

The importance of sensory integration therapy for children with autism spectrum disorder

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Abstract:

The study aimed to find out the importance of sensory integration in children with autism spectrum by reviewing 10 previous studies in this field using the analytical method. The results of the study concluded that sensory integration therapy applied for children with autism spectrum has different goals such as to reduce isolationist behavior in reducing speech disorder, reduce sensory response problems, and to reduce non-adaptive behaviors. The study also found that there are different means to measure sensory integration in children with autism spectrum. The study showed the effectiveness of the programs based on sensory integration in autistic children. In addition, studies are needed in a larger group of children with varying levels of autism traits.

Keywords: Autism spectrum disorder , Sensory integration , Therapeutic Program.

Introduction :

Autism is a type of complex progressive disorder that remains in **synchronicity?** with the child from its early age throughout life, affecting all aspects of the individual and keeping him away from normal development. This type of progressive disorders affects communication, whether verbal or non-verbal, as well as social relations and most of the mental abilities of these autistic children, and appears during the early years of the child's life, and the child loses interaction and benefit from those around him from the people and experiences

Children with autism spectrum disorder also face several problems and challenges, including problems in sensory integration. The autistic child discovers the surrounding environment through the senses of hearing such as taste, smell and touch and without awareness are appropriate for the various situations surrounding them due to the lack of ability to imitate and learn from their world. The inability to receive the correct messages from the child's environment may lead to various negative behaviors such as agitation, crying and many other behaviours. (Mostafa El-Sherbiny2010.180).

This fact also contributes to the imbalance in sensory integration in the emergence of motor planning difficulties, which are reflected in the difficulty of initiation, implementation, stopping,

combining and changing between motor acts, so the child seems to be disobedient to the motor instructions directed to him or that he harmonizes in stereotypical behaviors that affect the difficulty of starting and changing or stopping motor acts. (Paula Aquila, et al., 2015).

This is confirmed by a group of previous studies and research and that the presence of disorders in sensory integration in children with autism spectrum disorder and its negative impact on their behavior, development, learning, health and social lives, and from these studies we find the study of Dunn (1997) which indicated the existence of difficulty in autistic children in the process of sensory processing.

In the same context, the study of Adamson et al. (2006), which also confirmed the existence of sensory difficulties at the level of motor (Abu Hassan, 2018).

There are many indicators of sensory integration deficiency in children with autism, for example: delayed language and speech, lack of sensory perceptions and social skills, in addition to loss of sense of body position in space, or insecurity in movement against gravity. (Minsheu, N.; Hobson, A. 2008).

Based on the above data, we saw the need for systematic follow-up studies that relied on sensory integration in the building of their programs directed to children of the autism spectrum in order to highlight the importance of sensory integration in children with autism spectrum.

The study problem:

Through the scientific observation of the two researchers and the appreciation of the lack of scientific studies interested in providing ivory programs based on sensory integration in children with autism spectrum, especially in both the clinical and educational environment which becomes of paramount importance; however, we must take this topic as a research input for most researchers and those interested in this scientific field. We raised the following questions:

- Are there different tools to measure sensory integration in children with autism spectrum?
- Are there different therapeutic goals for therapeutic programs based on sensory integration offered to children with autism spectrum?
- Are there effective and positive results of the therapeutic programs based on sensory integration provided to children with autism ?

Hypotheses :

We provide the following provisional answers to the problematic questions :

- There are different tools for measuring sensory integration in children with autism.
- There are different therapeutic goals for treatment programs based on sensory integration provided to children with autism.
- There are effective and positive results of sensory integration-based therapeutic programs offered to children with autism spectrum.

The objectives of the study

The objectives of this research paper are the forthcoming:

The identification of the various tools that measure sensory integration in children on the autism spectrum, as well as the determination of the different therapeutic goals of programs based on sensory integration in children with autism spectrum, in addition to identifying the ability of the therapeutic programs based on sensory integration in effective and positive intervention in children with autism spectrum. Finally, proposing a method of providing therapeutic programs based on sensory integration in children autism spectrum.

The importance of the study:

Our study is concerned with evaluating and detecting the benefit of sensory integration and also identifying the pattern of sensory processing of various stimuli that a child with autism spectrum receives. Moreover, to help us know the disorder that affects this treatment which is due to the importance of understanding and analyzing cases and taking into account the sensory characteristics in therapeutic programs and ensuring, in other words, providing a suitable and adapted space and environment for sensory interactions. The results of this research can benefit and sensitize specialists working with people with autism spectrum disorder in creating techniques and knowledge for dealing with the autism group and improving care and making treatment programs and to take into consideration the suitability and style of sensory processing of the child.

Study terminology

Sensory Integration: Ayres defined sensory integration as *“the neurological process that organizes sensation from one’s own body and from the environment and makes it possible to use the body effectively within the environment.”* (May-Benson, Schaaf, 2015).

Thompson & Rains (2009) defines sensory integration as *‘a neural process that allows the regulation of sensations from one’s body and from the environment, making it possible to use the body to interact with the environment appropriately.’* (Thompson & Rains, 2009, 17)

Therefore, Sensory integration is a neural process that occurs to all people. we all receive information through the senses and the world around us and the information is processed and organized in a way that allows us to be comfortable and safe, so this issue respond appropriately to the situations and requirements of the environment, as the brain is programmed to organize this information in an integrated manner to make it meaningful and thus respond automatically (Alkahtani, 2020).

Moreover, sensory integration is a neural process that occurs at the level of the brain in order to regulate sensory information received from various sensory organs, represented in: sight, hearing, taste, smell, touch, as well as the perception of the body in space, and the equilibrium system, where this regulation results in an adaptive response by the individual which allows him to interact appropriately with the surrounding environment. It is therefore a process that allows improving the skills necessary to participate successfully in various life roles such as caring for oneself and others, academic skills, social skills.

Autism spectrum disorder:

The National Autism Society in Britain (1962) has defined the autism spectrum as a developmental difficulty that affects the way of communication and the child's belonging to the people around him, and this difficulty is manifested in three areas:

- Social interaction.
- Social networking.
- The ability to imagine. (Omar, 2012, 16)

In addition, the National Society for Autistic Children New (NSAC) defines autism spectrum disorder as a disorder or syndrome that makes the child isolated from the world around him, and that the personal manifestations involved must appear before the child reaches the age of thirty months, and this includes a disorder in the speed or sequence of growth, a disorder in the sensory response to stimuli, a disorder in speech, language and cognitive abilities, and a disorder in attachment or belonging to people, events and subjects (<http://www.tafaolcenter.com>).

Muhammad Ali Kamel says that autism is: *' a disability in social development characterized by being chronic and severe and it appears in the first three years of life and is the result of a neurological disorder that negatively affects brain functions '*. (Mohamed Kamel, 2005: 20).

Furthermore,(ASD) : *'is a neurodevelopmental disorder characterized by deficits in social communication and the presence of restricted interests and repetitive behaviors '*. (apa . 2013)

Through all these different definitions, we can define autism spectrum disorder as a developmental disorder that appears on a child before the age of 3 years. It is evident through three basic manifestations:

- Poor ability to communicate socially.
- Poor ability to communicate verbally and non-verbally.
- Stereotypical movements.

The therapeutic programs:

The therapeutic programs in this study are defined as that planned and organized program based on the theory of sensory integration to provide direct services and training for the child in the form of sessions, which aims to develop adaptive behavior in children on the autism spectrum by improving daily life skills and independence, improving social communication and motor skills, and reducing abnormal and disturbed behaviors.

Study Methodology

This research paper has relied on the analytical approach to be more appropriate to address the topic.

The purposes and objectives, through the description of the problem of the study and the theoretical jurisprudence related to it, the researchers also used the analytical method to analyze the information related to the interpretation of sensory integration disorder and the link between causes and consequences by moving from general to specific and all this in the light of the presentation of the most important therapeutic programs based on sensory integration among children with autism spectrum.

The results of the study

After collecting 32 studies on sensory integration in children with autism spectrum, only 10 studies were retained, and this is due to several reasons, including - relying only on studies that used the experimental method, in addition to retaining studies that studied the effectiveness of the program based on sensory integration and abandoning other studies that studied the level of diffusion, correlations and differences. The following results were reached:

The author of the study and the year	Purpose of the study	Tools used to measure sensory integration	The results reached
- Murphy, Vrinda (2009).	Effects of sensory integration on motor development in K-3 students with autism	Sensory checklist (designed by the researcher)	The effect of sensory integration therapy in increasing the ability of the sample members to complete motor skills that they were not able to perform before applying the program and also showed an improvement in cognitive skills after applying the program
-Pfeiffer B. A., Koenig K., Kinnealey M., Sheppard M., Henderson L. (2011).	Knowing how effective sensory integration therapy is in reducing non-adaptive behaviors.	Sensory Processing Measure. (The SPMdesigned by the researcher)	Significant improvement in the group treated using the sensory integration strategy compared to the other group, and the extent to which sensory integration therapy can reduce non-adaptive behaviors .
-Schaaf RC, Benevides T, Mailloux Z, Faller P, Hunt J, van Hooydonk E, Freeman R, Leiby B, Sendeki J, Kelly D. (2014)	The main objective was to assess the effects of the intervention on the achievement of the individual goal reported by the parents using GAS (preliminary result). Second, to evaluate the effects of the intervention on sensory, functional and adaptive behaviors using PDDBI, PEDI, and VABS II. The normal state of the primary and secondary outcome scales was assessed before the differences between the groups were assessed.	the Sensory Integration and Praxis Test (SIPT) (Ayres 1989) and the Sensory Profile (Dunn 1999).	This study provides evidence that this intervention may be a useful adjunct to a comprehensive intervention program for individuals with autism with functional and behavioral challenges related to difficulty of processing and integrating sensory information.
	Knowing the	Not identified by study	The effectiveness of the

Abdel karim and mohammed (2015)	effectiveness of the sensory integration strategy in developing fine and gross motor skills in children with autism spectrum disorder	researchers.	sensory integration strategy in developing gross and fine motor skills in children with autism spectrum disorder
Ahmed, Abu Zeid and Abu Zeid (2017)	Verify the effectiveness of a training program for the development of sensory abilities based on the theory of sensory integration in reducing isolationist behavior in autistic children.	Sensory Abilities Assessment Scale for Autistic Children.	The training program based on sensory integration theory succeeded in reducing isolationist behavior in children with autism.
Islam Salahuddin Salem (2018)	Investigating the effect of developing sensory integration in reducing speech disorder in autistic children,	Sensory Integration Estimation Scale (designed by the researcher)	The effectiveness of developing sensory integration in reducing speech apraxia disorder in children with autism.
Qismat, Amr and Malkawi (2019)	Examining the effectiveness of a training program based on sensory integration strategies in reducing sensory response problems in children with autism spectrum disorder	Sensory profile scale (second version)	The presence of manifestations of improvement in all dimensions of the scale related to non-adaptive sensory responses in children on the autism spectrum as a result of the program based on sensory integration applied to the research sample.
Hamid Khalaf Al-Anazi (2020).	Providing visual communication for children with autism disorder as a basis for social interaction and communication on their part, by preparing and implementing a training program based on the sensory integration strategy, and testing the effectiveness of this program in achieving its specific goals, and the possibility of its continued impact after its completion and during the follow-up period.	Sensory processing disorder scale for school-age children.	The effectiveness of the sensory integration program used in improving visual communication and skills in these children.
-Ghorban Hemati Alamdarloo - Hasan Mradi (2021)	determine the effectiveness of sensory integration intervention on emotional-behavioral problems in children with autism spectrum disorder.	The researchers did not rely on sensory integration measurement in their study	sensory integration intervention improves emotional-behavioral problems and its subscales (hyperactivity, aggression, behavioral problems, anxiety, depression, somatization, attention problems, learning difficulties,

			atypicality and withdrawal) in children with autism spectrum disorder.
Randell E, Wright M, Milosevic S, Gillespie D, Brookes-Howell L, Busse-Morris M, and al. (2022)	determine the clinical effectiveness and cost-effectiveness of sensory integration therapy for children with autism and sensory difficulties across behavioural, functional and quality-of-life outcomes.	the Sensory Processing Measure.	sensory integration therapy was not significantly better than the usual care and is a more expensive option. We cannot say that sensory integration therapy is helpful for all children with autism and different sensory processing difficulties; however, it might be helpful for some children to focus on specific problems. Future work could focus on which children and problems it would help the most.

Firstly, in talking about the different goals pursued by therapeutic programs based on sensory integration, we have reached the followings through our presentation of the results:

- Assess the effects of the intervention on sensory, functional, and adaptive behaviors.
- Verify the effectiveness of a training program for the development of sensory abilities based on the theory of sensory integration in reducing isolationist behavior in autistic children.
- Investigating the effect of developing sensory integration in reducing speech disorder in autistic children.
- Knowing the effectiveness of the sensory integration strategy in developing fine and gross motor skills in children with autism spectrum disorder
- We can also conclude that sensory integration intervention could be a suitable treatment to reduce sensory problems and improve emotional-behavioral problems in children with autism spectrum disorder.

As for the measures of sensory integration, they are different, some of which were designed individually by the researchers of the studies, and some of them were based on previous measures, for example, the Sensory Integration and Praxis Test (SIPT) (Ayres 1989) and the Sensory Profile (Dunn 1999).

As the last stage of presenting the results of this study, it is the stage of the results reached by researchers who have built treatment programs based on sensory integration for the benefit of children on the autism spectrum. The results obtained are the forthcoming:

- Improving emotional-behavioral problems and its subscales (hyperactivity, aggression, behavioral problems, anxiety, depression, somatization disorder, attention problems, learning difficulties, atypicality and withdrawal) in children with autism spectrum disorder.
- Reducing isolationist behavior in children with autism.
- The effect of sensory integration therapy in increasing motor skills also showed an improvement in cognitive skills and sensory integration from non-adaptive behaviors.
- The study also concluded that using the sensory integration strategy as an intervention program improves the sensory processing of visual information for children with autism

disorder as a basis for improving their visual responses and visual coordination behaviors in general.

- Improvement in non-adaptive sensory responses in children on the autism spectrum.

In light of the results obtained, we can propose this program so that it will be a support for researchers and workers in the field in the future.

The proposed program is based on a set of steps:

1- Create a calm and orderly environment: Provide a comfortable and distraction-free environment for the child, while providing order and organization in the surrounding space

2- Identify sensory needs: Identify the senses that need to be enhanced and developed in the child, such as touch, hearing, sight, and others. This is done by using the appropriate tools to measure sensory integration.

3- Provide specific sensory experiences: Provide opportunities for the child to experience different senses in structured and specific ways, such as touching with different sensors, listening to music, and interacting with games that enhance vision.

4- Use sensory regulation techniques: Apply appropriate sensory regulation techniques, such as using moderate pressure, and provide appropriate sensory stimulation to calm the hypersensory senses.

5- Work on developing sensory skills: Provide opportunities to develop the child's sensory skills through interactive activities and regular training.

6- Continue evaluation and follow-up: Evaluate the child's progress in sensory integration and follow it regularly to ensure continuity of treatment and achieve the desired results.

7- Measuring the results and presenting the results data to the parents. This is because it has been found that parents indicate that measuring results and displaying outcome data are beneficial to them in terms of keeping up with how their child is progressing. Presenting results can therefore be a useful strategy for communicating with parents and other stakeholders. This was confirmed by (King and All 2011).

Discussion of results:

The purpose of this systematic review was to describe the effectiveness of sensory integration-based intervention programs in children with autism spectrum disorder.

In general, the systematic analysis of the studies revealed a difference and variation in the goals provided by the programs based on sensory integration, including what the study sought to develop the main skills in autistic children, including the studies of Hamid Khalaf Al-Anazi(2020), Islam Salahuddin Salem (2018), Ahmed, Abu Zeid and Abu Zeid(2017), Abdel karim and mohammed(2015). Moreover, other studies aimed at removing non-adaptive behaviors, including Qismat, Amr and Malkawi (2019), Islam Salahuddin Salem (2018), and Pfeiffer B. A., Koenig K., Kinnealey M., Sheppard M., Henderson L.(2011). Furthermore, 9 out of 10 studies reported the effectiveness of sensory integration programs provided to children on the autism spectrum and explained their ability to develop various skills for autistic children and remove some non-adaptive behaviors in them. Here the results are promising, but they should be interpreted with caution due to the high risk of bias in many studies.

From this point of view, the results can be interpreted as that children with autism spectrum disorder urgently need intervention by integrating their senses, so 90 percent of the training programs based on sensory integration had a positive and effective impact, regardless of their content, which showed a difference in content, whether in terms of sessions, duration, or long-term and short-term goals, in addition to the strategies used, on the one hand, and on the other hand, in the studies selected for review. In addition, the researchers used different uses of measurement tools, some of them were designed by themselves, such as the studies of the following researchers (Murphy, Vrin(2009); Pfeiffer B. A., Koenig K., Kinnealey M., Sheppard M., Henderson L. (2011),Islam Salahuddin Salem (2018).

We noticed that some of them relied on the measures of other researchers, such as the study of - Schaaf RC, Benevides T, Mailloux Z, Faller P, Hunt J, van Hooydonk E, Freeman R, Leiby B, Sendeck J, Kelly D.(2014) and Qismat, Amr and Malkawi (2019), In addition we observed that the researchers relied on the uniqueness of the case, which means that each child with autism spectrum disorder is a special case and is not treated like the rest of the children, and this is due through the identification of the strengths and weaknesses of each child, and this is only the initial assessment of each child, and an evaluation based on scientific foundations and evidence.

It should be noted that despite these positive results from 90 percent of studies that used sensory integration therapy in the intervention and care of children with the autism spectrum, they must follow the methodological steps of this treatment in addition to the use of evidence-based therapy. This is confirmed by the researchers (Sarah A. Schoen, Shelly J. Lane, Zoe Mailloux, Teresa May-Benson, L. Dianne Parham, Susanne Smith RoleyRoseann C. Schaaf.) in a study done through a systematic review of Ayres sensory integration intervention for children with autism.

Based on these limited findings, it will be important to study additional ways to enhance sensory integration in children with autism spectrum disorder in an adequate and sustainable way.

Conclusion:

Sensory integration therapy is very important for children with autism spectrum disorder, and it is applied by a specialized team in the field of autism and sensory therapy. By providing appropriate sessions and techniques to meet the needs of the children. In addition, sensory integration therapy uses techniques such as moderate pressure, massage, balance and sensory stimulation to help children deal with hypersensories or limited senses.

The goals of sensory integration therapy include improving sensory regulation and developing communication and social interaction in children with autism spectrum disorder, and also aims to improve concentration and attention and develop motor and language skills. Furthermore, this therapy helps children adapt to the world around them and enhance their quality of life.

Recommendations:

In light of the research results, the researchers present a set of recommendations, which are as follows:

- Holding seminars with psychologists and educational specialists working with people with autism spectrum disorder to make them aware of the importance of programs based on sensory integration in reducing problem behaviors in children and also developing desirable behaviors in them.
- Holding seminars for parents in order to educate them about their children's needs and how to deal with them.

- Distributing brochures in different institutions and schools explaining sensory integration disorder in children with autism spectrum and the main ways to deal with it.
- Interest in studies concerned with sensory integration in children with autism spectrum.

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