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"Promoting Inclusive Activities in Adapted Environment Setting for Children with Disabilities"

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ABSTRACT

Background: *Inclusive Activities conducted in adapted environment has emerged as a promising intervention for children with disabilities, addressing both physical health and social inclusion challenges. Environment modifications including physical space adaptations, sensory accommodations, and structured support systems can significantly enhance exercise participation and outcomes for children with disabilities.*

Purpose: *This study aimed to promote Inclusive Activities conducted in adapted environment on selected variables for children with disabilities, specifically examining changes in resting pulse rate and body mass index.*

Methods and Materials: *Thirty children with moderate level intellectual disabilities residing in Tamil Nadu were randomly selected for this experimental study. The total sample (N=30) was divided into two equal groups: an experimental group consists of (n=15) and a control group (n=15). The experimental group participated in Inclusive Activities within specially adapted environment settings for 12 weeks, incorporating inclusive Activities, while the control group received no specific Activities. Environment adaptations included modified physical spaces, sensory accommodations, adaptive equipment, and structured peer support systems. Pre- and post-intervention assessments were conducted for resting pulse rate and body mass index (BMI).*

Results: *Statistical analysis using the 't' test revealed significant improvements in the experimental group. Resting heart rate decreased significantly from 83.86 bpm to 77.73 bpm (t-value = 2.56, $p < 0.05$). Body mass index showed highly significant reduction from 26.32 to 20.45 (t-value = 6.50, $p < 0.05$). The control group showed no significant changes in either variable.*

Conclusion: *Inclusive Activities conducted in adapted environment, demonstrates significant effectiveness in improving selected variables for children with disabilities. The environment modifications and structured support systems appear crucial for maximizing exercise benefits, highlighting the importance of context-specific interventions in pediatric disabilities populations.*

Keywords: *Inclusive Activities, Adapted Environment, Children with Disabilities, Resting Pulse Rate, Body Mass Index.*

INTRODUCTION

Inclusive Activities conducted **(Liu, X et al.,2025).** in adapted environment plays a crucial role in promoting the overall well-being of children with disabilities by enhancing their physical, cognitive, and social development within supportive and modified settings. Physical exercise is essential for all children **(Tomporowski, 2015),** but for those with disabilities, it serves as a key intervention for improving health-related fitness when delivered in appropriately adapted environments. Inclusive Activities in adapted environment refers to structured aerobic exercises such as fundamental movement and basic aerobic steps etc., performed in modified physical spaces and social environments that accommodate children with diverse abilities through environment adaptations and supportive frameworks **(Zhang, 2024).**

The concept of adapted environment encompasses physical modifications to exercise spaces, sensory adaptations (such as controlled lighting and sound), equipment modifications, and the creation of supportive social environments **(Anderson, K. L et al., 2024)** that facilitate inclusion. These environment

adaptations **(Wilson, S et al., 2020).** are crucial for ensuring that children with disabilities can participate fully and safely in exercise Activities alongside their peers.

Research indicates that participation in aerobic exercise within adapted environment **(Anderson, M. et al.,2018).** positively impacts the health-related variables of children with disabilities. The environment modifications not only ensure safety and accessibility but also enhance the therapeutic benefits of exercise interventions. Moreover, these Activities conducted in supportive environment settings help improve social interactions, self-esteem, and independence by providing opportunities for peer engagement and cooperative play within a framework designed to accommodate diverse abilities and needs **(Donnelly et al., 2016).**

The significance of Inclusive Activities in adapted environment beyond individual health benefits. Schools, rehabilitation centres, and community programs increasingly recognize their role in creating and maintaining adapted environments that foster inclusion, breaking social barriers, and creating spaces where children with disabilities can thrive alongside their peers **(Branstetter, 2013).** This study explores the impact of Inclusive Activities conducted in specially adapted environment on children with disabilities, highlighting its health and social benefits while emphasizing the importance of environment modifications in making exercise programs truly accessible and effective.

INCLUSIVE ACTIVITIES IN ADAPTED ENVIRONMENT

Inclusive Activities in adapted environment represents a comprehensive approach where exercise Activities are performed in specially modified environments designed to support children with disabilities (e.g., unified sports programs conducted in adapted facilities). These adapted contexts serve as supporting factors that enable children with disabilities to be more engaged and involved in inclusive training programs.

The adapted environment includes several key components:

Physical Environment Modifications: Exercise spaces are modified with appropriate flooring, lighting, and spatial arrangements to accommodate various mobility aids and sensory sensitivities. Equipment is adapted or specialized to ensure safe and effective participation.

Sensory Environment Adaptations: Controlled sound levels, appropriate lighting, and reduced sensory distractions create an environment where children with sensory processing differences can participate comfortably and effectively.

Social Environment Structure: The creation of supportive peer partnerships and structured social interactions within the exercise setting, facilitated by trained personnel who understand the needs of children with disabilities.

These Inclusive Activities include fundamental movements and basic exercises which have been modified not only in their execution but also in their environment delivery to suit the needs of children with disabilities. Inclusive Activities in adapted environment aims to improve health-related variables while fostering social interaction and emotional well-being within settings specifically designed for success **(Kasser et al., 2013).** By participating in such Activities within these adapted contexts, children with disabilities can enhance their health and social being, leading to greater independence in daily life.

Additionally, Inclusive Activities in adapted environment **(Anderson K. L et al., 2024)** provides opportunities for peer engagement, teamwork, and confidence-building within a framework specifically designed to support diverse abilities, contributing to their overall quality of life. Schools, rehabilitation centres, and community programs play a vital role in promoting Inclusive Activities by creating and maintaining this adapted environment through accessible physical spaces**,** trained instructors, specialized adaptive equipment, and environment modifications that enable all children to experience the joy and benefits of exercise.

METHODOLOGY

Study Design

This experimental study employed a pre-test and post-test design with randomized group allocation to determine how Inclusive Activities conducted in adapted environment affects children with disabilities on selected variables.

Participants

Thirty children (N=30) with moderate intellectual disabilities, participated in this study. Based on their pre-medical records, teacher evaluations, and parent consultations, only children with moderate

intellectual disabilities were included. The age range was between 12 to 16 years. Participants were randomly split into two equal groups: Experimental group I (n = 15) and Control group II (n = 15), which served as an inactive group that didn't participate in Inclusive Activities conducted in adapted environment. For the experimental group, fifteen typically developed children acted as supporting partners with the children with disabilities to perform Inclusive Activities within the adapted environment who where in similar age of 12 to 16, and the disabilities children alone where evaluated in this study.

Figure. 1

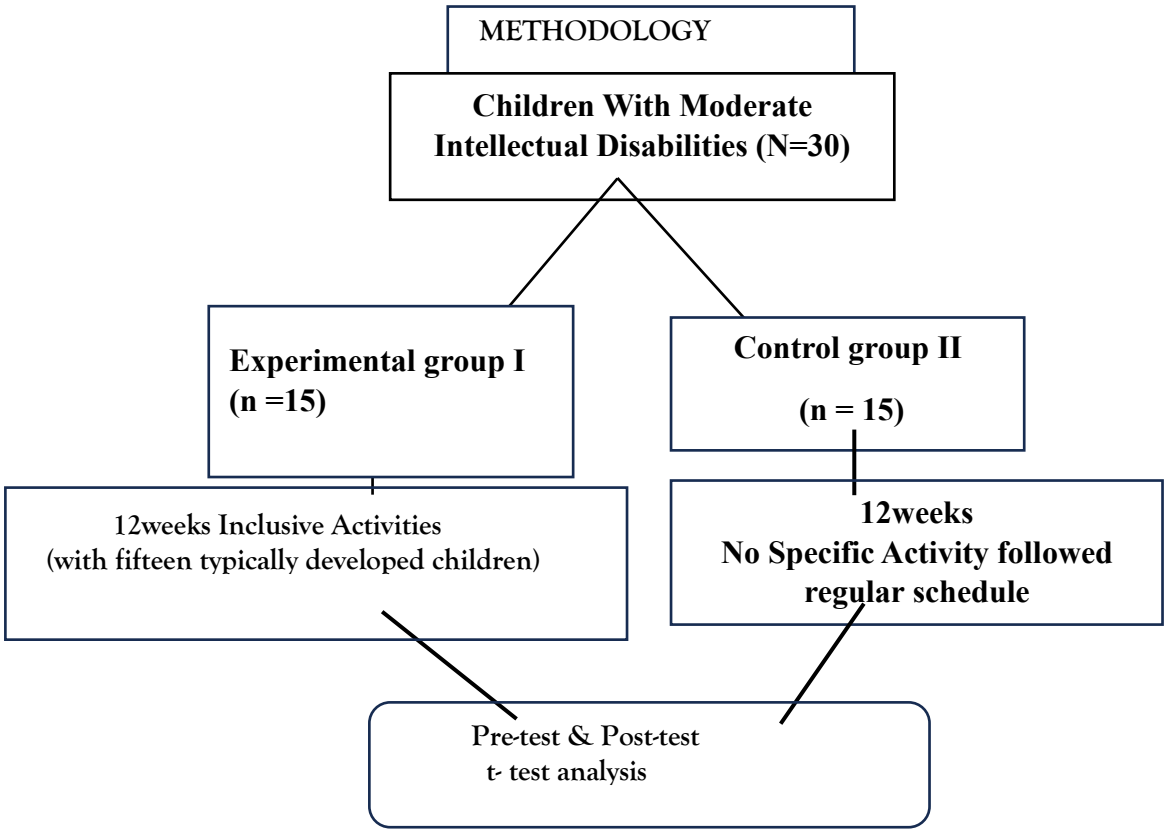

Figure 1 : shows the methodology design

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria:

- Children with mild intellectual disabilities aged 12-16 years
- Regular school attendance and willingness to participate
- Parental consent and child assent
- No history of recent injuries or medical contraindications to exercise
- Ability to follow basic instructions and participate in group Activities

Exclusion Criteria:

- Food habits of the children.
- Socioeconomic status of the children and
- Environment and climate condition.

Environment Adaptations Implemented

The exercise program was conducted in specially modified environments that included:

Physical Space Modifications:

- Activities areas with appropriate non-slip flooring and clear, wide pathways
- Adequate space allocation to accommodate various mobility patterns
- Visual boundaries and markers to define exercise zones
- Accessible storage for adapted equipment and mobility aids

Sensory Adaptations:
- Designated quiet spaces for sensory breaks and individual support

Equipment Adaptations:
- Modified exercise equipment suitable for various ability levels and physical limitations
- Adjustable equipment heights and resistance levels
- Tactile markers and textured surfaces for better grip and orientation
- Backup equipment to ensure continuous participation

Social Environment Structure:
- Structured peer support systems with trained peer mentors
- Qualified facilitators with special education training
- Clear communication protocols using simple, consistent language
- Positive reinforcement systems to encourage participation

The following criterion variables were selected based on their relevance to health outcomes and feasibility of measurement:
Resting Pulse Rate and Body Mass Index. The training period was set at twelve weeks to allow sufficient time for physiological adaptations, following established protocols for exercise interventions in special populations.

Table 1: Tools and Techniques

Health-Related Variables	Test/Assessment Method	Unit
Resting Pulse Rate	Digital pulse monitor (taken after 10 minutes rest)	Beats/Min
Body Mass Index	BMI formula (Weight kg / Height m^2)	kg/m^2

12 WEEKS OF INCLUSIVE ACTIVITIES INTERVENTION IN ADAPTED ENVIRONMENT TRAINING PROGRAM STRUCTURE

The training program was systematically organized using a progressive loading method over 12 weeks. Inclusive Activities was conducted for 3 days per week on working days (Monday, Wednesday, Friday) from 09:00 AM to 10:00 AM. Each 60-minute session was structured with rest time as follows:

Session Structure:
- Warm-up: Gentle stretching, breathing exercises, and light movement Activities adapted to individual capabilities
- Main Activities: Inclusive Activities with dance-like movements, fundamental motor skills, and aerobic steps
- Cool-down: Relaxation Activities, gentle stretching, and sensory calming techniques

PROGRESSIVE TRAINING PHASES

Phase I (Weeks 1-4): Foundation and Adaptation
- Focus: Basic movement patterns, environment familiarization, and peer interaction development
- Activities: Simple dance movements with counts, basic stepping patterns (A-step, V-step), and partner-assisted exercises
- Sets/Repetitions: 1-2 sets of 5-6 repetitions with 1 min rest intervals
- Environment Emphasis: Maximum sensory support, frequent breaks, and intensive peer assistance

Phase II (Weeks 5-8): Skill Development
- Focus: Improved coordination, increased exercise duration, and enhanced social interaction
- Activities: Combined movement patterns, rhythm-based exercises, and cooperative Activities
- Sets/Repetitions: 4-5 sets of 7-8 repetitions with 1min rest intervals
- Environment Emphasis: Gradual reduction in environment supports while maintaining safety

Phase III (Weeks 9-12): Advanced Integration
- Activities: Advanced dance sequences, challenging motor tasks, and group coordination exercises
- Sets/Repetitions: 6-7 sets of 9-10 repetitions with 1 min rest intervals
- Environment Emphasis: Minimal environment modifications while preserving essential adaptations

SPECIFIC INCLUSIVE ACTIVITIES ACTIVITIES

Fundamental Movement Activities:
- Locomotor Skills: Walking, marching, skipping, and sliding with musical accompaniment
- Stability Skills: Balance challenges using various bases of support with partner assistance
- Manipulative Skills: Object handling Activities using adapted equipment (larger, lighter, textured)

Aerobic Step Patterns Activities:
- Basic Steps: Modified steps suitable for various mobility levels
- Progressive Combinations: Gradual introduction of direction changes and arm movements
- Partner-Assisted Variations: Peer support for balance and coordination challenges

QUALITY ASSURANCE AND SAFETY PROTOCOLS

Staffing Requirements:
- Lead instructor certified in adapted physical education
- Assistant instructors with special education training (1:5 instructor-to-participant ratio)
- Peer mentors (1:1 ratio with children with disabilities)
- On-site healthcare professional for emergency response

Safety Monitoring:
- Continuous heart rate monitoring during exercise sessions.
- Individual progress tracking and exercise modification as needed
- Immediate access to quiet spaces for sensory regulation

Data Collection Procedures: Pre-test and post-test measurements were conducted in standardized conditions within the adapted environment context. All assessments were performed by trained personnel familiar with working with children with disabilities, ensuring consistent methodology and participant comfort.

STATISTICAL ANALYSIS

The collected data were analysed using appropriate statistical methods to determine the effectiveness of Inclusive Activities in adapted environment. The means and standard deviations of both experimental and control groups were calculated for resting pulse rate and body mass index for pre-test and post-test measurements.

For within-group comparisons (pre-test to post-test), paired-samples t-tests were conducted. For between-group comparisons, independent-samples t-tests were used to compare the mean differences between experimental and control groups. Statistical significance was set a priori at $p < 0.05$.

Table 2: Pre-Test & Post-Test Comparisons of Health-Related Variables

Health Related Variable	Groups	Test	Pre-Test/Post-Test	Mean	SD	t-Ratio
RPR & BMI	**Groups**	**Test**	**Pre-Test/Post-Test**	**Mean**	**SD**	**t-Ratio**
	Experimental Group	**RPR**	Pre-Test	80.86	9.28	2.56*
			Post-Test	74.73		
		BMI	Pre-Test	23.32	3.49	6.50*
			Post-Test	17.45		
	Control Group	**RPR**	Pre-Test	81.20	9.79	0.26
			Post-Test	81.86		
		BMI	Pre-Test	22.54	1.05	1.68
			Post-Test	23.00		

*Significant level 0.05

Abbreviation:
- Resting pulse rate - RPR

- Body Mass Index – BMI

Experimental Group Findings

Resting Pulse Rate (RPR):

- The experimental group showed a significant reduction in resting pulse rate from 80.86 bpm to 74.73 bpm ($t = 2.56$, $p < 0.05$)
- This 6.13 bpm decrease suggests improved cardiovascular fitness and efficiency
- A lower resting pulse rate typically indicates better cardiovascular conditioning

Body Mass Index (BMI):

- The experimental group demonstrated a highly significant reduction in BMI from 23.32 to 17.45 ($t = 6.50$, $p < 0.05$)
- This represents a substantial 5.87 point decrease in BMI
- The group moved from a normal weight category to the lower end of the normal range, approaching underweight (BMI < 18.5)

Control Group Findings

Resting Pulse Rate (RPR):

- The control group showed minimal change in resting pulse rate (81.20 to 81.86 bpm)
- This slight increase of 0.66 bpm was not statistically significant ($t = 0.26$, $p > 0.05$)
- No meaningful cardiovascular improvement occurred

Body Mass Index (BMI):

- The control group showed a small increase in BMI from 22.54 to 23.00
- This 0.46 point increase was not statistically significant ($t = 1.68$, $p > 0.05$)

Figure 2

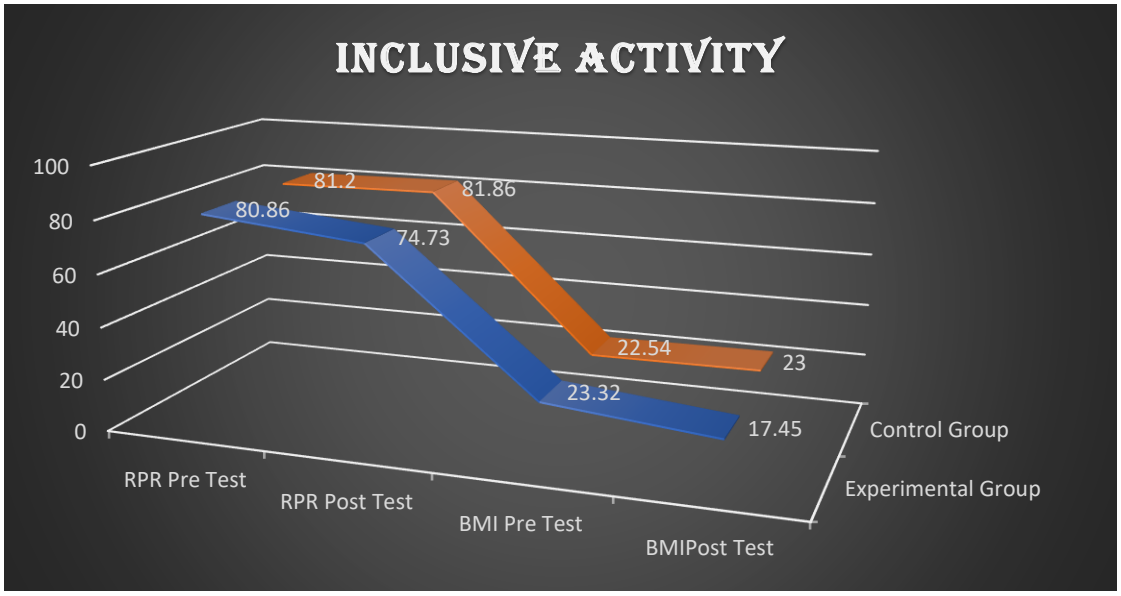

Fig 2: Bar Diagram showing the pre-test and post-test mean values of Experimental and Control groups of Children with Disabilities

DISCUSSION

The primary objective of this study was to determine the effectiveness of Inclusive Activities conducted in adapted environment on selected variables among children with moderate intellectual disabilities. The investigation focused on determining the influence of Inclusive Activities in adapted environment on resting pulse rate and body mass index through comprehensive pre- and post-test assessments. The results conclusively demonstrate that Inclusive Activities conducted in adapted environment produces significant positive improvements in both selected variables BMI & RPR among children with disabilities.

Limitations and Future Research Directions

Several limitations should be acknowledged when interpreting these results. The study was conducted with children with mild intellectual disabilities, and generalizability to other disabilities populations

requires further investigation. Additionally, the 12-week intervention period, while sufficient to demonstrate significant changes, may not capture long-term sustainability of improvements.
Future research should explore the optimal duration and intensity of Inclusive Activities interventions in adapted contexts, investigate the specific environment factors that contribute most significantly to improved outcomes, and examine the cost-effectiveness of environment adaptations compared to standard intervention approaches also can evaluate typically developed children in study. Longitudinal studies examining the sustained impact of these interventions would also be valuable for understanding long-term benefits and informing program development.

ETHICAL CLEARANCE

Ethical clearance for this study was permitted by Avinashilingam Institute Human Ethical Committee, Coimbatore.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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