Research Article

The British Journal of Sports Medicine (ISSN 3064-8130)

Effectiveness Of Sports Activity To Improve Motor Coordination In Special Children With Obesity.

Thirukumara Mahendran T[1]*, Dr.M.Arunkumar[2].

1. Picasso C - 201, Prince Residenzia,Irungattukottai - 602 117, India.
2. Saveetha College of Occupational Therapy, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha Nagar, Thandalam, Chennai 602 105.

***Corresponding author**

Thirukumara Mahendran T ,
Picasso C - 201, Prince Residenzia,Irungattukottai - 602 117, India.
Email : thiru.kummie@gmail.com

Received Date : December 30, 2024
Accepted Date : December 31, 2024
Published Date :February 06, 2025

ABSTRACT

Background: Obesity is a complex and multifaceted condition characterized by an excessive accumulation of body fat, which can negatively affect health.
Objectives: This study aims to evaluate the effectiveness of sports activities in enhancing motor coordination among children with obesity and special needs.
Materials And Methods: A research design involving screening, assessment, and intervention was used. The sample size was determined based on inclusion and exclusion criteria, and motor coordination was assessed using various scales. The study was conducted within a specified duration following a structured procedure.
Results: The findings suggest that engaging in sports activities significantly improves motor coordination among children with obesity and special needs.
Conclusion: Sports interventions are an effective approach for improving motor skills in children with obesity and special needs.

Keywords: *Motor coordination, children with special needs, obesity, sports activities..*

INTRODUCTION

Occupational Therapy (OT) is a specialized field dedicated to empowering individuals to achieve independence and enhance their quality of life. OT practitioners address physical, cognitive, and emotional challenges by utilizing purposeful activities. This client-centered approach prioritizes understanding individual needs and goals, employing occupation-based interventions tailored to each person's unique circumstances.(1)
OT serves a diverse range of individuals across the lifespan. This includes children with developmental delays, adults recovering from injuries or managing chronic conditions, and older adults seeking to maintain independence. Common practice areas encompass physical rehabilitation, mental health, pediatrics, and work rehabilitation.(1)
Childhood obesity is a significant public health concern with far-reaching implications. OTs play a crucial role in addressing this issue by focusing on the underlying factors that contribute to childhood obesity. This includes addressing sensory processing challenges, developing motor skills, and improving self-regulation.(1)
OTs promote healthy habits through a variety of strategies. These include establishing structured mealtime routines, incorporating healthy cooking activities into therapy sessions, and developing engaging physical activity plans tailored to the child's interests and abilities. Furthermore, OTs can adapt home environments to support healthy choices and collaborate with schools and families to create a supportive ecosystem for healthy living.(1)
Childhood obesity is characterized by excessive body fat accumulation, which can lead to a range of health complications, including impaired motor coordination and an increased risk of chronic diseases.(2)
Several factors contribute to childhood obesity, including genetic predisposition, family environment and lifestyle choices, social determinants of health, cultural influences, and underlying health conditions.(2)
Obesity in children can have significant physical and emotional consequences. Physical health risks include high blood pressure, high cholesterol, non-alcoholic fatty liver disease, and increased risk of chronic diseases later in life. Social and emotional challenges may include bullying, social isolation, and depression.(3)
Diagnosis of childhood obesity involves assessing BMI

The British Journal of Sports Medicine (ISSN 3064-8130)

and considering various factors, including family history, eating habits, activity levels, and other health conditions. Management typically focuses on lifestyle modifications, including a balanced diet, regular physical activity, and adequate sleep. Behavioral therapy and family-based interventions are crucial for long-term success.(3)

OTs contribute significantly to the treatment of childhood obesity by addressing the holistic needs of the child and their family. By focusing on building self-esteem, promoting healthy lifestyles, and creating supportive environments in homes, schools, and communities, OTs empower children to achieve and maintain a healthy weight.

MATERIALS AND METHODS

Study Design

This research employs a quasi-experimental design, which facilitates comparisons among groups while recognizing the absence of random assignment to conditions.

Participants

Sampling Technique: Convenience sampling was utilized.

Sample Size: 15 individuals were included in both the control and experimental groups.

Sample Setting: The research likely occurred in special education institutions or comparable environments where children with obesity can be reached.

Inclusion: Children aged 9 to 18 years diagnosed with obesity (BMI ≥ 95th percentile for their age and sex).

Exclusion: Children with significant medical conditions that impair motor function and those who cannot engage in play-based activities.

Instrument

Comprehensive Coordination Scale (CCS): This tool evaluates various aspects of motor coordination, including balance, fine motor abilities, and gross motor skills.

Subtests: Finger-to-Nose Test (FTN), Arm-Trunk Coordination Test (ATC), Finger Opposition Test (FOT), Interlimb Coordination (ILC-2), Lower Extremity Motor Coordination Test (LEMOCOT), Four-limb Coordination (ILC-4).

Scoring: Each subtest receives an individual score, and the total CCS score is calculated as the sum of all subtest scores.

Reliability: Demonstrates excellent intra-rater reliability (ICC = 0. 97) and strong to exceptional inter-rater reliability (ICC = 0. 76-0. 98).

Validity: Shows strong content, criterion, construct, and face validity.

Body Mass Index (BMI): Computed to ascertain obesity status.

Procedure

Recruitment and Informed Consent: Participants were recruited from suitable settings, and informed consent was secured from parents or legal guardians.

Baseline Assessment: BMI was assessed.

The CCS was assessed to all participants.

Interventions

Experimental Group: Engaged in regular football and basketball sessions (specifics regarding frequency, duration, and intensity to be detailed).

Control Group: Received regular exercise sessions and standard treatment.

Post-Intervention Assessment: BMI and the CCS were re-administered to all participants.

DATA ANALYSIS AND RESULTS

Table 1. Statistical analysis of pre- test and post- test in control group.

Test	Mean	SD	N	Z value	p value
Cntr1_Pre	37.9333	8.89194	15	-2.324	0.02*
Cntr1_Post	38.5333	8.71671	15		

Significant at 5% alpha level

As the p-value of 0. 02 is below the threshold of 0. 05. This indicates a statistically significant difference between the pre-test and post-test scores in the control group for the CCS. The findings suggest that the intervention provided to the control group resulted in notable improvements.

Table 2. Statistical analysis of pre- test and post- test in experimental group.

Test	Mean	SD	N	Z value	p value
Expt1_Pre	35.4	6.42317	15	-3.425	0.001*
Expt1_Post	45.2667	6.08824	15		

Significant at 5% alpha level

In the Experimental group, since the p value of 0. 001 is less than 0. 05. Hence, there is statistically significant difference in Experimental Group between pre-test and post test scores of CCS. This indicates that the experimental group demonstrated substantial improvement as a result of the intervention.

Table 3. Statistical analysis between the post- test scores of the control and experimental group.

Group	Mean	SD	N	Z value	p value
Cntr1_Post	38.5333	8.71671	15	-2.011	0.044*
Expt1_Post	45.2667	6.08824	15		

*Significant at 5% alpha level

Since the p value of 0. 044 is smaller than 0. 05. Therefore, there is a statistically significant difference in post-test

The British Journal of Sports Medicine (ISSN 3064-8130)

scores between the Experimental and Control Group of the CCS. This indicates that the intervention administered to the experimental group led to greater improvement in comparison to the control group.

DISCUSSION

This study investigated the effectiveness of a sports activity intervention within a special school setting for improving motor coordination in children with obesity. The analysis of pre-test/post-test results using the Comprehensive Coordination Scale (CCS) is discussed alongside relevant research from the literature review.

As the p-value of 0. 02 is below the threshold of 0. 05. This indicates a statistically significant difference between the pre-test and post-test scores in the control group for the CCS. The findings suggest that the intervention provided to the control group resulted in notable improvements.

In the Experimental group, since the p value of 0. 001 is less than 0. 05. Hence, there is statistically significant difference in Experimental Group between pre-test and post test scores of CCS. This indicates that the experimental group demonstrated substantial improvement as a result of the intervention.

Since the p value of 0. 044 is smaller than 0. 05. Therefore, there is a statistically significant difference in post-test scores between the Experimental and Control Group of the CCS. This indicates that the intervention administered to the experimental group led to greater improvement in comparison to the control group.

CONCLUSION

This study offers initial evidence that implementing a sports activity intervention in a special education setting can enhance motor coordination in children with obesity. The results indicate that the intervention was particularly effective for the experimental group. To better establish the intervention's impact, future research should employ a more rigorous design, provide comprehensive details about the activities, and investigate the mechanisms driving these improvements. Additionally, exploring the broader effects of such programs on motor development and overall health outcomes in children with obesity is recommended.

LIMITATION AND RECOMMENDATION

This analysis is based entirely on statistical data and does not consider potential confounding factors.

The small sample size (n=15 per group) limits the ability to generalize the results to a broader population.

To determine the true impact of the sports activity intervention, future research could include a more robust control group that participates in an alternative physical activity program or receives no intervention.

Examining the specific sports activities included in the intervention, along with their adaptations for children with obesity in a special school environment, as well as factors such as frequency, duration, and intensity, could offer valuable guidance for designing effective programs.

Utilizing qualitative methods to explore participants' experiences in both groups could provide meaningful insights into their enjoyment, engagement, and any challenges encountered with the sports activity program in the special school setting.

Conflicts Of Intrest

No conflicts of intrest

Ethical Approval

This study is approved by the Institution Scientific Review Board (ISRB) of Saveetha College of Occupational Therapy with REF. NO of SCOT/ISRB/032/2023.

Acknowledgment

I am immensely grateful to God for His unending grace and blessings. My deepest thanks go to my family and beloved ones for their unwavering support and encouragement throughout my studies. I extend my sincere gratitude to the Chairman, Vice-Chancellor, Registrar, Dean, and Director of Health Sciences at SIMATS for granting me the opportunity to complete my Bachelor of Occupational Therapy at their esteemed institution. Special thanks to Dr. M. Arun Kumar for his continuous guidance and support, and Mr. Ranjan for his statistical expertise. I also thank Mrs. R. Subha, Dr. G. Ravishankar, Mr. S. Saravanan, Ms. C. Haripriya, and Miss. R. Divyabharathi for their invaluable assistance in data collection. I am deeply indebted to my class coordinator, Mr. T. Arulking Giftson, and the faculty members of Saveetha College of Occupational Therapy, especially Mr. R.V. Beniel Raja, Mrs. P. Punitha, and Ms. J. Yasheetha, as well as non-faculty member Ms. Geethanjali for their endless support. Finally, heartfelt thanks to my friends and classmates for their cooperation, motivation, and help in completing my project.

REFERENCES

1. AOTA. American Occupational Therapy Association. Available from: https://www.aota.org/

2. Mayo Clinic. Childhood Obesity: Diagnosis & Treatment. Available from: https://www.mayoclinic.org/diseases-conditions/childhood-obesity/diagnosis-treatment/drc-20354833

3. Stanford Health Care. Obesity. Available from: https://

stanfordhealthcare.org/medical-conditions/healthy-living/obesity.html

4. Centers for Disease Control and Prevention. About Child & Teen BMI. Available from: https://www.cdc.gov/healthy-weight-growth/about/index.html

5. Centers for Disease Control and Prevention. Helping Young Children Thrive. Available from: https://www.cdc.gov/obesity/strategies/early-care-education/helping-young-children-thrive/index.html

6. National Institute of Diabetes and Digestive and Kidney Diseases. Adult Overweight & Obesity. Available from: https://www.niddk.nih.gov/health-information/weight-management/adult-overweight-obesity

7. Truong S, et al. Physical Therapy for Childhood Obesity: A Multifaceted Approach to Improve Health Outcomes. 2021.

8. Almeida Barros P, et al. Higher Body Fat Percentage Linked to Decreased Gross Motor Coordination in Children. 2021.

9. Ahreum Han, et al. Addressing Movement Skill Deficits in Obese Children: A Call for Intervention. 2018.

10. Moon SJ, et al. Customizing School Physical Activity Programs to Enhance Effectiveness for Elementary Children. 2024.

11. Impaired Motor Competence and Functional Performance in Children and Adolescents with Obesity. 2024.

12. Sánchez PJ, Ordoñez AI. Physical Activity Interventions Improve Motor Skills, Fitness, Attention, and Behavior in Children with Autism Spectrum Disorder and Overweight/Obesity. 2023.

13. Physical Activity Interventions for Obese Children: A Systematic Review Examining the Impact on Motor Coordination and Overall Health. 2024.

14. Alouche I, et al. Comprehensive Coordination Scale (CCS): A Tool for Assessing Coordination in Children. 2021.

15. Almeida Barros P, et al. Higher body fat percentage linked to decreased gross motor coordination in children. 2021.

16. Relationship Between CCS and MABC-2: Validating Coordination Assessment Tools in Children. 2010.

17. Yang Q, et al. Family Sports Participation as a Preventive and Treatment Strategy for Childhood Obesity: A Meta-Analysis. 2022.

18. Kilpeläinen TO, et al. Can Physical Activity Mitigate the Genetic Predisposition to Obesity? 2024.

19. Obirikorang C, et al. Prevalence and Risk Factors of Obesity Among University Students in Ghana. 2024.

20. Larsson SC, Burgess S. Causal Role of High Body Mass Index (BMI) in Chronic Diseases: Using Mendelian Randomization to Isolate Genetic Effects. 2021.

21. Bray GA. Limitations of Body Mass Index (BMI) as a Measure of Obesity and Individual Health. 2023.

22. Wang Y, et al. Worldwide trends in childhood overweight and obesity. 2006.

23. Fransen B, et al. Motor coordination in children: A comparison between children engaged in multisport activities and swimming. 2017.

24. Han A, et al. Addressing movement skills deficits in obese children: A call for intervention. 2018.

25. Moon SJ, et al. Customizing school physical activity programs to enhance effectiveness for elementary children. 2024.

26. Sanchez PJ, et al. Physical activity intervention improve motor skills, fitness, attention and behavior in children with autism spectrum disorder and overweight. 2023.

27. Alouche I, et al. Comprehensive coordination scale (CCS): A tool for assessing coordination in children. 2021.

28. Yang Q, et al. Family sports participation as a preventive and treatment strategy for childhood obesity. 2022.

29. Larrson H, et al. Causal role of high Body Mass Index (BMI) in chronic diseases: Using Mendelian randomization to isolate genetic effects. 2021.

30. Bray GA. Limitation of Body Mass Index (BMI) as a measure of obesity and individual health. 2023.