

**MOVING TOWARDS INCLUSIVE EDUCATION:
DESIGN PAEDIATRIC AUDIOLOGY PRACTICE
GUIDELINE**

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UNIVERSITI SAINS MALAYSIA

2025

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GUIDELINE**

by

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**Thesis submitted in fulfilment of the requirements
for the degree of
Doctor of Philosophy**

April 2025

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to the individuals and institutions that have played a crucial role in the completion of this doctoral thesis. This journey has been challenging, rewarding, and transformative, and I am indebted to those who have supported me along the way. First and foremost, I extend my sincere appreciation to my advisor, Ts. Dr. Rozniza Zaharudin, for her unwavering guidance, invaluable insights, and relentless commitment to excellence. Her constructive feedback, scholarly expertise, collective insights, and time devoted to evaluating and enhancing this work have significantly enriched the quality of this thesis. I am grateful to the members of my thesis committee, Assoc Professor Dr. Aznan Che Ahmad and Professor Dr. Lee Lay Wah for their mentorship that has been instrumental in shaping both the content and methodology of this research. I am truly fortunate to have had such dedicated and inspiring mentors. My sincere thanks go to the Special Education Programme, School of Educational Studies, USM for providing a stimulating academic environment and resources essential for the successful completion of this research. Special thanks go to my colleagues, friends, and family for their unwavering encouragement, understanding, and patience throughout this demanding process. Their emotional support has been my anchor during challenging times, and I am grateful for their belief in my abilities. Lastly, I would like to express my heartfelt thanks to School of Health Sciences whose support, has played a pivotal role in bringing this thesis to fruition. In conclusion, this journey would not have been possible without the collective support and encouragement of these remarkable individuals and institutions. I am deeply grateful for their contributions to my academic, research and personal growth.

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LIST OF SYMBOLS

%	Percent
dB	Decibel
HL	Hearing level

LIST OF ABBREVIATIONS

3PK	Pusat Perkhidmatan Pendidikan Khas
AABR	Automated auditory brainstem response
ABR	Auditory brainstem response
ALDs	Assistive listening devices
ANSD	Auditory neuropathy spectrum disorder
ASHA	American Speech-Language-Hearing Association
ASSR	Auditory steady state response
AVT	Auditory verbal therapy
BOA	Behavioural observation audiometry
CAPD	Central auditory processing disorders
CHL	Conductive hearing loss
CIs	Cochlear implants
CPG	Clinical Practice Guidelines
DHH	Deafness or hard-of-hearing
DPOAEs	Distortion product otoacoustic emissions
EA	Educational audiologist

EBP	Evidence-based practice
EHDI	Early Hearing Detection and Intervention
FM	Frequency modulation
HAs	Hearing aids
HI	Hearing impairment
IDEA	Individual with Disabilities Education Act
IE	Inclusive education
IEP	Individualised education programme / RPI
IPO	Input-process-output
IQ	Intelligence quotient
IQR	Interquartile range
JCIH	Joint Committee on Infant Hearing
KAP	Knowledge, Attitude and Practice (KAP)
MANSA	Malaysian National Society of Audiologists
MoE	Ministry of Education
MoH	Ministry of Health
MoW	Ministry of Women, Family and Community Development

OAEs	Otoacoustic emissions
PA	Phonological awareness
PCC	Patient-centred care
PPI	<i>Program Pendidikan Inklusif</i> / Inclusive Education Programme
RPI	<i>Rancangan Pendidikan Individu</i> / IEP
S-CVI	Subscale- content validity index
SEN	Special education needs
SNHL	Sensorineural hearing loss
SNR	Signal-to-noise ratio
TEOAEs	Transient evoked otoacoustic emissions
ToD	Teachers of the Deaf
TPB	Theory of Planned Behaviour
UNHS	Universal newborn hearing screening
VRA	Visual reinforcement audiometry
WHO	World Health Organization

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MENUJU KE ARAH PENDIDIKAN INKLUSIF:

REKA BENTUK PANDUAN AMALAN AUDIOLOGI PEDIATRIK

ABSTRAK

Pendidikan Inklusif (IE) bertujuan untuk menyediakan peluang pembelajaran yang adil bagi semua kanak-kanak, termasuk mereka yang bermasalah pendengaran (DHH). Ahli audiologi memainkan peranan penting dalam menyokong kanak-kanak dengan DHH, namun penglibatan mereka dalam IE masih kurang diterokai. Kajian ini menyelidiki praktis ahli audiologi di Malaysia dalam membantu kanak-kanak dengan DHH ke arah IE, cabaran yang mereka hadapi, serta perspektif mereka terhadap keperluan memperbaiki garis panduan klinikal. Penyelidikan ini menilai pengetahuan, sikap, dan praktis ahli audiologi dalam membantu penempatan kanak-kanak DHH ke arah IE. Pendekatan kaedah campuran digunakan dalam kajian ini, melibatkan tinjauan soal selidik dan temu bual bagi mengumpulkan data daripada ahli audiologi yang sedang berkhidmat. Matlamat utama kajian ini adalah untuk merekabentuk Garis Panduan Audiologi Pediatrik Malaysia yang menyokong ke arah IE bagi kanak-kanak DHH. Hasil daripada tinjauan dalam talian ahli audiologi menunjukkan bahawa walaupun semua ahli audiologi mempunyai pengetahuan yang diperlukan untuk merawat kanak-kanak dengan DHH, sikap yang positif tentang IE tetapi pengetahuan tentang IE masih kurang. Pendidikan arus perdana bukanlah matlamat jangka panjang utama bagi kebanyakan kanak-kanak ini. Kebanyakan ahli audiologi menganggap usia intervensi serta keupayaan pertuturan dan bahasa kanak-kanak sebagai faktor utama bagi pendidikan inklusif. Temu bual dengan guru pula menunjukkan sikap positif

terhadap pelajar yang boleh berkomunikasi secara lisan. Namun, masih terdapat keperluan untuk kerjasama antara guru dan ahli audiologi serta latihan khusus dalam pengajaran kanak-kanak DHH dalam persekitaran inklusif. Berdasarkan cabaran dan pandangan yang dikenal pasti dalam tinjauan ahli audiologi, temu bual guru serta analisis garis panduan praktis klinikal, garis panduan khas telah direkabentuk. Kandungan garis panduan ini termasuk isu berkaitan penempatan pendidikan untuk memastikan keperluan kanak-kanak DHH dipenuhi dalam kerangka IE di Malaysia. Kesimpulannya, kajian ini memberikan gambaran tentang praktis semasa dan sikap ahli audiologi Malaysia serta guru sekolah rendah dalam konteks audiologi pediatrik dan pendidikan inklusif. Garis Panduan Audiologi Pediatrik Malaysia yang dibentukkan ini menawarkan sumber yang untuk ahli audiologi yang terlibat dalam pendidikan dan penjagaan kanak-kanak DHH, menyumbang kepada persekitaran pendidikan yang lebih inklusif dan menyokong bagi kanak-kanak DHH di Malaysia.

MOVING TOWARDS INCLUSIVE EDUCATION:

DESIGN PAEDIATRIC AUDIOLOGY PRACTICE GUIDELINE

ABSTRACT

Inclusive Education (IE) aims to provide equitable learning opportunities for all children, including those who are Deaf and Hard of Hearing (DHH). Audiologists play a critical role in supporting children with DHH, yet their involvement in IE remains underexplored. This study investigates the current practices of Malaysian audiologists in preparing children with DHH for IE, the challenges they encounter, and their perspectives on the need for improved clinical guidelines. This research examines audiologists' knowledge, attitude, and practices in facilitating DHH students towards IE. A mixed-methods approach was employed, utilizing surveys and interviews to gather data from practicing audiologists. The goal was to design a Malaysian Paediatric Audiology Guideline that fosters IE for children with DHH for audiologists. Results from the audiologists' online surveys revealed that while all audiologists possessed the necessary knowledge to treat children with DHH and positive attitude in IE, there needed to be more knowledge about IE. Mainstream education was not a predominant long-term goal for these children. Most audiologists considered the child's age at intervention and their speech and language abilities as crucial prerequisites for inclusive education. Teacher interviews demonstrated a positive attitude towards students who could communicate orally. However, there is a need for collaboration with audiologists and specialised training in teaching children with DHH in inclusive setting. A guideline was designed based on the shared insights and challenges identified in both audiologists' surveys and teachers' interviews. This guideline was explicitly designed to address issues related to educational placement,

ensuring that the needs of children with DHH are met within the Malaysian IE framework. In conclusion, this study sheds light on the current practices and perceptions of Malaysian audiologists and primary school teachers in the context of paediatric audiology and IE. The designed Malaysian Paediatric Audiology Guideline offers a valuable resource for audiologists involved in educating and caring for children with DHH, contributing to a more inclusive and supportive educational environment for these children in Malaysia.

CHAPTER 1

INTRODUCTION

1.1 Overview

The human right to education, including children with disabilities, is the core of inclusive education (IE). Education is considered inclusive if it includes all students, does not exclude anyone, and welcomes and supports them in learning. (Tichá et al., 2018). One of the common disabilities that affect a child's speech-language acquisition and academic performance is hearing impairment (HI) or hearing loss. HI is also known as deafness or hard of hearing (DHH). It is a common invisible disability. The World Health Organization (WHO) estimates that 6.1% (466 million) persons around the world have disabling hearing loss (hearing loss greater than 40 dBHL). About 34 million (7%) of this figure are children (WHO, 2018). In Malaysia, there is no recent consensus regarding the statistics of hearing loss. However, recent Malaysia primary education data showed that DHH, regardless of the severity, comprised 4.1% (n= 1927), approximately 4 in 100, among all the disabilities such as blindness, learning disabilities, speech delay, physical handicap, multiple disabilities, and dyslexia (Ministry of Education Malaysia, 2018).

The impacts of DHH on children who have not yet acquired speech and language are more devastating. If a person lacks speech and language skills, verbal communication is impossible. Consequently, academic performance might be adversely affected without sufficient intervention. The primary teaching medium in the mainstream classroom is verbal communication. A certain degree of speech and language development in children with DHH is required to ease learning in a general

setting. Therefore, the intervention process for educating children with DHH could determine success in education and a better quality of life (QoL). Along the process, personnel from different disciplines, such as healthcare professionals (audiologists, speech-language pathologists, child psychologists, and occupational therapists) and teachers, must facilitate children with DHH towards IE.

This study aims to critically evaluate the knowledge and attitude of audiologists in Malaysia towards IE and analyse the current practice of audiologists and possible challenges (barriers) audiologists face in paediatric audiology practice towards IE. Therefore, the challenges audiologists face in using the guidelines were revealed. This study also analysed the suitability of existing paediatric audiology clinical practice guidelines in facilitating children with DHH towards IE. It shed light on the suitability of the guidelines audiologists can refer to in fostering children with DHH towards IE in Malaysia. This study then further evaluated the impact of the existing available guidelines toward IE in audiologists' daily clinical practice in Malaysia. Subsequently, this study designed a guideline for use in Malaysia, incorporating the principle of facilitating children with DHH towards IE.

1.2 Research Background

IE is "a process of addressing and responding to the diverse needs of all learners through increasing participation in learning, cultures, and communities, and reducing exclusion from education and within education." An IE approach advocates facilitating a learning environment where teachers and learners embrace the challenges and benefits of diversity. With this approach, learning environments are fostered to meet individual student needs and allow the opportunity to succeed for students (Baglieri & Shapiro, 2018).

IE, also known as mainstreaming, means enrolling students with special education needs (SEN), regardless of the form(s) of disability, into regular classrooms instead of separating them through placement in special education classes. This concept emerged in 1994, proclaimed by The Universal Declaration of Human Rights and reaffirmed by the World Declaration on Education for All. The fundamental principle of inclusive education is that all children should learn together wherever possible, regardless of difficulties or differences. This child-centred pedagogy is advocated to educate all children regardless of their disabilities (UNESCO, 1994). In 2015, the United Nations member states signed the 2030 Agenda for Sustainable Development and its 17 goals, and countries worldwide adopted the agreement. Goal 4 (SDG4) is to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". This goal is in line with the dimensions of "no one is left out" (guaranteeing access to opportunities for education and learning) and "no one is left behind" (ensuring effective, relevant, and pertinent outcomes) (UNESCO, 2017b). IE is gaining popularity worldwide, especially in developed countries.

A developing country like Malaysia began its official evolution towards IE by implementing the Malaysian Education Act of 1996. It was the first time the terms "special education" and "special school" were officially defined in Malaysian law. Being a "late starter" compared to some Western countries, Malaysia must keep pace with the philosophical changes from segregation to integration as inclusive within a short time (Lee & Low, 2014).

In its pursuit of IE, Malaysia has embraced international declarations like the Biwako Millennium Framework for Action Towards an Inclusive Barrier-Free and Rights-Based Society for Persons with Disabilities in Asia and the Pacific (2002), the

Framework for Action on Special Needs Education (Salamanca Statement, 1994), the United Nations Standard Rules on the Equalisation of Opportunities for Persons with Disabilities (1993), and the World's Declaration on Education for All (1990) (Ministry of Education Official Portal, 2011). There are three educational setting options for children with DHH in Malaysia: special school, integrated school, and mainstream school (or IE). It is lucidly stated in the Malaysia Education Blueprint (Preschool to Post-secondary Education) (2013-2025) that the Malaysian Ministry of Education (MoE) plans to move more students with special needs, including those with DHH, towards the inclusive education programme (*Program Pendidikan Inklusif*, PPI) and raise the overall quality of provision. It is in line with Malaysia's national identity, which promotes patriotism. Establishing a true national identity requires a strong sense of inclusiveness that can be achieved by learning to understand and accept diversity and embracing the variations regardless of ethnicity, religion, or socioeconomic status (MOE, 2013).

Malaysia has proved its determination to shift the segregation policy towards IE in 2019 by implementing a compulsory "zero reject" policy in schools in Malaysia. The schools, especially the mainstream schools, must accept all special needs students and prepare an individual education plan for every child (The Star Online, 2019). It aligns with the Malaysia Education Blueprint's target to have every teacher equipped with basic knowledge of special education and to have 75% of students with special needs enrolled in the inclusive programme by 2025 (MOE, 2013).

WHO (2018) estimates that among individuals with DHH worldwide, 7 in 100 of them are children. The immediate consequence of unidentified and untreated hearing loss among children with pre-lingual hearing loss is the incapability to use

spoken language to communicate. Thus, this places a child at educational risk in a mainstream classroom learning setting. With early intervention, children with DHH can benefit from hearing aids (HAs), cochlear implants (CIs) and other assistive listening devices (ALDs). Nevertheless, early intervention also includes speech-language therapy, aural rehabilitation, and other related services such as psychological support for co-existence behavioural disorders (e.g., autism spectrum disorders, attention-deficit hyperactive disorder, etc.) (WHO, 2018). In other words, several healthcare professionals provide early intervention services to children with HI. Audiologists play an essential role in identifying hearing loss and providing interventions like prescribing hearing device (s) to children with HI to allow for access to environment and speech sounds. It is true to interpret this as preparing or facilitating children with DHH towards IE.

The American Academy of Family Physicians defines clinical guidelines as statements that include recommendations intended to optimise patient care. They are systematically evidence-reviewed and an assessment of the benefits and harms of alternative care options for patients (American Academy of Family Physicians, 2018). There are international and local guidelines for audiologists from professional associations in managing cases from hearing assessment to intervention for children. The international guidelines include the American Speech-Language-Hearing Association (ASHA), American Academy of Audiology, AAA and British Society of Audiology (BSA), while local by the Malaysian Association of Speech-Language and Hearing (MASH), Malaysian National Society of Audiologists (MANSA) and from local Ministry of Health (MoH) or hospital. These guidelines are familiar documents for audiologists to use in daily practice to make clinical decisions in the clinic.

ASHA guidelines stress evidence-based practice (EBP), which integrates clinical expertise or opinion, external and internal evidence from scientific literature and observations, and client, patient or caregiver perspectives. The available guidelines for audiologists regarding aural rehabilitation are ASHA Practice Policy Documents for Educational/Paediatric Audiologists, Knowledge, and Skills- Roles, Knowledge, and Skills: Audiologists Providing Clinical Services to Infants and Young Children Birth to 5 Years of Age, Guidelines for Audiology Service Provision in and for Schools (ASHA, 2018a).

On the other hand, in Malaysia, the professional bodies representing audiologists are the MASH and the MANSA. MASH had published a code of ethics for their members in speech-language pathology and audiology professions. This code of ethics explains four principles of ethics (Malaysian Association of Speech-Language and Hearing, 1995). Early local guidelines mainly referenced international guidelines. While MANSA had published online five pages content document comprised of statements of purpose, the definition of an audiologist, the scope of practice (identification, assessment, and diagnosis, (re) habilitation, advocacy/ consultation, hearing conservation, education/ research/ administration), and restrictions on the unregistered practitioner (MANSA, 2018). The subjects and content of local recommendations are not as comprehensive as those of international guidelines. Neither of the MASH or MANSA documents specifically mentioned IE. Additionally, evidence-based practice was promoted by ASHA's international guidelines (ASHA, 2024).

1.3 Problem Statement

The global trend of shifting paradigms from segregation and integration to IE can be seen in many countries. For instance, in a Belgium study, 65% of Flemish children with DHH were attending mainstream schools in 2010, 28% of children using a CI entered directly into a mainstream preschool (ages 2.6-6.0 years), 46% into mainstream primary school and 66 % (2 out of 3) into mainstream secondary school. The number of children with CI entering secondary school increased by 40% compared to 1999 data (Raeve & Lichtert, 2012). In the United States, the percentage of secondary students with HI studying in mainstream schools (data from 2001 to 2003) is almost similar to the Belgium study, about 65% (Caemmerer et al., 2016).

On the other hand, in Malaysia (2018), in an inclusive educational setting, DHH comprised 6.5% (n= 547) of students with disabilities (n=8383). The weightage of primary school students with DHH is equal among the three settings: mainstream, integration, and special schools, ranging from 28.4 to 36.7%. However, most primary students with DHH are still in a special school (36.7%) and the least in a mainstream school (28.4%). In addition, the enrolment to the special school reduced as compared to the previous year by 7%. In other words, the increasing trend of inclusive enrolment of students with DHH has not yet been seen. (Ministry of Education Malaysia, 2018).

The enrolment of students with DHH study in an inclusive setting is still low. More than 70% of students with DHH are in integration or special schools. This enrolment rate could be due to different parties' non-standardised school placement practices, including parents, school authorities, teachers, audiologists, speech-language therapists, paediatricians, school administration, and related healthcare providers. The school placement procedures and the child's verbal communication

ability vary for different reasons, including the previous audiological interventions that were received. In addition, there is no school placement guideline available for all students. Therefore, some verbal students with DHH might be unintentionally enrolled on integrated or special schools.

It is undeniably true that implementing IE in developing countries will face many challenges that must be solved beforehand (Conroy, 2016). The identified challenges that developing countries face include inadequate facilities and personnel training programmes, lack of funding structures and absence of enabling legislation (Eleweke & Rodda, 2002). Moreover, research about IE in developing countries still needs to be conducted. In Malaysia, these challenges are still relevant. There are several studies regarding IE in Malaysia (Bailey et al., 2015; Ghani & Ahmad, 2012; Lee & Low, 2013; Razali et al., 2013); however, scarce literature about DHH was conducted on the scope of IE in Malaysia. As a result, the early intervention results prior to the later educational level will be the earlier findings on the outcome of DHH in Malaysia. Most of the local studies focused on CI and its outcomes.

Early intervention has a direct causal effect on the academic outcomes of children with DHH. Their achievements are undoubtedly related to themselves, their family backgrounds, and their experience at the school (Marschark et al., 2015). In the long run, with appropriate hearing devices, good auditory speech perception, language and educational level can be expected in mainstream education when children are provided with early intervention and a conducive auditory learning environment (Damen et al., 2006). Therefore, preparing children with DHH towards IE as early as possible is mandatory, such as through early aural intervention. In this case, the audiologist's role is important to facilitate inclusion for children with DHH.

The American-Speech-Language-Hearing Association (ASHA) defines audiologists as experts who can help to prevent, diagnose, and treat hearing and balance disorders for people of all ages. Specifically, audiologists provide professional and personalised services that help manage hearing and balance issues, including selecting hearing aids or assistive technology, noise and hearing loss prevention, and tinnitus (American Speech-Language-Hearing Association, 2018c). Malaysia's audiologist's description of practice scope is similar to the Americans', i.e., specialising in diagnosing and providing nonmedical treatment for hearing and balance disorders (Ministry of Health Malaysia, 2019). Both descriptions of the audiologist's scope of practice focus on clinical diagnosis and (re) habilitation.

In other words, the service delivery is confined to the clinical basis. The living environment of a child with DHH is not restricted to a clinical room. Besides their parents and family members, the schoolteacher is the person they spend most of their time with. Unfortunately, education support in a school setting is not well stated in the practice guidelines. Therefore, a guideline for audiologists that teachers and parents can refer to is needed to ensure that everyone is on the same page to facilitate the children with DHH towards IE.

Although the multidisciplinary approach is highly recommended in local and overseas guidelines, the actual multidisciplinary practice seems restricted to medical and healthcare disciplines. It is undoubtedly vital for audiologists with professional knowledge about DHH to have cross-disciplinary service delivery to support children with DHH once they enter the education world. Therefore, a more thorough understanding of the educational requirements of children with DHH in Malaysia is the first task for audiologists to expand service delivery across disciplines.

Furthermore, the multidisciplinary guidelines focused on providing knowledge and skills specific towards (re) habilitating children with DHH for IE are unavailable in the current guidelines (ASHA, 2006; Ministry of Health Malaysia, 2014).

With the documented clinical guidelines and the low enrolment rates of students with DHH in mainstream schools in Malaysia, the timely effectiveness of early intervention is in question. Malaysia's Ministry of Education Malaysia (MoE) has set the vision to have 75% of students with special needs enrolled in inclusive programmes by 2025, with the current 28.4% enrolment in primary school (2018), a more aggressive investigation to improve the current condition is of the vital need to reach the target. In addition, the findings of this study can help policymakers and educational groups establish and promote hearing loss awareness and improve the support provided to children with DHH in academic settings.

This study aims to evaluate the knowledge and attitude of audiologists and analyse their practices, including the barriers in facilitating children with DHH towards IE. At the same time, it is aimed to investigate the suitability of current paediatric audiology guidelines regarding IE. At the end of the study, a guideline for audiologists in facilitating children with DHH towards IE was designed. As we embark on this exploration, we intend to synthesise existing knowledge by designing a clinical practice guideline (CPG) in paediatric audiology that suits the Malaysian context and provides actionable insights for policymakers, healthcare professionals, and educators.

1.4 Research Objectives (RO)

The objectives of this study are as follows:

- RO1 To explore the knowledge and attitude of audiologists in Malaysia about IE for children with DHH.
- RO2 To explore teachers' experiences and opinions regarding teaching children with DHH and the received audiological support.
- RO3 To analyse and compare the clinical guidelines of established professional bodies in addressing paediatric audiology, school-based support, and IE for children with DHH, identifying key similarities, differences, and gaps in their approaches.
- RO4 To investigate the current practices of audiologists in preparing children with DHH for IE, and the challenges they encounter in clinical practice to enhance support for IE.
- RO5 To examine the current practice guidelines used by Malaysia's audiologists and explore their perspectives on the need for improved clinical guidelines to enhance support for IE.
- RO6 To design a guideline for audiologists in facilitating children with DHH towards IE.

1.5 Research Questions (RQ)

- RQ1 What is the knowledge and attitude of audiologists in Malaysia about IE for children with DHH?
- RQ2 What are the teachers' experiences and opinions regarding teaching children with DHH and audiological support received?
- RQ3 How do the clinical guidelines of established professional bodies address paediatric audiology, school-based support, and IE for children with DHH, and what are the key similarities, differences, and gaps in their approaches?
- RQ4 What are the current practices of audiologists in preparing children with DHH for IE, what challenges do they encounter in clinical practice to enhance support for IE?
- RQ5 What are the current practice guidelines used by Malaysia's audiologists, and what are their perspectives on the need for improved clinical guidelines to enhance support for IE?
- RQ6 What should be the design of Malaysia's paediatric clinical audiology practice guideline in facilitating children with DHH towards IE?

1.6 Operational Definitions

1.6.1 Clinical Practice Guidelines (CPG)

A clinical practice guideline (CPG) or clinical protocol is "systematically developed statements that help physicians, other practitioners, case managers, and clients make decisions about appropriate health care for specific clinical circumstances" (The Hearing Review, 2019).

In the context of this study, audiology CPGs are the clinical protocol in written statements that help practicing audiologists make decisions about appropriate health care for general audiology practice. Meanwhile, paediatric audiology CPG pertains to the paediatric (children) population.

1.6.2 Hearing Impairment (HI)

Hearing sensitivity, that is, how soft a person can detect sounds, is measured in decibel hearing level (dBHL) using pure tones in a quiet environment. HI can be categorised into mild, moderate, severe, and profound. A person is considered to have a HI if the measured hearing levels are worse than 20 dBHL in either ear. However, disabling HI is defined as moderate (41-60 dB) or worse HI in the better ear (WHO, n.d.). On the other hand, people with hearing loss ranging from mild to severe are regarded as 'hard of hearing' while those with profound loss are 'deaf' (World Health Organization, 2023).

In the context of this study, these terms, HI and deaf and/ or hard of hearing (DHH), can be used interchangeably. For this study, DHH is used at most times.

1.6.3 Paediatric, Children and Student

As defined by The Merriam-Webster.com Dictionary, paediatric relates to, affecting, or being an infant, child, or adolescent (The Merriam-Webster.com Dictionary, 2019). For the scope of this study, paediatric refers to infants or children. A child is a person of 19 years or younger unless national law defines an adult at an earlier age. An infant is a child who is less than 12 months old (World Health Organization, 2013).

In the context of this study, the intended group of paediatric population or children for the guideline is 0 to 7 years old. These two terms will be used interchangeably. The term "student" refers to children entering formal school age.

1.6.4 Inclusive Education (IE)

UNESCO (2017) defines IE as facilitating the diversity of needs of all learners regardless of their types of disabilities through increasing participation in learning, cultures and communities and reducing exclusion from education and within education. In this study, the focus is on DHH. Inclusive education, mainstreaming, and general education are usually used interchangeably.

In the context of this study, children with SEN refer to children with special needs and non-specific disabilities, while children with DHH refer to children with DHH who also have special needs, specifically in hearing.

1.6.5 Knowledge, Attitude and Practice (KAP)

Knowledge is the 'understanding of or information about a subject that you get by experience or study, either known by one person or by people generally or, the state of knowing about or being familiar with something' (2019a). The nature of knowledge rests on the different modes of acquisition of ideas: perception, imagination, memory, judgement, abstraction, and reasoning (Badran, 1995).

Attitude is a disposition to respond favourably or unfavourably to an object, person, institution, or event (Ajzen, 2005). It includes inclinations to react in a certain way to specific situations, to see and interpret events according to certain predispositions, or to organise opinions into coherent and interrelated structures (Badran, 1995).

Practice refers to action rather than thought or ideas. In line with the study context, practice is defined as something that is usually or regularly done, often as a habit, tradition, or custom (Cambridge English Dictionary, 2019).

1.7 Significance of Study

At the end of this study, a guideline as a referring source is intended to be designed comprising the local practicing audiologists' and teachers' perspectives for audiologists to manage children's cases with DHH focussing on facilitation towards IE. The guideline is intended to be easy for audiologists to refer to, for children with DHH up to preschool age, and for teachers and their families.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In recent years, the intersection of healthcare and education has become increasingly critical, with a growing recognition of the profound impact of health-related factors on a child's educational journey. One such essential domain is paediatric audiology, which plays a crucial role in identifying and addressing hearing-related challenges in children. Like many nations, Malaysia has been striving to enhance its IE practices to ensure that all children can access quality education regardless of their abilities. Against this backdrop, the design of clinical practice guidelines (CPGs) in paediatric audiology towards IE is crucial for ensuring evidence-based, standardised, and high-quality care for children with hearing loss towards a better long-term outcome, i.e., IE. Early identification and intervention are essential for children with HIs to achieve optimal language, cognitive, and social development, particularly in IE settings where they learn alongside their hearing peers (Fricke et al., 2017; Sarant et al., 2015).

However, in Malaysia, the absence of a nationally recognised paediatric audiology guideline has resulted in inconsistencies in clinical practices, challenges in early intervention services, and barriers to IE for children with hearing loss. This literature review comprehensively examines paediatric audiology, clinical practice guidelines, and IE, highlighting their interconnections and the need for an integrated approach in Malaysia.

Children with DHH often encounter barriers beyond the auditory realm, affecting their communication skills, academic achievements, and socio-emotional development. As Malaysia endeavours to create a more inclusive educational landscape, it becomes imperative to address the audiological needs of children, ensuring they receive timely and appropriate interventions. A CPG becomes a prerequisite in this endeavour, offering a systematic and standardised approach to paediatric audiological care.

This literature review aims to elucidate the current state of paediatric audiology in Malaysia, evaluating the existing challenges and gaps that hinder optimal service delivery. By scrutinising global best practices and experiences in developing and implementing CPGs, the review seeks to distil insights applicable to the Malaysian context. Moreover, it aspires to highlight the vital role that paediatric audiology CPGs can play in fostering IE, thereby contributing to the broader discourse on healthcare integration within the educational landscape.

The scope of this literature review encompasses a comprehensive examination of literature related to paediatric audiology, CPGs, and IE, with a specific focus on Malaysia. Key objectives include identifying current practices in paediatric audiology, analysing existing clinical practice guidelines globally, and formulating recommendations for designing contextually relevant guidelines for Malaysia.

As we embark on this exploration, we intend to synthesise existing knowledge and provide actionable insights for policymakers, healthcare professionals, and educators. By amalgamating expertise from these diverse fields, we aim to contribute to developing a robust framework that supports paediatric audiology clinical practice

guidelines, fostering IE and ensuring that every child in Malaysia has an equitable opportunity to thrive academically and socially.

2.1.1 Brief Overview of Paediatric Audiology

Paediatric audiology represents a specialised domain within the wider audiology field dedicated to addressing children's unique auditory needs from infancy through adolescence. As an interdisciplinary field, it integrates principles from audiology, otolaryngology, speech-language pathology, and education to comprehensively assess and manage hearing-related challenges in the paediatric population. The significance of paediatric audiology extends beyond identifying and treating HIs; it summarises the essential role that auditory function plays in a child's language development, academic achievement, and overall socio-emotional well-being.

In Malaysia, the scope of paediatric audiology is characterised by a diversity of audiological needs among children. Accessibility to audiological services, early identification of HIs, and integration of audiological interventions into educational frameworks are crucial components that shape the effectiveness of paediatric audiological care. Understanding the scope is essential in developing CPGs that can cater to the unique challenges posed by the Malaysian context, particularly within the framework of IE.

This literature review embarks on a comprehensive exploration of the current state of paediatric audiology in Malaysia, encompassing the availability of services, prevailing challenges, and existing gaps. Shedding light on the complexities of addressing hearing-related issues in children sets the stage for a more profound

understanding of the significance of CPGs tailored explicitly to the paediatric population. By examining the internationally established CPGs, the review aims to extract valuable insights that can inform the design of paediatric audiology CPGs in Malaysia, ultimately enhancing IE for children with DHH.

2.1.2 Importance of Inclusive Education in Malaysia

Inclusive education stands at the forefront of Malaysia's commitment to fostering a diverse and equitable educational landscape. The significance of IE in the Malaysian context is highlighted by several interconnected factors that address societal and individual needs. IE ensures that children, irrespective of their abilities or disabilities, have equal access to quality education. It aligns with Malaysia's vision of providing all children with an inclusive and non-discriminatory learning environment. Concurrently, it fosters social cohesion by promoting understanding, empathy, and acceptance among students, laying the foundation for a more inclusive and harmonious society.

Malaysia has demonstrated a commitment to IE through various policy initiatives. Legal frameworks, such as the Education Act and the National Education Policy, emphasise the importance of providing education that accommodates the needs of every child, regardless of their abilities (MOE, 2013) and the Zero Reject Policy (2019) (Othman & Rahmat, 2020).

IE empowers children with disabilities by recognising and catering to their unique learning needs. It seeks to break down barriers to participation and facilitate the holistic development of every child, including those with DHH, addressed by paediatric audiology. In addition, IE also enables the integration of children with

diverse abilities into mainstream educational settings. This integration not only benefits students with disabilities but also enriches the overall learning experience for all students. Subsequently, students will be prepared for a diverse and inclusive society by fostering respect for differences and nurturing a sense of social responsibility. It aligns with Malaysia's aspirations for a society that values diversity and inclusivity. As a signatory to the United Nations' SDGs, particularly Goal 4 (Quality Education) and Goal 10 (Reduced Inequalities), Malaysia recognises the role of IE in achieving these global objectives (UNESCO, 2017a; United Nations, 2023).

More integrated classrooms, such as inclusive classroom settings, have improved the educational outcomes of students with DHH (François et al., 2015; Oh-Young & Filler, 2015). Research indicates that diverse classrooms, where children with different abilities learn together, can enhance cognitive, social, and emotional development. Understanding the essential role of IE in Malaysia provides a contextual backdrop for the necessity of designing paediatric audiology CPGs. This guideline supports the educational inclusion of children with DHH and aligns with Malaysia's broader vision of an inclusive and equitable education system.

2.1.3 Significance of Clinical Practice Guidelines (CPGs)

A guideline is “information intended to advise people on how something should be done or what something should be” (Cambridge Dictionary, n.d.). In contrast, a framework refers to “the ideas, information, and principles that form the structure of an organisation or plan” (Cambridge Dictionary, n.d.). A good policy framework comprises a document hierarchy that includes policy, procedure, standards,

and guidelines. This guideline provides general guidance, additional advice, and support for policies, standards, or procedures within a framework (Wrensch, 2023).

A clinical practice guideline (CPG) or clinical protocol is “systematically developed statements that help physicians, other practitioners, case managers, and clients make decisions about appropriate health care for specific clinical circumstances” (The Hearing Review, 2019). In the early years, CPG is rarely solely based on research evidence (Raine et al., 2005). In the later years, CPG was defined as “statements that include recommendations to optimise patient care”. These statements result from a systematic review of evidence and an assessment of the benefits and costs of alternative care options (Institute of Medicine (US) Committee on Standards for Developing Trustworthy Clinical Practice Guidelines, 2011).

Well-developed guidelines can improve clinical practice, the quality of audiological assessment and treatment, patient outcomes, and cost-effective care, as well as identify niche areas in research for future investigation. The CPG statements provide a thorough understanding of each condition, procedure and/or treatment option based on evidence (American Academy of Audiology, 2023).

2.2 Overview of Paediatric Audiology Clinical Practices

The paediatric audiology clinical practices include hearing screening, diagnosis, intervention, and supporting education and teachers. An audiologist is a person who holds an academic degree, clinical training, and license to practice or professional credential and is uniquely qualified to provide a comprehensive array of

professional services related to the prevention of hearing loss and audiological identification, assessment, diagnosis, and treatment of a person with impairment of auditory and vestibular function, and to the prevention of impairments associated with them (American Academy of Audiology, 2004). Therefore, audiologists are responsible for conducting hearing assessment and diagnosis in children with DHH.

In other words, audiologists can help prevent, diagnose, and treat hearing and balance disorders for people of all ages (American Speech-Language-Hearing Association, 2018c). In the audiologists' scope of practice by the American Speech-Language-Hearing Association (ASHA) (2004), it is also stated that audiologists serve in several roles other than the clinician, e.g., therapist, teacher, consultant, researcher, and administrator. However, it is not elaborated in a great deal of these roles. This guideline of scope practice states that the audiologist is an integral part of the team with the school system that manages students with DHH and central auditory processing disorders (CAPD).

2.2.1 Paediatric Hearing Screening and Diagnosis in Children with DHH

As for the paediatric population, an audiologist administers hearing screening programs in schools and trains and supervises non-audiologists performing hearing screening in the educational setting. Nevertheless, audiologist also participates in the development of Individual Family Service Plans and Individualised Educational Programs, serve as a consultant in matters about classroom acoustics, assistive listening systems, HAs, communication and psycho-acoustic effects of hearing loss, and maintain both classroom assistive systems as well as students' personal HAs (American Academy of Audiology, 2004).

Individualised education programme is a written statement that guides the educational plan for a child, ages 3-21, in line with the Individuals with Disabilities Education Act of 2004 (IDEA). The IFSP guides the early intervention services for a child with disabilities and their family. Besides these two plans, the 504 plan is developed to ensure that a child with a disability receives accommodations for a general education classroom in the United States. ASHA (2008a) has further specified that the treatment for children includes developmental and educational interventions such as participation in individualised education programmes/ IFSP for school-age children or implementation of an IFSP for children from birth to 36 months of age, as well as involvement in the development and implementation of a 504 plan. It is the scope of practice for audiologists to measure the noise levels in educational institutions and recommend noise reduction modification.

In short, audiologists' central focus concerns all auditory impairments and related communication disorders. Audiologists provide patient-centred care in the prevention, identification, diagnosis and evidence-based intervention and treatment of hearing, balance, and other associated disorders for people of all ages. Treatment services require audiologists to know existing and emerging technologies, intervention strategies, and interpersonal skills to counsel and guide individuals and their family members through the (re)habilitative process. Audiologists provide professional, personalised, comprehensive diagnostic and nonmedical treatment services for hearing and balance disorders and related impairments to minimise the negative impact of these disorders, leading to improved outcomes and quality of life. In the United States, audiologists are licensed and/or regulated in all 50 states and the District of Columbia (American Speech-Language-Hearing Association, 2018a).

2.2.2 Paediatric Audiology Hearing Screening

Screening for newborns enables the diagnosis of treatable disorders early enough to provide an intervention that will improve outcomes (Fabie et al., 2019). Newborn hearing screening (NHS) aims to detect congenital hearing loss and provide intervention as early as possible. Before the implementation of NHS programs, the age of identification of bilateral profound hearing loss was usually around two years or older. After implementing the programmes, the age of identification was lowered even to months old (Nikolopoulos, 2015).

There is no uniformity in the NHS protocol. Most universal newborn hearing screening (UNHS) programmes utilise Transient evoked OAEs (TEOAEs) as their screening protocols. In contrast, few used distortion product otoacoustic emissions (DPOAEs), automated auditory brainstem response (AABR) and/ or diagnostic auditory brainstem response (ABR) within protocols. However, overall findings indicated that including automated or diagnostic ABR tests facilitated decreased false-positive and referral rates. Thus, it was concluded that using a two-stage or multiple-stage protocol contributes to lower referral rates and increased screening accuracy (Kanji et al., 2018). A study on two-stage DPOAEs followed by diagnostic ABR on 19,700 newborns achieved 100% sensitivity and 99.3% specificity (De Capua et al., 2007).