

EFFECTIVENESS OF VISUAL SEQUENCING ACTIVITIES ON OCCUPATIONAL PERFORMANCE AND QUALITY OF LIFE AMONG CHILDREN WITH INTELLECTUAL DISABILITY

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ABSTRACT

Background: Intellectual Disability (ID) is a neurodevelopmental disorder characterized by limitations in intellectual functioning and adaptive behavior, which can adversely affect occupational performance and quality of life. Visual sequencing activities use structured visual cues to support task organization, understanding, and execution, potentially enhancing functional independence and participation.

Aim: To determine the effectiveness of Visual Sequencing Activities on Occupational Performance and Quality of Life among children with Intellectual Disability.

Materials and Methods: The study employed a randomized controlled trial (RCT) research design to examine the effectiveness of Visual Sequencing Activities on Occupational Performance and Quality of Life among children with Intellectual Disability. The study was conducted at Child developmental centers and Chettinad Hospital. Ethical approval was obtained prior to the commencement of the study. A total of 60 children aged 7 to 12 years diagnosed with Mild Intellectual Disability were recruited using a convenient sampling method and were randomly assigned into an Experimental Group (n=30) and a Control Group (n=30) using opaque envelope randomization. Occupational Performance were assessed using the Canadian Occupational Performance Measure (COPM), and Quality of Life was measured using the Pediatric Quality of Life Inventory (PedsQL) before and after the intervention. The Experimental Group received Visual sequencing Activities for 60 minutes per session, two session per week, for a period of 8 weeks. The Control Group was subjected to continue to receive routine care of educational and therapeutic services. Pre-test and post-test scores were statistically analyzed to determine the effectiveness of the intervention.

Results: A total of 60 children aged 7 to 12 years with mild intellectual disability participated in the study, with 30 assigned to the experimental group and 30 to the control group. Independent sample t-test analysis revealed no significant baseline differences between groups in COPM and Pediatric Quality of Life Inventory (PedsQL) scores ($p > 0.05$), indicating group homogeneity prior to intervention. Paired sample t-test analysis demonstrated significant improvements in occupational performance, occupational satisfaction, and all PedsQL domains in the experimental group following visual sequencing activities ($p < 0.01$), whereas the control group showed no significant changes ($p > 0.05$). Post-test independent sample t-test analysis revealed significantly higher COPM and PedsQL scores in the experimental group compared with the control group ($p < 0.01$). These findings support the effectiveness of visual sequencing activities in enhancing occupational performance, satisfaction, and quality of life among children with mild intellectual disability.

Conclusion: The study concluded that Visual sequencing activities is an effective intervention for improving occupational performance and quality of life among children with Intellectual Disability. The structured use of visual sequencing activities provides meaningful opportunities for children to develop cognitive, behavioral, and self-regulation skills that are essential for academic performance and daily functioning. Therefore, Visual sequencing activities Training can be considered a valuable occupational therapy intervention for children with ID.

Keywords: Intellectual Disability, Visual Sequencing Activities, Occupational Performance, Quality of Life.

Introduction

Intellectual Disability (ID) is a neurodevelopmental disorder characterized by significant limitations in intellectual functioning and adaptive behavior, with onset occurring during the developmental period before 18 years of age. Intellectual functioning encompasses abilities such as reasoning, problem-solving, planning, abstract thinking, judgment, academic learning, and learning from experience. The global prevalence of ID is estimated to range from 1% to 3% of the population, with higher prevalence rates reported in low- and middle-income countries due to various socioeconomic, environmental, and healthcare-related factors (Moeschler et al., 2014; World Health Organization, 2011). In developing countries, approximately 10 to 15 children per 1,000 population are diagnosed with Intellectual Disability. Deficits in these areas can substantially affect an individual's capacity to function independently and effectively in everyday life (American Psychiatric Association, 2013). Adaptive behavior refers to the conceptual, social, and practical skills that individuals acquire and apply to meet the demands of daily living and societal expectations. These skills develop throughout the lifespan and are considered distinct from intellectual functioning. Children with Intellectual Disability commonly experience impairments in cognitive domains such as verbal comprehension, working memory, perceptual reasoning, and cognitive efficiency. Difficulties in communication, memory, perceptual performance, and motor functioning may further affect participation in educational, social, and daily living activities (Schalock et al., 2021; Farley et al., 2009). According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), Intellectual Disability is classified into four levels of severity: mild, moderate, severe, and profound. Unlike previous classification systems that relied primarily on IQ scores, the DSM-5 emphasizes adaptive functioning as the basis for determining severity, as it more accurately reflects the level of support required in everyday life. Mild Intellectual Disability is the most prevalent category, accounting for approximately 85% of all cases. Children with Mild Intellectual Disability typically demonstrate challenges in conceptual, social, and practical adaptive skills and often require intermittent support to participate successfully in daily activities and community life (American Psychiatric Association, 2013; Boat & Wu, 2015).

Occupational performance refers to an individual's ability to participate effectively in meaningful daily activities and life roles. It includes engagement in self-care, education, productivity, play, leisure, and social participation. Occupational performance is influenced by the interaction between the individual's abilities, environmental conditions, and the demands of the activity. Successful occupational performance promotes independence, participation, and overall well-being (American Occupational Therapy Association, 2020). Children with Intellectual Disability (ID) commonly experience limitations in conceptual, social, and practical adaptive skills that can affect their occupational performance. Difficulties in reasoning, problem-solving, communication, time management, social interaction, and activities of daily living may restrict their ability to participate independently in age-appropriate occupations. These challenges can influence academic achievement, social participation, and functional independence across home, school, and community settings (Lee et al., 2019; American Psychiatric Association, 2013). The development of occupational performance during childhood depends on the acquisition of various underlying skills, including motor abilities, praxis, sensory-perceptual processing, cognition, emotional regulation, communication, and social interaction. Typically developing children acquire these skills in a sequential manner, enabling effective participation in everyday occupations. In contrast, children with Intellectual Disability often demonstrate delays in one or more developmental domains, resulting in difficulties performing daily tasks and engaging in meaningful activities (Case-Smith, 2014).

Quality of Life (QoL) refers to an individual's perception of physical health, psychological well-being, social relationships, independence, and participation in meaningful life activities. Children with Intellectual Disability (ID) often experience reduced quality of life due to limitations in intellectual functioning and adaptive behavior. These challenges can affect their ability to perform daily living activities independently and participate effectively in home, school, and community environments. Many children require assistance with self-care activities such as dressing, bathing, feeding, toileting, and personal hygiene, which may reduce independence and increase caregiver responsibilities (Oti-Boadi, 2017; Raliphaswa et al., 2022). From an occupational therapy perspective, participation in meaningful occupations is a fundamental determinant of quality of life. Children with Intellectual Disability may experience difficulties in following instructions, sustaining attention, completing classroom activities, and meeting academic demands. Visual sequencing activities are structured therapeutic tasks that require individuals to identify, arrange, recall, and execute visual information in the correct sequential order using pictures, symbols, objects, or visual cues. These activities are designed to enhance visual perceptual processing, sequencing skills, attention, working memory, executive functioning, and task organization. Visual sequencing activities facilitate the development of skills necessary for academic performance, activities of daily living, and occupational participation by promoting the understanding and execution of step-by-step actions and routines (Schneck, 2010; Case-Smith, O'Brien, & Kuhaneck, 2019). The present study was undertaken to address the existing gaps in the literature concerning the use of visual sequencing activities for children with Intellectual Disability. There is a need for intervention approaches that enhance independence, participation, and functional performance by supporting children in completing everyday tasks more effectively. Visual sequencing activities have the potential to reduce cognitive demands, facilitate task organization, and promote successful engagement in meaningful occupations. However, limited evidence is available regarding their influence on both occupational performance and quality of life among children with Mild Intellectual Disability. Therefore, the current

study aims to examine the effectiveness of visual sequencing activities in improving occupational performance and quality of life, thereby contributing to the evidence base for occupational therapy interventions in this population. (Ahn, 2021; Angelin et al., 2021).

2. Aim & Objective of study

2.1 Aim of the study

- To study effectiveness of visual sequencing activities on occupational performance and quality of life among children with Intellectual disability.

2.2 Objectives

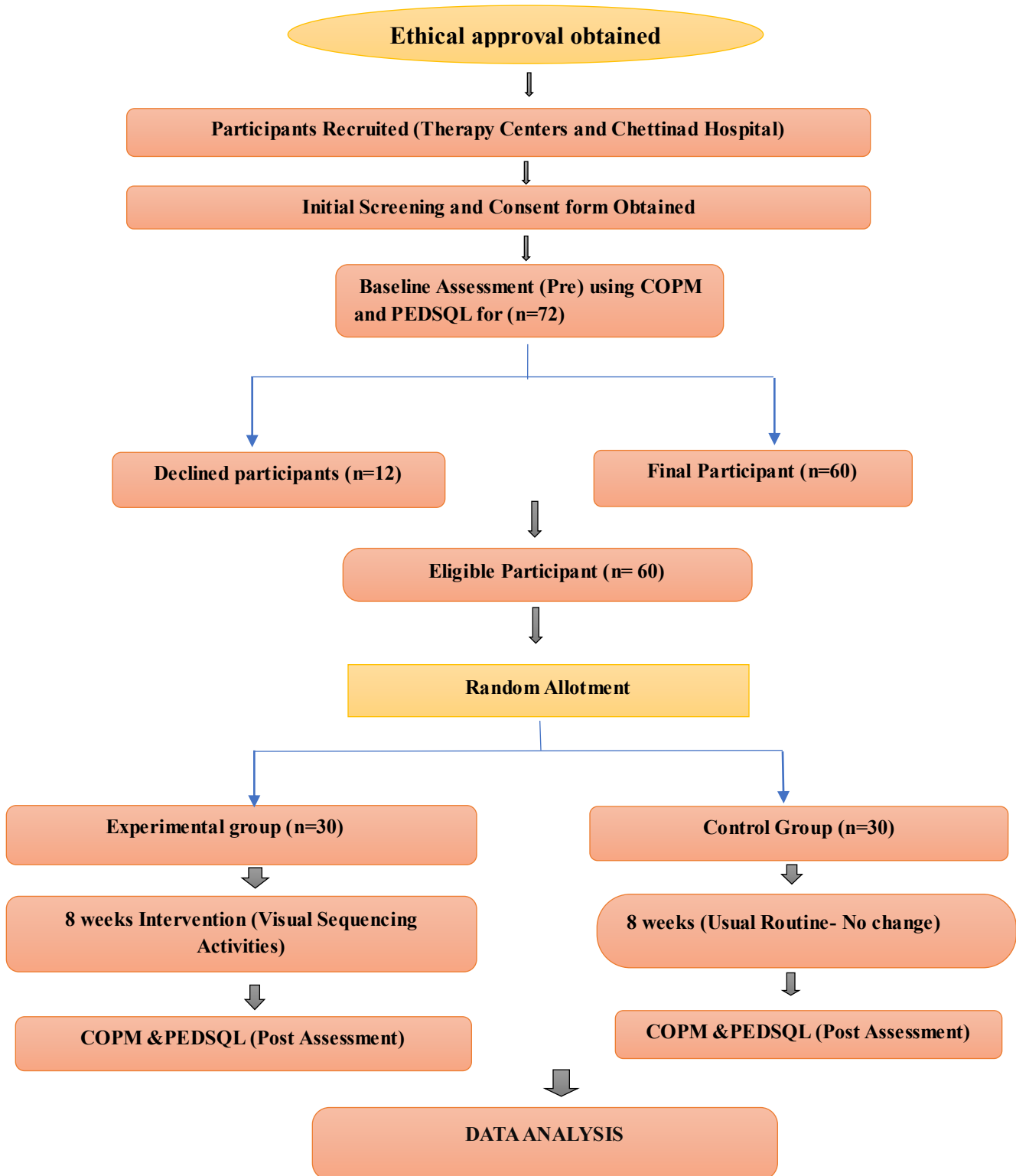
- To determine the Pretest values of the Control and Experimental group using Canadian Occupational Performance Measure (COPM) and Pediatric Quality of Life (PedsQL)
- To determine the Posttest values of the Control and Experimental group using Canadian Occupational Performance Measure (COPM) and Pediatric Quality of Life (PedsQL)
- To compare the Pretest and Posttest values within the Control and Experimental group using Canadian Occupational Performance Measure (COPM) and Pediatric Quality of Life (PedsQL)
- To compare the Pretest and Posttest values between the Control and Experimental Group using Canadian Occupational Performance Measure using (COPM) and Pediatric Quality of Life (PedsQL)

3. Methodology

The research aimed to assess how well visual Sequencing activities helped to improve occupational performance and quality of life among children with intellectual disability. The study used a RCT design which required participants to be divided into experimental and control groups. The researchers acquired ethical approval from CARE-IHEC while they registered their study in the CTRI before starting their research work. The study recruited 60 intellectual disability children between 7 to 12 years old through convenient sampling from Chettinad Hospital and Research Institute and Child developmental clinics located in Chennai. The study included both male and female participants who could complete the intervention program according to its requirements. The researchers excluded patients who had Children with severe visual impairment, upper limb orthopaedic impairments, speech and communication disorders, psychiatric conditions, medical disorders affecting movement, and significant behavioural problems that could interfere with participation in the intervention procedures were excluded from the study. The researcher used the chit method to assign participants into experimental and control groups because this method used sealed envelopes to hide the randomization sequence. The researchers designed the study to operate as a single-blinded experiment which prevented participants from knowing their assigned treatment. The Canadian occupational performance measure (COPM) and Pediatric quality of life (PedsQL) served as the outcome measure to evaluate both occupational performance and quality of life. All participants underwent baseline assessment which took place before their intervention. The Canadian Occupational Performance Measure (COPM) and Pediatric Quality of Life Inventory (PedsQL) served as outcome measures. The COPM was used to assess occupational performance and satisfaction, while the PedsQL was used to evaluate the quality of life of children with mild intellectual disability. The experimental group participants received Visual Sequencing Activities through a structured intervention program consisting of picture sequencing, object sequencing, activity sequencing, visual-motor sequencing, and cognitive sequencing tasks. The activities were graded according to the child's performance level and were conducted under the supervision of the researcher. The intervention lasted eight weeks with 2 sessions per week to complete a total of 16 sessions. The control group continued with their usual or existing treatment without receiving the new intervention during the study period. The researchers conducted a post-test assessment after the eight-week intervention period ended using the COPM and PedsQL which they administered to both study groups. The collected pre-test and post-test data were analyzed using appropriate statistical methods to evaluate the effectiveness of Visual Sequencing Activities on occupational performance and quality of life among children with mild intellectual disability.

3.1. Flow chart of study:

3.1 Flow Chart



4. Result and Analysis

This randomized controlled trial investigated the effectiveness of visual sequencing activities on occupational performance and quality of life among children with intellectual disability using the Canadian occupational performance measure (COPM) and Pediatric quality of life (PedsQL) served as the outcome measure to evaluate both occupational performance and quality of life.

Demographic Characteristics

Table 4.1. Baseline Demographic Characteristics of Participants Variable

Variable	Control Group (n=30)	Experimental Group (n=30)
Age (years), Mean ± SD	9.63±1.54	9.63±1.44
Male, n (%)	21(70%)	23(76.6 %)
Female, n (%)	9(30%)	7(23.3%)

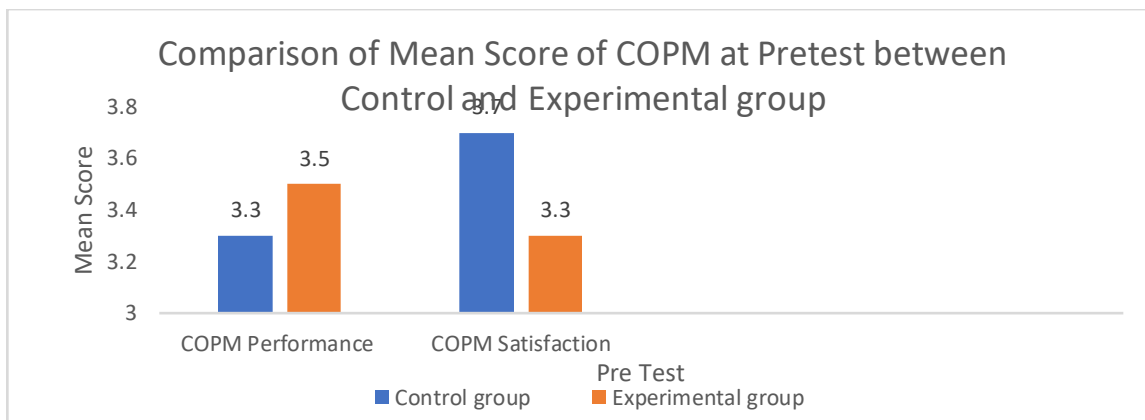
Table 4.2. Pre -Test Comparison Between Groups

Pre test	Control group	Experimental group	Mean difference	Independent t test	P value
	Mean ± Std.D	Mean ± Std.D			
COPM performance	3.30±0.88	3.56±0.91	-0.26	-1.118	.268
COPM satisfaction	3.73±0.86	3.33±0.85	0.39667	1.778	.081
Ped QL Physical	54.10 ± 8.44	52.73±6.53	1.36667	.701	.486
Ped QL Emotional	44.80 ± 7.23	47.33±7.07	-2.53333	-1.372	.175
Ped QL Social	54.93 ± 7.28	52.73±8.46	2.2	1.079	.285
Ped QL School	46.43 ± 8.05	47.96 ± 6.78	-1.53333	-.797	.428
Total Ped QL	50.06 ± 3.42	50.19 ± 3.77	-0.125	-.134	.894

Table 4.3. Post-Test Comparison Between Groups

Variable	Control Group Mean ± SD	Experimental Group Mean ± SD	T-value	p-value
COPM performance	2.90 ± 2.28	7.73 ± 0.85	-10.847	P < 0.01
COPM Satisfaction	4.03 ± 2.40	7.57 ± 0.84	-7.610	P < 0.01
PedsQL Physical	54.06 ± 8.50	81.56 ± 5.39	-14.956	P < 0.01
PedsQL Emotional	44.53 ± 7.14	78.03 ± 6.29	-19.266	P < 0.01
PedsQL Social	54.43 ± 8.14	81.30 ± 6.90	-13.775	P < 0.01
PedsQL School	46.80 ± 8.15	79.23 ± 7.51	-16.015	P < 0.01
Total PedsQL	50.90 ± 4.32	80.03 ± 3.59	-28.353	P < 0.01

4.2 a: Comparison of mean score of COPM at pretest between Experimental group and Control Group



4.2 b: Comparison of mean score of PEDSQL at pretest between Experimental group and Control Group

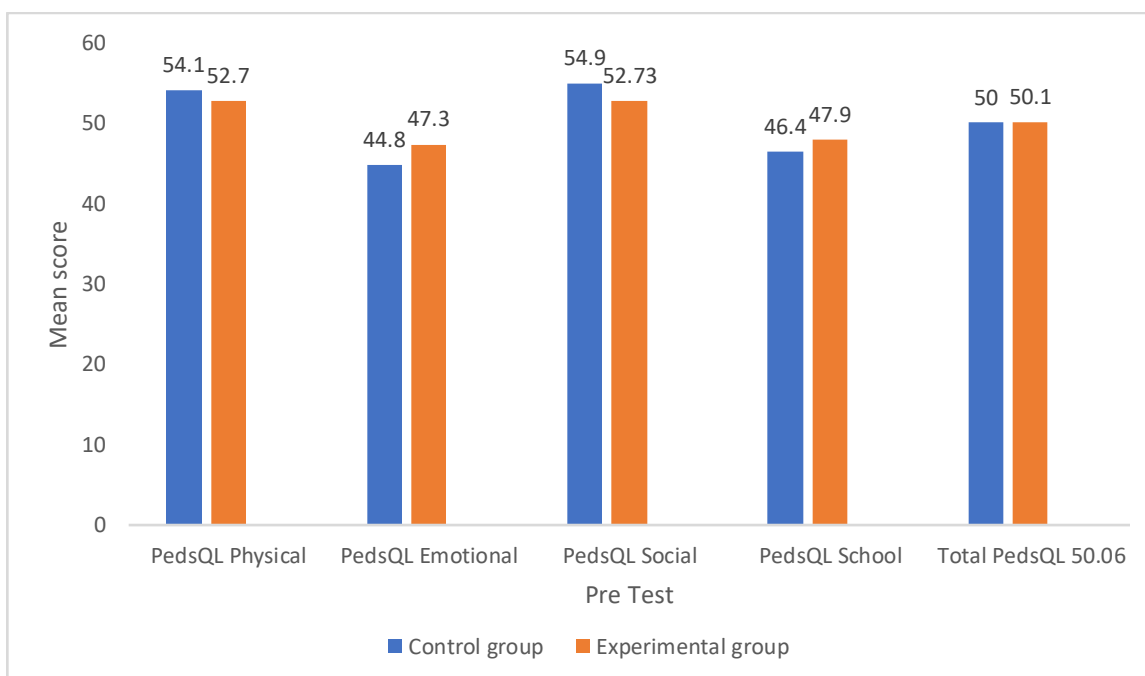


Figure: 4.3 a: Comparison Of mean score of COPM at posttest between experimental and control groups

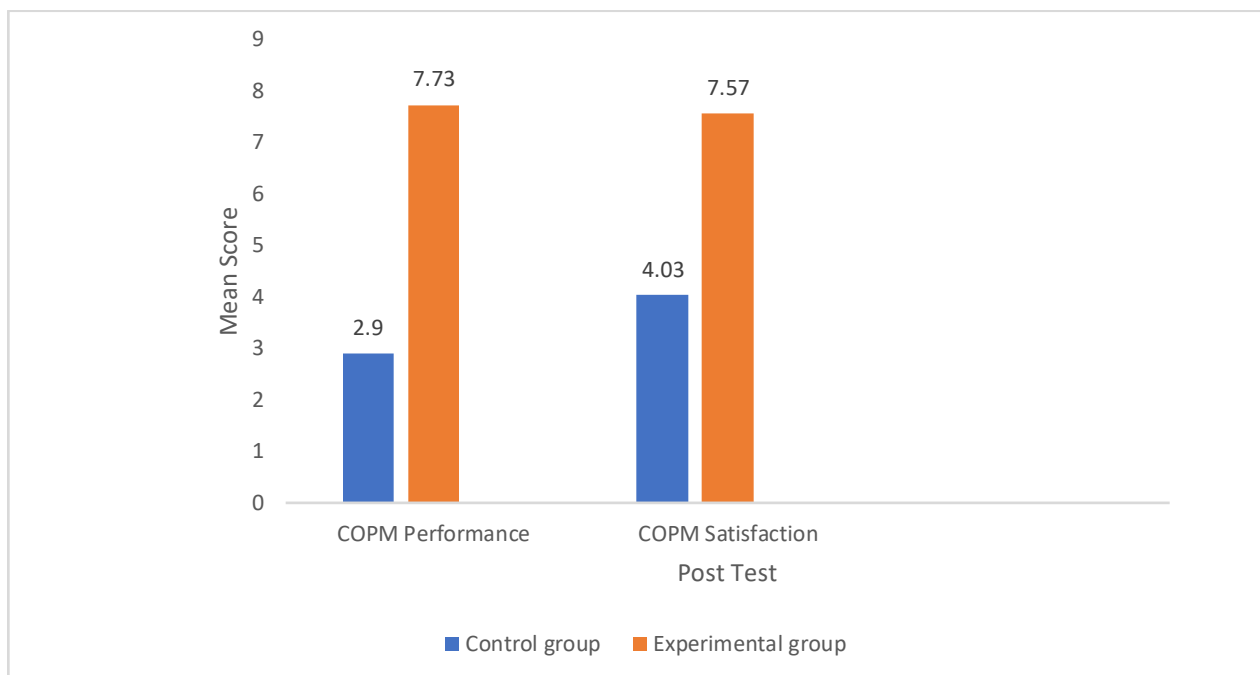
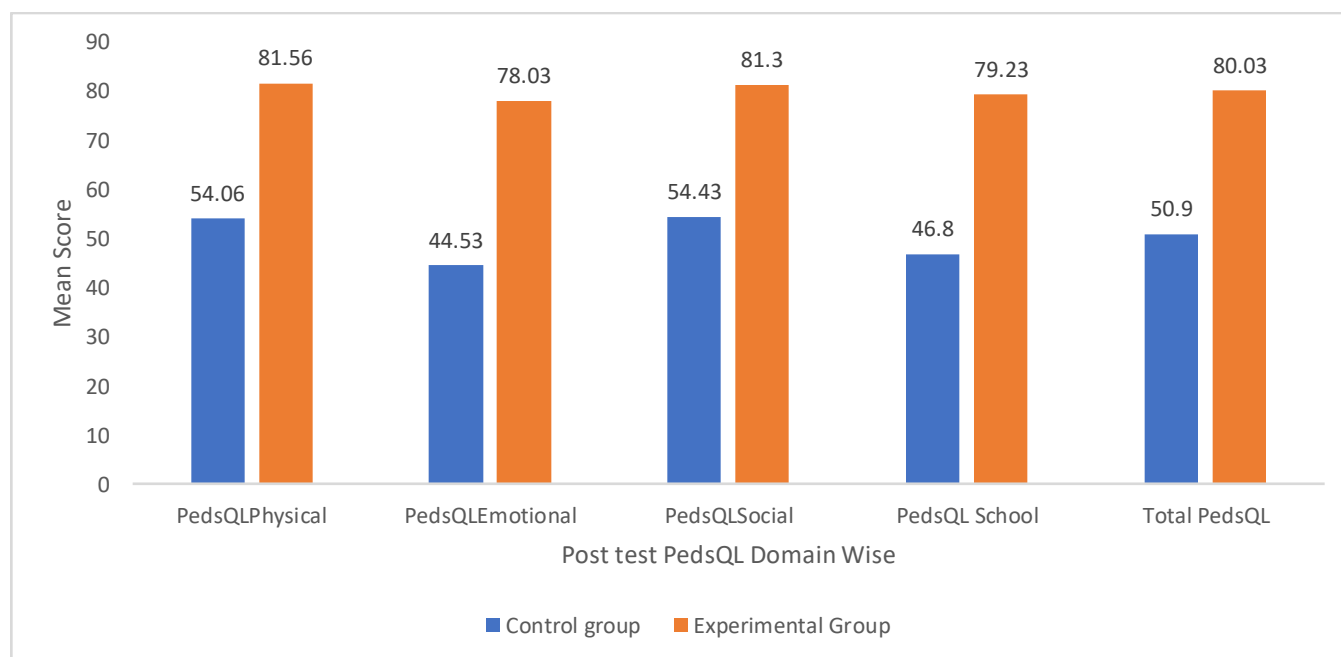


Figure 4.3 b: comparison of mean score of PedsQL at posttest between experimental and control group



5. Discussion

Children with mild intellectual disability often experience difficulties in sequencing, planning, and performing daily activities, which can negatively affect occupational performance and quality of life. The present study evaluated the effectiveness of visual sequencing activities on occupational performance and quality of life among children with mild intellectual disability. Baseline assessment revealed no significant differences between the experimental and control groups in COPM and PedsQL scores ($p > 0.05$), indicating comparability before intervention. Following the intervention, the experimental group demonstrated significant improvements in COPM Performance (3.56 ± 0.91 to 7.73 ± 0.85), COPM Satisfaction (3.33 ± 0.85 to 7.57 ± 0.84), and Total PedsQL scores (50.19 ± 3.77 to 80.03 ± 3.59) compared to the control group ($p < 0.01$). Post-test analysis further revealed significantly higher occupational performance, occupational satisfaction, and quality of life scores in the experimental group than in the control group. These findings

suggest that visual sequencing activities enhance task understanding, organization, and independent performance of daily activities. The results are consistent with previous studies reporting that visual supports improve participation, independence, and functional outcomes among children with developmental disabilities (Hodgdon, 1995; Bryan & Gast, 2000; Mechling & Savidge, 2011). Therefore, visual sequencing activities can be considered an effective occupational therapy intervention for improving occupational performance and quality of life among children with mild intellectual disability.

6. Conclusion

The findings of the present study demonstrated that visual sequencing activities were effective in improving occupational performance and quality of life among children with mild intellectual disability. Significant improvements were observed in COPM Performance, COPM Satisfaction, and PedsQL scores in the experimental group compared with the control group ($p < 0.01$). The study supports the incorporation of visual sequencing activities into occupational therapy programs to enhance participation, independence, and overall well-being among children with mild intellectual disability.

7. Limitations and Future Recommendations

The study was conducted with a relatively small sample size and an eight-week intervention period, which may limit the generalizability and long-term interpretation of the findings. The use of convenience sampling may have introduced selection bias, and the inclusion of only children with mild intellectual disability restricts the applicability of the results to other levels of intellectual disability. In addition, the absence of follow-up assessment prevented evaluation of the long-term sustainability of intervention outcomes, while individual differences among participants may have influenced post-test results. Future studies should include larger and more diverse samples using probability sampling methods to enhance generalizability. Long-term follow-up assessments are recommended to determine the sustained effectiveness of visual sequencing activities. Researchers should also investigate the applicability of the intervention among children with moderate and severe intellectual disabilities and include additional outcome measures such as executive functioning, adaptive behaviour, academic performance, participation, and activities of daily living. Further research is recommended on technology-assisted visual supports, digital sequencing programs, and school- and community-based occupational therapy interventions to improve occupational performance and quality of life among children with intellectual disability.

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