

Facilitating Children with Hearing Impairment Towards Inclusive Education in Malaysia: Document Analysis of Pediatric Clinical Audiology Guidelines

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Abstract—Inclusive education (IE) is a worldwide trend. Academic outcomes of students studying in inclusive setting varied. This is closely related to the early intervention the children with hearing impairment (HI) received in their early years. Audiologists are the front liners who deal with young children with hearing losses regarding hearing diagnosis and intervention. Unfortunately, there are limited audiology clinical practice guidelines focusing on facilitating children towards IE. In addition, the available guidelines might not be suitable for local use. As part of a larger study to propose a new paediatric audiology clinical guidelines for Malaysia use, this article analyzed the existing leading documents (document analysis) internationally i.e. American Academy of Audiology (AAA) and American Speech-Language-Hearing Association (ASHA) in order to identify the suitable topics for data convergence in order to prepare the pediatric audiology clinical practice guidelines for Malaysia use later. Two phases of document analysis were performed on the AAA and ASHA websites. Phase I identified 14 (45 with subtopics) relevant topics out of 19 from AAA and 174 (312 with subtopics) topics out of 186 from ASHA. At the phase II of document analysis, a total of 53 topics (9 topics from AAA and 44 topics from ASHA) out of 357 topics (14.9%) were selected in the final phase. These topics were then labelled with thematic coding based on three categories of pediatric audiology: general pediatric audiology topics, pediatric audiology assessments, and pediatric audiology (re) habilitation. These identified relevant topics are suitable for convergence of data to prepare a guideline for Malaysia use in facilitating children with HI towards IE.

Keywords—*inclusive education; audiology; clinical practice; document analysis*

I. INTRODUCTION

Inclusive education (IE) advocates school systems based upon “a child-centered teaching capable of successfully educating all children, including those who have serious disadvantages and disabilities [1]. Hearing impairment (HI) is a loss of hearing sensitivity that needs intervention as early as possible. Audiologist is the healthcare professional who is the first line personnel to detect the hearing impairment. As shown in the literatures, the earlier the diagnosis and intervention, the better the hearing outcomes including the academic outcomes [2]–

[4]. Nevertheless, academic outcomes remained varied either the educational settings (segregated or inclusive classrooms) or the academic attainment. Other factors would have caused the variability in the outcomes. Thus, a clinical practice guideline for audiologists targeting on facilitating children with HI towards inclusive education is a helpful tool in moving towards IE. However, there are limited clinical practice guidelines on audiological approaches to facilitate children towards IE. Furthermore, the guidelines might not be suitable for Malaysia use. Therefore, there is a need for a pediatric clinical audiology guideline for audiologist in Malaysia to enhance the professional service delivery in facilitating children with HI towards IE. This study aims to identify the suitable topics for suggesting a pediatric clinical audiology guideline.

II. METHOD

a) Research Design

Document analysis is used in this study to evaluate the documents systematically. The rationale of using this method is to triangulate the information regarding the pediatric audiology guidelines provided by American Academy of Audiology (AAA) and American Speech-Language-Hearing Association (ASHA) in their public website. By triangulation of data, the researcher attempts to provide ‘a confluence of evidence that breeds credibility’ [5].

This study utilized qualitative document analysis to converge the information of the selected relevant clinical practice guidelines of two internationally leading audiology associations: AAA [6] and ASHA [7]. The analysis of documents aimed to identify the suitable topics in suggesting pediatric clinical audiology guideline for Malaysia. The document analysis only included those publicly accessible published documents from the two associations.

b) Selection Criteria

Initially, the topics that related to pediatric population and ranging from assessment, intervention and schooling were identified based on the following criteria:

- Suitable for pediatric population.
- Culturally suitable for Malaysia use.
- Focus on services (clinical or administration) towards IE.
- Assessments/ Tools are available and/ readily in use in Malaysia.
- The principle / procedures are in line with the Malaysia's current practice.
- The guidelines topics are within 20 years of publication (after 1999).

c) Procedures

There are two phases of topics analysis based on the publicly accessible published documents from the AAA and ASHA websites. On the first phase of topics selection, the titles of the topics were analyzed through to select the topic that complied with the selection criteria. The content of the selected topics from the Phase I were then analyzed through to check for suitability to be included. The topics were not the sole topic, majority of the topics had many subtopics after clicking in the Phase I topic. Therefore, the Phase I topics were then expanded into more subtopics. Subsequently, all the subtopics (from the selected Phase I topics) with relevant content were identified in the second phase. Consequently, thematic categorization was performed for all the selected topics. Three thematic categories were used for this study.

III. RESULTS AND DISCUSSIONS

In the ASHA website, there are a total of 111 topics in the "ASHA Practice Policy" resources page for audiologists and speech-language therapists (April, 2019), 13 topics under "Practice Management", 24 topics under "Practice Portal for Audiologists", 27 topics under "Preferred Practice Pattern for the Profession of Audiology" and 11 topics under "Guidelines for Audiology Service Provision in and for School" as shown in Table 1. On the other hand, in AAA website, a total of 19 topics were listed under "Guidelines and Standards".

TABLE I. THE FIRST PHASE OF TOPICS SELECTION

Association	Section	Number of Topics	Total
AAA	Guidelines and Standards	19	19
ASHA	ASHA Practice Policy for Audiologists and Speech-Language Pathologists	111	186
	Audiology Practice Management (Subtopics of 'Information for Audiologists')	13	
	Practice Portal for Audiologists	24	
	Preferred Pattern for the Profession of Audiology	27	
	Guidelines for Audiology Service Provision in and for School	11	
TOTAL			205

Out of the 186 topics in ASHA website that were considered to be relevant to pediatric population, 24 topics were found to be redundant. Thus, a total of 174 topics were evaluated if

meeting the selection criteria. On the other hand, only 19 topics from AAA website were screened through. Based on the title of the topics, 110 topics (63.2 %) from ASHA and 14 topics from AAA were found relevant for the first phase of screening. These 14 topics were further expanded into 45 subtopics once clicked in the topic for viewing. Out of these 45 subtopics from the Phase II title screened (AAA), 9 topics (20%) were found relevant.

From the 110 topics of ASHA website, a total of 312 subtopics were further expanded once clicked in the topic for viewing (excluding the repetitions). Forty-four topics (14.1%) were found fitting in the selection criteria. Figure I and Figure II demonstrates the number of topic selection for each phase from AAA and ASHA documents. Table II shows the topics selected from each phase.

TABLE II. THE SELECTION OF AAA AND ASHA SUBTOPICS

Association	Initial Identified Topics	Phase I		Final Phase II Selected Subtopics
		Selected Topics	Expanded Selected Subtopics	
AAA	19	14	45	9 (20%)
ASHA	186	174	312	44 (14.1%)
Total	205	188	357	53

As shown in Table II, a total of 53 topics were identified as relevant to pediatric clinical audiology practice from the public websites of AAA and ASHA. These topics were labelled with thematic coding based on three categories of pediatric audiology: general pediatric audiology topics, pediatric audiology assessments, and pediatric audiologic (re) habilitation. As shown in Table III, AAA has the most topics on general pediatric audiology topics (n=4), followed by audiologic (re) habilitation (n=3) and the least pediatric audiology assessments (n=2). More than 50% of the selected topics from ASHA are focused on pediatric audiologic assessments (n=24, 54.5%), followed by the general pediatric topics and (re)habilitation with equal number for each theme. The selected topics are 35 more in ASHA than from AAA.

TABLE III. THE NUMBER OF TOPICS FOLLOWING THEMATIC CATEGORIZATION

Themes	Association	No. of Topics	
		AAA	ASHA
General Pediatric Audiology Topics		4	10
Pediatric Audiology Assessments		2	24
Pediatric Audiologic (Re)Habilitation		3	10
Total		9	44

In comparison, ASHA website guidelines have higher weightage of pediatric audiology assessments ranging from newborn hearing screening to various pediatric diagnostic tests and counseling. In total, ASHA had 24 subtopics that were elaborated in detailed regarding the pediatric audiology assessments (Table V). AAA only had two topics that were relevant to pediatric audiology assessments: “Infant Identification (Considerations for the Use of Support Personnel for Newborn Hearing Screening)” and “Audiologic Guidelines for the Assessment of Hearing in Infants and Young Children” as shown in Table III. These topics are relevant in audiologists’ daily routine pediatric assessments.

TABLE IV. SELECTED AAA TOPICS

Themes	Topics
General Pediatric Audiology Topics	<ol style="list-style-type: none"> 1. Standards of Practice for Audiology 2. Clinical Practice Algorithms & Statements 3. Central Auditory Processing Disorder (CAPD) 4. Ototoxicity Monitoring (American Academy of Audiology’s Position Statement and Practice Guidelines on Ototoxicity Monitoring)
Pediatric Audiology Assessments	<ol style="list-style-type: none"> 5. Infant Identification (Considerations for the Use of Support Personnel for Newborn Hearing Screening) 6. Audiologic Guidelines for the Assessment of Hearing in Infants and Young Children
Pediatric Audiologic (Re)Habilitation	<ol style="list-style-type: none"> 7. Pediatric Amplification Practice Guidelines 8. Hearing Assistance Technologies (Remote Microphone Hearing Assistance Technologies for Children and Youth from Birth to 21 Years) 9. Classroom Acoustics

ASHA offers a more comprehensive clinical practice guidelines to audiologists whereby there are separate guideline for each pediatric test. For instance, “Basic Audiologic Evaluation”, “Advanced Audiologic Evaluation”, “Pediatric Audiologic Evaluation”, “Electrodiagnostic Test Procedures”, “Auditory Evoked Response Evaluation”, “Guidelines for Manual Pure-Tone Threshold Audiometry”, “Early Intervention” et cetera as shown in Table V. These subtopics are important guidelines for audiologists for their daily clinical practice. This is in contrast with AAA that had the majority topics in the general pediatric audiology theme which comprised of topics like standard clinical practice, central auditory processing disorders, ototoxicity, speech-language- and school- related general topics. Generally, both associations had highlighted the same general topic for pediatric population which are the (central) auditory processing disorders (APD). ASHA has four topics (C)APD as compared to AAA has only one topic (Table V).

TABLE V. SELECTED ASHA TOPICS

Themes	Topics
General Pediatric Audiology Topics	<ol style="list-style-type: none"> 1. Scope of Practice in Audiology 2. Central Auditory Processing Disorder 3. (Central) Auditory Processing Disorders Evaluation 4. Treatment and Management of (Central) Auditory Processing Disorders, 5. Central Auditory Processing Disorder: Overview, References, Evidence-Map, Assessment, Treatment, Roles and Responsibilities, Acknowledgement, Causes, Signs &Symptoms, Incidence and Prevalence. 6. Guideline: Guidelines for Audiology Service Provision in and for Schools 7. Speech-Language Screening 8. Appropriate School Facilities for Students with Speech-Language-Hearing Disorders 9. Your Child’s Communication Development: Kindergarten Through Fifth Grade 10. Ototoxicity: Monitoring of the Auditory and Vestibular Systems
Pediatric Audiology Assessments	<ol style="list-style-type: none"> 11. Childhood Hearing Screening 12. Newborn Hearing Screening 13. Audiologic Screening 14. Permanent Childhood Hearing Loss 15. Balance System Disorders 16. Documentation of Audiology Services 17. Prevention 18. External Auditory Canal Examination and Cerumen Management 19. Basic Audiologic Evaluation 20. Advanced Audiologic Evaluation 21. Pediatric Audiologic Evaluation 22. Electrodiagnostic Test Procedures 23. Auditory Evoked Response Evaluation 24. Intraoperative Monitoring 25. Counseling 26. Consulting Services 27. Guidelines for Competencies in Auditory Evoked Potential Measurement and Clinical Applications 28. Guidelines for Manual Pure-Tone Threshold Audiometry 29. Pediatric Traumatic Brain Injury 30. Guidelines for Audiologists Providing Informational and Adjustment Counseling to Families of Infants and Young Children with Hearing Loss Birth to 5 Years of Age 31. Supplement to the JCIH 2007 Position Statement: Principles and Guidelines for Early Intervention Following Confirmation That a Child Is Deaf or Hard of Hearing 32. Year 2007 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs 33. Early Intervention 34. IDEA Part C Issue Brief: Referral Timelines and Requirements
Pediatric Audiologic (Re)Habilitation	<ol style="list-style-type: none"> 35. Hearing Aid Selection and Fitting 36. Product Repair/Modification 37. Audiologic Management of the Cochlear Implant Patient 38. Cochlear Implants 39. Audiologic (Re)habilitation Evaluation 40. Audiologic (Re)habilitation for Children 41. Outcome Evaluation and Follow-Up Measures 42. Hearing Assistive Technology Systems 43. Guidelines for Fitting and Monitoring FM System 44. Classroom Acoustics

The same as the theme of Pediatric Audiology Assessments, ASHA had a more general topic about Pediatric Audiologic (Re) Habilitation than of AAA. For instance, AAA provide one topic on Pediatric Amplification Practice Guidelines whereas ASHA had five topics that were related to pediatric amplification: “Hearing Aid Selection and Fitting”, “Product Repair/Modification”, “Audiologic (Re)habilitation Evaluation”, “Audiologic (Re)habilitation for Children” and “Outcome Evaluation and Follow-Up Measures”. The analysis of the identified topics showed that both associations provided relevant and updated guidelines for audiologists regarding pediatric audiology. It was also found that ASHA offered more topics for audiologists to refer to. In overall, a more detailed guidelines from the process of identification of hearing loss to intervention.

IV. SUMMARY AND CONCLUSION

Document analysis of the guidelines (topics) provided on the AAA and ASHA website increased the understanding regarding the important pediatric audiology general topics, assessments and (re)habilitation. The identified topics of both associations had similarities although at different numbers. It

can be served as the ground reference for the future study in suggesting a guideline that is suitable for Malaysia use.

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