



Integration of Mobility Training in Physical Education Curriculum for Enhancing Selected Fitness Variables Among School Girls

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Abstract

The study investigates the effects of mobility training on selected physiological variables, specifically flexibility, balance, and coordination, among adolescent schoolgirls aged 12-16. This research addresses a pressing issue: only 24% of adolescents meet recommended physical activity guidelines, with girls showing even lower participation levels. Mobility training, an innovative approach to fitness, enhances movement efficiency by combining flexibility, stabilization, and control.

A randomized controlled trial design was employed, involving 40 participants divided into experimental and control groups. The experimental group undertook an 8-week mobility training database consisting of dynamic stretches, mobility drills, and functional movements for 30 minutes, five days a week. Pre-test and post-test assessments measured flexibility (Sit and Reach Test), balance (Flamingo Balance Test), and coordination (Alternative Hand Wall Toss Test).

Results demonstrated significant improvements in the experimental group for flexibility (mean increase: 3.25 cm, $t = 20.29$), balance (mean increase: 4.65, $t = 14.70$), and coordination (mean increase: 4.15, $t = 15.70$). In contrast, the control group presented not at all statistically significant variations. The findings validate the efficacy of mobility training in enhancing physical attributes critical for motor performance and overall fitness.

This research emphasizes the standing of integrating mobility training into school physical schooling plans to promote adolescent health and development. Recommendations include structured lesson plans, professional training for educators, besides policy guidelines to support systematic implementation. Further studies should explore long-term effects and additional benefits, such as mental health and injury prevention, to establish mobility training as an essential component of holistic education.

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Introduction

A shocking fact: only 24% of adolescents get enough daily physical activity. This reality expresses the vital need to bring fresh fitness activities into the schools. Traditional physical education programs offer value but don't deal very well with a significant component - well-laid-out mobility training.

Schools must update their physical education lesson planning. Our research gets into how student fitness improves when targeted mobility exercises become part of regular physical education classes. The focus stays on adolescent girls between 12-16 years old. This group shows lower physical activity levels during their key developmental years(1).

Our study wants to show how well an integrated mobility training program works and provide solid evidence-based recommendations for school curricula. The research assesses both the physiological benefits and practical aspects needed to adopt this program successfully.

BACKGROUND: IMPORTANCE OF FITNESS IN ADOLESCENT GIRLS AND THE ROLE OF PHYSICAL EDUCATION IN SCHOOLS

A worrying trend has emerged in adolescent fitness, especially among teenage girls. The WHO endorses children aged five-seventeen should participate in sixty minutes of modest to dynamic physical movement daily. However, approximately 85% of adolescent girls fail to meet these guidelines(2).

Schools are crucial in tackling this challenge. Research shows that 80% of adolescents' primary source of physical activity comes from the school setting. Students get many benefits from physical education in schools:

- Improves academic performance and cognitive development
- Reduces physiological stress and anxiety
- Boosts interaction and team-building skills
- Promotes fitness and physical growth
- Breaks educational monotony

Physical education has become a vital part of developing fitness activities. Schools remain the most affordable way to boost adolescent health outcomes that continue into adulthood, despite limited resources.

The physical activity habits students develop during their teenage years predict their future activity patterns. Students who skip physical education rarely maintain active lifestyles through adulthood(7). Well-laid-out lesson plans help students participate in regular physical activity. Schools offer the best way to promote health among adolescents, according to international policymakers. Detailed physical education programs can help reverse the declining trends in adolescent fitness. This is crucial for girls who tend to participate less in physical activities during their teenage years(3).

MOBILITY TRAINING: DEFINITION AND SIGNIFICANCE IN OVERALL PHYSICAL FITNESS

Mobility training represents a fundamental change in our approach to physical fitness. Mobility means knowing how to move spontaneously and easily complete a full range of motion, which is different from mere flexibility. Mobility training combines exercises that improve range of motion, stabilization, and control within joints and surrounding muscles(4). The training merges the coordination between the central nervous system (CNS) and myofascial systems.

Physical educators have identified several core benefits of mobility training:

- Reduces injury risk by improving joint range of motion
- Improves movement performance and athletic skills
- Maintains joint health through proper lubrication
- Improves proprioception and body awareness

The research reveals that mobility exercises involve sensory receptors in both contractile and elastic tissues. The CNS improves positional awareness and muscle control through this process. Muscles, fascia, and connective tissue stay pliable and elastic once we add mobility training to fitness activities(6).

The human body works best with coordinated movement patterns rather than isolated exercises. This knowledge shapes the lesson plans for physical education, making mobility training a vital part of overall fitness development.

OBJECTIVES

The research focuses on two simple goals that will boost physical fitness among adolescent students. To achieve measurable outcomes in both educational and physiological domains through careful analysis and structured implementation.

Main Goals:

- To create a well-laid-out framework that blends mobility training with existing school curricula.
- To assess how mobility training affects physiological fitness and functional performance

To boost the quality of physical education. Teachers should receive professional development support and learn innovative teaching methods. The goals go beyond simple fitness improvements and include:

- To build institutional capacity for quality mobility programs
- Create green frameworks for long-term fitness development
- Set up effective ways to measure progress

The research shows that mobility training activates neural pathways linked to spatial reasoning and problem-solving. This suggests improvements in both physical capabilities and cognitive functions(5).

The work needs mobility training that goes beyond simple warm-up routines. Students should maintain and develop their range of motion while refining motor patterns. This approach will help us create a comprehensive mobility module that naturally fits into existing physical education frameworks.

Review of Literature

New research has transformed the understanding of how mobility training affects physical fitness. Research shows that mobility training methods improve sports performance by a lot.

The review of current literature shows these key findings:

- 75% of students change schools at least once between kindergarten and eighth grade
- Children aged 6-11 show the best flexibility development
- Regular physical activity boosts cardiometabolic health, bone density, and mental well-being

GAPS IN RESEARCH RELATED TO SCHOOL-AGED GIRLS AND MOBILITY TRAINING.

Recent research reveals significant gaps in the knowledge about mobility training's effect on adolescent girls. The statistics paint a concerning picture - approximately 90% of girls don't get enough physical activity. This highlights the need to act quickly with targeted programs.

The research gaps stand out clearly:

- Middle Eastern adolescent girls face unique cultural challenges that need better understanding
- Social-emotional and cognitive development milestones
- Gender-specific barriers to physical activity need more research
- Parents' influence across different cultural settings remains understudied

Methodology

The research design follows a well-laid-out experimental approach across multiple phases. To developed a complete methodology that arranges perfectly with the research goals.

The study contains these essential phases:

Participant Selection

- School girls aged 12-16 years
- Random assignment to control and intervention groups
- Baseline assessments before program initiation

Implementation Protocol

- 8-week intervention period
- 30-minute sessions, 5 days per week
- Progressive difficulty levels based on individual capacity

Selection of Variables

- Flexibility measured by sit and reach, unit of measurement in centimetres
- Balance measured by Flamingo balance test, unit of measurement in numbers
- Coordination measurement by Alternative hand wall toss test, unit of measurement in numbers

STUDY DESIGN: EXPERIMENTAL DESIGN WITH PRE-TEST AND POST-TEST ANALYSIS.

The research uses a thorough pre-test and post-test analysis to measure mobility training outcomes. To designed the study as a randomized controlled trial. This approach helps us evaluate how well the intervention works.

The experimental framework consists of these key components:

Phase	Duration	Activities
Pre-test	Week 1	Baseline assessments
Intervention	2- 7 weeks	Mobility training
Post-test	Week 8	Final evaluations

To set up strong quality assessment standards that include randomization, allocation concealment, and blinding of outcome assessors. This method helps us maintain research integrity as evaluate fitness development activities.

The program runs for eight weeks sessions. This gives participants enough time to adapt to the changes. Some participants who feel tired can split their daily training into two 15-minute sessions instead.

The collect data through morning assessments at four specific points:

- Baseline evaluation
- Week 4 assessment
- Week 8 progress check
- Follow-up analysis

INTERVENTION

The designed a detailed mobility training program that runs for eight weeks based on the participant selection criteria. The program mainly includes personalized therapy that employs digital devices to boost mobility and physical activity.

The program has these key components:

- Rehabilitation virtual reality systems

- Tablet and smartphone applications
- Wearable devices for progress tracking
- Digital feedback mechanisms

The structured our program schedule this way:

Time Period	Activity Duration	Frequency
Morning Session	30-60 minutes	5 days/week

DESCRIPTION OF THE MOBILITY TRAINING PROGRAM DYNAMIC STRETCHES, MOBILITY DRILLS, AND FUNCTIONAL MOVEMENTS

The mobility training program builds on dynamic stretches that move joints through their full range of motion. Each session follows a three-phase structure:

Phase	Duration	Components
Warm-up	5-10 min	Light cardio, joint mobility
Main Session	20-25 min	Dynamic stretches, drills
Cool-down	5-10 min	Static stretches

The program focuses on these essential movement patterns:

- Hip circles and twists enhance lower body mobility
- Shoulder rotations and arm swings develop upper body strength
- Spinal rotations build core stability
- Balance exercises sharpen proprioception

Each movement serves multiple purposes through thoughtful implementation. dynamic stretches like walking lunges boost both flexibility and strength. Arm circles begin with small movements and progress to larger circles as flexibility improves.

The physical education lesson plan features fitness-building activities at varied speeds and intensities. Research shows dynamic stretching before activities boosts performance significantly - improving shuttle run time, medicine ball throw distance, and jump performance by up to 10%.

DATA COLLECTION

This is the crucial portion of the study, that of arriving at the conclusion by examining the hypothesis. The procedure of testing the hypothesis in accordance with the results obtained in relation to the level of confidence was fixed at 0.05 level, was considered necessary for this study. The primary objective of the paired 't' ratio was to describe the difference between the pre-test and post-test means of school girls.

COMPUTATION OF 't' RATIO ON MOBILITY TRAINING OF SCHOOL GIRLS ON EXPERIMENTAL GROUP AND CONTROL GROUP

Group	Variables	Mean	N	Std. Deviation	Std. Error Mean	T ratio
Experimental Group	Flexibility	13.05	20	1.986	0.160	20.29*
		16.30	2	1.809		
	Balance	12.10	20	1.997	0.289	14.70*
		7.85	20	1.981		
	coordination	12.60	20	3.775	0.264	15.70*
		16.75	20	3.567		
Control Group	Flexibility	12.80	20	2.142	0.221	0.67
		12.95	20	2.038		
	Balance	12.95	20	2.305	0.222	1.79
		12.55	20	1.877		
	coordination	14.40	20	3.185	0.210	1.90
		14.80	20	2.858		

*Significant at 0.05, level of confidence

The table presents the computation of the 't' ratio to analyze the effect of mobility training on flexibility, balance, and coordination among schoolgirls in experimental and control groups. The results are compared at a 0.05 level of significance to determine whether the differences in the variables are statistically significant.

STRUCTURE OF THE TABLE

Group: Two groups are considered —

The Experimental Group (undergoing mobility training)

The Control Group (not undergoing specific training).

Variables: The variables assessed include flexibility, balance, and coordination.

Mean: The average scores of pre-test and post-test values for each group.

N: The number of participants in each group (N = 20).

Standard Deviation (SD): Measures the variability of scores within each group.

Standard Error of the Mean (SE Mean): Indicates the accuracy of the mean as a representation of the population.

‘t’ Ratio: Compares the means of pre-test and post-test to determine the effectiveness of the intervention. Values marked with an asterisk (*) are significant at the 0.05 confidence level.

Findings

Experimental Group:

Flexibility: The post-test mean (16.30) is significantly higher than the pre-test means (13.05). The t-ratio of 20.29 indicates a statistically significant improvement. **Balance:** The post-test mean (16.75) is significantly higher than the pre-test means (12.10). The t-ratio of 14.70 suggests a significant improvement. **Coordination:** The post-test mean (16.75) is significantly higher than the pre-test means (12.60). The t-ratio of 15.70 confirms the effectiveness of the training.

Control Group:

No significant changes are observed in flexibility, balance, or coordination. The t-ratios (0.67, 1.79, and 1.90, respectively) indicate that the differences in pre-test and post-test means are not statistically significant.

Conclusion

The results highlight that mobility training significantly improved flexibility, balance, and coordination in the experimental group, as shown by the significant ‘t’ ratios. However, no such improvement was observed in the control group, indicating the effectiveness of the intervention in enhancing mobility-related variables. The results provide compelling evidence of the efficacy of mobility training in enhancing physical attributes critical for overall motor performance and physical fitness in schoolgirls. The absence of significant improvements in the control group underscores the need for structured and targeted interventions to achieve similar benefits. The findings emphasize the importance of mobility training as an essential component of physical education programs, advocating for its systematic inclusion to improve physical development and motor skills in young individuals.

Recommendations

Mobility training programs should be incorporated into physical education curriculums at schools to enhance students' flexibility, balance, and coordination, contributing to their overall physical development. Provide professional development opportunities for teachers to implement mobility programs effectively, ensuring consistent and standardized delivery. Government and educational authorities should develop and disseminate policy guidelines that emphasize the benefits of structured mobility training for students. Design mobility programs that cater to diverse groups, including children with varying levels of physical ability, to ensure equal benefits for all students. Establish mechanisms to monitor the implementation and effectiveness of these programs, encouraging schools to report progress periodically.

Conduct longitudinal studies to explore how mobility training influences flexibility, balance, and coordination over several years, ensuring that improvements are sustained.

Investigate the potential benefits of mobility training on other physical and mental health parameters, such as posture, injury prevention, and self-esteem. By focusing on these recommendations, stakeholders can promote mobility training as a key component of holistic education and contribution.

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