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Kertas Asli/*Original Articles*

Ayres Sensory Integration ® Implementation in Malaysian Occupational Therapists: Challenges and Limitations

(Perlaksanaan Ayres Sensory Integration ® Terhadap Terapis Carakerja di Malaysia: Cabaran dan Limitasi)

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ABSTRACT

One of the most popular interventions provided by occupational therapists for pediatric clients is Ayres Sensory Integration® (ASI). Strict fidelity measures consisting of procedural and structural elements must be adhered to when using it. These fidelity measures distinguish Ayres Sensory Integration® from other sensory-based interventions. This study involved the development of a survey instrument and outlined the challenges that Malaysian occupational therapists face when using Ayres sensory integration® (ASI). The questionnaire development involved the processes of assessing its validity and reliability. A total of 161 occupational therapists working in various healthcare settings responded to the survey by answering a self-administered questionnaire. The results identified eight themes or issues: (1) Inadequate Training, (2) Resource Issues, (3) Physical Constraints, (4) Time Constraints, (5) Limited Information/ Support Provided By Family, (6) Limited Support From Management, (7) Limited Information/Support Provided By Suppliers, and (8) Issues in Implementing Evidence-Based Practice. Identifying the challenges of implementing ASI is an important aspect of improving occupational therapy assessments and interventions, which would establish the effectiveness of the interventions provided.

Keywords: Ayres sensory integration; occupational therapy intervention; fidelity measures; sensory processing issues

ABSTRAK

Salah satu intervensi yang paling popular yang ditawarkan perkhidmatan terapi carakerja untuk klien pediatrik ialah Ayres Sensory Integration® (ASI). Ia mempunyai pengukuran kesetiaan yang ketat dimana terdiri dari elemen proses dan struktur yang perlu dipatuhi. Pengukuran kesetiaan ini menjadikan Ayres Sensory Integration® berbeza dari intervensi berasaskan sensori yang lain. Kajian ini melibatkan pembangunan borang kaji selidik dan menerangkan tentang cabaran dan limitasi yang dihadapi terapis carakerja di Malaysia semasa melaksanakan Ayres Sensory Integration® (ASI). Pembangunan borang kaji selidik melibatkan proses kesahan dan kebolehpercayaan. Sejumlah 161 terapis carakerja yang bekerja di pelbagai pusat kesihatan memberi maklumbalas soal selidik menggunakan borang soal selidik kendiri. Keputusan kajian mengenalpasti lapan tema: (1) Kekurangan Latihan, (2) Isu Sumber, (3) Kekangan Fizikal, (4) Kekangan Masa, (5) Maklumat/Sokongan Terhad Disediakan Pihak Keluarga, (6) Sokongan Terhad Pihak Pengurusan, (7) Maklumat/ Sokongan Terhad Disediakan Pihak Pembekal dan (8) Isu dalam Mempraktikkan Praktis Berasaskan Bukti. Mengenalpasti cabaran dalam melaksanakan ASI penting bagi meningkatkan mutu perkhidmatan dalam penilaian dan intervensi terapi carakerja, sekaligus memantapkan keberkesanan intervensi yang diberikan.

Kata kunci: Ayres sensory integration; intervensi terapi carakerja; pengukuran kesetiaan; masalah pemprosesan sensori

INTRODUCTION

Sensory integration intervention is one of the most popular approaches in occupational therapy (Schoen et al. 2019). It is the most frequently used intervention with children who have sensory processing issues (Goin-Kochel et al. 2009). Dr. A. Jean Ayres (18 July 1920 -16 December 1988), a renowned clinician and researcher, developed the sensory integration approach (Ayres 1972, 1979, 1989; Parham & Mailloux 2015; Schaaf et al. 2009). She was an occupational therapist and neuropsychologist who dedicated her career to research (Lane et al. 2019). Dr. Ayres contributed significant findings to sensory integration theory, standardized assessments (Southern California Sensory Integration Tests [SCSIT 1975]), the Sensory Integration Praxis Test (SIPT 1989) (Glennon 2013; Mailloux 1990), and sensory integration intervention (1972), all of which play a major role in the Ayres Sensory Integration (ASI) intervention (Parham et al. 2011; Roley et al. 2007; Schaaf & Mailloux 2015). Growing research-based evidence indicates the effectiveness of sensory integration intervention in managing autism spectrum disorders and those with sensory processing issues (Schaaf et al. 2018). Since 2004, ASI studies have expanded and have demonstrated the effectiveness of evidence-based practice (Schaaf & Davies 2010).

The theory of sensory integration hypothesized that the achievement of adaptive behavior resulted from the brain's ability to process and integrate sensory input efficiently (Ayres 1972, 2005). The sensory integration process can be described as an organized and harmonized interaction of the sensory system that consists of the visual (sight), tactile (touch), vestibular (balance and movement), proprioceptive (joint sense), auditory (hearing), gustatory (taste), and olfactory (smell) senses (Schaaf & Mailloux 2015).

The sensory-motor functions that contribute to individual behavior; developmental and learning skills; and activities, engagement, and participation, are the main focus of the sensory integration approach. The sensory integration approach provides an environment in which the individual's inherent motivation to participate and gain mastery is stimulated. This intervention offers a just-right challenge that induces the individual to interact with their environment (Schaaf & Mailloux 2015).

The sensory integration approach has specific core principles, since it has aspects of structural and process elements that must be strictly adhered to, which differentiates this concept from other interventions that use sensory-based approaches (Parham et al. 2011). To ensure that the ASI fidelity procedure is properly used, its structural and process elements require certain criteria to be fulfilled (Schaaf & Mailloux 2015). The structural elements refer to the intervention setting, including the physical features of the environment in which the intervention is delivered, the systems of assessment, goal setting, communication with parents, and the therapist's qualifications (May-Benson et al. 2014). The process elements address the dynamics of the child-therapist interaction during the occupational therapy sessions and are listed as 'ensure physical safety', 'present sensory opportunities', 'maintain appropriate levels of alertness', 'challenge postural, ocular, oral, or bilateral motor control', 'challenge praxis and organization of behavior', 'collaborate in activity choice', 'tailor activity to present just-right challenge', 'ensure that activities are successful', 'support child's intrinsic motivation to play', and 'establish a therapeutic alliance' (Parham et al. 2011).

To further utilize the ASI Fidelity Measure, an instrument that assesses the aspects of ASI intervention in research, the therapist must have undertaken formal post-professional training in SI and received mentorship from an experienced therapist (May-Benson et al. 2014). Without those two criteria, ASIFM would be compromised and cannot be performed effectively. The process and structural elements can be used as guidance for ASI intervention in clinical settings (Schaaf & Mailloux 2015).

Malaysia is a country in which the use of sensory integration intervention is extensive (Kadar et al. 2012). However, the nature or magnitude of adherence to the core principles of ASI intervention practiced by the occupational therapists is not clear. Planning individualized intervention in occupational therapy practice is essential to ensure clients' needs can be met. However, adherence to the core principles of ASI is also vital in ensuring that the intervention has been implemented according to its underlying theoretical principles and procedural guidelines. It is important that occupational therapists who practice ASI intervention adhere to both the structural and process elements so that they can provide comprehensive evaluations, deliver the interventions safely in an adequately equipped space, and collaborate actively with family and other professionals (May-Benson et al. 2014). This may assist in establishing the effectiveness of the interventions in implementing evidence-based practice.

This study involved the development of a survey instrument and describes the challenges that Malaysian occupational therapists face when implementing Ayres sensory integration (ASI)®. An earlier survey found that both structural and process elements are practiced in Malaysian occupational therapy settings (Harun 2007, 2017). However, no reports have been compiled on the challenges faced by occupational therapists, a deficiency that limits the implementation of this intervention. Identifying these challenges would facilitate adherence to

ASI fidelity among occupational therapists in Malaysia.

METHOD

RESEARCH ETHICS

This study received ethical approval from the National Medical Research Registration (NMRR), Medical Research Ethics Committee (MREC), Ministry of Health, Malaysia, with project number: NMRR-19-2441-50131 (IIR); and from the Medical Research and Innovation Secretariat, Universiti Kebangsaan Malaysia, with project number: NN-2018-169.

STUDY DESIGN

This project utilized a qualitative cross-sectional study design. The study consisted of two phases. Phase 1 concerned the questionnaire development and the process of assessing the validity and reliability of the survey instrument used in the study, while phase 2 involved the survey process with occupational therapists regarding their ASI intervention practice. This report focused on the challenges faced by occupational therapists. The two phases are explained in this section.

PHASE 1 OF THE STUDY

DEVELOPMENT PROCESS OF THE SURVEY INSTRUMENT

A self-administered questionnaire was designed in this study and mailed to occupational therapists in study centers in Malaysia. This survey was answered by occupational therapists during phase 1 of the study and referred to the main theme, Sensory Integration Intervention. The questionnaire drew on Dzalani's (2017) questionnaire and the ASI Fidelity Measure (May-Benson et al. 2014; Parham et al. 2007, 2011). The information was collected from the *Sensory Integration Intervention Practice questionnaire survey* that was specifically developed for this study. This questionnaire was expanded and adapted from the *Sensory Integration Survey Form* that was originally developed by Harun (2007, 2017) and also based on the *Fidelity Measure of Ayres Sensory Integration Intervention* (May-Benson et al. 2014; Parham et al. 2007, 2011). Subsequently, it was further expanded, and the questions and scoring method were altered to fulfill the objective of this study. Questions that did not follow the ASI approach were excluded from the questionnaire. Changes to the survey included the use of a table layout, as many had suggested that the previous questions were lengthy and repetitive. Moreover, some wording was changed to enable better understanding and the grammatical mistakes were corrected. A total of two months was required to complete the questionnaire. Few surveys regarding the topic are available, so this study is important in revealing the understanding occupational therapists have about this field of service. The scoring in 4-point Likert scale and qualitative questions. A 10-minute duration needed to complete the survey.

THE VALIDITY TEST OF THE SURVEY INSTRUMENT

To ensure the feasibility of the developed questionnaire, a validity and reliability process was conducted. The questionnaire was sent to seven experts in occupational therapy or other practices related to the sensory integration approach. The experts' ages ranged from 33 years old to 45 years old. There were one male and six females. Five were SI-certified occupational therapists with a diploma, a bachelor's or a master's degree. A minimum of one year of practice was stipulated. One was a language expert with a bachelor's degree and one was a psychologist with a master's degree. The sampling technique used was convenience sampling. The initial questionnaire was sent to the experts to ensure that the questionnaire worked in practice, to identify and amend problematic questions, and also to identify any problems with the content, wording, layout, length, and instructions in the questionnaire. After improvements had been made to the initial questionnaire based on the experts' recommendations and suggestions, the questionnaire was re-sent to the experts to be rated. The experts were asked to evaluate the Content Validity Index (CVI) (Wynd et al. 2003) of the developed questionnaire based on three aspects: (1) the relevance of each question, (2) the clarity of each question, and (3) any ambiguity in the intent and meaning of each question.

The experts were asked to provide feedback based on a 4-point Likert scale, with 1 being very weak/unsuitable, 2 being weak/somewhat unsuitable, 3 being strong/somewhat suitable and 4 being very strong/suitable (Lynn 1986). Scores of one and two indicated invalid content while scores of three and four indicated valid content. The experts were also asked to express their opinions regarding the Sensory Integration Intervention Practice questionnaire survey by completing open-ended questions. Further modifications were made to the questionnaire based on the experts' opinions and suggestions. The analysis showed that the developed questionnaire showed an excellent content validity index of 0.99. Regarding the modified kappa index, an item is considered *excellent* if the k* value is higher than 0.74; *good* if the k* value is between 0.6 and

0.74; *fair* if the k* value is between 0.40 and 0.59; and *poor* if the k* value is lower than 0.40 (Polit et al. 2007). The Sensory Integration Intervention Practice questionnaire survey was then finalized into three sections, which were: (a) Respondents' demographic information (gender, age, race, professional qualification, and professional experience), (b) Ayres Sensory Integration® Intervention Process Element, and (c) Ayres Sensory Integration® Intervention Structural Element. This questionnaire consisted of quantitative and qualitative data. All sections had quantitative parts, but qualitative questions were utilized in the process elements and structural elements sections. In the next phase of this study, only qualitative data was reported when identifying challenges in implementing ASI.

THE RELIABILITY TEST OF THE SURVEY INSTRUMENT

Next, the questionnaire was tested further with 30 occupational therapists in Malaysia who had professional experience of working with children using the sensory integration approach. They were between 28 and 45 in age and all had more than five years of professional experience with children using the sensory integration approach. Both genders, female and male, and different races, Malay, Chinese, and Indian, were asked to test the questionnaire. The qualifications held by the occupational therapists had to be at least a diploma, a bachelor's, or a master's degree. A minimum size of 22 was sufficient where the alpha and power were fixed at 0.05, but 30 were selected by considering an additional 20% drop-out rate in the follow-up re-testing session (Bujang & Baharum 2017). Hence, the study required 30 samples, which were conducted through the convenience sampling technique. A minimum size of 22 was sufficient where the alpha and power were fixed at 0.05, but 30 were selected through convenience sampling technique by considering an additional 20% drop-out rate in the follow-up retesting session (Bujang & Baharum 2017). Hence, the study required 30 samples, which were conducted through the convenience sampling technique. In this process, reliability data was collected for internal consistency. The test-retest reliability of the questionnaire had a ten-day interval, which is acceptable to ensure minimal changes (Marx et al. 2003). Table 1 lists the details of the respondents' characteristics.

PHASE 2 OF THE STUDY: THE SURVEY PROCESS ON THE PRACTICE OF ASI INTERVENTION

RESPONDENTS

The respondents in this survey were qualified Malaysian occupational therapists. The inclusion criteria were that respondents must have had at least one year of professional experience of providing occupational therapy service to children and/or adolescents, and they had to work in either government or private settings (hospitals, clinics, higher institutions, or schools), or non-government organizations. Non-Malaysian citizens, those working outside Malaysia,

Table 1 Respondents' characteristics in reliability test

Characteristics	N	Percentage
Gender		
Female	26	86.7%
Male	4	13.3%
Age		
21-30 years old	16	53.3%
31-40 years old	11	36.7%
41-50 years old	3	10%
Race		
Malay	25	83.3%
Chinese	3	10%
Indian	2	6.7%
Professional Qualification in occupational therapy field		
Diploma	99	61.5%
Bachelor's Degree	54	33.5%
Master's Degree	8	5%
Professional experience as an occupational therapist		
4-6 years	17	56.7%
7-9 years	10	33.3%
More than 10 years	3	10%

and those who had never practiced ASI were not eligible to participate in the study. Respondents were required to provide information regarding their current practice of ASI intervention via a self-administered Sensory Integration Intervention Practice questionnaire survey.

A total of 550 occupational therapists were identified as potential respondents for the study through convenience sampling, that is, through recommendations from administrative officers, and Managers and Heads of Department of study centers.

DATA COLLECTION PROCESS

Information regarding the number of occupational therapists at each study center was obtained from the administrative staff at the respective centers. A package containing an invitation letter to participate in this survey, information about the study, a consent form, the questionnaire, and a stamped self-addressed return envelope was mailed to the Heads of Department or Managers of the centers involved in the study. The number of packages depended on the number of staff at those centers. The Head of Department/Manager at each study center was asked to assist by delivering the information concerning the study to their staff, and to distribute and collect the completed questionnaires, which would then be returned to the researchers. Respondents were informed through their Head of Department or Manager to take ample time to consider whether to participate in the study. After the respondents had signed the consent form, they were issued with the questionnaire and given two weeks to complete it. A telephone call reminder via the administration office was made to ensure acceptable response rates could be obtained (Funkhouser et al. 2016).

DATA ANALYSIS

Thematic analysis was conducted to analyse the data collected. This, according to Bowen (1998), is the proper way to proceed until theoretical saturation is achieved. Using the thematic analysis approach suggested by Braun and Clarke (2006), the transcripts were analysed by coding the data (in the occupational therapists' own words) into categories. Thematic analysis is a method of analysing and reporting patterns or themes within data. Using these categories, a set of eight themes was developed. Thematic analysis minimally organizes and describes the data set in detail (Boyatzis 1998).

RESULTS

QUESTIONNAIRE DEVELOPMENT

The experts commented on several points that needed correction. One necessary change in the survey concerned the layout: many suggested using a table since the previous questions were long and repetitive. Besides, some wordings were changed to ensure better understanding, while grammatical mistakes were corrected. The results showed that the questionnaire had good internal consistency (*Cronbach's α* 0.88) and excellent test-retest reliability (intraclass correlation coefficient average measure, $r = 0.92$, $p<0.001$).

RESPONSE RATES

A total of 165 respondents returned their questionnaires during the four-month data collection period. Four responses were excluded as the respondents indicated that he/she had never worked with children and/or adolescents and had professional experience of less than one year. The final valid response rate was 29.3%, giving a total of 161 respondents, which was acceptable for a mailed survey (Beebe et al. 2020).

CHARACTERISTICS OF THE RESPONDENTS

Out of those participating in the study, 84.5% were female while 15.5% were male. The majority were aged between 21 and 30 years old (60.8%), and the majority were Malays (78.9%). In terms of the respondents' professional qualifications in the occupational therapy field, the majority were diploma holders in occupational therapy (61.5%). Nearly a third, 29.8%, had more than ten years of professional experience as an occupational therapist, and 49.7% of the respondents reported that they had between one and three years experience in treating pediatric cases. The majority worked in government hospitals (67.7%).

In regard to the sensory integration approach/ techniques, 59.0% of the respondents reported that they had practiced these in their occupational therapy intervention for one to three years, 66.5% had gained knowledge in sensory integration from university or college, and the majority (52.2%) of the respondents had received supervision from a qualified professional in sensory integration. However, 89.4% of them had yet to acquire a professional certification in sensory integration.

Children and adolescents with autism spectrum disorders, ADHD, and global developmental delay were among the types of cases that were reported to require sensory integration intervention the most, and the majority of the respondents (96.3%) had used a sensory profile/short sensory profile as an assessment tool. Table 2 lists the details of the respondents' characteristics.

CHALLENGES FACED BY OCCUPATIONAL THERAPISTS IN IMPLEMENTING PROCESS ELEMENTS IN ASI INTERVENTION

Within ASI, there are ten process elements (Schaaf & Mailloux 2015). Other than 'create play context' and 'establish therapeutic alliance', the issue of physical constraints was the most reported challenge when implementing the process elements. A total of 20 respondents (12.4%) reported the challenge of physical constraints when implementing the process elements. Meanwhile, resource issues were reported for a number of elements: 'ensure physical safety', 'present of sensory opportunities', 'support sensory modulation', 'facilitating postular, ocular, bilateral integration level', and 'facilitating praxis and organization of behavior'. Details of the results for the process elements are presented in Table 3.

CHALLENGES FACED BY OCCUPATIONAL THERAPISTS IN IMPLEMENTING STRUCTURAL ELEMENTS IN ASI INTERVENTION

There are six core structural elements of ASI intervention: (1) competency and interest, (2) safe environment, (3) record review, (4) physical space, (5) communication with parents and teachers, and (6) equipment availability (Schaaf & Mailloux 2015). The resource issue was the most

Table 2 Respondents' characteristics in ASI survey

More than 10 years	N	Percentage
Gender		
Female	136	84.5%
Male	25	15.5%
Age		
21-30 years old	98	60.8%
31-40 years old	54	33.5%
41-50 years old	6	3.6%
More than 50 years old	3	1.8%
Race		
Malay	127	78.9%
Chinese	10	6.2%
Indian	8	5%
Others	16	9.9%
Professional Qualification in occupational therapy field		
Diploma	99	61.5%
Bachelor's	54	33.5%
Master's	8	5%
Professional experience as an occupational therapist		
1-3 years	37	22.9%
4-6 years	51	31.7%
7-9 years	25	15.5%
More than 10 years	48	29.8%
Experience in treating pediatric cases or working with children		
1-3 years	80	49.7%
4-6 years	48	29.8%
7-9 years	14	8.7%

to be Continued...

Continuation...

More than 10 years	19	11.8%
Years of sensory integration approach/ techniques in occupational therapy service		
1-3 years	95	59.0%
4-6 years	31	19.3%
7-9 years	21	13.0%
More than 10 years	14	8.7%
Current practice setting		
Government hospital	109	67.7%
Private clinic/center	30	18.6%
Government clinic	15	9.3%
Higher institution	4	2.5%
School	2	1.2%
NGO	1	0.6%
Source of knowledge in sensory integration		
University/college	107	66.5%
Attending courses	75	46.6%
Internet resources	57	35.4%
Books	55	34.2%
Journals	28	17.4%
Guidance/supervision/mentoring in sensory integration from qualified professional		
Yes	84	52.2%
No	77	47.8%
Professional certification in sensory integration		
Yes	17	10.6%
No	144	89.4%
Frequency of using sensory integration according to condition		
Autism spectrum disorder	158	98.1%
ADHD	155	96.3%
Global developmental delay	144	89.4%
Learning disability	141	87.6%
Down’s syndrome	134	83.2%
Cerebral palsy	123	76.3%
Others	46	28.6%
Usage of assessments to evaluate sensory processing/integration in clinical setting		
Sensory profile/short sensory profile	155	96.3%
Sensorimotor clinical observations	56	34.8%
Sensory integration praxis test	11	6.8%
Sensory processing measure	7	4.3%
Others	8	4.8%

reported challenge when implementing structural elements. Thirty-four respondents, 21.1% of the total, reported this issue as a challenge when implementing structural elements. The only structural element that did not seem to pose a resource issue was 'communication with parents and teachers'. The details of the results for structural elements in ASI intervention practice, according to the respondents, are presented in Table 4.

DISCUSSION

This study involved the development of a survey instrument and assessed its validity and reliability, aiming to outline the challenges faced by Malaysian occupational therapists when implementing Ayres sensory integration® (ASI). Fidelity consists of structural elements and process elements, which have underlying theoretical principles and procedural guidelines in ASI intervention.

A self-administered questionnaire was developed for use in the study. It consisted of three sections in which qualitative data was obtained. The questionnaire underwent a face validation process to ensure that the questions would be interpreted as intended. Information regarding the challenges faced by occupational therapists when implementing ASI was collected during study phase 1. Limited studies have been conducted in this area; therefore, this study is important as it offers an understanding of this field of service from the perspectives of occupational therapists (Dzalani 2007, 2017; Kadar et al. 2012). Similarities between previous studies include the use of descriptive analysis of sensory integration practice among occupational therapists in Malaysia. However, the use of psychometric evidence distinguishes this study from previous research, which lack this aspect.

Table 3 Challenges faced when implementing process elements in ASI intervention

Core process elements	Challenges faced
Ensure physical safety	Inadequate training
	Resource issues
	Physical constraints
Present of sensory opportunities	Resource issues
	Physical constraints
Support sensory modulation	Resource issues
	Physical constraints
Facilitating praxis and organization of behavior	Resource issues
	Physical constraints
	Time constraints
Therapist-child collaboration	Inadequate training
	Physical constraints
	Time constraints
Provide just-right challenges	Resource issues
	Physical constraints
Maximize child's success	Limited information/support provided by family
	Physical constraints
Create play context	Inadequate training
Establish therapeutic alliance	Inadequate training

The majority of the respondents involved in the study practiced in a hospital-based setting. The data gathered in this study was drawn largely from respondents who had worked as occupational therapists and worked with children and adolescents for between one and three years. They had been working for one to three years with children and adolescents with an extensive range of diagnosed conditions, including ASD. Consistent with other published studies, the respondents in this study reported that Autism Spectrum Disorder was the most frequently treated type of case in their practice (Baranek 2002; Case-Smith et al. 2015). According to the Clinical Practice Guidelines (CPG) on the Management of Autism Spectrum Disorder (ASD) in Children and Adolescents, developed by the Ministry of Health Malaysia (2014), sensory integration intervention is listed as one of the treatments used to manage ASD cases. It was reported that Malaysian Occupational Therapists practice Sensory Integration with children with sensory processing issues such as those diagnosed with ASD (Kadar et al. 2012). Children and adolescents with ASD have sensory issues, and SI was the intervention most frequently utilized to deal with sensory processing difficulties. It is

Table 4 Challenges faced when implementing structural elements in ASI intervention

Core process elements	Challenges faced
Safe environment	Physical constraints Resource issues Limited support from management Time constraints Limited information/support provided by suppliers
Record review	Inadequate training Resource issues Limited information/support provided by family Time constraints
Physical space	Resource issues Physical constraints
Equipment currently available	Resource issues Physical constraints
Communication with parents and teachers	Time constraints Inadequate training Limited information/support provided by family
Equipment availability	Inadequate training Resource issues Physical constraints Implementing Evidence-Based Practice

estimated that between 42% and 88% of people with ASD have impairments related to sensory processing, including under- and over-responsivity (Baranek 2002; Case-Smith et al. 2015).

'Physical constraints' was the most reported challenge when implementing the ASI process element. Limited space and facilities in a clinical setting make it difficult to conduct the ASI intervention. It is important to conduct a session in an appropriately sized room equipped with vestibular swings, climbing equipment, crash pillows, and other ASI equipment in order to fulfill the essential fidelity elements. Meanwhile, 'resource issues' were consistently reported in implementing six process elements. The low budget available for the purchase of equipment and renovation of each clinical setting contributed to physical constraints. 'Inadequate training' was reported when implementing four process elements. Many respondents reported their limited knowledge of SI, which contributed to the challenge of inadequate training. 'Time constraints' and 'limited information/support provided by family' were elements reported the least in this study. If ASI elements were missing, this indicated that the setting did not practice SI according to Ayres' approach (Mailloux et al. 2015). The lack of elements may reflect the practice of general pediatric occupational intervention and not specific intervention like ASI (May-Benson et al. 2014).

In terms of a 'safe environment', five themes emerged, including resource issues, physical constraints, limited support from management, time constraints, and limited information/support provided by suppliers. Limited resources resulted in a lack of physical features available to use to perform ASI (Schaaf & Mailloux 2015). Managerial support to allow centers to properly engage with SI settings was also important as it ensured that the proper intervention could be delivered to clients. Since the maintenance of equipment required extra time, occupational therapists who were already burdened with heavy caseloads were unable to fulfill that requirement. The lack of manuals and documentation for safety maintenance also contributed to that factor. South African occupational therapists expressed similar concerns, describing how less safety monitoring was performed and there was limited SI equipment in their work settings, in comparison to those of their colleagues in the United States (May-Benson et al. 2014). This may reflect a lack of accountability and awareness of the importance of scheduled maintenance. If just a limited range of affordable SI equipment is available, this can also contribute to the lack of equipment. Clinical settings could purchase locally produced equipment as a solution to this problem.

Meanwhile, four themes emerged in 'Record Review', including inadequate training, resource issues, limited support provided by family and time constraints. Occupational therapists who had not attended ASI courses had little knowledge of how to keep client medical records. A high workload in clinical settings (a resource issue) makes it difficult for occupational therapists to ensure adequate record-keeping that meets ASI requirements. Inadequate training resulted in limited SI knowledge and incompetent occupational therapists performing ASI. One cause for concern is that previous studies on occupational

therapy practice in Malaysia indicated that occupational therapists had received no training in SI, nor were they SI-certified (Harun 2007, 2017; Kadar et al. 2012). Unlike sensory-based intervention practice, therapists should be certified and undergo extensive training before they provide SI therapy (Kadar et al. 2012).

In 'Physical Space & Equipment Currently Available', two themes emerged: physical constraints and resource issues. In adhering to ASI fidelity, occupational therapists encountered issues of limited space and facilities. Ample space is required to place essential equipment and perform SI intervention. Resource issues may occur due to financial constraints and a lack of equipment, which meant there was no specific room or space to conduct SI intervention.

In 'Communication with Parents and Teachers', themes like time constraints, inadequate training and limited information/support provided by family emerged. Time limitations due to heavy caseloads may impact the communication between occupational therapists with parents and/or teachers. If the time between each client sessions was reduced, it meant less time was available to discuss on a child's progress with parents and/or teachers. Inadequate training may also contribute to the lack of communication between occupational therapists and clients. If occupational therapists are undertrained and incompetent in SI, this may have an impact when delivering the child's progress report to parents or caregivers. The occupational therapists may not be thoroughly knowledgeable in all aspects of ASI, hence, an ineffective communication with clients might be the result. This is consistent with a study by Kadar et al. (2012), who reported that occupational therapists sought to gain a better understanding of how to manage issues related to sensory difficulties as exhibited by children with ASD. Limited information and support were provided by the family because they were not transparent when providing this information.

For several reasons, occupational therapists believe that the current sensory integration practice in their setting needs to be improved. These include resource issues, physical constraints, inadequate training and problems implementing Evidence-Based Practice. It is important to improve sensory integration practice because effective SI intervention is demonstrated through ASI and the current practice of ASI is still deficient in many ways. The occupational therapy profession should implement the latest evidence-based intervention to ensure clients receive the best service from occupational therapists. As suggested by Watling et al. (1999), continuing education programs should include opportunities for occupational therapists to gain knowledge in behavioral management techniques, as well as a variety of intervention services that would facilitate skill development. It is important for occupational therapists to be precise and clear when presenting their views to colleagues and families, especially when using terms related to sensory integration (Pollock 2009).

LIMITATIONS

One limitation of this study was the lack of representation from the samples. Although the respondents came from various types of practices, occupational therapists working in a hospital setting comprised the majority of the participants. Therefore, these respondents may have been biased by social desirability when reporting about their facilities. Moreover, reports from the therapists' own perspectives were the only means to determine the challenges they faced. Additional data collection on fidelity scores would have made this study design stronger but was not feasible due to budget and time constraints. Although an attempt was made to capture a range of practice settings, larger sample sizes within each practice setting may be useful in future studies. These limitations and the adherence to ASI fidelity must be addressed to ensure better service delivery to people with disabilities.

CONCLUSION

This study illustrates the challenges that occupational therapists face when practicing ASI by following a strict fidelity measure. There remains scope for improvement as this information may be regarded as useful when presented to policymakers. Considerations regarding challenges faced by occupational therapists in clinical setting may have impact on the decisions of policymakers to draw a guideline in which support Ayres Sensory Integration structural elements.

Other than that, such information may be useful in planning for future occupational therapy facilities, suitable trainings for the practitioners and as well as on the planning of the occupational therapy building itself in order to cater for such requirements specifically to better suits for the ASI fidelity measures. This is especially useful and relevant if there are occupational therapy centers opted in offering such intervention according to their client's needs, challenges, and strengths. By this way, better practices can be delivered to the clients based on the gold standards as outlines by the ASI requirements. With better facilities and proper intervention delivery according to its specific requirements, occupational therapists can be empowered to produce with better- and high-quality evidence-based practices in their clinical settings.

COMPETING INTERESTS

The authors have no conflicts of interest to declare.

AUTHORS' CONTRIBUTIONS

Farah Samsu Rahman co-led the design of the study, the collection and analysis of the data, as well as the writing of the manuscript. Masne Kadar assisted with the design of the study, the data appraisal and the writing of the manuscript. Dzalani Harun assisted with the data appraisal and the writing of the manuscript.

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REFERENCES

Ayres, A. J. 1972. *Sensory Integration and learning disorders*. Los Angeles: Western Psychological Services.

Ayres, A. J. 1979. *Sensory Integration and the child*. Los Angeles: Western Psychological Services.

Ayres, A. J. 1989. *Sensory Integration and Praxis Tests*. Los Angeles, CA: Western Psychological Services.

Ayres, A. J. 2005. *Sensory integration and the child: 25th anniversary edition*. Los Angeles: Western Psychological Services.

Baranek, G. T. 2002. Efficacy of sensory and motor interventions for children with autism. *Journal of Autism and Developmental Disorder* 32(5): 397–422.

Beebe, T. J., Jacobson, R. M., Jenkins, M. S., Lackore, K. A., & Finney Rutten, L. J. 2020. Testing the Impact of Mixed-Mode Designs (Mail *and* Web) and Multiple Contact Attempts within Mode (Mail or Web) on Clinician Survey Response. *Health Services Research* 53(1): 3070-3083.

Bowen, G. A. 2008. Naturalistic inquiry and the saturation concept: A research note. *Qualitative Research* 8(1): 137–152.

Boyatzis, R. E. 1998. Transforming qualitative information: thematic analysis and code development. Thousand Oaks (CA): Sage.

Braun, V. & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3(2): 77-101.

Bujang, M. A. & Baharum, N. 2017. A simplified guide to determination of sample size

requirements for estimating the value of intraclass correlation coefficient: A review. Archives of Orofacial Sciences 12(1): 1-11.

Case-Smith, J., Weaver, L. L. & Fristad, M. A. 2015. A systematic review of sensory processing interventions for children with autism spectrum disorders. *Autism* 19(2): 133–148.

Dzalani Harun. 2017. Sensory Integration (SI) Intervention Practice in Malaysia: Traditional Vs Non-Traditional SI. *Newsletter Malaysian Occupational Therapy Association* April: 5-11.

Funkhouser, E., Vellala, K., Baltuck, C., Cacciato, R., Durand, E., McEdward, D., Sowell, E., Theisen, S. E., Gilbert, G. H., & National Dental PBRN Collaborative Group. 2017. Survey methods to optimize response rate in the national dental practice-based research network. *Evaluation & the Health Professions* 40(3): 1-27.

Glennon, T. 2013. Sensory Integration and Praxis Test. In Volkmar, F. R. (Eds.), *Encyclopedia of Autism Disorders* (pp. 2791-2795). New York: Springer Verlag.

Goin-Kochel, R. P., Mackintosh, B. H. & Myers, B. J. 2009. Parental reports on the efficacy of treatments and therapies for their children with autism spectrum disorders. *Research in Autism Spectrum Disorders* 3(2): 528-537.

Kadar, M., McDonald, R. & Lentin, P. 2012. Evidence-based practice in occupational therapy services for children with autism spectrum disorders in Victoria, Australia. *Australian Occupational Therapy Journal* 59(4): 284-293.

Lane, S. J., Mailloux, Z., Schoen, S., Bundy, A., May-Benson, T. A., Parham, L. D., Roley, S. S. & Schaaf, R. C. 2019. Neural foundations of Ayres Sensory Integration®. *Brain Sciences* 9: 1-14.

Lynn, M. R. 1986. Determination and quantification of content validity. *Nursing Research* 35(6): 382–386.

Mailloux, Z. 1990. An overview of the sensory integration and praxis test. *American Journal of Occupational Therapy* 44(7): 589-594.

Marx, R. G., Menezes, A., Horovitz, L., Jones, E. C. & Warren, R. F. 2003. A comparison of two time intervals for test-retest reliability of health status instruments. *Journal of Clinical Epidemiology* 56(8): 730-735.

May-Benson, T. A., Roley, S. S., Mailloux, Z., Parham, L. D., Koomar, J., Schaaf, R. C., Van Jaarsveld, A., & Cohn, E. 2014. Interrater reliability and discriminative validity of the structural elements of the Ayres Sensory Integration® Fidelity Measure®. *American Journal of Occupational Therapy* 68(5): 506–513.

Ministry of Health Malaysia. 2014. Clinical Practice Guidelines: *Management of Autism Spectrum Disorder in Children and Adolescents*. Putrajaya: MaHTAS.

Polit, D. F., Beck, C. T. & Owen, S.V. 2007. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health* 30(4): 459-467.

Pollock, N. 2009. Sensory integration: A review of the current state of the evidence. *Occupational Therapy Now* 11(5): 6-10.

Parham, L. D. & Mailloux, Z. 2015. Sensory integration. In J. Case-Smith (Eds.), *Occupational therapy for children* (7th ed., pp. 258–303). Maryland Heights, MO: Mosby.

Parham, L. D., Cohn, E. S., Spitzer, S., Koomar, J. A., Miller, L. J., Burke, J. P., Brett-Green, B., Mailloux, Z., May-Benson, T. A., Roley, S. S., Schaaf, R. C., Schoen, S. A. & Summers, C. A. 2007. Fidelity in sensory integration intervention research. *American Journal of Occupational Therapy* 61(2): 216-227.

Parham, L. D., Roley, S. S., May-Benson, T. A., Koomar, J., Brett-Green, B., Burke, J. P., Cohn E. S., Mailloux, Z., Miller, L. J., & Schaaf, R. C. 2011. Development of a fidelity measure for research on the effectiveness of the Ayres Sensory Integration intervention. *American Journal of Occupational Therapy* 65(2): 133–142.

Roley, S. S., Mailloux, Z., Miller-Kuhaneck, H., & Glennon, T. 2007. Understanding Ayres Sensory Integration. *Occupational Therapy Practice* 12(17): 1-8.

Schaaf, R. & Mailloux, Z. 2015. *Clinician's guide for implementing Ayres Sensory Integration: Promoting participation for children with autism.* Bethesda: AOTA Press.

Schaaf, R. C. & Davies, P. L. 2010. Evolution of the Sensory Integration Frame of Reference. *The American Journal of Occupational Therapy* 64(3): 363-367.

Schaaf, R. C., Schoen, S., Smith Roley, S., Lane, S., Koomar, J. & May-Benson, T. 2009. A frame of reference for sensory integration. In P. Kramer & J. Hinojosa (Eds.), *Frames of reference in pediatric occupational therapy*. 99-186. Philadelphia: Lippincott, Williams & Wilkins.

Schaaf, R. C., Dumont, R. L., Arbesman, M. & May-Benson, T. A. 2018. Efficacy of Occupational Therapy Using Ayres Sensory Integration®: A Systematic Review. *American Journal of Occupational Therapy* 72(1): 1-10.

Schoen, S. A., Lane, S. J., Mailloux, Z., May-Benson, T., Parham, L. D., Smith Roley, S., & Schaaf, R. C. 2019. A systematic review of Ayres sensory integration intervention for children with autism. *Autism Research* 12(1): 6–19.

Watling, R., Deitz, J., Kanny, E. M. & McLaughlin, J. F. 1999. Current practice of occupational therapy for children with autism. *American Journal of Occupational Therapy* 53: 498–505.

Wynd, C. A., Schmidt, B. & Schaefer, M. A. 2003. Two quantitative approaches for estimating content validity. *Western Journal of Nursing Research* 25(5), 508–518.

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