

EFFECTIVENESS OF COMBINED SENSORY INTEGRATION AND BEHAVIOURAL INTERVENTION ON INSISTENCE ON SAMENESS IN DAILY ROUTINE AMONG CHILDREN WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

Background: Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by persistent difficulties in social communication, social interaction, and restricted, repetitive behaviours. Insistence on Sameness (IS), a core behavioural feature of ASD, is characterized by a strong preference for routine, difficulty adapting to change, and distress during transitions. These behaviours can adversely affect occupational participation, adaptive functioning, and engagement in daily activities. This study evaluated the effectiveness of a combined Sensory Integration and Behavioural Intervention programme in reducing IS among children with ASD. **Aim:** To determine the effectiveness of combined Sensory Integration and Behavioural Intervention on Insistence on Sameness in children with Autism Spectrum Disorder. **Methods:** A randomized controlled trial included 60 children with ASD aged 7–12 years, randomly assigned to an Experimental Group (n=30) or Control Group (n=30). Insistence on Sameness and repetitive behaviours were assessed using the Repetitive Behaviour Scale–Revised (RBS-R). The Experimental Group received a combined intervention for 60 minutes per session, four sessions weekly for eight weeks, while the Control Group received routine occupational therapy. Data were analysed using descriptive statistics and paired and independent sample t-tests. **Results:** The Experimental Group demonstrated significant reductions in all RBS-R subscales and total scores, including the Sameness Behaviour subscale (2.50 ± 0.51 to 1.00 ± 0.74 ; $p < 0.001$), whereas no significant changes were observed in the Control Group. **Conclusion:** Combined Sensory Integration and Behavioural Intervention effectively reduced Insistence on Sameness and repetitive behaviours while improving behavioural flexibility in children with ASD.

Keywords: Autism Spectrum Disorder, Insistence on Sameness, Sensory Integration Therapy, Behavioural Intervention, Occupational Therapy, RBS-R.

1. INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by persistent difficulties in social communication, social interaction, and the presence of restricted and repetitive patterns of behaviour. These characteristics influence the child's ability to perform age-appropriate activities and participate independently in everyday life. Children with ASD often experience challenges in self-care, play, learning, and community participation because of impairments in adaptive functioning, behavioural flexibility, and sensory processing. Consequently, these limitations affect occupational performance and reduce engagement in meaningful daily activities. Occupational therapy aims to enhance functional

independence by addressing the sensory, behavioural, and environmental factors that interfere with successful participation in everyday occupations (American Psychiatric Association, 2022). Among the behavioural characteristics associated with ASD, Insistence on Sameness (IS) is recognized as a prominent feature. It refers to a strong preference for predictable routines, familiar environments, and consistent patterns of behaviour, accompanied by resistance to unexpected changes. Children with IS often expect activities to occur in the same order and may become distressed when routines are modified. Changes in daily schedules, transitions between activities, or unfamiliar situations can result in anxiety, repetitive questioning, emotional outbursts, withdrawal, or refusal to participate in activities (Gotham et al., 2013). Insistence on Sameness can considerably affect occupational participation across different settings. Everyday occupations require flexibility to adapt to changing environments, schedules, and task demands. However, children with ASD who exhibit rigid behavioural patterns frequently experience difficulty adjusting to these routine variations. Activities such as dressing, bathing, feeding, toileting, classroom participation, play, and community outings may become challenging when familiar routines or environmental conditions are altered. Behavioural rigidity may also delay the acquisition of adaptive skills and reduce participation in meaningful occupations (Boyd et al., 2012; Bodfish et al., 2000). The impact of IS is especially noticeable during transitions. Moving from one activity to another requires behavioural flexibility, planning, sensory regulation, and adaptive responses. Children with ASD may struggle when transitioning from preferred to non-preferred activities, preparing for school, changing classrooms, or entering unfamiliar environments. Such situations may lead to behavioural resistance, emotional dysregulation, repetitive behaviours, or avoidance, thereby limiting successful participation in structured daily routines. Similar challenges are observed in school and community settings, where unexpected changes in schedules, classroom arrangements, or social situations may interfere with learning, peer interaction, and recreational participation (South et al., 2005; Leekam et al., 2011).

Research indicates that sensory processing difficulties contribute significantly to the development of Insistence on Sameness in children with ASD. Many children demonstrate atypical responses to tactile, auditory, vestibular, proprioceptive, and visual input. Sensory hypersensitivity or reduced responsiveness may increase dependence on predictable routines as a strategy for maintaining emotional and behavioural regulation. Consequently, unfamiliar sensory experiences encountered during daily occupations may increase behavioural rigidity and reduce adaptability (Lane et al., 2010). Sensory Integration Theory, developed by A. Jean Ayres, explains how effective processing and organization of sensory information support adaptive behaviour and participation in daily activities. Sensory Integration Therapy uses structured sensory experiences to improve sensory modulation, postural control, praxis, attention, and self-regulation, thereby enhancing occupational performance. Previous studies have reported improvements in sensory regulation, self-care, social participation, and functional performance following Sensory Integration intervention among children with ASD (Ayres, 1972; Pfeiffer et al., 2011). Behavioural intervention is another evidence-based approach commonly used in ASD management. Strategies including positive reinforcement, visual schedules, task analysis, prompting, modelling, graded exposure, and transition supports encourage adaptive behaviours while reducing behavioural rigidity. These approaches assist children in developing flexibility, improving transitions, and increasing participation in self-care, educational, play, and community-based occupations (Schaaf et al., 2014; Wong et al., 2015). Although Sensory Integration Therapy and Behavioural Intervention have individually demonstrated positive outcomes, limited research has investigated their combined effect on Insistence on Sameness in everyday routines. An integrated intervention may simultaneously address sensory regulation and behavioural flexibility, leading to improved occupational participation. Therefore, the present study was undertaken to evaluate the effectiveness of a combined Sensory Integration and Behavioural Intervention programme on Insistence on Sameness among children with Autism Spectrum Disorder, thereby contributing evidence to support occupational therapy practice.

2. Aim and Objectives:

Aim:

To study the effectiveness of Combined Sensory Integration and Behavioural Intervention on Insistence on Sameness among children with Autism Spectrum Disorder.

Objectives:

- 1.To study the demographic variables of the Control Group and Experimental Group.
- 2.To determine the pre-test scores of the control Group using the Repetitive Behaviour Scale–Revised (RBS-R).
- 3.To determine the pre-test scores of the Experimental Group using the Repetitive Behaviour Scale–Revised (RBS-R).
- 4.To determine the post-test scores of the Control Group using the Repetitive Behaviour Scale–Revised (RBS-R).
- 5.To determine the post-test scores of the Experimental Group using the Repetitive Behaviour Scale–Revised (RBS-R).
- 6.To compare the pre-test and post-test scores between the Control Group and Experimental Group using the Repetitive Behaviour Scale–Revised (RBS-R).

3. Methodology:

Research Design

Study was conducted using Randomized control trial

Study Setting

The study was conducted at Chettinad Hospital and Research Institute (CHRI) and selected paediatric developmental and therapy centres in and around Chengalpattu, Tamil Nadu, India. The intervention sessions were delivered in a structured clinical environment under the supervision of the investigator.

Study Participants

A total of 60 children previously diagnosed with Autism Spectrum Disorder were recruited for the study. Participants were randomly allocated into two groups:

- Experimental Group (n = 30)
- Control Group (n = 30)

3.4 Inclusion Criteria

- Children previously diagnosed with Autism Spectrum Disorder based on DSM-5 criteria by a qualified physician or clinical psychologist.
- Children aged 7–12 years.
- Both male and female children.
- Parents or primary caregivers willing to provide informed consent and participate in the study.

Exclusion Criteria

- Children with severe visual, hearing, or physical impairments.
- Parents unwilling to participate in the intervention program.
- Children with epilepsy

Outcome Measure

The **Repetitive Behaviour Scale–Revised (RBS-R)** was used to assess Insistence on Sameness in children with Autism Spectrum Disorder. The **Sameness Behaviour Subscale** includes 11 caregiver-rated items assessing resistance to change, routine adherence, and transition difficulties. Each item is scored on a 4-point Likert scale, with higher scores indicating greater behavioural rigidity and Insistence on Sameness.

4. Intervention Procedure

The participants in the Experimental Group received a **Combined Sensory Integration and Behavioural Intervention** programme for a period of **8 weeks**, comprising **four sessions per week**, with each session lasting **60 minutes**. Each treatment session was divided into three phases: a **10-minute warm-up**, **45 minutes of structured intervention**, and a **5-minute cool-down**. The warm-up phase included sensory regulation activities such as deep breathing exercises, vestibular and proprioceptive input, movement-based activities, and attention-enhancing tasks to prepare the child for the intervention session. The main intervention phase incorporated Sensory Integration activities, including therapy swing exercises, balance board training, obstacle course activities, therapy ball exercises, vestibular stimulation, proprioceptive input, tactile stimulation, motor planning, and postural control activities. Behavioural Intervention strategies were integrated simultaneously and included positive reinforcement, Functional Communication Training (FCT), visual schedules, token economy, prompting and fading, differential reinforcement, transition-management strategies, structured play, and social participation activities. The intervention programme was individualized according to each child's sensory processing abilities and behavioural needs, with the primary aim of reducing Insistence on Sameness, improving behavioural flexibility, facilitating smoother transitions, and enhancing participation in daily routines. Each session concluded with a 5-minute cool-down consisting of relaxation exercises, deep breathing, calming sensory activities, and preparation for transitioning out of the therapy session. Participants in the Control Group received routine occupational therapy services throughout the study period without the combined Sensory Integration and Behavioural Intervention programme.

Data Collection Procedure

Baseline assessment was conducted for both the Experimental and Control Groups using the **Repetitive Behaviour Scale–Revised (RBS-R)** before the commencement of the intervention. Following the completion of the **8-week intervention programme**, post-test assessment was carried out using the same outcome measure to evaluate changes in repetitive behaviours and **Insistence on Sameness**.

Statistical Analysis

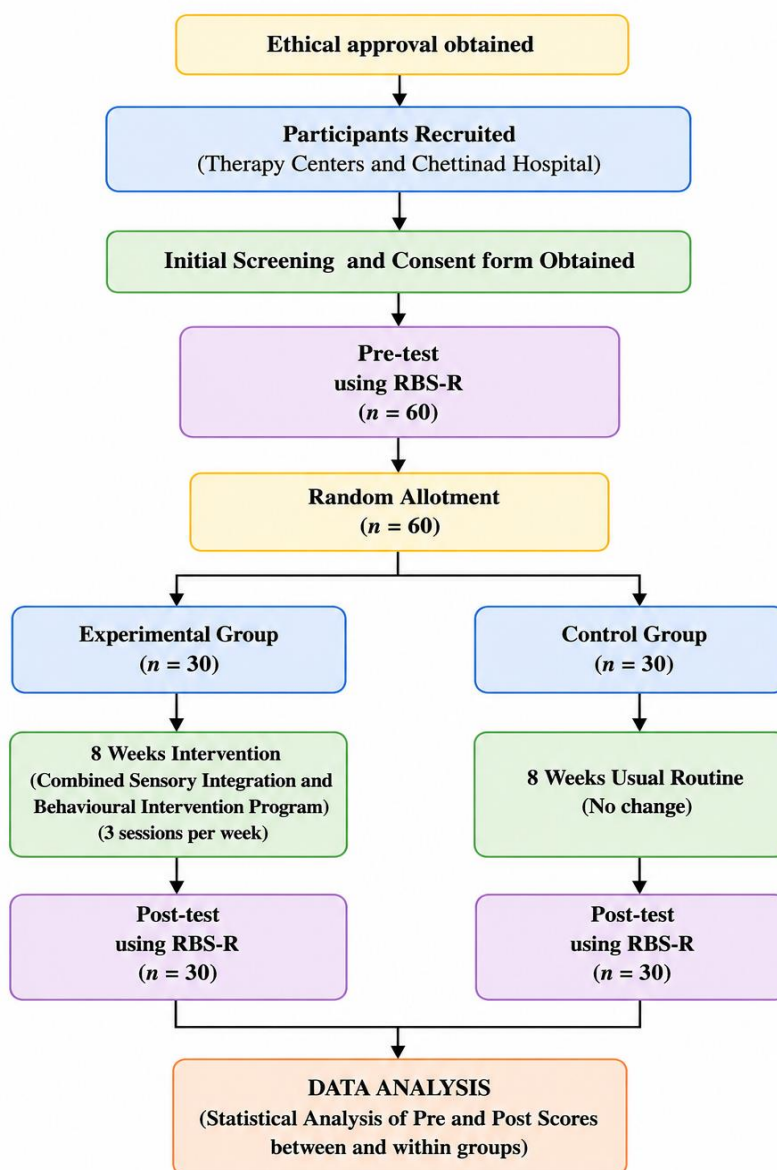
The collected data were analyzed using **Statistical Package for the Social Sciences (SPSS) version 25.0**. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and outcome variables. The **paired sample t-test** was used to compare pre-test and post-test scores within each group, while the **independent sample t-test** was used to compare the mean scores between the Experimental and Control Groups. A **p-value of less than 0.05** was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the **Institutional Human Ethics Committee, Chettinad School of Occupational Therapy**, before the commencement of the study (Proposal ID: **HEC-I/3806/25**). The study was conducted in accordance with ethical principles for research involving human participants. Written

informed consent was obtained from the parents or primary caregivers of all participants before enrolment. Confidentiality, anonymity, and privacy of participant information were maintained throughout the study

FLOW CHART OF THE STUDY



5. Result:

The interpretation of the data used to assess the effectiveness of the **Combined Sensory Integration and Behavioural Intervention** is presented in this section. The **Repetitive Behaviour Scale–Revised (RBS-R)** was administered during the pre-test and post-test assessments, and the collected data were statistically analysed. The results were compared within the Control and Experimental Groups as well as between the two groups following the intervention. While the Control Group received routine occupational therapy, the Experimental Group underwent the Combined Sensory Integration and Behavioural Intervention programme.

Analysis of Demographical Variables

Table 1. Distribution of Demographic Variables among the Control and Experimental Groups

Group	N	Mean S. D
Control	30	8.36 ± 1.15
Experimental	30	8.66 ± 1.12

The above table presents the comparison of the mean age between the Control and Experimental Groups. The mean age of the children in the Control Group was **8.36 ± 1.15 years**, whereas the mean age of the children in the Experimental Group was **8.66 ± 1.12 years**.

Figure 1 Age distribution between control and experimental groups

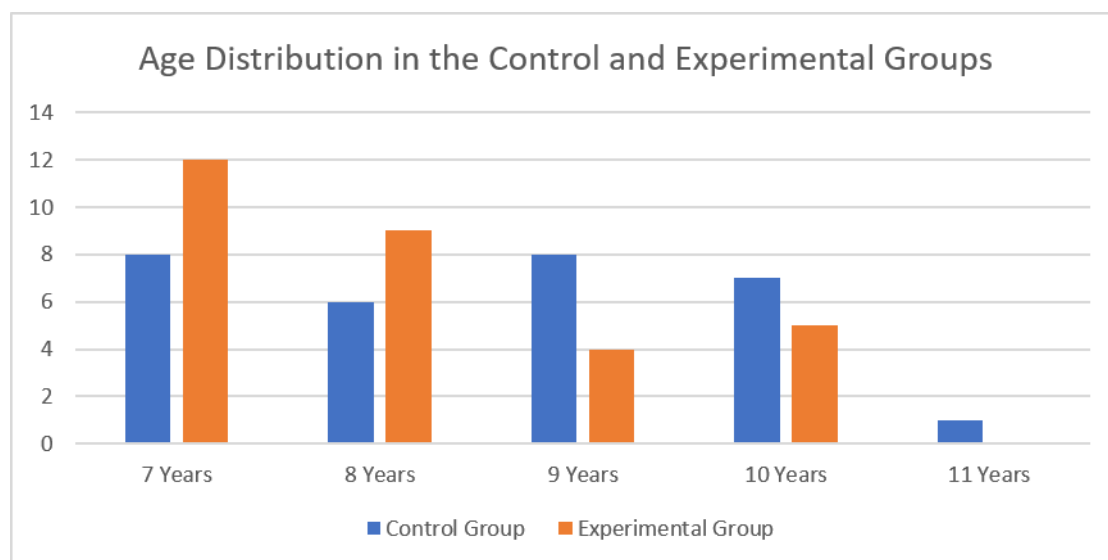


Figure 1 illustrates the mean age of participants in both groups. The mean age of the Experimental Group was **8.66 years**, while the Control Group had a mean age of **8.36 years**.

Table 2 Distribution of gender among Control and Experimental Groups

	Experimental		Control	Total
Gender	Male	18	20	38
	Female	12	10	22
Total	30		30	60

Table 2 shows the gender distribution of participants in the Experimental and Control Groups. Among the total **60 participants**, **38 were males** and **22 were females**. The Experimental Group included **18 males** and **12 females**, whereas the Control Group included **20 males** and **10 females**.

Figure 2 Gender distribution Between Control and Experimental Groups

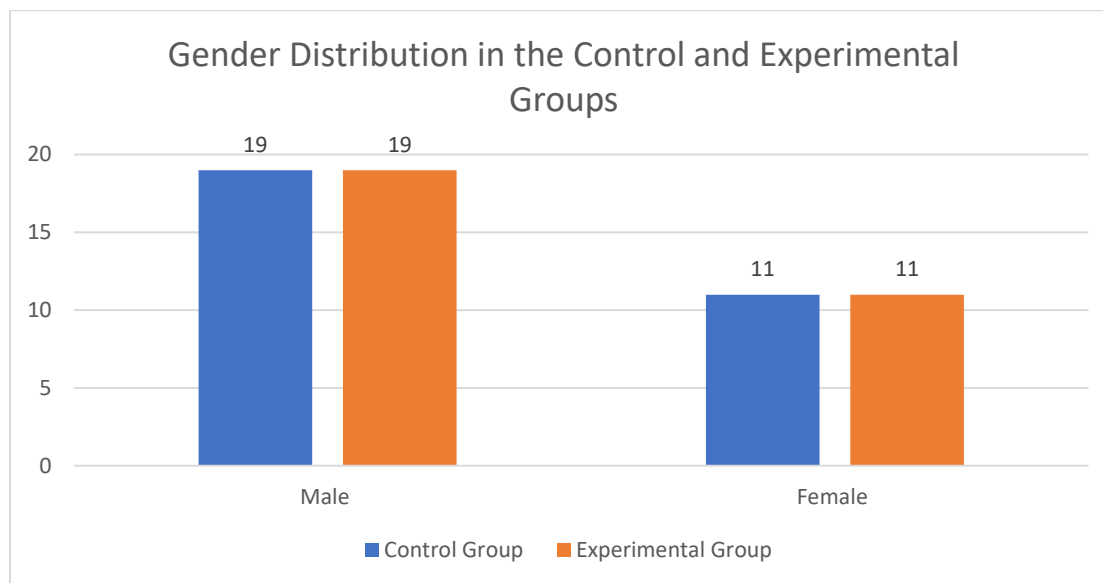


Figure 2 shows the gender distribution of participants in both groups. Among the total participants, males constituted the majority in both the Experimental and Control Groups.

Table 3 Comparison of Pre-Test and Post-Test Overall RBS-R Scores of Control and Experimental Groups

Group	Pre-test Mean $\pm$ SD	Post-test Mean $\pm$ SD	Mean Difference
Control	14.63 $\pm$ 1.16	14.57 $\pm$ 1.30	0.07
Experimental	15.43 $\pm$ 1.28	6.17 $\pm$ 2.35	9.27

The above table presents the comparison of pre-test and post-test Overall **RBS-R** scores between the Experimental and Control Groups. The Experimental Group demonstrated a marked reduction in mean RBS-R scores from **15.43 $\pm$ 1.28** to **6.17 $\pm$ 2.35**, indicating a significant reduction in **Insistence on Sameness** and repetitive behaviours. In contrast, the Control Group showed only a modest reduction, with scores decreasing from **14.63 $\pm$ 1.16** to **11.80 $\pm$ 1.79**.

Figure 3. Comparison of Pre-Test and Post-Test Overall RBS-R Scores between the Control and Experimental Group

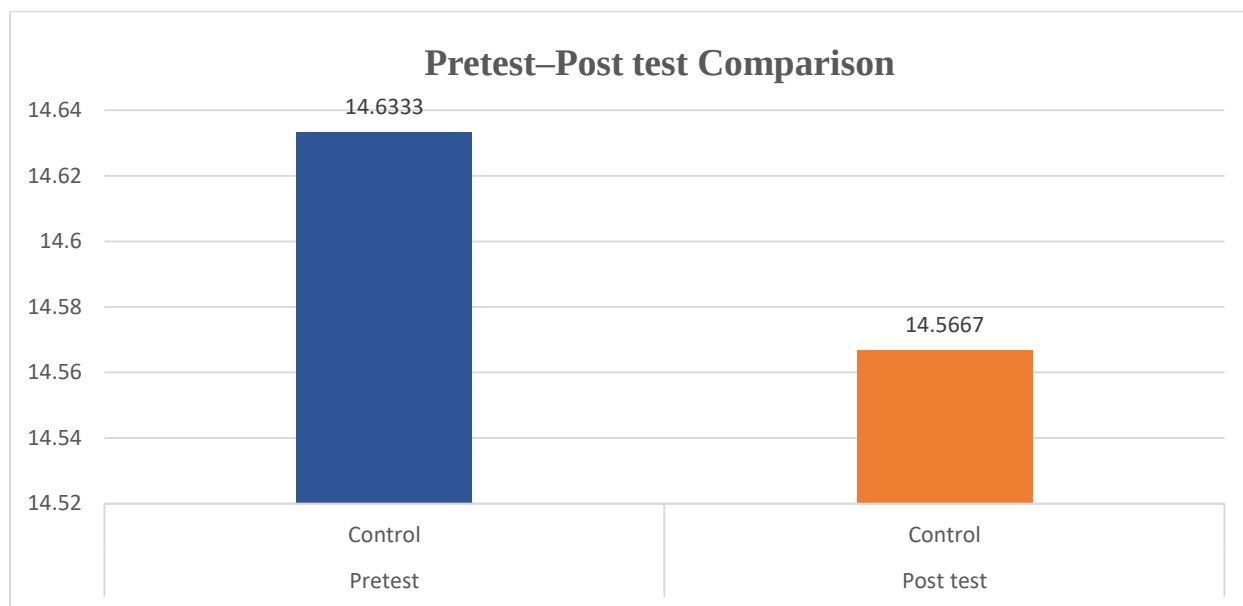


Figure 3 shows that both groups had comparable pre-test Overall RBS-R scores. Following the intervention, the Experimental Group demonstrated a substantial reduction in RBS-R scores, whereas the Control Group showed only minimal improvement, indicating the effectiveness of the Combined Sensory Integration and Behavioural Intervention

6. Discussion:

The present study evaluated the effectiveness of a **Combined Sensory Integration and Behavioural Intervention** programme in reducing **Insistence on Sameness** among children with Autism Spectrum Disorder. The intervention combined sensory integration activities with behavioural strategies and demonstrated significant improvements in behavioural flexibility and reductions in repetitive behaviours compared with routine occupational therapy. The demographic profile showed a predominance of male participants (63.3%), which is consistent with the higher prevalence of ASD reported among boys (Maenner et al., 2023). Baseline Overall **RBS-R** scores were comparable between the Control Group (14.63 ± 1.16) and Experimental Group (15.43 ± 1.28), indicating homogeneity before intervention. Following the intervention, the Control Group showed only modest improvement (14.63 ± 1.16 to 11.80 ± 1.79), whereas the Experimental Group demonstrated a marked reduction in Overall RBS-R scores (15.43 ± 1.28 to 6.17 ± 2.35), indicating significant improvement in **Insistence on Sameness** and associated repetitive behaviours. The observed improvements may be attributed to the combined effects of **Sensory Integration Therapy** and **Behavioural Intervention**. Sensory Integration activities improve sensory modulation, postural control, praxis, and self-regulation, while behavioural strategies such as positive reinforcement, Functional Communication Training (FCT), visual schedules, prompting, and transition-management techniques promote behavioural flexibility and adaptive responses during daily routines. Previous studies have reported similar improvements in sensory processing, behavioural regulation, and occupational participation following Sensory Integration and behavioural interventions (Ayres, 1972; Pfeiffer et al., 2011; Schaaf et al., 2014; Wong et al., 2015). Post-test comparisons demonstrated significantly better outcomes in the Experimental Group than in the Control Group, supporting the effectiveness of the combined intervention. These findings are consistent with previous studies reporting that integrated sensory and behavioural approaches improve adaptive functioning, behavioural flexibility, and participation in everyday occupations among children with ASD. The findings also support **Ayres' Sensory**

Integration Theory, which emphasizes the importance of sensory processing in adaptive behaviour and occupational performance. Overall, the study suggests that the Combined Sensory Integration and Behavioural Intervention is an effective, evidence-based occupational therapy approach for reducing **Insistence on Sameness**, improving behavioural flexibility, and enhancing participation in daily routines among children with Autism Spectrum Disorder.

7. Conclusion

The present study concluded that the **Combined Sensory Integration and Behavioural Intervention** programme was effective in reducing **Insistence on Sameness** and associated repetitive behaviours among children with Autism Spectrum Disorder. Children who received the intervention demonstrated significant reductions in Overall RBS-R scores, indicating improved behavioural flexibility, adaptability to routine changes, and participation in daily activities. In contrast, children in the Control Group showed only modest improvements following routine occupational therapy. The findings indicate that integrating **Sensory Integration Therapy** with **Behavioural Intervention** provides an effective occupational therapy approach for addressing behavioural rigidity and improving occupational participation in children with Autism Spectrum Disorder. Therefore, the combined intervention may be considered a valuable evidence-based treatment strategy for managing **Insistence on Sameness** in this population.

8. Limitation and recommendation

The present study was limited by a relatively small sample size, a short intervention duration of eight weeks, and reliance on caregiver-reported responses using the **Repetitive Behaviour Scale-Revised (RBS-R)**. Variations in ASD severity, sensory processing abilities, and family support were not fully controlled during the study. Furthermore, no follow-up assessment was conducted to determine the long-term effectiveness of the intervention. Future studies should include larger sample sizes, longer follow-up periods, additional standardized outcome measures, and comparative intervention designs. Further research is also recommended to investigate the effects of combined Sensory Integration and Behavioural Intervention across different ASD severity levels and on outcomes such as occupational performance, adaptive functioning, social participation, emotional regulation, and caregiver quality of life.

9. Acknowledgement:

I sincerely thank Almighty God, my family, friends, participants, and everyone who supported and contributed to the successful completion of this dissertation.

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