TRANSLATION AND ADAPTATION OF SELF EVALUATION OF LISTENING FUNCTION AND EASE OF LISTENING FORM (SELF+) INTO MALAY VERSION

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by

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Dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Health Sciences (Honour)(Audiology)

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CERTIFICATION

This is to certify that the dissertation entitled "Translation And Adaption Of Self Evaluation Of Listening Function And Ease Of Listening Form (Self+) Into Malay Version" is the project work done by NUR HIDAYAH BINTI YUSUF from October 2024 to July 2025. We have read this dissertation and, in our opinion, it fulfils the acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Health Sciences (Honours) (Audiology).
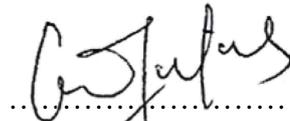
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DECLARATION

I hereby declare that the work has been done by myself, all the results are of my own investigation and any ideas or quotations from others' work are fully acknowledged according to standard referring practices of the discipline. I also declare that it has not been submitted as a whole in previous or concurrently for any other degrees in any institution.

…………………………..

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Date: **25/8/2025**

ACKNOWLEDGEMENT

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LIST OF ABBREVIATIONS

SELF+	Self Evaluation of Listening Function and Ease o Listening Form
WHO	World Health Organization
ASHA	American Society Hearing Association
USM	Universiti Sains Malaysia
UKM	Universiti Kebangsaan Malaysia
PPSK	Pusat Pengajian Sains Kesihatan
BAHA	Bone Anchored Hearing Aid
CROS	Contralateral Routing of Signal
CHAPS	Children's Auditory Performance Scale
LIFE	Listening Inventory for Education
PEACH	Parent's Evaluation of Aural/Oral Performance of Children
LDQ	Listening Difficulty Questionnaire
ICF	International Classification of Functioning,Disability and Health
SSQ	Speech,Spatial and Quality of Hearing Scale
HEAR-QL	Hearing Environments And Reflection on Quality of Life questionnaires
CVI	Content Validity Index
AI	Artificial Intelligence
CI	Cochlear Implant

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TRANSLATIONAND ADAPTION OF SELF EVALUATION OF LISTENING FUNCTION AND EASE OF LISTENING FORM (SELF+) INTO MALAY VERSION

ABSTRAK

Masalah pendengaran merupakan isu kesihatan global yang signifikan, yang menjejaskan lebih daripada 430 juta individu di seluruh dunia termasuk sebilangan besar kanak-kanak. Pengesanan awal dan intervensi yang tepat amat penting dalam mengurangkan kesan negatif gangguan pendengaran terhadap kemahiran komunikasi, perkembangan sosial, dan prestasi akademik kanak-kanak. Alat penilaian subjektif seperti borang Self Evaluation of Listening Function and Ease of Listening (SELF+) memberikan gambaran yang bermakna tentang pengalaman pendengaran kanak-kanak dalam situasi harian. Namun begitu, versi SELF+ yang telah disahkan dalam Bahasa Melayu masih belum wujud, sekali gus mengehadkan penggunaannya dalam kalangan populasi berbahasa Melayu.Kajian ini bertujuan untuk menterjemah dan menyesuaikan borang SELF+ ke dalam Bahasa Melayu untuk digunakan dalam kalangan kanak-kanak Malaysia berumur antara 7 hingga 12 tahun. Reka bentuk kajian keratan rentas telah digunakan, merangkumi enam langkah piawai: persediaan, terjemahan awal, terjemahan balik, semakan oleh jawatankuasa pakar, ujian lapangan, dan penyesuaian akhir. Proses pengesahan melibatkan penilaian kesahihan kandungan oleh pakar.Dapatan kajian menunjukkan bahawa versi SELF+ dalam Bahasa Melayu mempunyai kesahihan kandungan yang tinggi, dengan indeks kesahihan kandungan (CVI) melebihi nilai yang disyorkan iaitu 0.80.Bagi setiap item, Indeks Kesahan Kandungan pada Tahap Item (I-CVI) untuk item Q2, Q3, Q4, Q6, Q7, Q8, Q9 dan Q10 mencapai skor I-CVI sempurna iaitu 1.00, menunjukkan persetujuan penuh

terhadap kejelasan dan kesesuaian item. Item seperti Q1, Q5, Q11 dan Q12 masing-masing memperoleh skor I-CVI sebanyak 0.94, yang menunjukkan tahap persetujuan yang tinggi dengan sedikit keraguan. Indeks Kesahan Kandungan pada Tahap Skala Purata (S-CVI/Ave) adalah 0.98, yang menunjukkan kejelasan keseluruhan yang sangat baik bagi keseluruhan borang soal selidik.Maklum balas daripada kanak-kanak dan pakar mengesahkan bahawa item-item dalam soal selidik ini adalah jelas, sesuai, dan relevan secara budaya. Versi akhir soal selidik ini difahami dengan baik oleh kumpulan umur sasaran. Alat yang telah disesuaikan ini juga menunjukkan konsistensi yang baik dalam menilai pengalaman pendengaran, sekaligus mencerminkan kestabilan dalam penggunaannya.Kesimpulannya, versi SELF+ dalam Bahasa Melayu adalah alat yang sah dan boleh dipercayai untuk menilai fungsi pendengaran dan tahap kemudahan mendengar dalam kalangan kanak-kanak berbahasa Melayu. Penyesuaian budaya dan linguistik yang teliti menjadikannya instrumen yang berguna untuk kegunaan klinikal, pendidikan, dan penyelidikan dalam meningkatkan penilaian auditori dan penjagaan kesihatan pendengaran kanak-kanak di Malaysia.

TRANSLATIONAND ADAPTION OF SELF EVALUATION OF LISTENING FUNCTION AND EASE OFLISTENING FORM (SELF+) INTO MALAY VERSION

ABSTRACT

Hearing loss is a significant global health issue, affecting more than 430 million people worldwide, including a considerable number of children. Early detection and intervention were crucial to reducing the negative effects of hearing impairment on a child's communication skills, social development, and academic performance. Subjective assessment tools, such as the Self Evaluation of Listening Function and Ease of Listening Form (SELF+), provide valuable insights into children's listening experiences in everyday situations. However, a validated Malay version of the SELF+ questionnaire was previously unavailable, limiting its use among Malay-speaking populations.This study aimed to translate and culturally adapt the SELF+ into the Malay language for use with Malaysian children aged 7 to 12 years. A cross-sectional design was employed, following a standardized six-step process that included preparation, forward translation, back translation, expert committee review, field testing, and finalization. The validation process involved assessment of content validity by experts.The findings revealed that the Malay version of SELF+ demonstrated strong content validity, with content validity index (CVI) values exceeding the recommended threshold of 0.80. For each item, the Item-level Content Validity Index (I-CVI) for items Q2, Q3, Q4 ,Q6,Q7,Q8,Q9 and Q10 achieved perfect I-CVI scores of 1.00, indicating agreement on clarity and appropriateness. Items such as Q1, Q5, Q11, and Q12 each received I-CVI scores of 0.94, showing strong agreement with minor reservations. The Scale-level Content Validity Index Average

(S-CVI/Ave) was 0.98, demonstrating overall excellent clarity across the questionnaire write this in malay version Feedback from children and experts confirmed that the questionnaire items were clear, appropriate, and culturally relevant. The final version was well understood by the target age group. The adapted tool also showed excellent coherence among items, indicating its stability and consistency in assessing listening-related experiences.In conclusion, the Malay version of SELF+ is a valid and reliable tool for evaluating listening function and ease of listening among Malay-speaking children. Its careful cultural and linguistic adaptation makes it a useful instrument for clinicians, educators, and researchers in improving auditory assessments and enhancing hearing healthcare services for children across Malaysia.

CHAPTER 1

INTRODUCTION

This chapter presents a brief introduction to research and its scope. It includes the background of the study, problem statement, objectives , significance and theoretical framework that supports and gives important key concepts

1.1   Background of the study

Hearing impairment ranks as the fourth most common cause of disability on a global scale. According to the WHO ,around 430 million individuals, or more than 5% of the global population including 34 million children need rehabilitative services due to their disabling hearing loss. It also stated that more than 700 million individuals, or 1 in every ten people will suffer disabling hearing loss by the year 2050 (Porter and Kuykendall, 2022).The recent data suggest that approximately 5% of the world's population, which includes 32 million adults and 34 million children and adolescents has suffers from hearing loss that was considered to be disabling(WHO, 2024).It was characterised as hearing loss when the loss was greater than 40 dB HL in the better

hearing ear in adults and greater than 30 dB HL in the better hearing ear in children(Schmucker et al., 2019). The prevalence of hearing impairment in children was significantly higher than adults due to several factors, most of which were associated with genetic predispositions and environmental impacts throughout a child's formative years. Hearing impairment was a frequent condition that affects children and can be caused by several different circumstances. Genetic influences were among the major contributors to this condition. Two primary types of hearing loss may be distinguished from one another which syndromic hearing loss and

non- syndromic hearing loss. Genetic factors were responsible for approximately 50% of all cases of hearing loss in children.On the other hand, syndromic hearing loss was related with additional health problems and can be caused by more than 400 different genetic abnormalities.

According to the American Speech Language Hearing Association (ASHA), hearing loss can be inherited in inheritance patterns, such as X-linked, autosomal recessive, and autosomal dominant. Autosomal dominant inheritance was a form of heredity in which a single copy of a defective gene from one parent can result in hearing loss. This means that if a parent has the condition, there was a 50% probability that their child would also be afflicted by it. On the other hand, autosomal recessive inheritance necessitates that both parents carry a defective gene for the child to display hearing loss. This results in a 25% risk of occurrence for each sibling who was born to carrier parents who generally have a normal sense of hearing. X-linked hearing loss was a disorder that mostly affects males because they only have one X chromosome. If the X chromosome has the mutation, males will exhibit symptoms, however, females may be carriers of the mutation without displaying any signs of the condition(Breu et al., 2008). However, childhood hearing loss also significantly impacted by environmental factors. Recurrent cases of otitis media, also known as middle ear infections,were common in children and can cause short-term and long-term hearing loss. When fluid builds up in the middle ear, it can interfere with sound transmission and lead to conductive hearing loss. Severe damage to the auditory structures and potential delays in speech and language development might result from repeated infections throughout critical developmental (Kochhar et al., 2007).

1.1.1 Effect of Hearing Loss In Children

Childhood hearing loss can profoundly affect multiple aspects of development, as emphasized by various sources, including the World Health Organization (WHO). Hearing impairment impacts auditory abilities, language development, social interaction, educational performance, and emotional well-being. Children with hearing impairments frequently struggle to develop spoken language abilities at age appropriate standards. Hearing loss hinders their ability to perceive speech sounds distinctly, which was crucial for acquiring verbal communication and comprehending language. Even a mild hearing loss can have a major influence on a child's social and communication skills, as well as their speech and language development if early intervention was not given in the first 6-12 months (Germiller, 2007). Not only that, academic underachievement might also result from untreated hearing loss. Children who don't hear many words while they were young might not learn to read and write properly. As a result, future employment prospects may be less favourable and educational achievement may be poorer. However, communication challenges might result in enduring emotional and psychological effects, perhaps leading to feelings of isolation, loneliness, and depression. The impact on the family was similarly significant. Parents with children who were deaf or hard of hearing have distinct problems, which commonly experience greater stress levels, encounter higher out-of-pocket costs, and miss more workdays compared to other parents. The stress may be further intensified by communication challenges with their children and an increased demand for support and financial (Krug et al., 2016).

Hence,amplification devices might be needed to help children with hearing loss. Nowadays, there were a lot of many amplification devices has been introduced such as traditional hearing aids, contralateral routing of signals (CROS) aids,

implantable devices like bone-anchored hearing aids (BAHA), bone conduction hearing aids (BCHA) and cochlear implants and assistive listening devices.Thus, all of this amplification device will be given to patient based on their severity of loss as it was very useful and helpful for patient that have difficulties in hearing.

Several studies have shown that subjective measurements were helpful in evaluating the effectiveness of hearing aids in young children. A lot of this subjective measurement rely on questionnaires or inventories designed to assess the auditory and speech abilities of children as observed by their parents or other caretakers in natural listening environments. Since parents were more likely to observe their children in natural environments, their observations of child behaviour were more accurate reflections of how the child acts than results from tests conducted in structured settings. Furthermore, parental reports assist in identifying the child's strengths and areas for improvement, promote professional-parent collaboration, and cost-effective. Many questionnaires have been developed to assess children's hearing abilities and determine the effectiveness of various hearing devices that have been provided for them. However, the majority of this questionnaire were created for English-speaking populations, and they might not be applicable to groups of populations with diverse cultural and linguistic backgrounds. In this research, we will be using Self Evaluation of Listening Function and Ease of Listening Form (SELF+). This questionnaire was developed by Teresa Ching et al. and published online. SELF+ was a scale designed to systematically measure a child's perception of their auditory and communicative interactions with others in real-world environments. In the SELF+, the child will be asked to reflect on their listening behaviours in various real-life situations and evaluate their listening skills. Thus, the SELF+ also prompts the children to indicate their ability to listen in multiple situations, whether it's easy or hard to listen. Not only that, this

SELF+ questionnaire will be completed with the child via an interviewer. As there was no version adapted to the Malay version of the SELF+ that could be used to evaluate children's auditory skills, this study aims to translate and adapt the Self Evaluation of Listening Function and Ease of Listening Form (SELF+) in the Malay version(Quar et al., 2012).

1.1.2   Listening Function and Ease of Listening

Listening was a complex cognitive activity that involves more than just the perception of sound. It involves the active interpretation and comprehension of auditory information, which essential for effective communication and interaction with others, especially in children. The listening function was described as the ability to receive, process, and interpret auditory information. Having this skill was crucial for learning and communicating effectively. According to the World Health Organisation (WHO), listening involves not only hearing sounds but also comprehending and making meaning of those sounds in context. Children depend on their auditory skills for language acquisition and social development. Studies showed that children with proficient listening skills generally achieve better in academic and social outcomes compared to their peers with poor listening abilities (WHO, 2024). Moeller et al. (2010) discovered that children who had early intervention for hearing loss showed improvement in speech and language outcomes, which this also highlighting the significance of evaluating listening function in at-risk populations (Moeller et al., 2010).

Ease of listening denotes as the subjective perception of the amount of effort required for an individual to comprehend auditory information. This idea particularly relevant in the evaluation of individuals with hearing impairments or those using assistive devices such as hearing aids or cochlear implants. The ease of listening was

affected by a number of factors, including the clarity of speech signals, the presence of background noise, the listener fatigue, and the cognitive load. Studies have consistently demonstrated that listening ease was a crucial factor in communication effectiveness and overall auditory satisfaction (Gatehouse & Noble, 2004). In complex acoustic environments, ease of listening can vary significantly. Background noise and reverberation were common barriers that require listeners to use more cognitive effort to decode speech signals. This increased demand frequently results in listening fatigue, which characterised by a feeling of exhaustion experienced by individuals after prolonged engagement with auditory stimuli. In addition, when it comes to ease listening it is not only a reflection of the functionality of the auditory system but it also takes into account about the cognitive factors like the capacity of working memory and attention. Individuals with greater cognitive resources may find it easier to listen, even in difficult situations (Rönnberg et al., 2013). For individuals with hearing impairments, ease of listening was an important factor in the effectiveness of rehabilitation strategies. Hearing aids and cochlear implants aim to enhance audibility, nevertheless, they may also introduce distortions or amplify background noise, thereby affecting the natural listening experience. Subjective evaluations of ease of listening offer significant insights into the real-world effectiveness of these intervention and suggest adjustments to improve results (Dillon, 2012).

1.1.3 Paediatric Hearing Assessment Questionnaires

Evaluating the auditory capabilities of children with hearing impairments was essential for comprehending their developmental requirements and guiding effective intervention strategies. It was important to note that subjective assessment tools, such as questionnaires, play a crucial part in this process since they offer insights into the

listening experiences that the child has in everyday environments. In contrast to objective assessments such as audiometry, which evaluate hearing sensitivity in controlled environments, questionnaires capture real-world auditory challenges and the effects of hearing loss on a child's everyday life (Bagatto et al., 2011). Questionnaires that directly engage children provide a distinctive perspective, enabling researchers and clinicians to investigate their own experiences and self-assessed listening abilities, which were sometimes overlooked in traditional evaluations.

Interview-based methods for administering questionnaires were very beneficial in paediatric audiology. Interviews foster a supportive and engaging environment that enables children to express their thoughts freely. In contrast to self-administered questionnaires, interviews facilitate the clarification of questions and probing for more detailed responses. This adaptability was crucial when engaging with young children who may have limited language skills or different levels of comprehension. Moreover, interviews can minimise the literacy barriers, particularly within culturally diverse populations, so ensuring that responses accurately represent the child's true experiences (Moeller, 2000).

Several questionnaires specifically designed for children with hearing impairments rely on interview methods to improve data collection such as Children's Auditory Performance Scale (CHAPS), Listening Inventory for Education (LIFE), Parent's Evaluation of Aural/Oral Performance of Children (PEACH), and Listening Difficulty Questionnaire (LDQ).

1.2 Problem Statement and Study Rationale

The increasing prevalence of hearing loss in Malaysia highlights the critical need for instruments to evaluate listening abilities that were readily available, reliable, and culturally relevant. Good listening skills were essential in numerous aspects of life, including education, and interpersonal interactions. To evaluate an individual's listening ability and proficiency in comprehending spoken information, instruments such as the Self-Evaluation of Listening Function and Ease of Listening Form (SELF+) have been created. However, most listening assessment instruments were only available in English, making them inapplicable to non-English speakers, especially in regions where Malay is the main language. Currently, there isn't a SELF+ validated in Malay that can be applied to properly assess listening function and ease of listening in a Malaysian context (Sweetow & Sabes, 2006). This gap was an obstacle for clinicians, educators, and researchers who aim to evaluate listening function in Malay-speaking people's native language. Furthermore, language and cultural variations may compromise the validity of directly using the English version within a Malay-speaking population, hence emphasising the significance for accurate translation and adaptation of the instrument. Moreover, studies have shown that in order to ensure an evaluation tool's validity in the target group, it was not enough to translate it from one language to another merely. This because direct translations might fail to capture cultural nuances ,linguistic variations, and individual differences in perception and response. Tools that have been translated must undergo cross-cultural adaptation to assure that they were acceptable from a language and culture (Beaton et al., 2000a).

Hearing-related questionnaires were important tools for evaluating children's listening skills, offering a systematic approach to comprehend their auditory skills and detect possible hearing or auditory processing disorders. These questionnaires provide multiple benefits including the early detection of hearing impairments, facilitation of academic achievement, and enhancement of social interactions. These methods enable experts, educators, and parents to assess a child's listening ability across diverse settings. Hearing related questionnaires were very effective for the early identification of auditory processing or hearing-related problems. Early identification of hearing problems enables the implementation of treatment that can promote essential developmental milestones, including speech and language acquisition. This early detection was essential, as research shows that undetected or untreated hearing impairments can result in developmental delays, including speech and language issues, reading delays, and social difficulties (Moeller et al., 2010). Thus, early intervention can alleviate these risks by enabling professionals to implement corrective actions, such as hearing aids, cochlear implants, or speech therapy, that can foster language and communication skills from the beginning.

Moreover, hearing questionnaires also offer significant insights into the impact of hearing loss or auditory processing issues on a child's ability to communicate effectively. These evaluations can help to identify child's difficulties by collecting the data on a child's listening behaviours in several settings, such as at home, at school, and during social interactions. This comprehension was essential for developing suited interventions that can enhance the child's communication abilities and assist them in navigating social situations more proficiently. For example, if a child indicates difficulties comprehending speech in noisy environments, speech-language pathologists can customise their approaches to precisely confront this issue

(Wiggin et al., 2013).

Not only that, listening skills were essential for academic achievement, as it influencing a child's ability to follow the instructions, understand lessons, engage in group discussions, and participate in interactive learning activities. Hearing questionnaires assist educators and parents in determining whether a child's academic difficulties arise from listening challenges rather than other causes, such as cognitive or behavioural issues. For instance, Children who struggle to follow the verbal instruction may find it challenging to accomplish activities or engage in discussions, and it can resulting in frustration and potential disengagement. By identifying listening difficulties early, educators can implement appropriate accommodations, such as seating arrangements to minimise background noise, using visual aids, and providing written instructions, to facilitate these children to fully engage in learning (Moeller et al., 2010).

Hence , translating and adapting questionnaires cannot only ensure that they were culturally appropriate and linguistically accessible, but it also allowing questionnaires not only can ensure that they were culturally appropriate and linguistically accessible but also allows for the effective measurement of hearing-related variables in varied populations. The essential consideration when translating and adapting the hearing related questionnaire was to make sure they were appropriate for the cultural context of the target group. Perceptions of hearing loss and difficulties with listening could differ from one culture to another due to differences in lifestyle, communication style, and social norms. For example, some questionnaires item questionnaires may be relevant for people in one culture but inappropriate for another

Thus, a hearing-related questionnaire may not appropriately reflect the actual

experiences of the target group if it was not adapted properly.In addition, individuals' perspectives on hearing loss may vary according to their culture. For instance, in cultures where group conversations were less typical than one-on-one interactions, a question regarding listening issues in social contexts might be understood differently; cultural adaptation was essential to maintain the questionnaire's original intent and relevance (Hall et al., 2018a). Furthermore, translating and adapting questionnaires also can support valid and reliable data collection. Basically, the purpose of any hearing-related questionnaire was to obtain accurate and reliable data for future clinical or research studies. However, the possibility of measurement inaccuracy will be increased if the questionnaires were translated without taking the cultural and linguistic variances into account. As a consequence, the reliability of any clinical or research results may be compromised due to inaccurate data. According to the studies, a systematic approach for translation and adaption was crucial to that the translated questionnaire measures the same things as the original (Hall et al., 2018a). For example, the SELF+ questionnaire must be consistently evaluate listening difficulties across diverse cultural contexts. The information obtained from that version might not accurately indicate the person's actual listening skills if the translated version introduces bias or misunderstanding. Thus, this may result in incorrect diagnoses or inappropriate interventions (Beaton et al. 2000). Lastly, an important consideration when translating and adapting hearing-related questionnaires was maintaining the instrument's efficacy and original goal in the target language. The goal here is not a about the translation of words but rather the achievement of conceptual, semantic, and operational equivalence between the source and target languages(Beaton et al., 2000a). "Conceptual equivalence" means that the questions' underlying meanings remain unchanged, making sure that terms like "ease of

listening" were interpreted identically across cultures. This necessary to ensure that the translated version accurately measures the same constructs as the original, which crucial for its clinical usefulness. For instance, certain terminology in an English-language questionnaire, such as "hearing handicap" or "listening effort," may lack clear equivalents in other languages. Redefining or adapting the terms to meet the cultural understanding of hearing-related concerns in the target group may be necessary in addition to translation. Thus, attaining functional and conceptual equivalence ensures that the questionnaire effectively assesses identical psychological and health- related components across diverse populations, enabling meaningful comparisons and conclusions in global research studies (Hall et al., 2018a).

1.3   Research Objective

The objectives of this study will be divided into general and specific objective

1.3.1   General Objective

To translate and culturally adapt the Malay version of SELF+ among primary school child

1.3.2   Specific Objective

1. To perform a forward translation of the original English version of SELF+ into Malay.

2. To conduct a backward translation of the Malay-translated SELF+ back into English.

3. To evaluate the content validity of the Malay version of the SELF+ questionnaire

1.4   Research Questions

1. How accurately can the original English version of the SELF+ questionnaire be translated into Malay?

2. Does the backward-translated version of SELF+ demonstrate conceptual and linguistic equivalence with the original English version?

3. What are the content of the Malay version of SELF+?

1.5   Significance Of Study

This study aims to translate and adapt the Self-Evaluation of Listening Function and Ease of Listening (SELF+) into Malay to create a culturally and linguistically appropriate tool for assessing listening function in Malay speakers. It seeks to ensure that Malay-speaking individuals can accurately report their listening difficulties, which will improve the inclusivity of healthcare and the precision of diagnoses and treatments. Additionally, this study aims to support healthcare professionals in providing more personalized care and to contribute to research and public health initiatives focused on hearing care in Malaysia for primary school children.

CHAPTER 2

LITERATURE REVIEW

The literature review chapter critically examines existing scholars that were relevant to the study, providing a comprehensive synthesis of key concepts, theories, and empirical studies. By analyzing and synthesizing a range of sources, this chapter aims to establish a robust theoretical framework and identify gaps in current knowledge that the thesis seeks to address. Ultimately, the literature review serves as a foundation for understanding the context and significance of the research undertaken in this thesis

2.1 Introduction

Self-reported outcome measures that evaluate a patient's disability and functioning impacted by hearing impairment were crucial in aural rehabilitation. This aligns with the International Classification of Functioning, Disability and Health (ICF) which states that the specific difficulties encountered by patients must be identified and enabling clinicians to apply this information for targeted interventions in relevant areas of need (Lynn, 1986).Generally speaking, objective outcome measurements, including real ear measurement and speech recognition tests, were frequently used by audiologists in Malaysia (Camila Piccini Aiello et al., 2011) . Although objective testing offer several advantages, but this test just assess the functional improvement in sound perception resulted from amplification. Consequently, subjective assessments, such as self-outcome measurements, have been used as they provide more information into the patient's quality of life affected by hearing impairment . Therefore, Several self-reported outcome measurement tools were available globally to assess listening function and ease of listening in individuals with hearing impairment including the Self evaluation

of listening function and ease of listening form (SELF+), International Outcome Inventory for Hearing Aids (IOI-HA) and Parents' Evaluation of Aural/Oral Performance of as Children (P.E.A.C.H.) (Tengku Zulaila Hasma Tengku Zam Zam et al., 2017), Children's Auditory Performance Scale (CHAPS) and Listening Inventory for Education-Revised (LIFE-R). The International Outcome Inventory for Hearing Aids (IOI-HA) was one of the most widely used self-reported tools designed to evaluate hearing aid outcomes. This tool assesses various aspects of hearing aid such as daily use, benefit, residual difficulties, satisfaction, and overall impact on quality of life (Robyn M. Cox & Genevieve C. Alexander, 2002). Similar to SELF+, the IOI-HA provides insights into real-world listening difficulties faced by hearing aid users. However, the IOI-HA more focused on device satisfaction, whereas SELF+ was designed to evaluate general listening function and ease of listening across different environments, with or without hearing aids. Next, one such tool have been developed specifically for children with hearing impairment was the (P.E.A.C.H.), which designed for parents to evaluate their child's listening and communication abilities in real-life settings (Ching & Hill, 2007) The P.E.A.C.H. questionnaire assesses listening behaviors at home, school, and social environments, providing valuable parental insights. Furthermore, the CHAPS questionnaire evaluates children's listening and communication skills in various auditory environments, including classrooms and social settings. Although it primarily collects input from teachers and parents, its flexible administration allows for interviews with older children to verify observations. This adaptability makes it an essential tool for comprehending the difficulties encountered by children in real- life listening situations (Baydan et al., 2020). Similarly, the Listening Inventory for Education-Revised (LIFE-R) includes a student version that uses interviews to assess the child's perception of their listening abilities in educational

settings with the age range between 7-14 years old. This tool includes an interview-based element in which children self-report their experiences related to classroom listening, interactions, and the effects of hearing devices. The interview enables direct interaction with the child, ensuring the questions were clear and relevant while facilitating adjustments according to their understanding level (Krijger et al., 2018).

In audiology, the application of this was crucial for assessing the effects of hearing loss and the efficacy of therapies. Nevertheless, numerous tools were originally created in English-speaking environments, presenting considerable obstacles for application in non-English-speaking communities (Hall et al., 2018).

For instance, children with hearing impairment might impacts their social, emotional, cognitive, linguistic, and academic abilities. However, it was a (re)habitable condition with prompt diagnosis and intervention. Therefore, children who began wearing hearing aids (HA) and/or cochlear implants (CI) at an early age will show language-speech development that was close to normal limits. A critical aspect of diagnosing and rehabilitating these children by monitoring their progress in auditory abilities and improvements in dealing with issues related to hearing loss or obstructions in the process. However, while audiological tests can be used to assess the efficacy of HAs and CIs, it was challenging to use them to evaluate the quality of life, changes in subjective complaints, and communication skills in complex situations in young children. This because their language skills were not fully developed at that age, making it difficult for them to express themselves. Thus, the scales were essential for these evaluations. Additionally, the scales can be used to assess the efficacy of auditory prosthesis and follow-ups in auditory rehabilitation. Various scales have been established to assess children's listening abilities in everyday situations. These scales vary in the domains they assess, the ages they cover, and whether they were designed

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for students, parents/guardians, or educators. Hence, the scales were designed for the parent, teacher, or directly for the child, based on the child's age and assessment parameters (Eroğlu et al., 2021). Therefore, it was importance to have a good and reliable translated and adapted version of hearing related questionnaire in order to ensures that hearing care professionals can make well-informed decisions, ultimately improving patient care and enabling consistent research outcomes across different populations.

2.1.1 Cross Cultural Adaptation

Cross-cultural adaptation was a process that involves translating an instrument from one language to another while maintaining the cultural and linguistic subtleties. The research conducted by hasises that cross-cultural adaptation not just about a literal translation of the text but also about adapting the instrument to be culturally relevant and conceptually equivalent in the target language and culture. This process will involve several significant steps in order to have a good and reliable translation and adapted questionnaire such as preparation, translation phase, review by a multidisciplinary committee, and field testing. Thus, once the translation has been finalized, it was important to conduct psychometric evaluations, such as reliability and validity testing, to ensure that the adapted instrument performs well in the target culture. Cross-cultural adaptation goes beyond mere language translation; it involves making sure that the instrument measures the same constructs in a way that was meaningful and culturally appropriate across different populations. In conclusion, cross- cultural adaptation was a critical step for maintaining the validity and reliability of health-related surveys, such as those utilised in audiology, across various linguistic and cultural populations. The objective was to achieve functional equivalence between the source and target

versions, ensuring that the instrument performs as intended inside its new cultural environment (Hall et al., 2018).

2.1.2 Challenges In Translating And Adapting Questionnaires

The process of cross-cultural adaptation, particularly in the translation and validation of instruments for diverse languages and cultural contexts, shows various challenges that must be determined to maintain the validity, reliability, and relevance of the adapted tool across different cultural and linguistic environments.

2.1.2(a) Conceptual Equivalence

When it comes to cross-cultural adaptation, one of the most significant challenges in cross cultural adaptation was making sure that the source version of the questionnaire and the target version were conceptually equivalent to one another. The conceptual equivalency refers to the question of whether or not the concepts that were being measured have the same meaning in different cultures. According to Hall et al. (2018), cultural differences have the ability to impact the interpretation of certain concepts which could result in the possible misrepresentation of data if the questionnaire was not properly adapted. For instance, a question relating social activities such as going to a concert would be less relevant in countries where such activities were not widespread. Similarly, the concept of "family" might be different across cultures, with the nuclear family being the norm in Western cultures and the extended family being the norm in other cultures. In the process of adapting hearing-related questionnaires, such as the Speech, Spatial, and Qualities of Hearing Scale (SSQ), it may be necessary to make modifications in order to take into account differences in lifestyle and social norms. If these conceptual gaps were not addressed, it was possible that the data obtained will not truly reflect the experiences of the population that being targeted (Hall et al., 2018). According to Quar et al.(2012), in the

adaptation of the PEACH scale into Malay, certain examples from the original English version were either omitted or modified due to their inapplicability to the local Malaysian context. For instance, the phrases like "dishwasher" and "train" were excluded due to their uncommon use in Malaysian households. Although these modifications enhanced cultural relevance, but they still posed a problem in maintaining that the adapted version still assessed the same constructs as the original instrument (Quar et al., 2012).

2.1.2(b)   Addressing Linguistic and Semantic Challenges

Moreover, achieving linguistic and semantic accuracy also one of the limitation in cross cultural adaptation. Direct translations of words or phrases may not consistently convey identical meanings, resulting in variations in respondents' comprehension of questions. In cross-cultural adaptations, it was frequently essential to choose culturally suitable phrases or expressions that convey the original goal without compromising the meaning. For instance, idiomatic expressions or colloquial terms in one language might not contain an equivalent in the target language, resulting in misunderstandings or unclear interpretations. This become more complicated when the target language has multiple regional variants or dialects, all of which have their own nuances. Addressing this difficulty requires comprehensive testing, which may be time-consuming and resource- intensive (Hambleton & Patsula, 1998). Additionally, Hall et al.(2018) emphasise the significance of thorough back-translation and review by experts in order to make sure that the translated questionnaire was faithful to the meaning that was originally intended(Hall et al., 2018b) .Based on one studies by AlNowaiser et al. (2023), it stated that The HEAR-QL which originally developed in English, contains numerous terminology specific to hearing health, quality of life, and social interactions, which require thorough translation to preserve their intended meaning. Direct

translations frequently fail to convey the cultural or contextual meaning, requiring back translation and evaluation by experts in both languages. Thus, in this article it states that they use two bilingual Arabic-speaking otolaryngologists assessed the translation for adequacy, but the possibility of linguistic discrepancies still persists and remains high.

2.1.2(c)   Resource-Intensive of The Adaptation Process

The process of cross-cultural adaptation was highly resource-intensive, requiring a significant amount of time, effort, and collaboration among experts. Cross-cultural adaptation was a resource- intensive process that necessitates much time, effort, and collaboration among specialists. Hall et al. states that the best adaptation process comes with multiple steps, including forward translation, back translation, committee review, and field testing. Each step needs the expertise of bilingual translators, healthcare professionals, and cultural specialists, in addition to comprehensive testing and validation. For instance, it was crucial to conduct testing of the adapted questionnaire with a representative sample of the intended respondents to make sure its clarity and reliability; nevertheless, doing so can be a costly and time-consuming process In many cases, cost and time constraints may cause researchers to skip the crucial steps, which it can compromise the quality of the adapted questionnaires. Thus, an instance of this occurs when field testing is skipped or performed with an insufficient sample size due to time or financial limitations. Field testing was essential to verify that the modified questionnaire was intelligible and culturally suitable for the intended demographic. Inadequate testing may result in researchers use a questionnaire that does not accurately to assess the intended constructs within the new cultural context, hence it can produce unreliable or invalid data. For example, in a hearing-related questionnaire, failure to appropriately field-test of the cultural relevance of sound

examples or communication scenarios may result in respondents having difficulty relating to or comprehending the items (Hall et al., 2018b).

2.1.3   Validation And Reliability of Translated Questionnaires

In cross-cultural adaptation of questionnaires, the validation and reliability processes were essential to ensure the instrument accurately reflects the construct it aims to measure in the new linguistic and cultural context. Based on the research by Quar et al. (2012) has stated that the adaptation of the PEACH (Parents' Evaluation of Aural/Oral Performance of Children) scale into Malay involved several measures to ensure both validity and reliability. This approach was crucial when the questionnaire was designed for clinical or educational contexts, where precise evaluations can significantly impact the treatment or intervention results. Validation involves ensuring that the translated version appropriately assesses the same construct as the original. The initial step of this process involves translation and cultural adaptation. The PEACH scale was translated from English to Malay with a back-to-back translation approach, so it can insure the preservation of the original meaning(Quar et al., 2012).

In addition, the translated scale was also evaluated by native-speaking audiologists and after that done the back-translated to verify its accuracy. Furthermore, it was tested with parents in order to make sure the clarity and appropriateness. This stage was important for establishing face validity, verifying that the scale apparently measures its intended construct from the perspective of the target population. Furthermore, the outcomes of the Malay PEACH scale were compared with the original English version to verify that the adapted scale assessed the same constructs, hence enhancing the construct validity. The comparable test results between the original and adapted versions indicate that the adaptation was successful (Quar et al., 2012b)

However, the study also showed that the Malay PEACH scale were found to have excellent reliability. For the Malay PEACH scale, the Cronbach's coefficient alpha was calculated to assess internal consistency. The stated alpha value of 0.93 was considered excellent, signifying that the items within the Malay PEACH scale exhibit a strong correlation and consistently assess the same underlying construct of auditory/oral competence in children. Cronbach's alpha scores that exceeding 0.70 were generally considered acceptable in social sciences, whereas a value of 0.93 indicates minimal redundancy among items, however they cohesively contribute the scale's overall purpose. In this study they also calculated the corrected item-total correlations, which ranged from 0.52 to 0.85. These values indicate a significant contribution of individual items to the overall scale reliability. The corrected item-total correlations for the Malay translation were highly comparable to the original English PEACH scale, hence affirming the internal consistency of the translated version (Quar et al., 2012b).

There was also another study by Eroğlu et al. (2021),where they conducted a pilot study using Parents' Evaluation of the Aural/Oral Performance of Children (PEACH) Rating Scale in Turkish Version and demonstrated a high degree of reliability. The internal consistency of the translated version was evaluated using Cronbach's alpha coefficient, resulting in a value of 0.942 for the total scale, signifying a very high level of internal consistency. Furthermore, the Turkish Version PEACH scale's sub-dimensions that representing quiet and noisy environments, demonstrated strong internal consistency, with Cronbach's alpha coefficients of 0.874 and 0.903, respectively. Additionally, the study used the test-retest method to verify the reliability. This method involves administering the questionnaire to the same subjects at two different times to see if their answers remain consistent over time. The correlation between the first and second test administrations was extremely good, with a total score

correlation value of r = 0.949 (P < .001). The quiet and noise sub-dimensions also exhibited strong correlations between the two testing intervals, with r = 0.945 (P < .001) and r = 0.907 (P <.001), respectively. The findings validate that the Turkish adaptation of the PEACH scale yields stable and reliable measures throughout time(Eroğlu et al., 2021). Therefore, All of this findings were in consistent with other validation studies of the PEACH scale that were carried out in a variety of languages, including the Persian, Malay, and Chinese versions. These studies all showed high levels of internal consistency and strong test-retest reliability (Eroğlu et al., 2021). For instance, another study by Naghibirad et al. (2016),stated that the Persian version of the PEACH questionnaire demonstrated strong internal consistency across several sections, with Cronbach's alpha values of 0.91 for the total score, 0.86 for the quiet section, and 0.82 for the noisy section in children with normal hearing. For cochlear implant users, Cronbach's alpha values were 0.91 for the overall score, while 0.84 for the quiet section, and 0.80 for the noisy section (Naghibirad et al., 2016).

2.2   Conceptual Framework

The cross-cultural adaptation of patient-reported measurement tools, such as the Self Evaluation of Listening Function and Ease of Listening Form (SELF+), was fundamental to ensuring the applicability and validity of these tools across diverse linguistic and cultural groups. This adaptation process involves both linguistic translation and cultural adjustment to preserve the instrument's conceptual integrity and relevance for the target population. According to Hall et al. (2018), effective cross- cultural adaptation ensures equivalence across multiple dimensions as showed in figure 1 : conceptual, item, semantic, and operational. Conceptual equivalence guarantees that the constructs being measured remain

meaningful across different cultures. Item equivalence focuses on the relevance of individual items within specific cultural contexts. Semantic equivalence involves precise language translation, maintaining consistent meanings and accessibility, while operational equivalence ensures that the structure, instructions, and response formats remain functionally consistent across cultural adaptations.

In adapting the SELF+ questionnaire, this study follows a six-step systematic process. The procedure includes forward translation, back translation, and an expert committee review, based on established guidelines. During the forward translation phase, the instrument was translated into the target language, and the back translation stage helps identify discrepancies, ensuring linguistic fidelity. The committee review involves bilingual experts who validate the cultural relevance and clarity of the content. Subsequent field testing assesses comprehensibility and usability among the target demographic, with an iterative refinement process that aligns the translation to cultural and linguistic nuances.

A central aspect of cross-cultural adaptation was sensitivity to cultural differences. Cultural variations, such as family structures and daily activities, can influence how individuals interpret and respond to questions. Recognizing these variations ensures the adapted instrument resonates with the lived experiences and language norms of the target population, which not only improves data accuracy but also facilitates reliable comparisons across studies and populations.

However, in the step 5 (field testing) , the face validity index and content validity will be conduct. In order to ensure the validity and reliability of the Malay version of SELF+, a thorough validation study was carried out. After the customised questionnaire has been validated, reliability testing verifies that participant responses remain consistent and stable over time, and self-evaluation of listening function and ease of listening were