a negative environment for parents, teachers, administrators and legislators (Mencher & DeVoe, 2001:20). It is in light of these

concerns that it becomes important to evaluate the relevance of IHS in developing countries.

### **3.3. RELEVANCE OF INFANT HEARING SCREENING IN DEVELOPING CONTEXTS**

The six principles (grouped into disorder-related and process-related categories) that underpin the justification of a screening procedure and that were identified and discussed in Chapter 2 (paragraph 2.3), will now be reviewed within the context of developing countries. This discussion will precede an evaluation of a context-based decision-making approach toward IHS implementation in these countries.

#### **3.3.1 Disorder-related principles in developing countries**

In contrast to developing countries, epidemiological data for hearing loss is available for the vast majority of developed countries (Uus & Davis, 2000:192). This attests to an extreme dearth of data due to factors such as limited resources, poor motivation for/high resistance to epidemiological research and low priorities within health systems to deal with hearing loss (Mencher, 2000:178; Madriz, 2001:85). As a result the prevalence of hearing loss in developing countries is largely unknown (Olusanya et al., 2004:289). For the few prevalence studies that have been reported, comparison is difficult due to significant differences in methodology, categorisation and definition of hearing loss (Prasansuk, 2000:178; Uus & Davis, 2000:192; Bastos et al., 1995:1; Jacob et al., 1997:133; Rao, 2002:105; Swart et al., 1996:95; McPherson & Swart, 1997:3).

The World Health Organisation estimates that 250 million people worldwide have disabling hearing loss and that two-thirds of them live in developing countries (Kumar, 2001:219). Based on a review of reported prevalence rates in the paediatric population of developing countries, it was concluded that the

prevalence is not less than one to five live births per 1 000 generally reported in the developed countries where NHS has been introduced (Olusanya et al., 2004:293). In fact the prevalence of congenital hearing loss has been associated with deprivation and therefore it will not be surprising to find higher prevalence data for developing than for developed countries. A recent study reports that this association of hearing loss with deprivation can be attributed to two main reasons (Kubba et al., 2004:125). The first reason is related to the greater incidence of prematurity and low birth weight in deprived families. This places neonates at risk of suffering hearing loss as a result of hypoxia, jaundice and aminoglycoside treatment. The second reason concerns the fact that hearing-impaired individuals are disadvantaged both educationally and in their employment prospects. This means that families with many hearing-impaired members will tend to be in a lower socio-economic bracket (Kubba et al., 2004:125).

The reported prevalence of congenital hearing loss in developed countries has proved to be sufficiently high to warrant mass NHS (Mehl & Thomson, 1998:5). It is expected therefore that mass NHS in developing countries can also be justified on the grounds of equivalent or even higher prevalence figures. Even though almost all the studies reporting the negative consequences of neonatal hearing loss and the effect of early versus later identification of hearing loss has been forthcoming from developed countries, it is more than reasonable to expect similar consequences and effects on neonates born in developing regions of the world. In fact, the consequences of late-identified hearing loss would certainly be more pronounced in most developing countries owing to the lack of available support services that can help these children to become active participants in their community (Olusanya et al., 2004:301). It is therefore realistic to deduce that the consequences of neonatal hearing loss and the positive effect of early identification in developing countries are at least as significant as in developed countries and treatment is therefore equally justified in both contexts.

*The disorder-related principles of IHS considered in the developing countries of the world justify the philosophy of also screening newborns and infants in these regions.*

### **3.3.2 Process-related principles of infant hearing screening in developing countries**

The process-related principles of IHS concern aspects such as accuracy of screening methods, efficiency of screening programmes and costs. The accuracy of screening methods has been well established during the last decade (Watkin, 2003:168) and this will not differ for neonates and infants in developing countries as long as screening personnel are adequately trained and periodical monitoring is implemented. Ensuring high quality training for personnel involved is therefore an important priority (Gopal et al., 2001:106). The small number of available reports of IHS in developing countries indicates that the accuracy of OAE and AABR screening methods are similar to those in developed countries (Chapchap & Segre, 2001:34; Rouev et al., 2004:808; Radziszewska-Konopka & Owsiak, 2004:30). The use of IHS is therefore equally justifiable in developing countries considering the accuracy of available screening methods.

The efficiency of early identification programmes is considered according to three outcome measures. Firstly the coverage and referral rates obtained in IHS programmes; secondly, the effects of screening on parents, and lastly, the effectiveness of follow-up. Once again, the extreme dearth of IHS programmes makes it very difficult to provide indicators for efficiency of early identification programmes in developing countries. The only report of a national UNHS programme in a developing country has been from Poland (Radziszewska-Konopka & Owsiak, 2004:30). This programme, established by a charity foundation in 2002, reports a national coverage of 98%, which is similar and even better than results in developed countries like the USA and UK. Referral rates reported from other UNHS programmes in developed countries have also suggested similar figures to the developed world, ranging between 1.8 and 12%.



(Chapchap & Segre, 2001:34; Rouev et al., 2004:808; Radziszewska-Konopka & Owsiak, 2004:30).

An important aspect that requires investigation is the effect of IHS on parents in developing countries. All studies reporting on these factors have been forthcoming from developed countries. The strong influence of cultural, religious and unrealistic expectations borne out of poor education may change the way IHS affects parents in developing countries (Stephens et al., 2001:184). The results from developed countries suggest, however, that parents believe that the benefits of detecting a baby with a hearing loss outweigh any anxiety about IHS itself (Hergils & Hergils, 2000:325).

Follow-up is a challenge even in the developed world. Although there seems to be great variability, reports of follow-up figures in developing countries suggest that this is a global challenge for implementing effective IHS programmes. High follow-up rates were reported for a UNHS programme in Brazil, indicating an 82% follow-up rate (Chapchap & Segre, 2001:34). For a hospital-based UNHS programme in Bulgaria, however, a follow-up rate of only 54% was reported (Rouev et al., 2004:808). It must be kept in mind that as programmes develop and mature, better tracking procedures are implemented, which increases the follow-up rate. In one of the most successful state-wide screening programmes in the USA, the initial follow-up rate was 48% for the first five years and has now improved to 76% with 9 hospitals achieving a 95% follow-up rate (Mehl & Thomson, 2002:1). Ensuring high follow-up rates are therefore to be viewed as a process that requires continuous effort toward improvement.

The limited number of UNHS studies reported from developing countries suggest that IHS is a feasible and inexpensive practice, but the actual costs are not disclosed (Olusanya et al., 2004:300; Chapchap & Segre, 2001:34; Rouev et al., 2004:808). No studies are reported from Africa and the only study that provides a cost figure comes from a UNHS programme in Bulgaria. The calculated cost for UNHS in Bulgaria was 2.41€ (euro) per newborn infant screened or 1407€ per case identified (Rouev et al., 2004:809). These costs compare favourably to

costs reported in developed countries and the authors consequently concluded that the programme was cost-effective. It is important to remember, however, that in developing countries such as Thailand or Nigeria, where the Gross National Product per citizen is often lower than the price of a screening device, the costs associated with IHS programmes can be staggering to their economy (Mencher & DeVoe, 2001:19). The figures are even more daunting when costs from developed countries are merely transposed onto developing countries. In actual fact, as the Bulgarian study shows (Rouev et al., 2004:809), the actual costs in developing countries will be much lower because the costs are generated within the context of that country's economic infrastructure.

*The overview of disorder-related and process-related principles justifying IHS when assessed within the context of developing countries, indicates that the implementation of IHS is just as relevant, if not more so, than in the developed world. Justification for a practice, however, does not mean that it is possible to implement the necessary programmes. Yet, the justification of this screening practice in developing countries, even though unaffordable to many governments, creates a motivation and an urgency to pursue ways to realise it.*

### **3.3.3 Context-dependent implementation of infant hearing screening**

The marked disparities between the socio-economic status of developing countries preclude a single judgement about the relevance of IHS implementation for the entire developing world (Olusanya et al., 2004:296). The conditions for each country must therefore be considered to determine how prepared it is for taking such action. Certain high-income countries in the developing world like Saudi Arabia and Cyprus are more likely to be ready than low-income countries like Somalia and Bangladesh (Olusanya et al., 2004:296). It is therefore essential that each country, community or local health authority determines the desirability, scope and timing of an IHS programme on a rational basis *according to their own situation*.

Mencher and DeVoe (2001:19) add another dimension to this argument that must be considered. The authors state that “[i]f we are only able to offer scientifically valid programs in the rich nations, and in the poorer nations where limited healthcare and environmental issues significantly increase the probability of a child being born with a hearing loss, the same programs...we will continue to be faced with health, ethical, moral and professional issues which will need to be resolved” (Mencher & DeVoe, 2001:19). In a practical sense it is therefore necessary to consider each context in order to evaluate whether its socio-economic situation allows for IHS. From an ethical point of view, it is every child’s fundamental human right to have good hearing (Olusanya, 2000:168) through IHS programmes providing early detection of and intervention for hearing loss, whether he/she lives in the developed or the developing world. Although this dilemma does not have any immediate or obvious solution (Mencher & DeVoe, 2001:19), it deserves the attention of healthcare professionals, charity foundations and governments so that the benefits of IHS may be extended to developing countries.

#### **3.4. STATUS OF INFANT HEARING SCREENING IN DEVELOPING COUNTRIES**

IHS reports originating from developing countries are scarce. This silence reflects the absence of such programmes due to socio-economic, cultural and healthcare barriers, as well as an absence of trained audiologists and other hearing healthcare personnel (Gopal et al., 2001:106). Poor prevalence and aetiological data for hearing loss in developing countries remains an obstacle. Furthermore, data reporting the mean age of hearing loss detection and intervention is virtually non-existent due to the absence of systematic or routine screening programmes in developing countries. The initial detection of hearing loss is primarily passive and results from parental concern about observed speech and language delays, unusual behaviour or otitis media complications. The detection period can start from two years old and extend well into the adolescent years (Olusanya, 2001:142; Russo, 2000:203). These facts also

attest to the shortage of trained audiologists and economic infrastructure to support IHS programmes and related research endeavours.

Inventories of resources and services available for early detection of hearing loss in developing countries are also extremely difficult to find (Madriz, 2001:85). Reports from developing countries are typical of hearing screening programmes for young school-aged children (Mencher 2000:179). Discrepancies also exist between reports from different regions in developing countries. Recent studies reporting on hearing loss in developing countries include reports from regions such as Asia, South America and Eastern Europe, but none from Africa (Prasansuk, 2000:207-211; Uus & Davis, 2000:192-197; Russo, 2000:202-206; Madriz, 2000:212-220; Hadjikakou & Bamford, 2000:198-201). The lack of insight into the status of IHS in developing countries emphasises the need for contextual research in these regions.

According to Uus and Davis (2000:195) the current age of identification and management of hearing loss for children in developing countries, such as Estonia, is comparable to that of developed Western countries approximately 20 years ago. This is generally true for the majority of developing countries. Reports have even suggested that questionnaire type screening at school entry is currently the only viable option for “early identification” of hearing loss in developing countries (Olusanya, 2001:146). With the first 6 to 18 months postulated to be the critical phase for speech and language development it is clear that identification after 18 months is not early enough and cannot be considered as “early identification” (Yoshinaga-Itano & Apuzzo, 1998:380).

Apart from a few exceptions such as Poland (Radziszewska-Konopka & Owsiak, 2004:30), reports from countries in the developing world generally agree that very few systematic early identification programmes are being conducted to identify hearing loss. In Poland, however, countrywide UNHS was initiated in 2001 by a charity organisation, which has established an effective programme with coverage of 98% of all births (Radziszewska-Konopka & Owsiak, 2004:30). Reports from other regions such as Bulgaria have also testified to UNHS in

certain hospitals (Rouev et al., 2004:806). Thus exceptions are emerging that indicate the potential of attaining widespread IHS in developing contexts.

A study conducted on audiological services in Latin America and the Caribbean concluded that very few early identification programmes for hearing loss are being conducted systematically (Madriz, 2001:88). Some small projects appear to be taking place in central hospitals or paediatric centres in major cities, but the existence of structured programmes for early identification of hearing loss in high-risk newborns does not seem to be the rule (Madriz, 2000:217). Panama, Cuba and Brazil were the only countries reported to show any kind of formal and stable screening programme (Madriz, 2001:88; Russo, 2000:203, Chapchap & Segre, 2001:33).

An extreme shortage of information regarding IHS from Southeast Asia and Africa is evidenced by the absence of research reports (Prasansuk, 2000:207; McPherson & Swart, 1997:3; Rangasayee, 2004:30). A recent study pointed to initiatives in India aiming to identify hearing disabilities in the age range 0 to 6 years, whilst programmes are being implemented to develop manpower to handle children with hearing loss ranging between 0 to 2,5 years of age (Rangasayee, 2004:30). A study reporting on early identification of hearing loss in Mauritius also reported concerns regarding the late identification of affected infants as no IHS programmes are in place (Gopal et al., 2001:106). In South Africa, there has also recently been a call toward targeted IHS as a first step toward UNHS programmes (HPCSA, 2002:2; Swanepoel et al., 2004:634).

The current body of knowledge clearly indicates that IHS is not a common practice in developing countries and the lack of basic data needed to plan such initiatives emphasises the need for comprehensive contextual research initiatives. The implementation of widespread IHS programmes in developing countries is widely considered to be unattainable due to number of reasons. These reasons will be considered in the following section.

### **3.5. CHALLENGES TO INFANT HEARING SCREENING IN DEVELOPING COUNTRIES**

Screening for hearing loss is a low priority in developing countries as the result of an overwhelming burden of infectious diseases in many of these countries. It is not uncommon to find that healthcare needs in most of these countries are ranked into high and low priorities with emphasis on life-threatening conditions and diseases such as diphtheria, tetanus, meningitis and HIV/Aids, whilst conditions perceived as non-life-threatening such as hearing loss are neglected (Olusanya, 2000:167). Although hearing loss is indeed not a life-threatening condition, it becomes a severe threat to essential quality of life indicators unless intervention occurs early in infant development. The adverse effects of hearing loss on cognitive-linguistic skills and psychosocial behaviour are well established in contrast to the established benefits of early intervention (Moeller, 2000:5; Yoshinaga-Itano, 2003:199-206; Davis & Hind, 2003:194).

In developing countries, where health priorities are aimed at saving lives rather than at improving quality of life, the motivation for addressing an invisible non-life-threatening condition such as hearing loss is very limited (Olusanya, 2000:168). The planning or implementation of any hearing screening programme will be met with a natural resistance. This is further complicated by the invisible nature of hearing loss, which encourages complacency in addressing the disability (Olusanya, 2001:168; Louw & Avenant, 2002:146). Cultural differences in perception of disabilities may also result in inaction, since a characteristic of African families, for example, is often a fatalistic outlook that leads to an accepting passive attitude toward hearing loss (Louw & Avenant, 2002:146). These factors make it difficult to attract resources towards the effective management of hearing loss in infants. Even when resources become available, ongoing commitment to prevention programmes is uncertain because the consequences of inaction may not seem as frightening as in other epidemics (Olusanya, 2001:145).

Developing countries such as those in Latin America continue to spend more money on treatment than it does on prevention, with a general attitude of “damage control” rather than in-depth searching to investigate the root of problems experienced (Madriz, 2000:218). Madriz (2000:218) makes four conclusions regarding hearing healthcare in the developing nations of Latin America. Firstly, that deafness and hearing loss receive a very low priority status from most governments and national health systems. Secondly, that material and human resources continue to be very limited, and their distribution very irregular. Thirdly, that accessibility is limited due to dispersed populations, large distances and the immense surface areas of some countries. This makes not only the implementation of disability registers and national epidemiological and demographic studies, but also medical and audiological services for special needs populations very difficult. Fourthly, technology continues to be very costly by Latin American standards. According to Newton et al. (2001:229), a lack of trained personnel and testing equipment to facilitate early detection of hearing loss also constitutes significant barriers for developing countries.

Challenges to IHS service delivery in developing countries according to Olusanya et al. (2004:300-302), Gopal et al. (2001:102-106) and Louw and Avenant (2002:146-147) are highlighted in Table 3.2.

There are significant challenges that must be faced when the implementation of IHS is considered in developing countries. However, according to Olusanya (2000:170), the “perennial hurdle has always been how to achieve reasonable balance in priorities in the face of competing needs and limited resources”. Despite the fact that developing countries must deal with challenges such as absence of proper equipment, staff and facilities in addition to common cultural and linguistic differences between professionals and communities, the desire to implement widespread IHS for children is no less intent, humane or appropriate (Mencher & DeVoe, 2001:19).

**TABLE 3.2 Challenges to IHS implementation in developing countries**

CHALLENGE	DESCRIPTION
<b>Manpower shortages</b>	Acute shortage of ear-care professionals in the developing world. Developed countries have ~320 otolaryngologists per million children under 15, while developing countries are estimated to have less than 1 per million children. Formal full-time training for audiologists is also lacking in most tertiary institutions in developing countries.
<b>Tracking and follow-up</b>	Completing the screening process through to diagnosis and appropriate/timely intervention may be racked with difficulty. Geographical location and socio-economic circumstances of parents play a vital role in this regard. Some parents may simply not be interested in continuing screening after the initial fail.
<b>Provision of support services</b>	Hearing aids are usually expensive, trained dispensers are scarce and ear mould laboratories are few or non-existent. The lack of formal training for speech language pathology contributes to few available early interventionists who are appropriately trained to provide suitable intervention services.
<b>Attitudes, cultural and religious beliefs</b>	Little or no attention is often paid to persons with disabilities in developing countries compared to those in developed countries. Special provision for disabled persons is not common in public facilities and the social stigma associated with hearing loss often results in a disposition to withdraw from people. It is therefore not uncommon to see parents delaying the acceptance of using hearing aids because they are noticeable. The strong influence of cultural, religious and unrealistic expectation of parents may also lead to the outright rejection of Western intervention options.
<b>Awareness among health workers</b>	Awareness amongst health professionals regarding hearing loss in young infants is very limited and even more so in developing countries where a larger emphasis is placed on life-threatening conditions. Health professionals are heavily relied upon for opinion on medical conditions and they wield considerable influence on parents who may be in denial or are simply reluctant to accept prescribed intervention.
<b>Economic burden of prevailing fatal diseases</b>	This problem prevails specifically in low and middle-income communities in developing countries. The challenge is to initiate and sustain the momentum for IHS while the burden of fatal diseases persists. Resources may have to be diverted to meet emergencies and child survival issues, thereby curtailing public funding for IHS.

(Compiled from: Olusanya et al., 2004:300-302; Gopal et al., 2001:102-106; Louw & Avenant, 2002:146-147)



### **3.6. IMPORTANCE OF INFANT HEARING SCREENING IN DEVELOPING COUNTRIES**

The most important benefit of IHS is that it allows the identification of hearing loss early enough to obtain optimal speech and language outcomes from timely intervention. To date there has been no other proven method that can produce comparable outcomes for children with permanent hearing loss (Yoshinaga-Itano, 2004:463-464). This makes IHS the procedure of choice for ensuring optimal outcomes for infants with hearing loss, whether they live in a developed or developing country. It is for this reason that the implementation of IHS in developing countries justifies serious consideration.

#### **3.6.1. Benefits of infant hearing screening in developing countries**

The benefits of implementing IHS programmes in developing countries are multiple and far-reaching. Previously, hearing screening programmes in developing countries were mainly applied during the school-going period, which is not early enough. The introduction of widespread IHS programmes in the face of the challenges inherent to a developing context could result in many positive outcomes such as the following (Olusanya et al., 2004:296):

- *Compilation of epidemiological data*

Epidemiological data on hearing loss is essential for the development of strategies that will form the basis of national programmes of prevention and management (Mencher, 2000:178). This type of data on the prevalence and pattern of congenital hearing loss is difficult to obtain without IHS (Olusanya et al., 2004:296). Risk factors may vary across communities, especially in developing countries where environmental factors are much more prominent. Thus IHS programmes will be helpful in identifying and characterising these risks (Gopal et al., 2001:102-103; Olusanya et al., 2004:296). Accurate epidemiological data is also needed to justify the allocation of funds from already limited budgets and IHS programmes may provide this much needed information (Mencher, 2000:178).

□ *Parental empowerment*

Early identification of hearing loss through IHS empowers parents to seek appropriate and timely assistance for their hearing-impaired child (Clemens et al., 2000:5; Hergils & Hergils, 2000:321; Olusanya et al., 2004:297). This early detection of hearing loss confers the right to make informed choices, without prejudice to their economic situation, to the parents (Olusanya et al., 2004:297). Parents may become alienated if their physicians deny them this empowerment, especially where the services for assistance are available.

□ *Growth and development of audiological services*

Contextual epidemiological data demonstrating the actual widespread extent of hearing loss point to the need for developing audiological services to address this silent epidemic. In addition to this, parents of children who are identified with hearing loss through IHS will naturally desire to help these children as soon as possible. This desire to take prompt action after confirmation of hearing loss could stimulate the development of essential and appropriate intervention services that are scarce in developing countries at present (Olusanya et al., 2004:297). In turn, this should encourage governmental and private sector involvement in the management of infants with hearing loss and could lead to a review of primary healthcare programmes to incorporate primary ear care services (Olusanya et al., 2004:297). The predominant system of sign language for children with profound hearing loss would be reformed to more oral approaches, allowing the children's better integration and inclusion.

□ *Integration and inclusion for children with hearing impairment*

The cultural and social stigma attached to childhood disabilities, especially in developing countries, generally precludes the integration of hearing impaired children into the community. The inability to acquire the native language of a community isolates an individual (Louw & Avenant, 2002:145). NHS has proved to produce native language skills in hearing impaired children that are within the normal range of development – something that no previous method has ever been able to demonstrate

(Yoshinaga-Itano, 2004:455). Management following detection by NHS could therefore facilitate rapid integration and inclusion into the extended family and society. This type of outcome has the potential to generate a positive cultural change toward hearing impaired persons over time.

The benefits of IHS programmes in developing countries are clear and have the potential to provide accurate data, empower parents, stimulate development of audiological services and most importantly, allow children with hearing loss the opportunity to be included into society as actively contributing members. These positive outcomes emphasise the need for investigating healthcare platforms that may be used to implement IHS programmes.

### **3.6.2. Healthcare platforms for infant hearing screening**

Despite the many prevailing challenges to implementing IHS in developing countries, there are existing structures in these countries that must be investigated as possible platforms from which such programmes can be launched. Although IHS is most effective in birthing centres before the neonate is discharged, it is also true that in developing countries a significant number of births occur outside the big hospitals (Olusanya et al., 2004:297). Many parents and infants are also lost to follow-up, and persuading them to attend a centre specifically for the purposes of hearing screening may be difficult. It is therefore practical and easier to use existing healthcare platforms that are integrated into primary healthcare services (Olusanya, 2001:142). This means that existing healthcare programmes that are well established must be evaluated to determine whether they will be suitable for incorporation into IHS programmes. IHS programmes have a primary goal of identifying hearing loss within the first 3 months and ensuring initiation of intervention by 6 months of age, and this will have to serve as a guide in selecting possible platforms. Selection of appropriate healthcare platforms that can be used for IHS will rely on the characteristics of each context and the type of infrastructure available. Suggestions of such platforms are summarised in Table 3.3. (Olusanya et al., 2004:297-298; Solarsh & Goga, 2004:109-110).

**TABLE 3.3 Healthcare platforms for IHS**

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**POSSIBLE HEALTHCARE PLATFORMS FOR IHS**

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**EXPANDED PROGRAMME ON IMMUNISATION (EPI)**

*This is a global initiative of UNICEF to deliver vaccinations against tuberculosis, diphtheria, pertussis, tetanus, measles and hepatitis B in infants. Vaccines are given at birth, before the age of 4 months and after 6 months. Latest updates indicate fairly high coverage rates of 70-78% for vaccines in the developing region. The immunisation structures in many of these countries are well established and constitute a ready platform from which IHS programmes can be promoted. Repeated visits for the multi-dose vaccines often spaced 4-weeks apart and completed on or before the age of 6 months offer a good chance for the promotion of IHS and subsequent follow-up of positive cases.*

**BABY-FRIENDLY HOSPITAL INITIATIVE (BFHI)**

*The BFHI is a global WHO/UNICEF-sponsored effort to promote exclusive breast-feeding from birth to age 6 months. The unique advantage is that it provides regular contacts for healthcare professionals to encourage, educate and support nursing mothers to breast-feed babies through a series of ten steps. Breast-feeding is culturally acceptable in many developing countries and has made the BFHI campaign quite popular with women. Hospitals and community health centres have incorporated this programme into ante-natal clinics and introducing IHS alongside this initiative may prove to be cost-effective with a high prospect of good coverage in the target population.*

**INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS (IMCI)**

*A strategic initiative by the WHO/UNICEF originally designed as an integrated case management of the five most important causes of childhood mortality (acute respiratory infections, diarrhoea, measles, malaria and malnutrition). The key objectives are to reduce death, the frequency and severity of illness or disability. The generic guidelines and Adaptation Guide have identified ear disorders as one of the conditions to be addressed. The IMCI is designed to be adapted to a country's needs in terms of prevention of diseases, curative care interventions, and measures that promote healthy growth and development in children. It should be possible to include the introduction of IHS under this strategy in any of the over 60 developing countries that have so far adopted the strategy.*

**NATIONAL EAR CARE PROGRAMME (NECP)**

*National efforts to promote the development of ear care services in countries like Nigeria and Costa Rica have established full-fledged governmental agencies specifically for this purpose. These agencies have the responsibility of producing a national ear care policy and this practice is actively encouraged by the WHO in developing countries. Such a platform would be valuable in the planning and implementation of IHS programmes, either independently or in collaboration with relevant agencies. Population-based surveys and the experience gained from the field in the process would be useful in planning the introduction of IHS in respective countries.*

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(Compiled from: Olusanya et al., 2004:297-298; Solarsh & Goga, 2004:109-110)

There has also been a recent increase in professional bodies in developing countries recommending guidelines and standards for IHS in their countries in an attempt to provide benchmarks in a world where none previously existed (Mencher & DeVoe, 2001:19; HPCSA, 2002:1). The South African NHS Position Statement 2002 (HPCSA, 2002:1-8) is one such an example that provides context specific standards and benchmarks. Another critical factor to consider, however, is the fact that there are different options of IHS programmes that must be carefully investigated for implementation in developing countries.

### **3.6.3. Targeted and universal newborn hearing screening**

Screening of both at-risk and non-risk newborns under UNHS programmes results in improved yields compared to Targeted Newborn Hearing Screening (TNHS). This makes UNHS the programme of choice and the final benchmark for the implementation of any NHS programme. The underlying drive is an ideal not to miss any newborns with hearing loss and its justification has been largely predicated on the limitations of TNHS and the availability of fast and reliable screening instrumentation (Olusanya et al., 2004:299). The reality of the situation in developing countries, however, probably makes TNHS the more suitable screening option as acknowledged by the JCIH (2000:20). TNHS can be implemented as a first but intermediate step toward a long-term goal of UNHS.

The advantage and limitation of TNHS is that it is able to detect approximately 50% of infants with hearing loss by screening just less than 10% of the births (Mahoney & Eichwald, 1987:161; Mason et al., 1997:91). The advantage lies in the fact that a reasonably small-sized sample of the birth cohort with risk factors for hearing loss could be screened to identify a large number of infants, thus requiring fewer resources. The limitation is that 50% of infants with hearing loss will still be missed. According to Yoshinago-Itano (2004:462) these children who are missed are also those who have the highest potential for success with early intervention, since they have a significantly lower incidence of secondary disabilities. It is therefore not a simple matter, but what is clear is that UNHS is the final goal for all programmes since every child deserves the opportunity to

develop optimally. TNHS can therefore be considered as an intermediate step toward more comprehensive programmes. Related to the issue of cost is the option of selecting to identify bilateral or unilateral hearing loss. Even though unilateral hearing loss does influence developmental and emotional outcomes in children (Bess et al., 1998:339), limited resources inevitably place a larger emphasis on identifying bilateral hearing loss above the more expensive identification of unilateral and bilateral hearing losses (Lutman, 2000:368).

The general rule should therefore be that each country, community or local health authority needs to determine its individual readiness for the different options according to its own situation. TNHS or other contextual screening protocols in the developing world may be suitable intermediate steps towards more comprehensive screening in the form of UNHS due to a lack of IHS services in the vast majority of developing countries.

### **3.7. CONCLUSION**

It is clear that the goal of the Joint Committee on Infant Hearing, namely to provide UNHS to all children (JCIH, 2000:10), is reaching beyond the borders of developed countries such as the United States and the UK, and is now also becoming evident in the developing parts of the world (JCIH, 2000:10). If the committee's premise of providing NHS for all infants is valid, then efforts should be mobilised to put screening programmes in place in less affluent countries (Mencher & DeVoe, 2001:19). If such mechanisms are not supported, a double standard of healthcare will be promoted which will continue to produce ethical and moral dilemmas regarding the identification and treatment of debilitating hearing loss in infants and young children.

Childhood hearing loss is recognised as a significant health problem by the World Health Assembly who revealed its serious intent by urging governments in developing countries to implement specific actions to address this problem (WHO, 1995:9). The principle thrust of existing UNICEF programmes in

developing countries is to ensure that every child is afforded a good start in life as a fundamental human right. This principle fully includes NHS, which improves the quality of life of early-identified infants and allows inclusion and integration into communities. There are a growing number of international initiatives such as those mentioned above, which provide developing countries the opportunity to initiate, develop and implement action plans for identifying childhood hearing loss (Olusanya et al., 2004:302).

Implementation of these programmes is largely dependent on accurate epidemiological data regarding congenital and childhood hearing loss. Unfortunately, however, consistent and comparable data in the developing regions of the world are scarce. This fact and the reported lack of support services for identified infants with hearing loss are often presented as reasons for not implementing IHS in developing countries (Mencher & DeVoe, 2001:20). These reasons, although they are valid, will not stimulate the development of services or the acquisition of necessary data. As Kenworthy (1990:328) noted, “only through comprehensive identification will the need for early intervention programs be realized”. Pilot studies at the community, state or national level, or even as non-governmental initiatives, should therefore be encouraged to provide needed empirical evidence that will elucidate the need for IHS and stimulate the development of appropriate services (Olusanya et al., 2004:302). Pilot studies are necessary to provide a framework that will guide the choice of suitable and affordable IHS protocols for each individual country, since there is no single answer for every context (White, 2004:28).

The benefits of IHS programmes in developing countries are significant and will serve a number of important healthcare and societal priorities. The implementation of these programmes does however face many challenges such as widespread disease, poverty, inequality and violation of human rights in developing countries. But these challenges and the high standards set by developed countries should not deter efforts to encourage IHS in low- and middle-income countries. Despite the challenges of developing contexts and despite the high benchmarks stated for IHS programmes in developed countries,

the case for IHS in less affluent contexts is clear. Initiatives must be promoted as a foundation for further development even if the initial results are not promising. Such programmes entail a continual period of growth and as was recently reported at the International Conference on Newborn Hearing Screening Diagnosis and Intervention held in Cernobbio, Italy, the “greatest enemy of good is excellent” (White, 2004:28). *The developing world must start where it can; the developed world should help where it can, so that we may provide the best outcomes for infants with hearing loss as widely as we can.*

### **3.8 SUMMARY**

This chapter provided an overview of issues pertaining to IHS in the developing countries of the world. An initial discussion was devoted to present the current healthcare perspective toward hearing loss in developing countries. This was followed by a justification of the relevance of IHS as a practice in developing contexts as well as in developed settings. The status of IHS practice in developed countries was provided as a precursor to an investigation of the challenges to IHS in developing countries. A case was subsequently made for implementing IHS in developing countries by presenting the benefits of such a programme and posing possible platforms for launching such initiatives. Finally, the argument was brought to a close by answering the question posed at the beginning of the chapter.