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Evaluating Teachers' Knowledge and Implementation of Sensory Integration Strategies for Students With Autism Spectrum Disorder from Teachers' Perspectives

ABSTRACT

This study aims at examining teachers' knowledge and implementation of sensory integration strategies for autism spectrum disorder in terms of their own perspectives. In order to reach this goal, the researcher adopted a descriptive-analytical research method and prepared and applied questionnaire derived purposely on a sample of 30 teachers qualified for autism spectrum disorder.

As per the findings corresponding to the first research question, teachers' knowledge regarding sensory integration strategies was found to be moderate with mean score of 3.54. Likewise, the findings for the second research question showed that teachers' level of implementation of sensory integration strategies was moderate with a mean score of 3.49.

Therefore, considering these results of the study, it can be suggested that teachers who have students with autism spectrum disorder should receive sufficient training and knowledge regarding necessary sensory integration strategies involved and practical activation methods in educational settings.

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تقييم معرفة وتطبيق معلمات ذوي اضطراب طيف التوحد لاستراتيجيات التكامل الحسي من وجهة نظرهن
ضرار القضاة / أستاذ التربية الخاصة المشارك / جامعة اربد الأهلية
الخلاصة:

يهدف هذا البحث إلى تقييم معرفة وتطبيق معلمات ذوي اضطراب طيف التوحد لاستراتيجيات التكامل الحسي من وجهة نظرهن، ولتحقيق هذا الهدف استخدم الباحث المنهج الوصفي التحليلي، من خلال تطبيق استبانة على ٣٠ معلمة، تم اختيارهن بالطريقة القصدية. وأظهرت نتائج السؤال الأول أن مستوى معرفة معلمات اضطراب طيف التوحد باستراتيجيات التكامل الحسي كان متوسطاً، حيث بلغ المتوسط الحسابي للبعد (3.54). وكذلك أشارت نتائج السؤال الثاني أن مستوى تطبيق معلمات اضطراب طيف التوحد لاستراتيجيات التكامل الحسي كان متوسطاً، حيث بلغ المتوسط الحسابي للبعد (3.49). ويوصي

الباحث بتزويد معلمات ذوي اضطراب طيف التوحد بالمعرفة الكافية بأهم استراتيجيات التكامل الحسي وطرق تطبيقها وتفعيلها.

الكلمات المفتاحية: المعلمات - اضطراب طيف التوحد - استراتيجيات - التكامل الحسي

1. Introduction

Autism Spectrum Disorder is one of the most common disabilities within our world, with some of the highest rates of prevalence across all societies worldwide. This widespread prevalence has resulted not only in increased attention to individuals with autism spectrum disorder, but also within the discourse surrounding the quality of programs and services offered. They focus on improving their developmental and functional skills while decreasing more severe challenging behaviors, facilitating meaningful interaction with the environment, and supporting the development of personal and adaptive characteristics.

Sensory characteristics are part of the very signature set of challenges experienced by people on the spectrum — they emerge early in life, and they are easy to observe. These traits are among those included as diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5). Some people have hypersensitivity to sensory input or under-responsiveness—known as sensory processing disorder. While these sensory difficulties may lessen or remain throughout the lifespan, they greatly impact how people interact with and experience their world. Sensory integration programs are decried to reduce these characteristics severity (Kirby et al., 2022).

Recent studies on sensory integration have delved into the factors that contribute to counting numerous behaviors seen in individuals—and their specific struggles with sensory processing. This spurred more research on sensory integration and how it relates to these individuals. The findings from many studies show that sensory integration programs have a major effect on improving motivation for learning, independence in the performance of daily living skills, physical capabilities and cognitive, social language and communicative functions skills (Xu et al., 2019).

When there are disruptions in managing sensory inputs, we call them as the sensory processing disorders which have several adverse effects and serious developmental implications. They affect so much: Play, behavior, learning and

more. Those sensory processing disorders are some of the biggest hindrances or deficits these individuals have and represent some of their most significant weaknesses that contribute to their learning and developmental progress. These disorders affect mainly the senses (the main organs for gathering, processing and storage of information) and they directly impose how society or individuals act appropriately in an educational context, emotional context or social interactivity (Bawaked & Gharib, 2019). Hence, according to this the current study attempts to examine teachers' of autism spectrum disorder knowledge and use of sensory integration strategies from their point of view.

2. Research Problem and Questions

It cannot be discarded that individuals with autism spectrum disorder need approach of using sensory integration strategies much more than other population, considering the deficits and dysfunctions during their sensory integration process. This affects their reception, processing and response to external stimulation by other people or objects, which can lead to inappropriate reactions that further impair them from learning about and interacting with their environment as well as the community around them. Thus, it is important to use using them sensory integration strategies regardless of the area in which they have deficiencies (Mohammed et al., 2020). Moreover, Bawaked and Gharib (2019) showed that 95% of people with autism spectrum disorder suffer from different sensory problems, among which tactile sensitivity represents the largest share.

Research The benefits of sensory integration strategies have also been supported by research studies. Mohammed et al. (2020) stated that it is essential to activate sensory integration strategies and infer their relevance of improving self-confidence that plays an active role together with reducing stereo typed behaviours, increasing eye contact and enhancing motor efficiency. Likewise, Bawaked and Gharib (2019) emphasized that sensory integration strategies help recognize the nature of these problems, where their deficiencies are located and how they occur to mitigate them as much as possible. Moreover, based on Saada and Rashid (2015), the use of sensory integration strategies facilitates students' communication skills in terms of how to express themselves, how to clarify their needs/requirements and engage with people around them as well as offering them the ability to be stable and independent. Students also become more flexible while acclimatizing into their society/environment outside the

school system where they learn comfortably without any psychological pressure.

Of course, a closer inspection of the degree to which these strategies are implemented shows that this is moderate. This finding was consistent with Al-Rifai and Abu Hassan (2019), Alhelo (2021) and Ghandoura & Al-Zar'ah, (2020) who found that teachers of children with autism spectrum disorder autism spectrum disorder is moderate in its application of sensory integration strategies. The previous level can be enhanced further by activating sensory integration and training specialists dealing with autistics for the use of sensory integration improvements in overcoming this issue (Alhelo, 2021). In addition, Ghandoura & Al-Zar'ah, (2020) emphasized the need for more training of teachers about sensory integration related to children with autism spectrum disorder.

Due to the researcher's specialization and practical experience with children with autism spectrum disorder autism spectrum disorder, it was found that there is weakness in correct and effective implemental of sensory integration strategies against those children. There was also a lack of information about teachers' knowledge and use of sensory integration strategies, and the activation and application of these strategies by teachers (researcher). Moreover, very few studies written in Arabic have been dedicated to the current research topic. Thus, the objective of the present study was to address with the questions:

1. How do teachers with autism spectrum disorder evaluate their knowledge of sensory integration strategies from their own perspective?
2. How do teachers with autism spectrum disorder evaluate their application of sensory integration strategies from their own perspective?

3. Research Objectives

The current study investigates teachers' knowledge of sensory integration strategies and their use of these approaches with children diagnosed as having autism spectrum disorder based on the presentation of the research problem, which emphasized applying the clinicians' role using any skill that assists in improving, enhancing, or building a child's skills and capabilities through verbal cues (sensory integration strategies) with children who have been identified as having autism spectrum disorder.

4. Significance of Study

In the view of the researcher, theoretical significance of this study rests with at least a couple of considerations. And second, it deals with a subject that concerns children with autism spectrum disorder, who are in special need of care and tenderness. Second, of the sensory integration strategies, vitally and effectively contribute to minimizing their sensory challenges in order to meet their needs and desires as well as significantly impact on development, learning and meeting the required needs. Additionally, sensory integration was one of the diagnostic markers stated in the DSM-5 for autism spectrum disorder; thus, this study is so significant and applicable to autism spectrum disorder research in Arab world which providing novelty and originality. It is anticipated that the results of the current study will motivate future professionals to conduct studies with individuals displaying sensory deficits with other disabilities, therefore contributing to this gap in specialized research.

In other words, the findings of this study are important in informing educators, specialists, policymakers and others decision-maker in relevant institutions on the importance of understanding teachers' knowledge and implementation of sensory integration strategies for kids with autism spectrum disorder. Knowing this may help them reflect on the use of these strategies with children who has an autism spectrum disorder. Furthermore, the study provides a tool for researchers to evaluate teachers' awareness and practice of sensory integration techniques that could benefit future research as well as educational implementation.

5. Research Terms and Operational Definitions

Special education teachers for students with autism spectrum disorder : A person who has a degree that allows him/her to teach in the area of special education (Ghandoura & Al-Zar'ah, 2020). They are defined operationally as teachers of students identified with autism spectrum disorder who attend day-care centers.

Autism Spectrum Disorder: A neurodevelopmental disorder that involves persistent deficits in social communication and social interaction alongside restricted, repetitive patterns of behavior, interests or activities. Autism spectrum disorder occurs along a progression of mild to severe behaviors, and usually develops within the first eight years of a child's life. Some with autism spectrum disorder may have strong language abilities and high intellectual

potential, and some do not (Leader et al., 2022). Operationally, with autism spectrum disorder means individuals who were formally diagnosed with the disorder and had been enrolled in day-care centers.

Sensory Integration Strategies: A systematic and heterogeneous combination of skills, experiences, and occupations which aim to enhance sensory functions in order to be able to orientate children with autism spectrum disorder in their environment. Occupational therapists usually implement these strategies separately (Ghandoura & Al-Zar'ah, 2020) They are operationally defined as sensory integration strategies that teachers with autism spectrum disorder know and use.

6. Delimitations of the Study

The findings of the present study may not be generalizable beyond the tool used to monitor teachers' knowledge and use of sensory integration strategies for autism spectrum disorder. The study is limited to teachers on the autism spectrum and to the first semester of the 2025/2026 academic year. Moreover, it is limited to day-care centres in Makkah

7. Theoretical Literature and Previous Studies

Autism Spectrum Disorder (ASD) is a lifelong neurodevelopmental disorder marked by deficits in social communication, social interaction, and restricted and repetitive patterns of behavior, interests, or activities. Autism Spectrum Disorder occurs in a range of behaviors from mild to severe and will show up in a child within the first eight years of life. This model implies that individuals with autism spectrum disorder vary widely: Some may have advanced language and cognitive skills while others exhibit the reverse (Leader et al., 2022). Autism Spectrum Disorder, according to the International Classification of Diseases Tenth Revision (ICD-10) from World Health Organization, is a complex disorder that affects three areas: social interaction and communication, as well as repetition and stereotypical behaviors and movements (Al-Harbi & Al-Qudah, 2023).

Autism Spectrum Disorder is regarded as one of the most diverse, complex and overdetermined disorders due to sharing features with other such behavioral, emotional and developmental disorders. These traits may appear in different patterns and influence other areas of lives (Al-Hathali & Al-Qudah, 2022).

In relation to cognitive characteristics, the following are common traits seen in individuals with autism spectrum disorder: limited imagination; deficits in imaginative thinking (including difficulties expressing themselves, their wishes and ideas); poor sustained attention, weak analytical skills, memory impairments and very restrictive interests that tend toward routine (Al-Qahtani & Al-Qudah 2022).

One of the greatest barriers, sensory features appear early in life and are often seen at a young age. Into the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), these sensory characteristics were made diagnostic criteria. People with autism spectrum disorder can show hyper-responsiveness to sensory inputs or hyporesponsiveness of their environment (sensory processing disorder) These sensory challenges may diminish with growing age or be maintained, but have a profound effect on how individuals process and respond to sensory input (Kirby et al., 2022).

Examples of behavioral characteristics include stereotyped movements such as hand-flapping, aggression, highly repetitive and routine behaviors, and restricted interests. The child's Symptoms of self-injurious behaviors, like head banging, excessive fear or anxiety, hyperactivity or intense lethargy, and dislike to changes in time and space may also be present either chronically or episodic and either specific or variable (Al-Hathali & Al-Qudah 2022). Students with autism spectrum disorder may also demonstrate socially inappropriate or unprovoked disruptive behaviors, frequently seen in the classroom setting, such as inappropiorious speech, laughing, whistling or stomping and unintelligible sounds (moaning) and murmuring. Such behaviors can disrupt the process of education and become a barrier to conducting classroom activities (Al-Qahtani & Al-Qudah, 2022).

[3] Definition of Sensory Integration: A similar process in which the brain greets, registers and organizes sensory information from the environment. Handel and Spatz described that this process starts at later stages of a student's development, where he or she can interpret sensory information received and respond according to the student's abilities. Some sensory integration processes developed based on variations of stimuli in the environments can also affect how a student reacts and learns from these spaces (Limal, 2020).

Sensory integration can be defined as natural and automatic dance and orchestration of the body senses. During this process, the brain collects data from its surroundings and quickly processes and analyzes them, which are

further converted into activities/actions performed by us (the student) due to our sensory inputs. As a result, the sensory processing (Weber 2019) done according to fractals, dictates all our daily actions, interactions thoughts and decisions as well as all learning processes.

They are not permanent, in other words, but neither do they work outside the context of autism spectrum disorder; there are effective strategies that fundamentally alter how the brain processes and interprets sensory inputs on a more mature, adaptive, functional level. A well-recognized and frequently used approach is that of a sensory diet: organizing sensory activities and stimuli in a planned, systematic fashion, regulating the timing and amount, type and frequency of input according to body needs (Sensory Processing Disorder Resource Center 2020). A related strategy is that of the sensory meal, which seems to be an organised arrangement of sensory stimuli — similar to how nutritional meals are organised (Bainbridge, 2019).

More techniques like sensory diet and classroom modifications are designed to limit environmental stimuli that may worsen symptoms of sensory processing disorder. Praxis is utilized to synchronize the timing of planning and performing movements of a specific task, following an organized sequence to achieve a particular goal (Greenfield, 2017).

Deep pressure approach uses a brush or more specific tool and applies pressure to joints and non-linear touch points; this gives organized sensory information. A sensory diet is used, followed by a program schedule for them to show these strategies with the predetermined results being achieved (Lancaster et al., 2016). The heavy work activities strategy consists of a different variety of pushing and pulling activities that improve their perception, attention, and focus in children with autism spectrum disorder as they are more aware of their bodies. One important benefit of such activities is that they can be done both at home and in a school context with no need for special layout (Morin, 2020).

In addition, sensory integration strategies may require removing the student from stimuli causing hypersensitivity and distress. A second approach is graduated exposure to the presenting stimulus until the threshold of response in the student normalizes into a stable and adaptive range. Developing vestibular sensory integration, for instance, occurs through active participation in physical play activities that stimulate the vestibular system including swinging, jumping, and rolling; thus these movements are thought to be beneficial during early stages of development. Certain types of massage, and use of massage devices,

may facilitate the development of sensory integration skills in the muscular and tactile domains (Bainbridge, 2019).

7.1. Previous Studies

And through the extensive review of educational literature and previous studies related to many databases, it was found that there is a lack of Arab and foreign studies that addressed the specific subject of current research targeting teachers' autism spectrum disorder in the Arab world. Although several studies have characterized sensory integration strategies, these were either performed in different populations and cultural settings or utilized other research variables (e.g., use of fMRI technology variants, sensorimotor stimulation interventions, etc.) methods and subjects. Thus, the urgent need for more Arabist studies in this regard. The existing studies are laid out from most recent to oldest, according to this data.

Results showed that 15–20 min of session in the sensory integration early intervention improved body security skills among children with autism as measured by the MABC-2 (Test for Motor Functioning & Body Control and Movement coordination test) (Mustafa, N. A., & Yohanna, J. S. (2021) The study used a quasi-experimental design with pre- and posttests in both groups (experimental and control). The sample was (10 children with ASD in Iraq), and the intervention tool was the early intervention program for developing body security skills in autistic children. The findings suggested that implementation of sensory integration strategies is successful for developing skills of body security, eye contact, reduction of stereotypical movements as well as improvement in physical fitness and self confidence among the children with autism spectrum disorder.

In a similar fashion, the Al-Bahnasawi et al. “Has an Early Intervention Program of Sensory Integration Effectively Decreased the Severity of Child with Autism Spectrum Disorders” (2020) which aimed to see the effectiveness of early sensory integration on the severity of disorders in children with autism. A quasi-experimental design was used with 10 randomly selected children with autism spectrum disorder. After the program was implemented, there were significant differences between the experimental and control groups on sensory integration-based interventions showing that reduced sensitivity of sensory and cognitive impairments developed as a result of these treatments leading in turn to overall growth rate changes. The discussion revolved around how this could

include social emotional skills areas because both research by Bernier et al¹⁴ (2012) and Kauffman¹¹ (1989).

The study by Mohamed et al. (2020) examined sensory integration activities for children with autism spectrum disorder, including play-based activities designed to lessen the symptoms of sensory processing disorder. It also sought to recreate sensory-motor capabilities connected with elementary skills of standing, walking, running, jumping and crawling/coupling body movements as well auditory and sensorial integration. The study employed a quasi-experimental design and included a sample of 10 children with autism spectrum disorder who attended inclusive programs in public schools. Lobo, V. E., & Purer, K. (2021). The Occupational Therapy Academy: Practicing Sensory Processing Skills in Children with Autism Spectrum Disorder During PE Classes [APDC]104-107. Results indicated that the program was successful in improving sensory processing abilities among children as well as improved self-confidence and a positive self-image of children with autism spectrum disorder.

Ghandoura & Al-Zar'ah, (2020) sought to determine the degree that teachers of children with intellectual disabilities in primary schools in Mecca used sensory integration strategies. This was a descriptive design, utilizing convenience sampling-based sample of 110 randomly selected teachers at public and private schools/ institutes in Mecca. The study tool is a validated questionnaire developed by the researcher. The means and standard deviations indicate that teachers used sensory integration strategies for intellectual disabilities with an average score of 36.077, while there were no statistically significant differences caused by any of the study variables ($\alpha \leq 0.05$).

Based on the purpose of study by Al-Rifai and Abu Hassan (2019), the aim of the present study was to measure knowledge levels ability of specialists with a master's degree in special education, speech and language, or psychomotor therapy who work with children diagnosed with autism spectrum disorder about sensory integration disorders' signs. A total of 58 specialists were sampled using descriptor-analytical design. Results: The specialists' knowledge was found to be low in some sub-dimensions and moderate in others. Knowledge levels showed a statistically significant difference with respect to specialization (the highest mean qualifiers were psychomotor therapists, followed by special education specialists, and then speech and language specialists). Experience Also Made No Significant Difference

Bawaked and Gharib (2019) investigated the effects of a sensory integration based program in decreasing aspects of tactile sensitivity in children diagnosed with autism spectrum disorder. The sample consisted of 3 children who were enrolled in the Sesame Gate Center, Jeddah in a single-case quasi-experimental design. They were trained on their tactile hypersensitivity to water using a sensory integration program. The results validated the program's effectiveness, as every participant washed their hands on 3 successive occasions totaling a hit rate of 100%.

A review of the literature up to October 2023 shows a favorable consensus about the effects of implementing sensory integration strategies with individuals on the autism spectrum disorder. There is a demonstrable lack of studies in this area, especially regarding the application of sensory integration techniques with children with autism spectrum disorder in Arab countries. This suggests that more research in this area is required. Lastly, although this study discussed as well developed its tools and interview questions based on previous studies, it was distinguished by its approaches, questions for research, instruments used procedures participants, along with the time and place of implementations

8.1. Research Methodology

The Descriptive Analytic Method: The scientific approach that the researcher used in this study is the descriptive-analytical method, which depends on studying a particular problem or scientific phenomenon based on logical explanation. This approach is based on gathering information, and data about the phenomenon being studied as it occurs, almost in real-time, in order to accurately describe it to make conclusions and address research problems (Al-Qudah & Al-Hayajneh 2022). This was an appropriate approach to address the research questions as it allows systematic collection, organization, statistical analysis followed by presentation and interpretation of the findings.

8.2. Research Population

The research sample included teachers of students diagnosed with autism spectrum disorder in day-care centers at Mecca during the first semester of 2025/2026. The size of the research population should be deter... Thus, the sample size for this study was 73 teachers.

8.3. Research Participants

According to Poles (2020), the number of participants included in descriptive studies must be up to 10% of the research population. For this criterion, 30 teachers (which accounts for more than 10% of the total population) were included in the present study.

8.4. Research Instrument

But to fulfil the research objectives and answer its questions, a closed-end questionnaire was the suite of items used in the study intended to examine the teachers' knowledge regarding their own analysis of sensory integration strategies utilized for autism spectrum disorder. The instrument development was conducted in several steps described following:

8.5. Information-Gathering Stage

That was done by using international assessment standards for assessing teachers knowledge and application of sensory integration techniques for autism spectrum to gather all relevant data and information. Then the instrument was constructed in accordance with the theoretical literature and previous studies such as Alhelo, 2021; Saadah & Rashid(2015); Ghandoura & Al-Zar'ah, (2020).

8.6. Instrument Construction Stage

To assess teachers' awareness and usage of sensory integration strategies for autism spectrum disorder, the researcher prepared a questionnaire comprising 36 items, categorized into two principal components:

1. Evaluation of teachers' knowledge of sensory integration strategies, measured by items 1–18.
2. Evaluation of teachers' application of sensory integration strategies, measured by items 19–36.

8.7. Research Procedures

The research was based in steps, namely:

1. Preparing a questionnaire for assessing teachers' knowledge and application of sensory integration strategies for autism spectrum disorder and determining its validity and reliability.

2. Preparing the research instrument (questionnaire) and distributing it to the teachers of with autism spectrum disorder.
3. Gathering the filled out questionnaires in preparation for data entry into a computer.
4. A computer analysis is the next step of entering this data into a computer to produce results.
5. Statistical Analysis of the Data

8.8. Face Validity

The researchers confirmed the face validity of the questionnaire instrument for this study through a focus group consisting of five expert judges to make sure that instrument was suitable and made it possible to meet research objectives. The instrument, together with the research questions and objectives, were the responsibility of the authors. The judges' observations and suggestions helped to refine and improve the questionnaire. Its first version included 36 items, and its final version had also 36 items,... This was to have an adequate instrument capable of measuring what it is supposed to measure.

The scale was a five-point Likert format (Always, Often, Sometimes, Rarely, Never), receiving numerical values of 5–1. Face validity and internal consistency measures were used to assess the validity and reliability of the scale.

The five-point scale was classified as follows:

Highest score (5)

Lowest score (1)

Number of categories (3)

= 1.33

Highest score (5)–Lowest score (1) ÷ Number of categories (3) = 1.33

The result (1.33) was added to the upper limit of each category, resulting in the following classification:

1.00–2.33: Low

2.34–3.67: Medium

3.68–5.00: High

8.9. Validity and Reliability of the Research Instrument

In order to confirm the construct validity of the instrument, it was also administered to 10 teachers outside allowed from the main sample but belonged to research population. Pearson correlation coefficients were computed to test the relationship between an item and its respective dimension.

Table 1

Item-Total Correlation of the “Teachers’ Knowledge of Sensory Integration Strategies” Dimension

Item No.	Pearson r	Item No.	Pearson r	Item No.	Pearson r
1	.575**	7	.779**	13	.717**
2	.729**	8	.791**	14	.708**
3	.715**	9	.666**	15	.713**
4	.509**	10	.755**	16	.746**
5	.649**	11	.690**	17	.734**
6	.730**	12	.564**	18	.683**

Note: **p < 0.01

In this regard, as observed in Table 1, for the “Knowledge” dimension of Pearson correlations ranged from 0.509 to 0.791 and was statistically significant.

Table 2

The Pearson Correlation of Items in the “Evaluation of Teachers’ Application of Sensory Integration Strategies” Dimension with Total Score of the Dimension

Item No.	Pearson r	Item No.	Pearson r	Item No.	Pearson r
1	.414**	7	.364**	13	.776**
2	.399*	8	.695**	14	.379**
3	.551**	9	.437**	15	.561**
4	.376**	10	.519**	16	.647**
5	.378**	11	.397**	17	.641
6	.609	12	.630	18	.754

Note: **p < 0.01

Pollution, litter and waste management were components of the same dimension in that it MCDM analysis ResultsThe dimensions for each criterion as well as their subcomponents are given in Table 2. The Pearson correlations for the “Application” dimension are shown to be ranging between 0.364 and 0.776 (all statistically significant) and given in Table 2.

8.10. Reliability of the Research Instrument

Cronbach's alpha was computed as an estimate of the internal consistency of the instrument to verify its reliability. The overall Cronbach's alpha coefficient for all dimensions was 0.906, showing very high reliability. In addition, by way of split-half reliability (coefficient = 0.829) was calculated.

Table 3

Cronbach's Alpha, Fixe-Half Reliability and Pearson Correlation for All Dimensions of Internal Consistency

No.	Dimension	No. of Items	Cronbach's Alpha	Split-Half Reliability	Pearson r (Dimension–Total)
1	Knowledge of Sensory Integration Strategies	18	0.886	0.873	.921**
2	Application of Sensory Integration Strategies	18	0.898	0.856	.907**
—	Total Dimensions	36	0.906	0.829	—

Note: **p < 0.01

As shown in Table 3, the Cronbach's alpha for “Knowledge” dimension and for “Application” dimension are as follows: 0.886 for knowledge and 0.898 for application dimensions whereas the overall reliability was found to be

statistically significant with 0.906 covering all dimensions of necessary data elements required to formulate clinical decision support systems (CDSS). Pearson correlations between each dimension and total score from 0.907 to 0.921 ($p < 001$).

8.11. Statistical Methods

Depending on the objective, these data were analyzed using the Statistical Packages for social sciences (SPSS). Data were analysed using the following statistical approaches:

- Pearson correlation coefficient
- Cronbach's alpha coefficient
- The reliability of the research instrument was measured using split-half reliability coefficient
- Descriptive statistics: frequencies and percentages to describe sample distribution by personal variables
- Descriptive Statistics for Questionnaire Items and Dimensions

8.12. Research Ethics

The authors also stress the factor of guaranteeing confidentiality for participants' data (Al-Qudah & Al-Hayajneh, 2022). In doing so, the researcher did not ask for information that might identify participants individually. Furthermore, all data were erased upon completion of the study to ensure privacy and ethical standards.

9. Research Results

Question 1: Do teachers with autism spectrum disorder have knowledge about sensory integration strategies?

The mean and standard deviation of the items in the dimension "Knowledge of Teachers with ASD Regarding Sensory Integration Strategies" were evaluated. In Table 4, the items were listed in descending order based on their means.

Table 4

Descriptive Statistics (Means and Standard Deviations) of Items in the Dimension of "Knowledge of Teachers Regarding Sensory Integration Strategies" (N = 70)

No. Item Mean Std. Deviation Rank Level

1	I know the materials and tools they like, such as: (clay, some fabrics, foam, etc.).	4.01	0.97	1	High
14	I recognize sources of visual stimuli that cause them distraction, such as: (certain lights, colors, windows, etc.).	3.84	1.04	2	High
11	I know sources of auditory stimuli that cause sensitivity, such as: (air conditioner noise, speaker sounds, etc.).	3.79	1.01	3	High
12	I know the isolation strategy to reduce auditory sensitivity to disturbing sounds.	3.74	1.00	4	High
15	I recognize strategies for organizing the classroom environment according to their visual sensitivities.	3.74	1.02	4	High
17	I know strategies to organize the classroom environment according to their sensory characteristics.	3.70	1.09	6	High
2	I recognize sources of tactile stimuli that cause sensitivity, such as: (texture of some papers, certain fabrics, etc.).	3.69	1.02	7	High
9	I know the preferred tastes for them, such as: (sweet, sour, bitter, salty, etc.).	3.57	1.14	8	Medium
5	I recognize sources of olfactory stimuli that cause sensitivity, such as: (certain perfumes, oils, smells of markers, etc.).	3.53	1.18	9	Medium
13	I know the distraction strategy to reduce auditory stimuli in the classroom, such as: (introducing pleasant sounds simultaneously with unpleasant sounds).	3.53	1.13	9	Medium
6	I know the isolation strategy to reduce olfactory sensitivity (avoiding exposure to irritating smells).	3.50	1.26	11	Medium
16	I know gradual strategies to reduce excessive visual sensitivity.	3.47	1.11	12	Medium
3	I know gradual strategies for introducing tactile stimuli, such as: (gradually exposing them to irritating tactile stimuli).	3.43	1.16	13	Medium
4	I know therapeutic strategies to reduce tactile sensitivity, such as: (massage devices, deep pressure, etc.).	3.37	1.17	14	Medium
10	I know the gradual exposure strategy in introducing disliked foods with familiar foods.	3.34	1.19	15	Medium

- I recognize some strategies used to expand olfactory
7 cognitive repertoire, such as: (exposure to different smells). 3.21 1.20 16 Medium
- I know the distraction strategy to reduce olfactory
8 sensitivity, such as: (diverting attention from unpleasant smells by introducing another stimulus, e.g., aromatic oil). 3.16 1.24 17 Medium
- 18 I recognize sensory diet strategies to reduce any type of excessive sensitivity. 3.11 1.20 18 Medium

Dimension Overall — 3.54 0.78 Medium

As seen in Table 4, the arithmetic averages for the items in “Evaluation of Teachers’ Knowledge of Sensory Integration Strategies for autism spectrum disorder” dimension were between 3.11 and 4.01. The item with the highest mean was 1, I know the materials and tools they like, for example clay, some fabrics, foam or whatever was cited above (4.01) categorized as high. Then were Item 14, “I identify sources of visual stimulation that produce distraction such as certain lights, colors, windows, etc.” (=3.84) also high and Item 11 “I recognize sources of auditory stimulus that cause sensitivity in the classroom like air conditioning noise, speaker sounds” (=3.79), also high.

The mean lowest was for Item 18, “I identify sensory diet strategies to decrease any type of over sensitivity., regarding the average of 3.11 considered medium. A higher mean (3,54) overall for this dimension revealed a knowledgeable teacher.

The researcher said the reason is that autism teachers have learned information about sensory integration mainly through their personal efforts, such as reading and attendance at training programs in the field of sensory integration, or following specialists in this area on social media. Their desire to do more, albeit in different ways, is based on the observed gap in knowledge about sensory integration strategies during their undergraduate training where they were not exposed to specific courses on sensory integration strategies for autism spectrum disorder.

This demonstrates that the writer is practicing their ongoing research into sensory integration strategies, in this case autism spectrum disorder (ASD), and recognizes when and how these strategies contribute to reducing distraction, managing sensory stimuli, applying them in a real-world context but even

assisting with social integration with fate of nurture peers. Further, educators understand the importance of these strategies in learning, skills and perception development through sensory-oriented education.

These results contrast with those of Saada and Rashid (2015) that revealed the need for teachers to better understand sensory integration strategies. These results were inconsistent with Al-Rifai and Abu Hassan's (2019) findings, which showed that specialists who hold a master's degree in Special Education, Speech and Language, and Psychomotor Therapy working with autistic children had knowledge about sensory integration disorders' manifestations in these children at the most dimensions as low.

Question 2: How often do teachers with autism spectrum disorder use sensory integration strategies?

Descriptive statistics (e.g., arithmetic means and standard deviations) were computed for items within the dimension "Evaluation of Teachers' Application of Sensory Integration Strategies for with autism spectrum disorder." Items were grouped in descending order of their means (Table 5).

Table 5

Means and Standard Deviations for the Items in Dimension 2 (Application of Sensory Integration Strategies) (N = 70)

o. Item Mean Std. Deviation Rank Level

10	I move them to a quiet place when they are upset or stressed by surrounding sounds.	4.07	1.08	1	High
14	I provide them with pens of different colors during classroom activities.	4.06	1.08	2	High
4	I provide them with clay or bead stringing activities during free time to strengthen fine motor skills.	3.99	1.12	3	High
17	I play cutting and pasting games with them to train visual-motor coordination.	3.97	0.99	4	High
12	I play auditory games with them, such as: (making different animal sounds, transportation sounds, etc.).	3.94	1.14	5	High
1	I expose them to different textures, such as: (rough fabric, soft clay, ice molds, sand, etc.).	3.86	1.09	6	High

11	I expose them to various auditory stimuli, such as: (sound of water drops, music, and other sounds).	3.67 1.25 7 Medium
3	I provide them with sand to write on during classroom activities.	3.50 1.18 8 Medium
18	I use brightly colored or light-emitting tools while playing with them.	3.50 1.15 8 Medium
2	I provide different surfaces for walking barefoot, such as: (sand, texture fabrics, rubber or sponge floors).	3.40 1.22 10 Medium
15	I avoid reflective light on the board from electric lights or windows.	3.34 1.37 11 Medium
8	I provide foods with different tastes, such as: (sweet, sour, etc.).	3.31 1.21 12 Medium
5	I give them massages using tools with different textures, such as: (sponges, cold compresses) on various body parts like: (palm, inner hand, etc.).	3.27 1.12 13 Medium
9	I provide foods with different textures (soft and crunchy).	3.20 1.11 14 Medium
6	I gradually introduce unpleasant olfactory stimuli until sensitivity decreases.	3.11 1.32 15 Medium
16	I use light-emitting laser pens to attract their attention to the activity.	3.06 1.36 16 Medium
7	I provide them with natural aromatic products, such as: (lavender oil, peppermint oil).	2.91 1.39 17 Medium
13	I provide tools to reduce the intensity of sounds they are exposed to in class or during morning assembly, such as: (earplugs).	2.64 1.39 18 Medium

Dimension Overall — 3.49 0.81 — Medium

The results in Table 5 show that the arithmetic means for the items (47-56) of the dimension “Evaluation of Teachers’ Application of Sensory Integration Strategies for with autism spectrum disorder” have been between 2.64 and 4.07. The maximum mean related with the item number (10), “When they are upset or stressed by surrounding sounds, I move them to a quiet place.” Mean was 4.07 and it suggests high level. Ranked second was item number (14): “I provide them with pens of different colors during classroom activities”, with mean 4.06, also at high level. The third item number (4): “I provide them clay or bead

stringing at free time to solidify fine motor skills”, mean of 3.99, at high level. The item with the lowest mean score was item number (13): “I offer tools to decrease the loudness of sounds that they are exposed to in class or during morning assembly, like earplugs”, which had a mean score of 2.64 at a medium level. The mean score for the dimension was 3.49 representing a moderate level.

This result is attributed by the researcher to teachers’ sound knowledge of sensory integration strategies and their impact on autism spectrum disorder. With this knowledge, teachers foster a calm classroom environment that minimizes the stress and discomfort generated by surrounding sounds for individuals with autism spectrum disorder. This step is the first in implementing sensory integration strategies as isolating from aversive stimulus as much as possible would act to strengthen mutual trust between teachers and promote progress and development which ensures better management of their sensory processing issues.

Utilising various methods to increase the students’ sensory integration as well as enhancing their attention and engagement in the activities raised the teachers’ levels of perception, awareness, and willingness to participate in educational activities.

Additionally, they assist in lessening sensory sensitivity and developing their motor and cognitive skills with visual-motor coordination. With regards to sensory integration in with autism spectrum disorder, the effective training provided to teachers allowed them to apply these strategies. Besides, giving teachers the tools to utilize sensory integration strategies strengthened their ability and knowledge of using different effective approaches to limit distractions or environmental factors that interfere with autism spectrum disorder when participating in learning activities.

These results agree with Ghandoura & Al-Zar’ah, (2020) results, which indicated a medium level of practice among teachers of intellectual disabilities in using sensory integration strategies.

10. Recommendations

Based on the results of this study, the researcher suggests developing teacher training programs to prepare educators for applying sensory integration strategies with autism spectrum disorder. Sensory integration strategies and its

requirements should also be made aware among teachers as they need to have adequate knowledge about it.

Moreover, further studies and research should be conducted to discuss effective sensory integration strategies of teaching with autism spectrum disorder, and that teachers should be provided adequate theoretical knowledge about such strategies.

It also suggests emphasizing the role of occupational therapy specialists in educational establishments performing with autism spectrum disorders and clarifying the divide of roles between them, as well as the teachers of those. Furthermore, teachers need to be educated about the significance of adopting sensory integration techniques for alleviating the intensity of certain with autism spectrum disorder behaviors that are related to sensory processing issues.

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