

International Journal of Intellectual Disability

E-ISSN: 2710-3897

P-ISSN: 2710-3889

IJID 2021; 2(1): 18-23

© 2021 IJSA

www.rehabilitationjournals.com

Received: 12-11-2020

Accepted: 17-12-2020

Md Jamal Uddin

Team Leader-Program,
Disabled Rehabilitation &
Research Association (DRRA),
Dhaka, Bangladesh

Md Mahmudul Hasan

Research Associate, Al-Basar
International Foundation,
Dhaka, Bangladesh

Mst Shahanaz Parvin

Program Manager, Disabled
Rehabilitation & Research
Association (DRRA), Dhaka,
Bangladesh

Correspondence

Md Jamal Uddin

Team Leader-Program,
Disabled Rehabilitation &
Research Association (DRRA),
Dhaka, Bangladesh

A comparative study on sensory integration treatment and behavioral modification treatment for the children with hyperactivity and autism spectrum disorder

Md Jamal Uddin, Md Mahmudul Hasan and Mst Shahanaz Parvin

Abstract

Autism or Autism Spectrum Disorder (ASD) in children is a public health concern in Bangladesh, with limited development in the options for treatment and management. Health professionals as well as various methods such as sensory integration, behavioral modification are involved in managing children with ASD. The study was conducted to find whether sensory integration and behavioral modification was the more effective process for improving the functional performances in the treatment of children with ASD. This descriptive study utilized empirical research design among conveniently selected 50 children with ASD at a private clinic in Dhaka, Bangladesh. Equal numbers of children were placed in two groups through simple random technique. Data was collected through observation using structured questionnaire based on sensory Integration & praxis Test (SIPT), Sensory Processing Measure (SPM) and behavioral modification. A pre and post- test after providing treatment in both groups were carried out to observe the differences. Data analysis was done by SPSS to present the descriptive statistics of the study. The sensory integration treatment group showed better results than its rival group. Although, both interventional groups showed significant improvement in some key functional performance areas, however, some of the specific area like attention span, speech & understanding had remarkable improvement in sensory integration group. It is evident that sensory integration treatment is more effective than behavioral modification treatment for children with ASD but later one has some good result for children with ASD. Combination of treatment has been recommended by this study.

Keywords: Autism, sensory integration, behavioral modification, rehabilitation professionals

Introduction

Autism Spectrum Disorder is characterized by qualitative impairments in social interaction and communication and by the presence of restricted and repetitive behavior ^[1]. For most of it 60 years study, Autism has been considered a rare disorder with an estimated prevalence of approximately 4 per 10,000 children ^[2]. In contrast, the estimation carried out by Medical Research Council in 2001 was more conservative. It is estimated that all studies conducted by 2000, had provided an average prevalence rate of 10 per 10,000 for autistic disorder ^[3]. The pattern of occurrence is very similar everywhere in the world. Although there are some physical, physiological, social and economic factors that accelerate the cause of ASD. Of these, prenatal and parental mental health, obstetric factors, age, gender, gene, medicine, chemical materials, diet, medical condition, alcohol, mental disorder and environment are significant ^[4].

In different eras, autism was diagnosed based on different contemporary criteria. Kanner's and Rutter's criteria for diagnosing ASD were very popular from 1950 to 1970 ^[5]. The Diagnostic and Statistical manual of Mental Disorders' (DSM) provided criteria have generally been accepted for diagnosing persons with Autism since 1980. Till to date, DSM has issued its 5th edition for the diagnosis of ASD. A notable area recognized in the DSM-V is the sensory input which highlights the relationship of hyper- or hypo-activity of behaviorally sensory aspects of the environment ^[6]. In line with DSM, It is important to diagnosis of ASD prior to treatment.

In fact there is no absolute treatment for ASD but majority believe that early intervention may provide information about the symptoms.

In addition to assessment of the severity and nature of sensory deficits, assessment of the entire sensory organs such as the vestibular, proprioceptive, sensory, gustatory, olfactory, auditory, and visual organs is also required in some cases ^[7]. Along with this, it is required to check thoroughly whether he/she has difficulties with fine motor and complex gross motor movements or not. Vocational relevant assessment is essential because the children with ASD tend to have difficulty in learning routines and habits; therefore, early attention should be given on establishing the habits of ASD children. Evaluation of current work habits, work relevant interests, peak skills and family resources needs to be done in the context of the child's long-term vision and it should begin primarily in the school years, preferably by the age of 11 years. In addition, assessment of family conducted in collaboration with the child caregivers' provides both an understanding of the child's environmental context as well as a foundation for implementing a sound intervention.

Sensory integration, also called sensory processing, refers to the processes in the brain that make sense of the information coming in from our senses, giving us information about what is happening outside and inside our body. Sensory Integration is a well-established and growing area of therapeutic practice developed by Dr. A. Jean Ayres, an occupational therapist, psychologist, and neuroscientist, this framework was originally shown to be effective with children with learning and behavior difficulties and an evidence-based practice for use with children with autism. According to Ayres ^[8], sensory integration is characterized as the association of sensory input utilization. This utilization may perhaps be a basic view of the body or the environment as a whole, or an adaptive reaction, or a learning process, or the improvement of a number of neural purposes. The initial acceptance of the sensory integration model has been well illustrated and argued in several studies ^[9, 10, 11, 12]. The model in conjunction with its attendant clinical measures and approaches highlights the significance of vestibular, proprioceptive, and tactile stimuli to growth and behavior. In addition, according to medical-model judgment SI therapy is theoretically able for the observation of learning disability and motor impairment through analytical assessment and process of treatment and remediation that ultimately presents external indications responsible for a number of underlying neurological deficits ^[9]. In addition, SI therapy is considered as functioning to remedy or improve the consequences of specific general sensory-motor disorders accountable for numerous individual motor or learning disabilities, and to present sensory processing for the flourishing improvement of such capabilities. Certainly, this SI therapy functions as a forerunner to learning; it is not adequate to produce in skillful performance though; however, conventional teaching methodologies are still supported in tandem with SI therapy ^[9].

Behavioral therapy for ASD is popular as it reportedly has a high chance of success. In this type of therapy, the child quickly learns that only appropriate behavior is rewarded and inappropriate behavior does not encourage and in fact, it is ignored. The success rate of behavioral therapies increases if the sessions are started at an early age; that is before the child turns to 3 years old ^[13]. Children supported by Applied Behavior Analytic (ABA) programs make greater intellectual and educational gains than children in

other intervention programs, special nursery programs show efficacy compared to other less time-intensive programs. While there was no clear relationship between the amount of intervention time received and the children's improvements, an ABA program of around 20 hours per week appeared to be most effective ^[14]. It is important to note that behavioral therapy is not the only way to treat autism and that it does not cure autism. Nevertheless, this therapy is a good option to consider in terms of helping the growth and development of autistic child ^[13]. Similarly, A UK study has confirmed that Applied Behavior Analysis (ABA) is the most effective intervention method for children with Autism ^[4]. The study was a comparative study of different teaching interventions for children with Autism in a community setting and looked at the effectiveness of the interventions on children's intellectual, educational, and adaptive behavioral functioning and family stress levels. As the researcher trained on Behavioral Modification approach in his graduation studies as well as practicing which has based on Behavioral therapy, researcher used Behavioral medication treatment approach with the children in this study.

In Bangladesh, there is no research for identifying the effectiveness of any techniques applying for the improvement of the condition of children with ASD till to date. This type of study is the first in Bangladesh to explore the effectiveness of two treatment approaches, such as behavioral changes and sensory integrations, which may be more effective for hyperactive children with ASD. In addition, such a study was needed to gain insight into the medical conditions of children with ASD and to find effective treatment procedures for rehabilitation professionals.

Methodology

This descriptive study utilized empirical research design and structured questionnaires. Two treatment group namely behavior modification and sensory integration therapy was formed for this purpose. Conveniently 50 children with ASD were selected where 25 children were selected for each treatment group by using simple random technique. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria ^[15] was used for identifying ASD in the children and the Sensory Processing Measure (SPM) tools ^[16] was applied for assessing the hyperactivity among the identified ASD children. It has been proved that the Sensory Processing Measure (SPM) tool is reliable and valid, and can identify children with or without sensory processing issues ^[17]. The diagnosed children with ASD aged ranging from 5 to 7 years and living in the Dhaka city were the inclusion criteria of the target group. The child whose age was below 5 years & who were over 7 years old and the parents of children who were not willing to take part of their child in the study was excluded. Structured questionnaires based on sensory integration & praxis Test (SIPT), Sensory Processing Measure (SPM) and behavioral modification (BM) was developed as the data collection tools. In order to collect data, face to face interview and an observation technique in an Occupational Therapy & Sensory integration Center, a private clinic situated in Mohammadpur, Dhaka, Bangladesh was carried out by the principal researcher. Data regarding socio-demographic information was obtained by interview of the participants' parents. On the other hand, all the observation of participants' was carried out in the clinic according to the

treatment schedule. The treatment was provided in each groups 3 sessions for 1 hour in every week for 5 months. The treatment session included different use of tools, equipment, texture relevant to Sensory integration therapy in a design Sensory Integration setting where in Behavioral medication uses different kind of verbal and non-verbal communication methods with some structure/unstructured process in the quite room. As the outcome measure plan has been designed through pre-test and post-test collection methods, so participants data was collected initially following questioner though observation and interview. Then after the treatment was provided, the children's performance was monitored in 6 settings. The settings were sensory dysfunction, speech, and understanding, language comprehension, language expression, productivity and behavior. Participants' performance over 6 signs of sensory dysfunction was observed. These were a) Avoids getting messy or wants to be cleaned up immediately, b) Dislikes being touched, hugged or kissed, c) Resists bathing or grooming tasks, d) Avoids certain textures of clothing, e) Avoids going barefooted, especially on grass or sand, f) Avoids certain food textures or colors. In the speech and understanding context, 4 activities' performance was noticed such as a) Knows and use his/her own name, b) Comes when name is called, c) Knows and uses other children or adults name, d) Uses mother/ father/ brother/ sister correctly. In the language comprehension domain, 7 activities performance was observed, for instance a) Asks/shouts for attention properly, b) Makes gesture for attention, c) Responds to "yes"/ "no", d) Obeys simple instruction, e) Understands meaning of "in"/ "on"/ and "big"/"small", f) Understands meaning of "long"/ "short"/ and "left"/"right", g) Points to picture of named object. In regards to the language expression, there were 7 activities which performance was observed such as a) Gesture for "no" says "no", b) Gesture for "yes" says "yes", c) Points to what he/she wants, d) Use 5/10/20 words correctly, e) Combines 2/3 words in sentence, f) Use "me" or "my" frequently, g) Like to hear stories. In the case of productivity, participants performance was observed in two activities, named a) school, b) play (types: parallel, co-operative, solitary and exploratory). In the behavioral domain, performance levels were observed in 3 cases such as a) aggressive, b) restless and c) presence of any autistic symptom (repetitive behavior, reversal). The observed performance level for each domain was scored as "No response", "Good", "Better" and "Best". The participants' performance was scored as "No response" when they were

fully dependent on the caregiver. It had considered as "Good" when they were partially dependent on the caregiver. Again, the participants' performance was scored as "Better" when they were independent with the simple direction of the caregiver. It was considered as "Best" when the study subjects were fully independent. Children's enjoyment and interest was ensured in each and every time during observation. All instructions for the children were given in Bengali. Data were checked regularly after its collection by the researcher. Data were entered into the computer and saved in the statistical package for social science (SPSS) software. After completion of data collection, it was re-checked for quality and validity. Appropriate descriptive statistical analysis, calculation, and tests were carried out to make relation with the variables according to the objectives of the study. The duration of the study was 6 (six) months which was last from January to June 2007. Permission from participants' parents was sought prior to data collection.

Results

This chapter represents participants' socio-demographic profile, baseline assessments information (pre-test) and comparison of the post-test status obtained by the observation of two treatments.

Table 1: Socio-demographic profile of participants (n=50)

Variables	Sub-groups	Percentage (%)
Age (in years)	5	46
	6	34
	7	20
	Mean ± SD 5.74 (±.777) years	
Gender	Male	60
	Female	40
Family Income (in Bangladeshi Taka)	≤10,000	43.9
	10,001-20,000	32.2
	20,001-30,000	14
	>30,001	9.9
Religious status	Muslim	90.6
	Hindu	9.4

The table (1) shows the socio-demographic profile of the study participants. The maximum 46% participants' age was 5, The Mean ± SD was 5.74 (±.777) years. Out of the total study subjects, the male was 60%. In terms of household income, the utmost 43.9% study subjects had a family income of ≤10,000 Bangladeshi Taka (BDTK). The highest 90.6% of participants had identified them as Muslims.

Table 2: Participants' assessment status before applying the SI and BM therapy (n=50)

Assessment area	Status	Participants' Percent
Sensory Integration Dysfunction	No Response	10.0
	Good	45.0
	Better	37.5
	Best	7.5
Speech and Understanding	No Response	7.5
	Good	62.5
	Better	17.5
	Best	12.5
Comprehension	No Response	2.5
	Good	55.0
	Better	27.5
	Best	15.0
Expression	No Response	12.5
	Good	55.0

Productivity	Better	25.0
	Best	7.5
	No response	12.5
	Good	55.0
	Better	20.0
Behavior	Best	12.5
	No Response	7.5
	Good	52.5
	Better	37.5
	Best	2.5

The pre-treatment status of the participants can be observed from Table 2. It is found that approximately 45%, 62.5%, 55%, 55%, 55% and 52.5% of participants' performance was in the good level in the domain of sensory integration dysfunction, speech and understanding, language comprehension, language expression, productivity and behavior respectively. Performance level "better" was seen among 37.5%, 17.5%, 27.5%, 25 %, 20% and 37.5 % of participants successfully. On the other hand, 7.5%, 12.5%, 15%, 7.5, 12.5%, and 2.5% of participants showed the "best" performance level in the above mentioned areas. Furthermore, "no response" was observed among 10%, 7.5%, 2.5%, 12.5%, 12.5% and 7.5% of participants respectively.

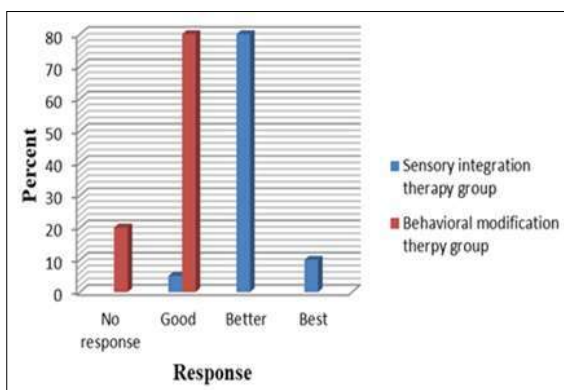


Fig 1: Comparison for sensory dysfunction

The bar chart (1) shows the responses of two treatments methods on sensory integration dysfunction of children with ASD where it is clearly noticed that sensory integration therapy produces almost all types of positive responses ranging from 15 % best, 80 % better and 5% good. In contrast, only one positive response namely 80 % good is found in case of behavioral modification treatment but having 20 % negative responses signifies the poor ability of this method in sensory functioning.

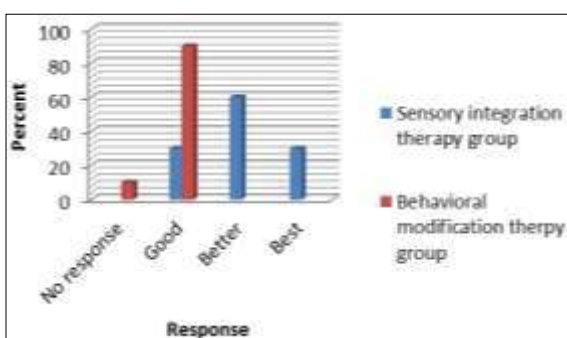


Fig 2: Comparison for speech and understanding

In terms of speech and understanding in figure 2, group A (SIT) shows no negative but all positive responses, while group B (BMT) portrays only one type of positive response with 10% negative feedback. This means the end has a debilitating effect on the speech and understanding of children with ASD.

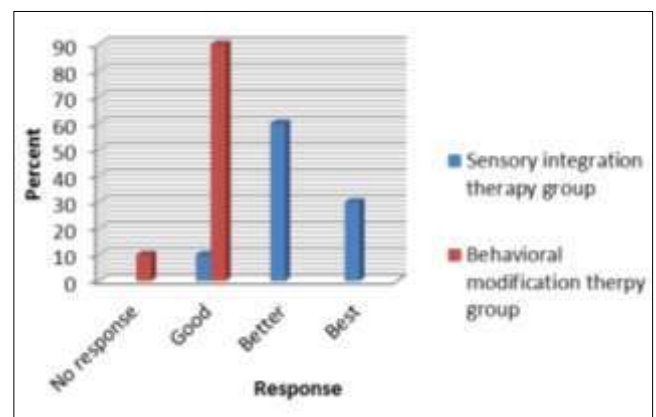


Fig 3: Comparison for language comprehension

The best, better and good response is found in about 30%, 60% and 10% of cases, respectively for sensory integration therapy groups in language comprehension (Figure-3). On the other hand, behavioral modification therapy yields only 90% good response with 10% bad response.

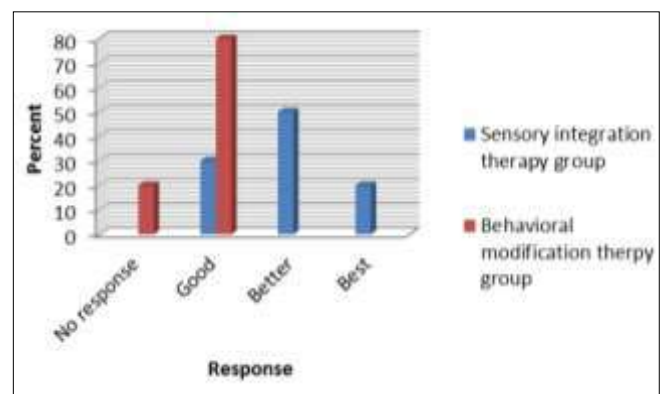


Fig 4: Comparison for language expression

According to graph chart (Figure-4), it is explicitly seen that all the cases belonging to sensory integration therapy or group A illustrates either best, better or good responses for language comprehension where group B contains solely one type of positive responses namely 80% good along with 20% negative reactions. This signifies the last one has poor ability on language expression.

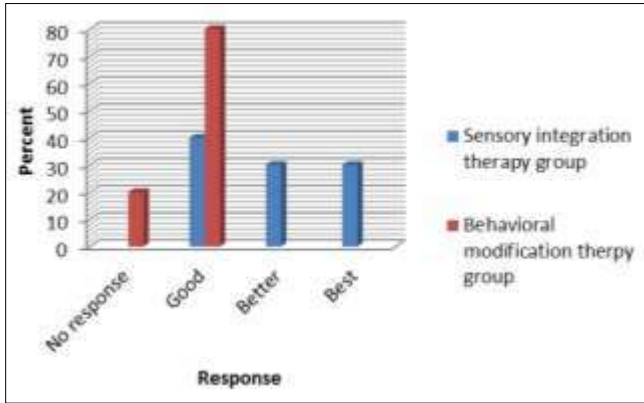


Fig 5: Comparison for productivity

In regards to productivity (Figure-5), very similar result is found for sensory integration therapy group (group A). For example, best, better and good reactions are noticed for 30 %, 40 % and 30 % cases. Contrariwise, group B (BMT) shows 20 % of negative along with only 80% of good responses.

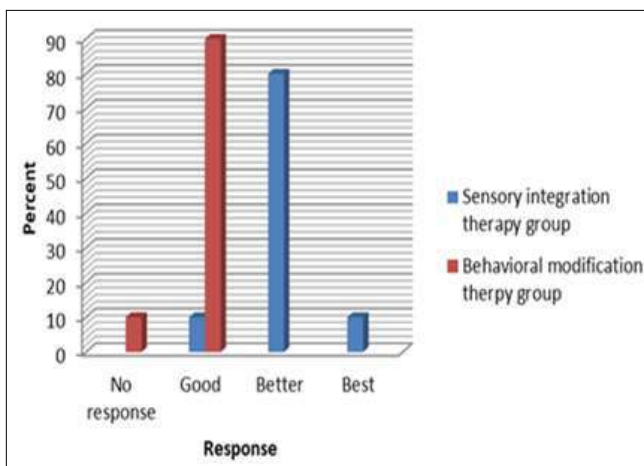


Fig 6: Comparison for behavior

In the case of behavioral response (Figure-6), only one type of positive response known as good in group B or behavioral drug therapy group was found in 90% of the cases and the remaining respondents showed negative response. However, sensory integration therapy group or group A yields all type of positive responses ranging from 10 %, 80% and 10 % respectively, indicate the effectiveness of sensory integration therapy in the behavior of children with ASD.

Discussion

It is clearly noted that children who received sensory integration compared to behavioral modification therapy responded better to different levels of performance and activity.

First of all, most of the children showed expected responses in respect to sensory integration dysfunctions which signifies the approaches’ effectiveness. This finding is supported by several empirical sections. Ottenbacher [13] conducted a meta-analysis of eight academic works about SI theory where it was clearly proven that SI was effective in reducing children's sensory dysfunctions.

Secondly, children showed better speech and language capability, and understanding in case of receiving sensory

integration therapy than other treatment approaches. Also, standard language comprehension and expression had been observed in those receiving SI therapy. Ottenbacher [18] claimed that the consequence of sensory integration therapy implemented to the representative population seems to have empirical support. The effects were established as the highest for motor / reflex performance gauges, though they were very rare in the language system.

In regards to hypersensitivity, it is not proven empirically that hypersensitivity is caused due to SI therapy. However, typical sensory responses and processing is resulted from the SI therapy. For example, better interaction with the environment was observed while Temple Grandin [19] had used deep pressure or proprioceptive input in a squeeze machine for treating a youth. The most important factor is that sensory integration therapy had improved productivity and leisure ability of children.

On the other hand, behavioral modification treatment also improved average level of some area of children performances. The findings of a year-long study, funded by the Surrey-based South East Regional Special Educational Needs Partnership, suggests that children with ASD benefit greatly from applied behavior analytic approach, but less from other commonly applied early intervention programs [14]. However, after conducting comparative research on different teaching interventions which basically looked at the efficacy of the interventions on children with ASD’s intellectual, educational and adaptive behavior functioning level by a UK based study, applied behavior analysis was considered as the most effective intervention [20].

As per the result and discussion, it is clear that children can be benefitted by both treatments; sensory integration group showed better performances that behavioral modification group though. In case of the treatment of ASD children, many researchers suggest both group of treatment or both in same times. These are good options to consider in terms of helping the growth and development of autistic children [13]. There are too few evidence-based evaluations of the effectiveness of the different types of interventions offered in terms of promoting a child with Autism functioning. Therefore, it is required to evaluate interventions in order to give parents and support workers the necessary information for deciding to take the most appropriate intervention for the child [14].

Conclusion

This study was mainly carried out to find out the best method of treatment for children with ASD. Along its aim, it was also tried to look at the status of children with ASD and its related treatment and approaches using by the different professionals. After long observations and analysis of statistical data, it was found that sensory integration therapy is more effective for improving children with ASD than behavioral modification treatment in some areas of performance and activity.

Recommendation

Although it finds out that sensory integration treatment is more effective for children with ASD but behavioral modification treatment has some good impact on them as well. On the other hand, no bad impression was seen during behavioral modification treatment. Therefore, it is recommended to apply both treatments at the same time in line with the need of children with ASD.

Because sensory integration therapy had shown good results for improving children with ASD, it is advisable to implement both approaches in the treatment of problems other than performance-based difficulties for children with ASD.

As this study was carried out among few children with ASD in a very short duration at urban area, it can easily be sated that the outcome of this study's does not represent the entire population of the condition across the country. Therefore, it is strongly recommended to carry out studies with more sample size and long duration.

Declarations

We are the authors acknowledging the support provided by the Occupational Therapy & Sensory integration Center, Dhaka, Bangladesh for collecting our data. No funding was received for this work from any organization.

References

1. American Psychiatric Association. Diagnostic and statistical manual of the mental disorder (DSM-IV), 4th ed. Washington: American Psychiatric Association. 1994.
2. Prior M. Is there an increase in the prevalence of ASD spectrum disorders. *Journal of Pediatrics and Child Health*. 2003;39(2):81-82.
3. Medical Research Council. Review of ASD research: epidemiology and causes, London: Medical Research Council. 2001.
4. Emberti Gialloreti L, Mazzone L, Benvenuto A, Fasano A, Alcon AG, Kraneveld A, *et al*. Risk and protective environmental factors associated with autism Spectrum Disorder: Evidence-based principles and recommendations. *Journal of Clinical Medicine*. 2019;8(2):217.
5. Kanner L. Problems of nosology and psychodynamics in early childhood ASD. *American Journal of Orthopsychiatry*. 1949;19(2):416-426.
6. Huerta M, Bishop S, Duncan A, Hus V, Lord C. Application of DSM-5 criteria for autism spectrum disorder to three samples of children with DSM-IV diagnoses of pervasive developmental disorders. *American Journal of Psychiatry*. 2012;169(10):1056-1064.
7. Jorquera-Cabrera S, Romero-Ayuso D, Rodriguez-Gil G, Triviño-Juárez J-M. Assessment of sensory processing characteristics in children between 3 and 11 years old: A systematic review. *Frontiers in Pediatrics*. 2017;5:57.
8. Ayers AJ. *Sensory integration and the Child*, 1st ed. Los Angeles: Western Psychological Services. 1979.
9. Ayres AJ. Treatment of sensory integrative dysfunction. *Australian Occupational Therapy Journal*. 1972;19(2):88-98.
10. Clark FA, Shuer J. A clarification of sensory integrative therapy and its application to programming with retarded people. *Mental Retardation*. 1978;16(3):227-32.
11. Anita CB, Shelly JL, Elizabeth AM. *Sensory integration: theory and practice*, 2nd ed. Philadelphia: F.A. Davis. 1991.
12. Ottenbacher K, Short MA. Sensory integrative dysfunction in children: A review of theory and treatment. *Advances in Development*. 1985;12(3):284-292.
13. Sandra LH. *Right from the start: behavioral intervention for young children with ASD*, 2nd ed. Maryland: Woodbine House. 2007.
14. Reed P, Lisa A, Osborne Mark C. The Real-world effectiveness of early teaching interventions for children with ASD spectrum disorder. *Sage Journals*. 2007;73(4):417-433.
15. American Psychiatric Association. *Diagnostic and statistical manual disorder: DSM –V*, 5th ed. Washington DC: American Psychiatric Association. 2013.
16. Parham LD, Ecker C, Kuhaneck HM, Henry DA, Glennon TJ. *Sensory Processing Measure (SPM)*, 1st ed. Texas: Western Psychological Services. 2007.
17. Miller-Kuhaneck H, Henry DA, Glennon TJ, Mu, K. Development of the Sensory Processing Measure–School: Initial studies of reliability and validity. *American Journal of Occupational Therapy*. 2007;61(2):170-175.
18. Ottenbacher K. Sensory integration therapy: affect or effect. *The American Journal of Occupational Therapy*. 1982;36(9):571-578.
19. Grandin T. Calming effects of deep touch pressure in patients with autistic disorder, college students, and animals. *Journal of Child and Adolescent Psychopharmacology*. 1992;2(1):63-72.
20. Bailey A, Le Couteur A, Gottesman J, Boiton P, Simonoff E, Yuzda E, *et al*. ASD as a strongly genetic disorder: evidence from a British twin Study. *Psychol Medicine*. 1995;25(1):63-77.