

ORIGINAL ARTICLE**SENSORY INTEGRATION VERSUS COGNITIVE-BEHAVIORAL THERAPY ON BEHAVIORAL ISSUES IN LEARNING-DISABLED CHILDREN****ABSTRACT****BACKGROUND AND AIMS**

Number of studies demonstrated that children with learning disabilities suffers from emotional-behavioral problems, however neuro-physiologic approaches are efficient to produce better health-related outcomes thus this study aimed to investigate the effectiveness of sensory integration versus cognitive-behavioral therapy on behavioral issues of learning-disabled children.

METHODOLOGY

A Randomized Controlled Trial included 30 learning disabled-children, diagnosed by Psychologist on the standardized criteria, divided into Group-A (n=15) and B (n=15) where Group-A performed Sensory Integration while B performed Cognitive-Behavioral Therapy for 4 weeks. Data was collected at baseline and post the intervention on Behavioral Problem Scale and Conner's Teacher Rating Scale respectively.

RESULTS

Both the groups showed significant results ($p < 0.05$), however Group-A showed marked reduction in BPS in comparison to B while CTRS was observed with slight greater improvement in Group-B than A.

CONCLUSION

It was concluded that sensory integration is as effective as cognitive behavioral therapy in improving behavioral problems of learning-disabled children.

KEYWORDS

Learning, Behavior, Children, Cognitive-Function, Disability Evaluation, Rehabilitation.

Ms.Syeda Iffat Nasir

Rehabilitation Program Advisor
Policy and Planning Division
Ministry of Transportation, Ontario
szehra07@yahoo.com

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INTRODUCTION

According to a study the Learning disability affect 1.5 million people worldwide and it is the most prevailing form of disability¹. Another literature search identified, 3 out of 100 individuals were annually affected with this form². It is also known as dyslexia, dyscalculia, dyspraxia etc. that is problems in learning, articulating phonemes and in mathematical concepts². 5% of students who are studying in public schools have been affected with Learning disability³. It is not occurred alone, but it is the mixture of many symptoms like, speech errors calculations, and reading difficulties^{3,4}. These learning difficulties in children can identified in conjunction with other, or with several emotional, social and behavioral disabilities⁵. Learning disability affects the variety of functional skills like read, write, speak and listen etc. Furthermore, the ability to receive and retrieve information is idiopathic. Another study by, Boardman et al (2018) indicated these children have higher IQ regardless of their disability^{3,4}. Numerous studies identified that conditions of learning difficulties also affect many brain areas which leads to devastating consequences. Even though, at a time an individual can exhibited from more than one learning disability^{5,6}. In 2005, Lerner explain nine characteristics of learning disabled individuals in which it can occur naming; problem with processing of information, deficits of psychological processes, quantitative problems, impaired social skills, difficulties in oral language, problem with written language, compromised motor skills, reading difficulties, and difficulty in sustaining attention⁷. As per literature, it was revealed that the most common form of learning disability is reading disorder and presented in individual consist of 70 to 80% learning deficits in reading activity⁷. Children with learning deficits, exhibits difficulties in phonemic awareness which is ability to segmented sounds while difficulty with the letters with matched combinations with respect to sound-symbol correspondence. However, grammatical punctuation and spelling errors as well as poor penmanship exhibited with written expression⁸. Non-verbal disability can evident comprising of clumsiness in motor activity, poor visual acuity, organization manner and social problems are different from reading difficulty^{9,10}. In many studies it has been proved that children with learning disability may experience from variety of social, emotional and behavioral problems that may vary from mild to severe in heterogeneous group¹¹. Moreover, behavioral features included attention deficits, difficulty in pragmatic language, poor social skills, quantitative disorders as well as information processing disability are common in children suffering from the condition^{12,13}. In some researches it is revealed that only 5% prevalence rate of learning disability is identified while rest is unknown. Besides, Ruppap et al (2015) and Ciullo, Falcomata and Vaughn (2015) revealed that the

most common difficulties which are faced by children with learning disabilities, in particular dyslexia, dyscalculia and combination of it^{13,14}. It was exposed that these were common conditions among primary school children with higher prevalence rate. It was also reflected in the study that comparison among those results similar levels of neural activation in the brain with unidentified pattern. Furthermore, it was also observed that not only the brain activity is similar, the behavioral presentation among these children may also be similar^{15,16,17}. It was also revealed in the same studies that children with learning disability have disturbed relationship with peers and family. These unfulfilled needs tend to generate avoidance behavior that makes it more difficult for these children to understand social cues. These children adopt different defensive behaviors to avoid social relationships. Some of them may even practice aggressive and irritable behavior as coping technique¹⁸. Researchers recommend that whenever learning disabilities occurs with the combination of behavioral disorder, then it should be important to recognize the root cause of this association¹⁹. In one study which is conducted in Belgium explained the relationship between learning disabilities and emotional-behavioral problems. This study highlights these emotional-behavioral problems such as difficulty to make and maintain friendships and poor social skills. Moreover, these emotional-behavioral problems may results poor communication skills, so they become more egocentric nature²⁰.

According to one more study on learning disability revealed that most of the students have difficulty in solving word problems so they rarely are successful in accomplishment of it²¹. Moreover, with the help of learning disability scale, it was indicated that these children have fidgety problems, aggressive and hyperactive behavior, delinquent tendencies, as well as several phobias and sleep disturbances under the umbrella of emotional and behavioral problems²² although, the frequency may differ in emotional and behavioral problems because of type of disability^{23,24}. Moreover, McConaughy et al explained that those children who have difficulty in attention are among the best to predict learning disabilities. Furthermore, they also recommend that children who have faced learning disabilities may also experience social and emotional affects. In addition, this study also indicated the chief reported patterns that are, fidgeting, aggressive and hyperactive states sleep disturbances, phobias, and poor social skills²⁵. In particular, there is a strong connection between learning disability and psychopathology as well. In another study, conducted by Cantwell and Baker, 600 speech and language impaired children were recruited and followed for 5 years, resulted that only 25% of these children had learning disability while rest of the 75% children had psychiatric illness. Anxiety and depres-

sion are the most common presentation in these children²⁶. Similarly, in one study it was observed that behavioral and emotional imbalance in child life may result poor academic achievement and difficulty in social development. The primary care givers and guardians are the first ones who noticed and identified these problems and seek treatment for their child. Previous researches highlighted the different factors that affect a child's learning ability, but the social, emotional, and behavioral difficulties have remained unidentified²⁷.

Despite of the fact, certain neurophysiologic interventions are found to effective in improving behavioral problems as it has been evident that management with medication has found to be most cost-effective yet individual behavioral, sensory or combined neurophysiologic approach has also shown effectiveness^{28,29}. However, these approaches are only limited to certain population such that ADHD, Cerebral Palsy or Autism. Therefore, to the best of author's knowledge, no or limited sensory or behavioral interventions have been conducted on learning-disabled children. Besides, very few studies have been conducted in Pakistan, to uncover the behavioral and emotional problems in children with learning disabilities. This may be because of low resources and shortage of data. So, the aim of this study is investigate the effectiveness of sensory integration versus cognitive-behavioral therapy on behavioral issues of learning-disabled children and to provide a guide to future studies to identify methods to overcome this devastating cause. Further, to provide awareness of the factors related to the learning disability.

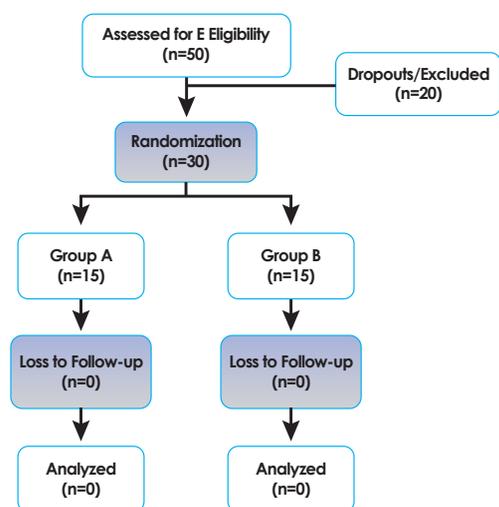
METHODOLOGY

STUDY DESIGN

Randomized Controlled Trial

STUDY SETTING AND PARTICIPANTS

The study was conducted at DEWA Learning Disability School on the children with mild to moderate learning disability.



DURATION OF STUDY

Study was completed within the duration of six months.

SAMPLE SIZE

A total sample of 30 participants was recruited in the study.

SAMPLING TECHNIQUE

The participants were allocated into Group-A (n=15) and B (n=15) through computer-based randomization .

SAMPLE SELECTION

• INCLUSION CRITERIA

Learning-Disabled children aged 6 to 12 years, diagnosed by Psychologist through IQ level and Standardized Achievements i.e. Reading, Writing or Arithmetic tests. The children were also not indulging in either type of physical, occupational or psychological therapy.

• EXCLUSION CRITERIA

Primary Caregiver/participant's' refusal to participate in the intervention or children with severe learning disabilities or have secondary complications.

DATA COLLECTION TOOL

• Behavioral Problem Scale (BPS) comprised of 18 questions related to behavior. The 5-point likert scale was used to record the response of each participant. The scale is ranging from 1-5, where 1 denotes never, 2 denotes seldom, 3 denotes sometimes, 4 denotes always, and 5 denotes very often. Highest score was 4 and 5.

• Conner's Teacher Rating Scale (CTRS) consisted of 30 questions, based on the number of common problems associated with behavior in the last month on 5-likert rating scale of Never Seldom, Occasionally, Often, Very Often and Not Ticked.

INTERVENTION

• GROUP-A

The participants of Group-A performed Sensory Integration Therapy, 1 hour session, 3 days per week for 4 weeks. The 12 sessions of therapy included number of stimulus such as brushing (Tactile), jumping on trampoline, bouncing, push-pull activities (Proprioception), sing-songs (Auditory) swinging, rolling, spinning (Vestibular) and focusing or following pathways (Visual).

	GROUP-A (n=15) Mean±S.D.	GROUP-B (n=15) Mean±S.D.
Age (years)	11.78±1.6	10.33±1.2
Gender	6 Males 9 Females	5 Males 10 Females
Height	85.6±9.3	71.1±8.8
Weight	12.3±5.4	11.9±4.3

• GROUP-B

The participants performed time-matched Cognitive-Behavioral Therapy that included problem-solving approach with game and activities along with self-instruction training that will guide the child's cognition and overt behaviors. These components were taught to the child to resolve their social problems.

DATA ANALYSIS STRATEGIES

Data was entered and analyzed on IBM SPSS Statistics version 20. The frequency and standard deviations of the demographic data was determine through descriptive statistics while paired t-test and independent t-test were applied as an inferential statistics within and in between the groups respectively.

RESULTS

A total number of 30 participants completed the intervention with mean age of 11.78±1.6 in Group-A with 6 males and 9 females whereas 5 males and 10 females in Group B with mean age of 10.33±1.2. The baseline characteristics of participants are shown in Table-1.

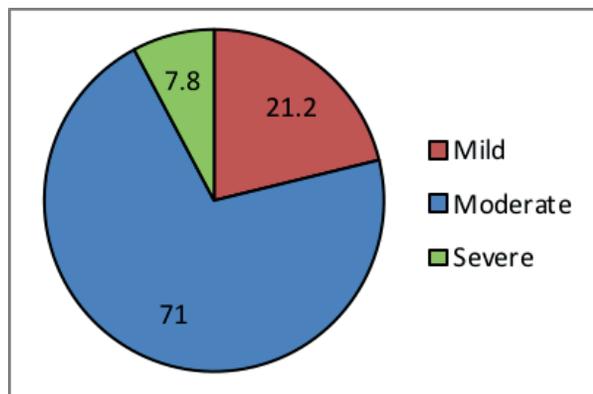


Figure.1 represents categories of participant's behavior on BPS

In within the group, paired t-test analysis, Group-A and B showed significant improvements in BPS and CTRS ($p < 0.05$) however, Group-A showed more improvement in BPS in comparison to B while Group-B demonstrated slightly greater improvement in CTRS as shown in Table.2.

Outcome Measures		Group-A	Group-B
BPS	Pre	43.21±9.7	42.24±7.6
	Post	48.39±10.7*	46.32±9.8*
CTRS	Pre	29.21±5.8	30.21±9.7
	Post	32.39±10.7*	33.95±11.6*

* $p < 0.05$

Moreover, difference between Group-A and B was

determined through Independent T-test after 4 weeks of intervention. The differences between the two groups were analyzed using post mean values of components. In general, both the groups showed significant results ($p < 0.05$), however Group-A showed marked reduction in BPS in comparison to B while CTRS was observed with slight greater improvement in Group-B than A as shown in Figure-2.

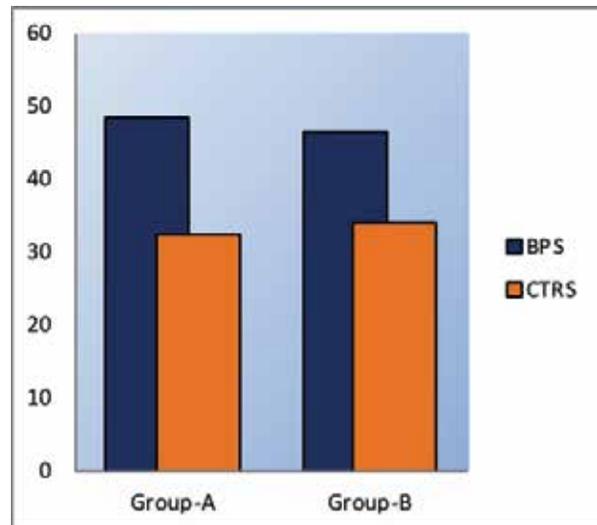


Figure.2 shows post-mean values comparison of Group-A and B

DISCUSSION

The purpose of this study was to compare the effectiveness of sensory integration therapy and cognitive behavior therapy in learning disable children behavior. The implication may justify the efficacy of both the interventions on the target population. Furthermore, it was also revealed that mild behavioral problems exist in children with learning disabilities. It has been evident that higher the scores on BPS, higher problems were found in behavior. Recent literature endorsed that behavior problems may also lead towards psychiatric illness; therefore, early diagnosis might be helpful for the child for better health outcome^{30,22,23}. To tap behavioral features, standardized instruments with excellent psychometric properties are needed. Availability of these resources is found to be limited. Studies also showed that intellectual disability is also a causative factor of behavioral issues that are mostly not addressed by the health care providers, if addressed then requires expensive healthcare facility for the confirmation of diagnosis^{31,24}. Similarly, our study participants represent varied behaviors and emotions although due to limited sample size our study was not able to analyze the magnitude of the condition.

Recent literature recommends that specific educational instructions are required for social and emo-

tional support that might help students in academic learning^{32,25}. Moreover, it will provide sense of belongingness to students therefore they would not feel excluded. Another study by Sadusky et al (2018) revealed that affected children having peers with learning disability have greater rate of sharing and feel more positive regarding themselves^{33,26}. In the similar study, it was also suggested that teacher's role is very important in this regard, teacher of the classroom must appreciate the positive behavior of acceptance and encouragement so in that way leading to relief in the negative impact of learning disabilities^{34,27,28,29}. Collaborative partnership with families and support should also be the part of this program. On the other hand, Barry et al (2015) explained that it has been need to use some worldwide contributions to increase social and emotional competencies so, in that way it can reduce behavioral problems not only in affected individual but in also with those who had high risk of developing these problems^{31,32,33,35}. In one study it was indicated that with the help of behavioral interventions can treat the learning disabilities and other linked conditions also like sleep disturbances and restlessness³⁵. Likewise, one more study proved that behavioral interventions like role play have strong effective results in treating these conditions in children with learning disability^{36,37}. Results of this study indicated that relaxation training can be very useful technique to treat aggressive behavior, anxiety and restlessness in children with learning disabilities^{38,39}.

Researches proved that all psychodynamic and psychotherapeutic strategies and antipsychotic drugs can be effective in treating behavioral problems in learning disabilities⁴⁰. With reference to one study, drugs can also play important part in treating the behavioral problems that in turn affect learning. Among them the efficacy of zuclopenthixol has found to be promising³⁷. On the contrary, other studies comments on the efficacy of antipsychotic medications that it has being neither beneficial nor harmful to treat behavioral problems³⁸. In contrast to it, other studies claim psychodynamic approach; including cognitive behavioral therapy and humanistic centered approach were found to be promising in treatment of learning disabilities⁴⁰. Despite of the fact, certain evidences are supporting to the sensory integration and also cognitive behavioral therapy that may led inference that both the interventions are equally effective in improving behavioral symptoms in children with learning disabilities although, due to scarcity of studies in this domain generalizability of results is doubtful.

As learning disability is strongly associated with poor academic performance thereby leading a conflictual and often unsatisfactory pattern of relationships with family members, peers and teachers as well as low self-esteem^{31,25}. Consequently, to answer the question of optimal types, and frequency of

intervention, head-to-head comparison in which participants are randomly assigned to receive different therapies are highly desirable.

However, there is a need for more researches with large sample size and with standardized tool to identify the behavioral problems in children with learning disabilities. Furthermore, there is need to investigate the effect of modified educational programs that may work in learning disabled children. In addition, it is recommended to include some behavioral and learning techniques in teachers training program so that they can understand and manage the student behavior effectively during classroom activity and guide them that how they can control their impulses and manage their disability.

CONCLUSION

It was concluded that sensory integration is as effective as cognitive behavioral therapy in improving behavioral problems of learning-disabled children. Further, majority of children have moderate behavioral problems. Thus, more studies are suggested to investigate the behavioral and emotional issues with larger sample size to address these problems to avoid devastating health outcomes in future generations.

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