EFFECTIVENESS OF SENSORY INTEGRATION THERAPY(SIT) IN PATIENTS WITH MILD AUTISM SPECTRUM DISORDER(ASD)

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Abstract

Background: Autism Spectrum Disorder (ASD) is a neurodevelopmental condition that affects social interaction, communication, and behavior. Children with ASD often experience sensory processing difficulties that interfere with learning and daily functioning. Sensory Integration Therapy (SIT) is designed to help individuals process sensory information more effectively.

Objective: To investigate the effectiveness of Sensory Integration Therapy (SIT) in improving sensory processing, daily functioning, and quality of life in individuals with mild ASD.

Methods: This experimental study included 36 children aged 7–14 years diagnosed with mild ASD, selected from pediatric hospitals and autism centers in Pune. The intervention lasted for 3 months, with 2–3 sessions per week. Techniques included tactile, visual, auditory, and proprioceptive sensory activities. The Childhood Autism Rating Scale (CARS) was used pre- and post-intervention. Data were analyzed using paired t-test (Jamovi 2.6).

Results: The mean pre-intervention CARS score was 25.13 and post-intervention score was 22.94, showing a statistically significant improvement ($p < 0.01$, Cohen's $d = 1.02$). The number of children with minimal-to-no symptoms increased from 26 to 29, while severe cases decreased from 3 to 2.

Conclusion: Sensory Integration Therapy significantly improved behavioral and functional outcomes in children with mild ASD, reducing symptom severity and enhancing sensory and social functioning.

Keywords: Autism Spectrum Disorder, Sensory Integration Therapy, Childhood Autism Rating Scale, Sensory Processing, Pediatric Rehabilitation

INTRODUCTION

Autism spectrum disorder (ASD) is a type of neurodevelopmental condition that affect how a person communicates and interacts socially. It also includes behaviors like having very specific interests and repeating certain actions. ASD is a biological condition that comes from both genetic and environmental influences that affect the brain as develops.[1] ASD is a condition with an estimated prevalence of 1 in 44 people that impacts all areas of child's growth, such as behavior, thinking skills, self-care abilities, social communication, language, and the ability to plan and organize tasks.

The symptoms and how serious they are for ASD can be very different for each child. The way it shows up in a person depends on their age, how their mind works, their language skills, and any other conditions they might have.[2] There have been many global and regional efforts to enhance early detection of diagnosis and treatment of ASD. The World Health Organization (2014) states that the monitoring of child and adolescent development, in order to ensure timely detection and management of ASD in primary care, is a vital part of a national health system.[3] Past 50 years autism spectrum disorder (ADS) has gone from a narrowly defined, rare disorder of childhood onset to a well-publicized, advocate, and researched lifelong condition recognized as fairly common and very heterogeneous. The description of core features of ASD as being social communication deficits and repetitive and unusual sensory-motor behaviors has not changed substantially since its original delineation. However, autism is now seen as a spectrum that can range from very mild to severe. Nevertheless, many (but not all) individuals with ASD require lifelong support of some kind.[4]

NEED OF THE STUDY

Nowadays there are many cases of autism we have seen, there are many patients often struggle with sensory processing difficulties that interfere with learning, behaviors and social interactions In this topic, I wanted to research about that can tactile, visual, auditory and proprioceptive techniques improve sensory processing abilities in individuals with mild autism spectrum disorder (ASD)

METHODOLOGY

Duration - 3 months
Study design - Experimental Study
Study set up- Pediatric Hospitals and autism centers in Pune
Treatment duration - 3 months
Sampling method – Convenient sampling (Childhood Autism Rating Scale (CARS)

MATERIALS

- Consent form
- Data collection sheet
- Pen
- Writing pad

- Brush
- Sand, rice, beans
- Swiss ball
- Resistance bands
- Sound
- Torch

OUTCOME MEASURES

1. Childhood Autism Rating Scale (CARS)

Validity and Reliability
1) Childhood Autism Rating Scale (CARS) Reliability:
sensitivity - 81.5%
specificity – 78.6%

PROCEDURE

- **CONSENT –**

Study was begun with presentation of synopsis. Ethical clearance was taken from ethical committee of college of physiotherapy tilak Maharashtra Vidyapeeth. Consent was taken from the parents and guardians of the participants.

- **ASSESSMENT –**

Participants were selected according to the inclusive and exclusive criteria.
Aim and objectives of the study was explained to the participants.
Childhood Autism rating scale was explained to everyone

- **TRAINING PROTOCOL –**

After getting approval from everyone started the research over there Intervention protocol for 2 – 4 months With 2-3 session per week with All over Protocol was of 60min

Techniques were performed as below:

- Auditory technique: 15 min
- Visual technique: 15 min
- Tactile technique: 15 min

- Proprioceptive technique: 15 min

SENSORY INTEGRATION TECNIQUES

- **Tactile Techniques**:

1.Deep Pressure: firm hugs, joint compressions.

2.Brushing Therapy: gentle brushing with a sensory brush.

3.Tactile Play: playdough, sand, rice, beans.

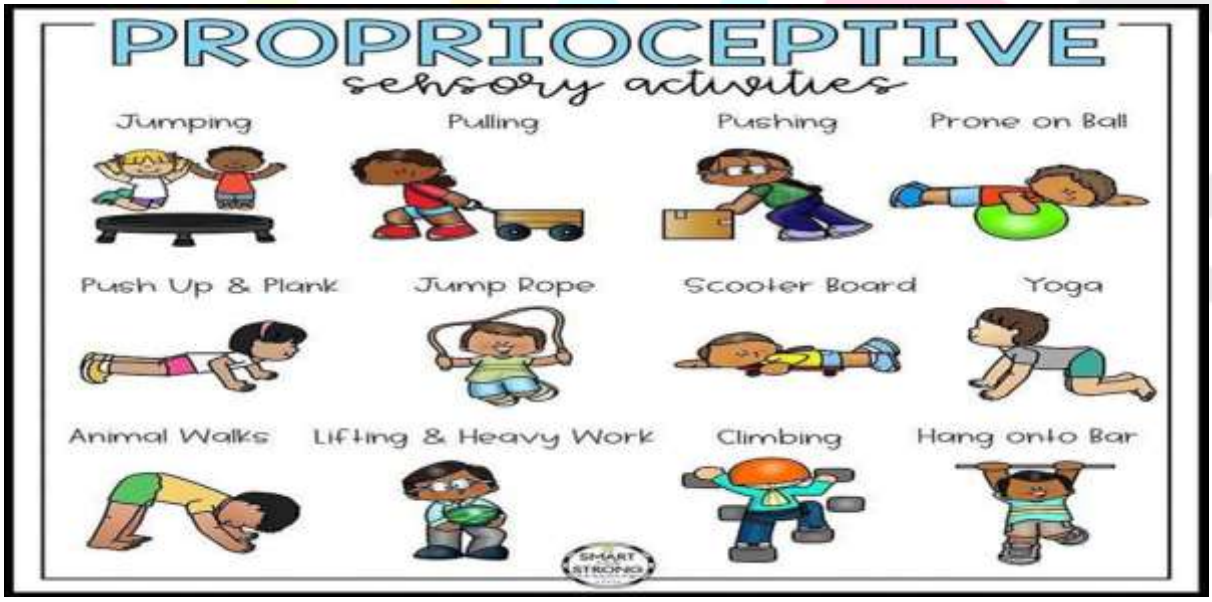
- **Proprioceptive Techniques:**

1.Jumping, pulling, pushing, yoga.

2.Animal walks.

3.Lifting heavy weights.

4.Resistance Band Exercises: stretching and resistance exercises.



- **Auditory Techniques:**

1.Music Therapy: listening to calming music.

- **Visual Techniques:**

1.Light Therapy: exposure to specific light frequencies.

2.Visual Schedules: using visual aids to organize daily routines.

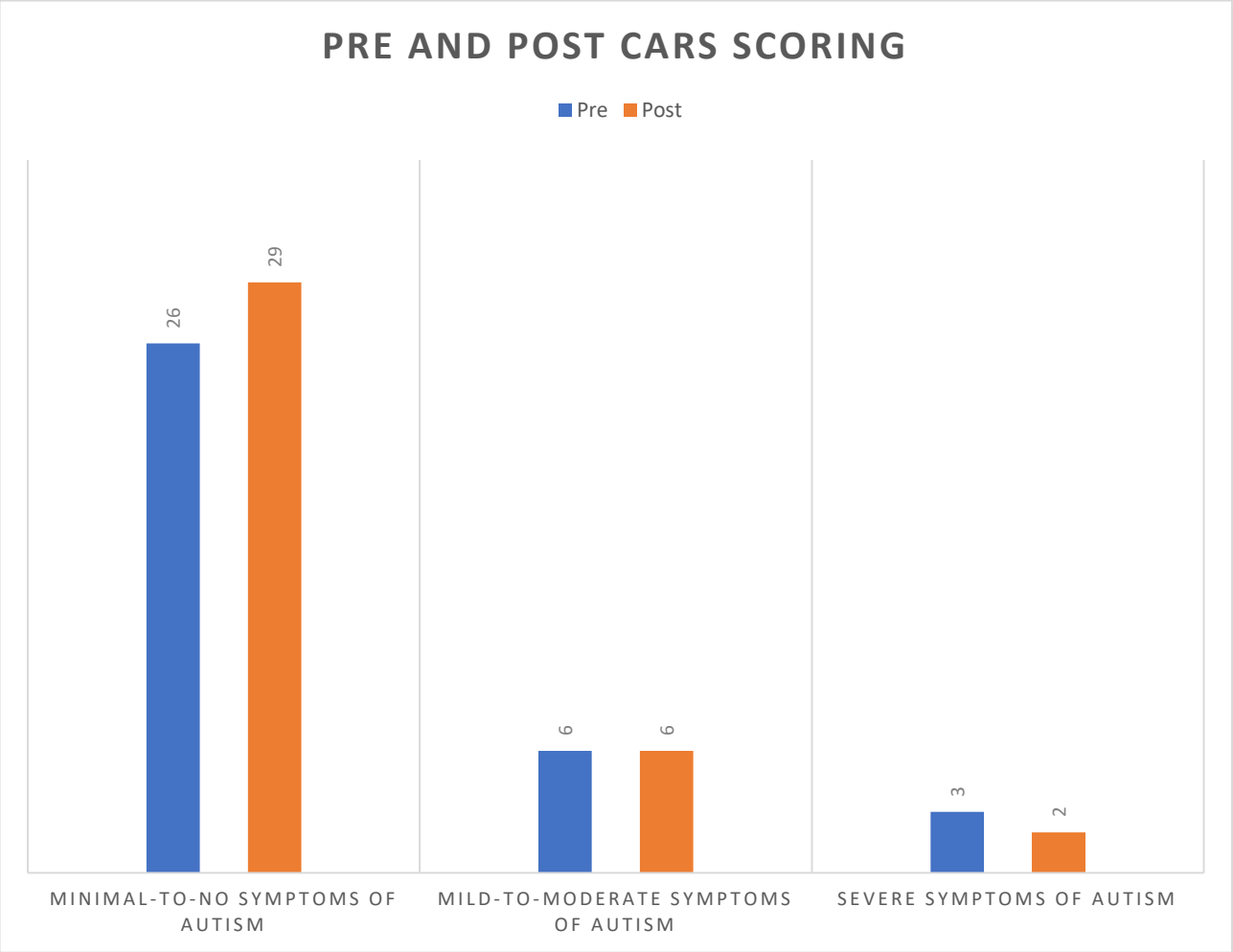
3.Eye Movement Desensitization: eye movements to reduce anxiety.

STATISTICAL ANALYSIS AND INTERPRITATION

Pre assessment Percentile		Post assessment percentile	
Mean	25.13513514	Mean	22.94595
Standard Error	1.302666566	Standard Error	1.308293
Median	24	Median	21
Mode	19	Mode	24
Standard Deviation	7.92381138	Standard Deviation	7.958036
Sample Variance	62.78678679	Sample Variance	63.33033
Kurtosis	-0.909313692	Kurtosis	-0.44874
Skewness	0.4951266	Skewness	0.659785
Range	28	Range	30
Minimum	14	Minimum	12
Maximum	42	Maximum	42
Sum	930	Sum	849
Count	37	Count	37

	t	df	p	Cohen's d
Pre assessment Percentile - Post assessment percentile	6.21	36	<.001	1.02

	Pre	Post
Minimal-to-no symptoms of autism	26	29
Mild-to-moderate symptoms of autism	6	6
Severe symptoms of autism	3	2



RESULT

36 children with Autism were included in the present study. Pre and post values were recorded on the Childhood Autism Rating Scale – second edition. Descriptive statistics, frequency distribution was done for the demographics, gender wise distribution, and pre and post scoring for CARS. The Pre and Post scores were compared using the paired t-test as the data was normally distributed (checked by Shapiro Wilk test). Statistical analysis was done using Jamovi version 2.6 software.

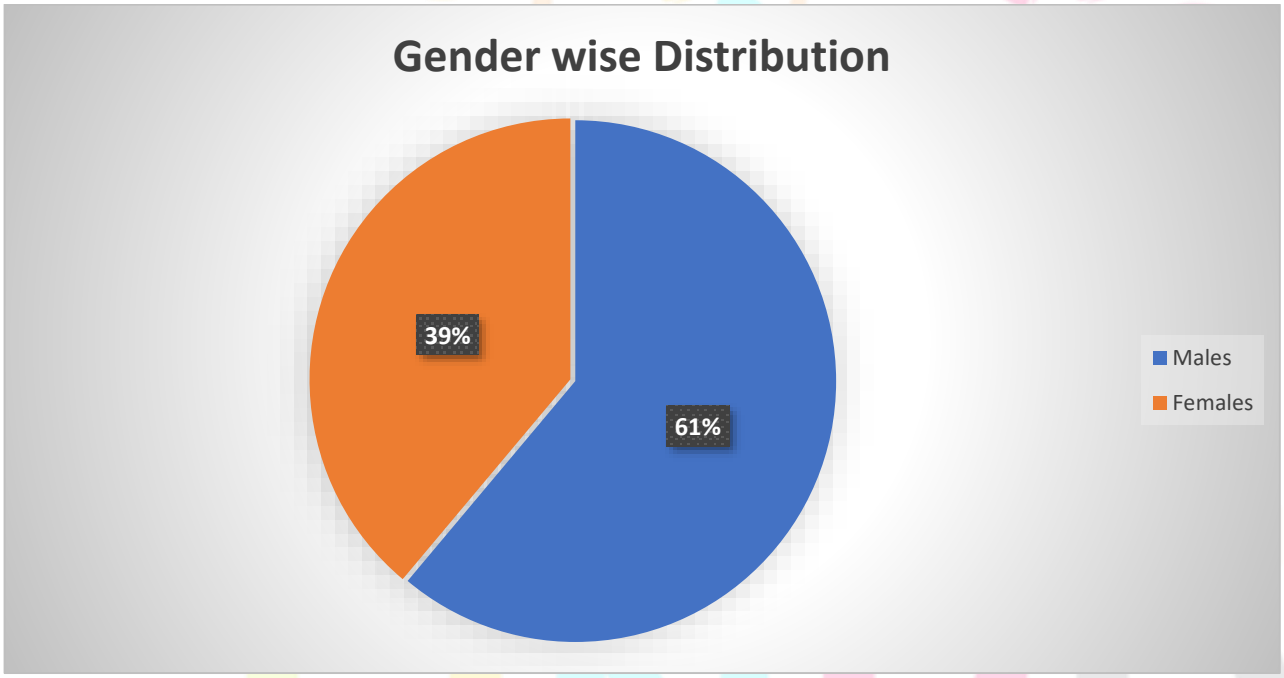
Descriptive statistics of Age (in years)

	Age (in years)
Mean	10.13
Median	10
Mode	12
SD	1.94
Minimum	7
Maximum	14

The participants in the study were children aged between 7 and 14 years with a mean age of 10.13 years (SD = 1.94). The median age was 10 years and the mode was 12 years indicating that most participants were around this age. The narrow range of age values and relatively low standard deviation suggest that the sample was fairly homogeneous in terms of age distribution.

Gender-wise Distribution

	Frequency	**Percentage**
Males	22	61%
Females	14	39%

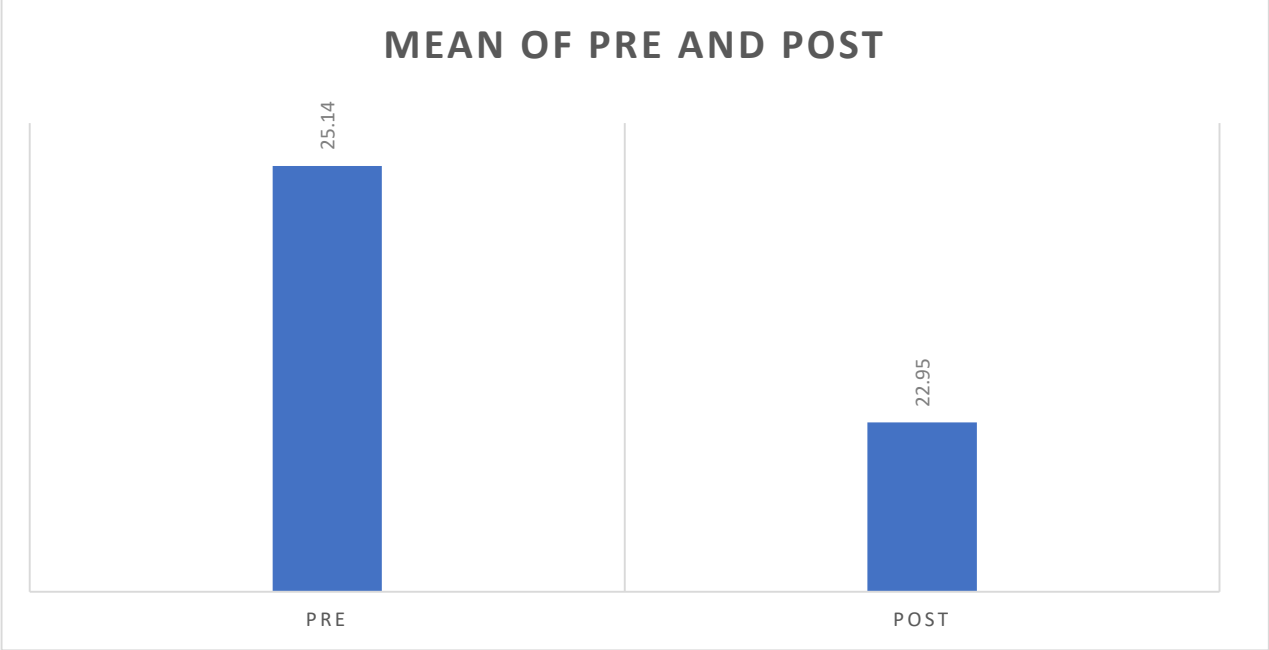


Out of the 36 children included in the study 22 (61%) were males and 14 (39%) were females. This indicates a higher representation of male participants which aligns with existing literature suggesting a greater prevalence of autism spectrum disorder among males compared to females

Descriptive Statistics of CARS

	Pre	**Post**
Mean	25.13	22.94
Median	24	21
Mode	19	24

SD	7.92	7.95
Minimum	14	12
Maximum	42	42



The mean pre-intervention CARS score was 25.13 while the mean post-intervention score decreased to 22.94 that indicate an overall improvement in autism-related symptoms following the intervention. The median score reduced from 24 to 21 and although the standard deviation remained similar (Pre: 7.92; Post: 7.95) the lower post-intervention mean and median suggest a general trend of reduced symptom severity. The minimum scores decreased from 14 to 12 while the maximum remained constant at 42 which reflect that improvement occurred across various severity levels.

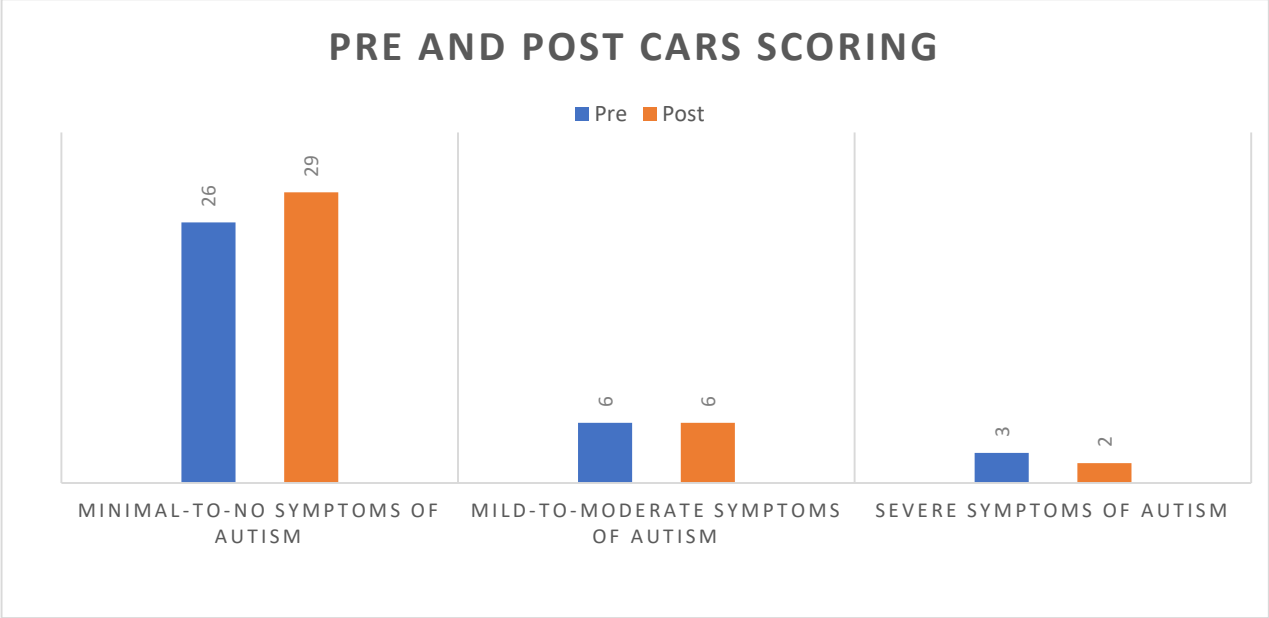
Comparison of Pre and Post Scores using the Paired t-test

	p-value	**Effect size**
Pre and Post	<0.01	1.02

The paired t-test revealed a statistically significant difference between the pre- and post-intervention CARS scores ($p < 0.01$) with an effect size of 1.02. This large effect size suggests that a strong practical significance indicating that the intervention had a substantial positive impact on reducing autism symptoms severity among the participants.

Distribution as per CARS score (Pre and Post)

	Pre	Post
Minimal-to-no symptoms of autism	26	29
Mild-to-moderate symptoms of autism	6	6
Severe symptoms of autism	3	2



When categorized based on the CARS interpretation of 26 children were classified as having minimal-to-no symptoms of autism before intervention and which increased to 29 post-interventions. The number of children in the mild-to-moderate category remained constant at 6 while those with severe symptoms decreased from 3 to 2. This shift in distribution demonstrates an overall improvement of autism-related behaviors with a higher proportion of children showing minimal or no symptoms after the intervention.

DISCUSSION

The present study evaluated the effectiveness of sensory integration therapy in improving behavioral and functional outcomes of the children with Autism Spectrum Disorder (ASD) using the Childhood Autism Rating Scale – Second Edition. Thirty-six children aged 7 to 14 years were enrolled and their pre- and post-intervention scores were compared. The results showed a significant reduction in autism severity scores following sensory integration therapy intervention which state that positive changes in sensory processing, social communication, and adaptive behavior.

The mean pre-intervention childhood autism rating scale score of 25.13 decreased to 22.94 post-intervention which indicate a noticeable improvement in autism-related symptoms. The paired t-test showed a p-value < 0.01 which confirm that the difference between pre- and post-scores was statistically significant. Furthermore the

effect size of 1.02 indicates a large practical effect, suggesting that sensory integration therapy had a meaningful influence on symptom reduction. The shift in classification of children as per childhood autism rating scale categories—from 26 to 29 children showing minimal-to-no symptoms and a reduction in the severe category from 3 to 2—further reinforces the clinical significance of sensory integration therapy in improving functional outcomes.

The findings from another study by Schaaf et al. (2014) and Pfeiffer et al. (2011) showed significant improvement in goal attainment, adaptive behavior, and social responsiveness following all the technique-based interventions[6]. The results of the current study support the hypothesis that is consistent of individualized sensory can bring measurable improvements in children's performance across domains of daily living and interaction. It also provides evidence it not only focuses on sensory processing but also contributes to an overall enhancement in cognitive, emotional, and behavioral regulation.

The gender distribution in the present study showed a higher proportion of male participants (61%) than compared to females (39%). This finding is consistent with the epidemiological trends of ASD by which indicate a higher prevalence among males. The gender difference, however did not influence the intervention outcomes in this study, suggesting that sensory integration therapy was equally beneficial across both the genders. The mean age of 10.13 years reflects that children were in middle childhood, which a crucial developmental phase is presented by increased responsiveness to environmental stimuli and learning experiences[7]. This further supports the effectiveness of SIT when introduced during school-age years, as children at this stage possess sufficient cognitive and physical abilities to actively engage in therapy activities.

The present results states that sensory integration therapy plays a vital role in modulating the sensory, motor, and affective domains of children with ASD. Improvement in CARS scores following intervention indicates a reduction in maladaptive behaviors and an enhancement in task engagement, social participation, and responsiveness. This suggests that integrating sensory integration therapy as part of a multidisciplinary rehabilitation program can provide a holistic and sustainable improvement in functional independence and quality of life for children with autism.

CONCLUSION

Sensory integration therapy significantly improved behavioral and functional outcomes in children with Autism Spectrum Disorder, as per the Childhood Autism Rating Scale scores.

LIMITATIONS

1. There is a relatively small sample size which limits the generalizability of the results to the broader ASD population.

2. There was no control group receiving alternative or no intervention, which makes it difficult to isolate the effects of Sensory integration therapy from other potential confounding factors such as developmental milestones or environmental changes.
3. The use of CARS-2 as the sole assessment tool provides a general measure of autism severity.
4. Long-term follow-up was not done.

FUTURE SCOPE

1. There should be a focus on a larger, multi-centered study with a randomized controlled design to establish stronger evidence regarding the effectiveness of sensory integration therapy in autism.
2. Tools like the Sensory Profile or Sensory Processing Measure can provide deeper insights into specific areas.

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