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Impact of Game-Specific Training and Plyometric Exercises on Selected Physical Fitness Variables in College-Level Women Ball Badminton Players

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ABSTRACT

Investigating the effects of plyometric and game-specific training on particular physical fitness metrics in collegiate women's ball badminton players was the aim of this study. Thirty individuals, ages 18 to 21, were chosen at random from SRM Institute of Technology, Kattankulathur, in order to achieve this goal. Following their selection, these subjects were split into two groups at random, each with 15 participants: the experimental group and the control group. Whereas the control group did not engage in any experimental activities, the experimental group followed a program of plyometric exercises and game-specific training. This study looked at two aspects of physical fitness: arm explosive power and agility. Both a preliminary test and an extension test were part of the true arbitrarily group design used in the study. Each of the 30 participants was randomized equally to receive either the experimental group, which included plyometric exercises and training tailored to the game, or the control group. Pre-tests were given to all 30 volunteers to evaluate the chosen physical fitness factors before the six-week study period. At the end of the entire experimental period, post-tests were administered, and the results were carefully documented. A predefined level of significance, fixed at 0.05 confidence, was used for statistical analysis. According to the study's findings, participants in the plyometric and game-specific training groups significantly improved their arm explosive power and agility.

Keywords: *Arm explosive power, women ball badminton players, agility.*

1. INTRODUCTION

Ball badminton

Ball badminton, a sport steeped in tradition yet embracing modernity, stands as a testament to the enduring allure of athletic competition. Originating in the heart of India, this captivating game has transcended cultural boundaries to captivate enthusiasts worldwide. Combining elements of badminton, tennis, and volleyball, ball badminton offers a unique blend of agility, strategy, and skill those appeals to players of all ages and backgrounds. In this exploration, we delve into the rich history, evolving techniques, and cultural significance of ball badminton, shedding light on why it continues to thrive as a beloved pastime and competitive sport [1].

As we embark on this journey, it's essential to trace the roots of ball badminton back to its origins in India. While exact historical records may be elusive, the game is believed to have emerged centuries ago as a form of leisure activity in villages and towns [2]. Over time, it gained popularity, particularly in southern India, where it became an integral part of local culture and festivities. Despite its humble beginnings, ball badminton gradually evolved into a formalized sport, thanks to the efforts of dedicated individuals who sought to codify its rules and promote its competitive aspect.

[3] One of the defining features of ball badminton is its accessibility and inclusivity. Unlike traditional badminton, which often requires specialized equipment and facilities, ball badminton can be played in a variety of settings, from sandy beaches to grassy fields. This versatility has contributed to its widespread appeal, attracting players from diverse backgrounds and regions. Whether played casually among friends or competitively in organized leagues, ball badminton fosters a sense of camaraderie and shared passion among its participants.

Central to the allure of ball badminton is its dynamic and fast-paced game play. The objective is simple: maneuver the ball across the net and prevent the opposing team from returning it. However, achieving this goal requires a combination of skill, strategy, and athleticism [4]. Players must master a range of techniques, from powerful smashes to delicate drops, all while anticipating their opponent's moves and adjusting their tactics accordingly. The result is a thrilling spectacle that keeps spectators on the edge of their seats.

Moreover, ball badminton holds cultural significance for many communities around the world. In India, it is celebrated not just as a sport but as a symbol of tradition and heritage. Tournaments and championships attract thousands of spectators, who gather to cheer on their favorite teams and players [5]. Beyond its sporting prowess, ball badminton serves as a platform for social cohesion, bringing people together across divides of age, gender, and socioeconomic status.

In ball badminton represents a fusion of tradition and modernity, combining ancient roots with contemporary appeal. As we delve deeper into its history, techniques, and cultural significance, we gain a greater appreciation for the sport's enduring legacy and its potential to unite people from all walks of life. Join us on this journey as we celebrate the beauty and excitement of ball badminton, and discover why it continues to enchant players and spectators alike. (Sarah Johnson 2024)

Training tailored to a particular sport improves and refines the fundamental abilities needed to succeed in any sport. Your young athlete's confidence in their speed, agility, and hand-eye coordination will grow. A top-notch, year-round sport-specific training program is provided by Sport-Specific Skill Training [6]. It emphasizes the development of the sport's technical, tactical, psychological, and physical components. The Physical Development Ranch's goal of developing leadership, education, and character is mostly achieved through this training program. The core abilities required for achievement in any sport are introduced and honed through sport-specific training. Your young athlete will feel more confident about their speed, agility, and hand-eye coordination. There are possibilities for both individual and group training. It is important to remember that muscle building is an essential part of an athlete's overall fitness.

[7] Plyometric workouts are essential for improving athletes' capacity to perform skills and give their best effort; they do not result in needless mass. Enhancing sports performance, including endurance, requires including muscle strengthening and conditioning. Often called "plyo" or "jump instruction," plyometric training is a type of exercise that emphasizes quick, explosive movements to build strength, speed, agility, and power. It entails powerful, rapid muscle contractions, usually followed by an eccentric period of rapid stretching. Enhancing a person's capacity to exert maximum power in a brief period of time is the main objective of plyometric training. Plyometric exercises, which are frequently utilized in athletics adaptation, rehabilitation efforts, and general fitness programs, usually entail jumping, hopping, and dashing movements [8]. Usually, the training consists of exercises like: Box Jumps: Leaping into and out of a box or platform to increase lower-body strength and vertical leap. Depth Jumps: To improve reactive strength, drop from an elevated platform and quickly jump as high as you can as you land. Bounding: A set of strong, disproportionate running motions that increase quickness and force. Medicine Ball tosses: Use explosive medicine ball tosses and catches to build strength in your upper body. Jump Squats: To improve your core strength and power, perform lunges using an energetic jump at the top. Plyometric Push-Ups: To increase upper body power, push off your opponent with sufficient effort to raise both arms off the ground after each repetition. To improve an athlete's performance, plyometric training is frequently incorporated into games-specific training regimens. This is particularly true for sports like tennis, volleyball, and sprinting that call for quick, explosive movements. Strength, speed, and general athleticism can all be enhanced with it for general fitness. Plyometric exercise may have significant impact and poses a hazards of injury if done incorrectly, so it's crucial to approach it carefully and with the right technique. To guarantee safe and successful implementation, people wishing to include plyometrics to their exercise regimens should speak with a certified coach or trainer. [9].

2. LITERATURE REVIEW

S. S. D. M. et al. [10] introduced Effect of sports specific training on skill performance variables of hockey players. This study's main goal was to find out how hockey players' skill performance variables were affected by sports-specific training. Over the course of eight weeks, the experimental group received sports-specific training, while the control group did not engage in any protocol-related activities or sports-specific training. to determine whether both the control and experimental groups differed significantly from one another. Sports-specific training is an effective training strategy for hockey players to achieve the intended improvements in skill performance metrics.

YOKESH et al. [11] proposed Effects Of Plyometric Training With And Without Yogic Practices On Balance Among Handball Players. The purpose of the study was to ascertain the effects of aerobic activity on handball players' balance, with as well as without yoga. For this study, the genuine arbitrary experimental group design was used to establish three distinct

groups of 15 subjects each: aerobic exercise with yoga activities, propulsive training without yoga activities, and a group serving as a controls. Compared contrasted with the untreated condition and plyometric exercises with and without buddhist practices, the study's results indicate a significant improvement in balance following thirteen weeks of sprinting combined with yoga.

Tvrdy et al. [12] designed Effects of combined explosive, plyometric, and sprint training on the physical fitness of soccer players. By splitting the U14 soccer players into two groups, this study sought to determine the effectiveness of a 6-week combined plyometric and speed training program aimed at enhancing the players' speed-strength capabilities. To improve their speed, both groups underwent the same training regimen. All test findings showed considerably higher values in the EG group than in the EG II group. According to the outcome This study suggests employing a method of progressive overload for training regimens that increase exercise volume, complexity, or intensity.

Anbukumaran et al. [13] studied Comparative effect of plyometric training yogic exercises and game specific training on selected psycho-motorvariables among college men volleyball players. The study's goal was to assess how certain athletic variables of male volleyball players were affected by plyometric training, yoga poses, and game-specific training. The testing period lasted for twelve weeks. In order to determine the significance of the mean differences, the pre-test and post-test scores were statistically analyzed using Analysis of Covariance (ANCOVA). Scheffe's post hoc test was employed if the adjusted test's "F" ratio was determined to be significant. Based on the findings, it was determined that all training approaches would offer superior ways to build the psychomotor skills required of male volleyball players.

3. METHODOLOGY

Both pretests and post-tests were part of the randomized design used by the researcher. Thirty female ball badminton players (N=30) were divided into two equal groups of fifteen each by random assignment. The group participating in the experiment and the comparison group were the names given to these groups. A pre-test was given to all 30 female ball badminton players prior to the start of any training in order to evaluate a few physical fitness factors, particularly arm explosive power and agility.

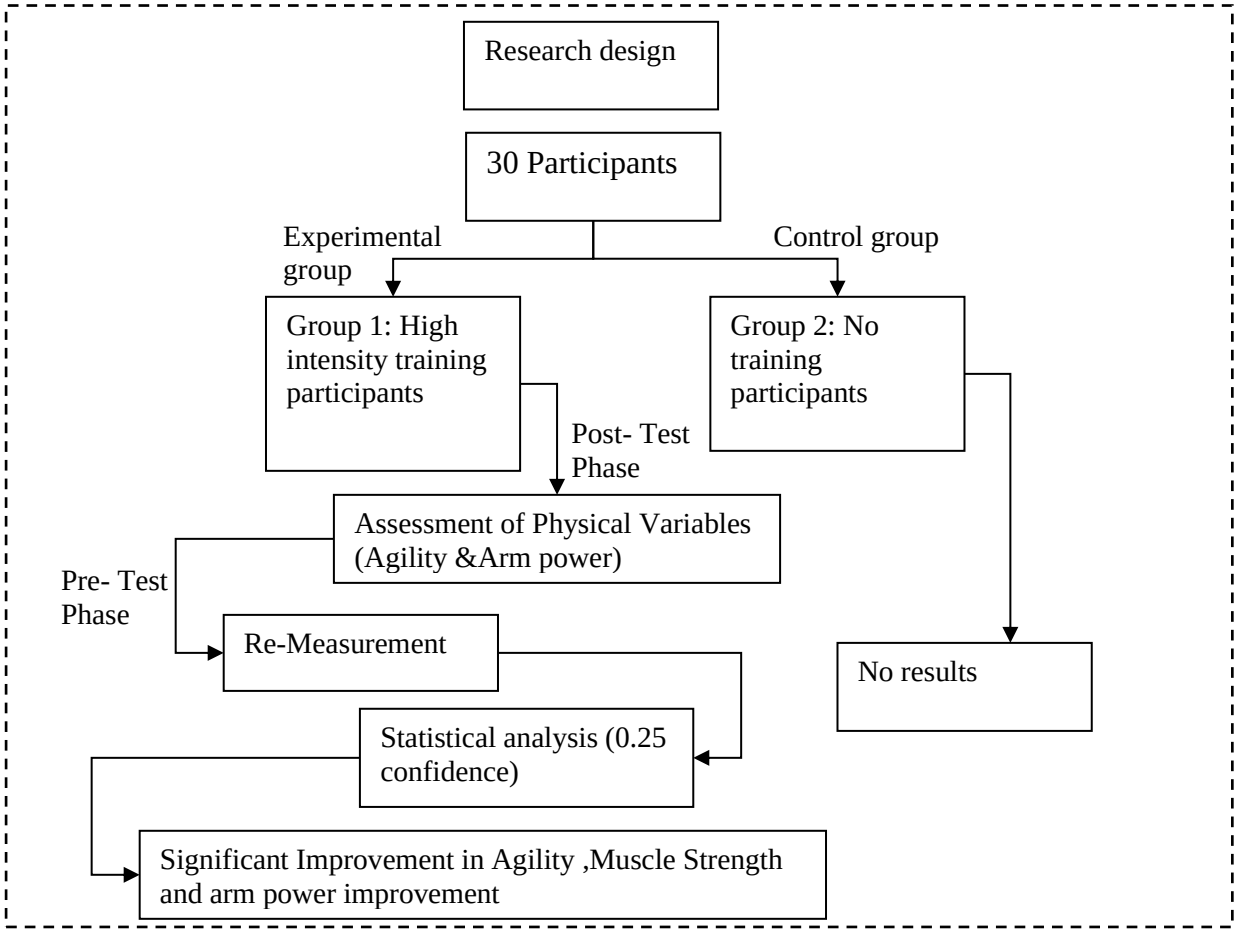

Figure 1. Architecture of proposed system

The architecture of the suggested system, which includes multiple training portions and enhances arm power and agility, is seen in figure 1. The design demonstrates how the participants are split up into two groups and trained using various exercises, with the trained students showing the results.

Forty-five female ball batminton players were chosen from the university to fulfill the study's objectives. Their ages varied from 18 to 25 years old, according to the records. Three groups of 15 subjects each—one for plyometric training with yoga exercises, one for plyometric training without yoga exercises, and one for control—were created using the genuine randomized experimental group design for this investigation.

The experimental group then participated in a six-week program that included plyometric exercises and game-specific training, although the comparison sample was not involved in any sort of exercise activities. Post-tests were administered to examine the same dependent factors following the conclusion of every six-week training period. To see if there were any statistically significant improvements, the dependent t-test was used to statistically analyze the data from these tests. Notably, an accuracy level of 95% was guaranteed for all analyses by setting the significance level at 0.05.

4. RESULT

For the results, the standard deviations of both the pre- and post-test agility values for women's college ball badminton players were compared in order to determine the 't' ratio. Two equal groups (n=15) have been randomly allocated to the subjects: the experimental group and the control group. For eight weeks, the experimental group received sports-specific training, whereas the control group engaged in everyday activities without any additional training. We found no discernible variations in the performance of the Pre-test and Post-test in the first measurement. In every test that was measured, the prost-test was able to improve greatly.

Test I: Pre- and post-tests on particular training, plyometric training, and agility control groups

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	**Pre test**	20.20	4.36	0.18	17.98*
	Post test	23.46	4.20		
Control group	**Pre test**	21.06	4.46	0.19	1.43
	Post test	27.40	4.22		

**Importance level 0.05 level degree of freedom (2.14, 1 and 14)*

The calculation of the 't' ratio between the standard deviation of before and after the test dexterity values for women's ball badminton players at the collegiate level is shown in Table I. Before and after training, the experimental group's mean agility scores were 20.20 and 23.46, respectively, whereas the control group's means were 20.06 and 20.40. At a 0.05 level of confidence, the computed "t" ratio of 17.98 was statistically significant for one degrees of freedom and 14 participants, above the required table value of 2.14. This result strongly implies that the experimental group's agility increased greatly as a result of plyometric activities and strength training tailored to the game. On the other hand, the calculated "t" ratio of 1.43 proved non-significant with one degree of freedom and 14 individuals at a 0.25 level of assurance because it was below the critical table value of 2.14. This outcome unequivocally shows that after the intervention, the control group's agility did not significantly increase.

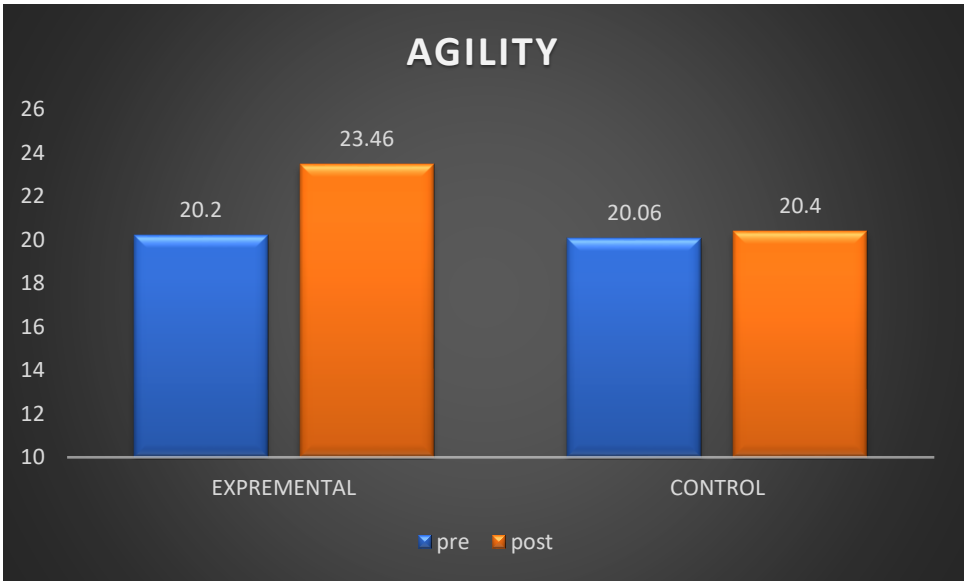

Figure 2. Agility performance comparison

Figure 2 shows the experimental and control groups' pre- and post-test agility scores, showing a notable improvement in the experimental group following training.

Test II: Arm explosive power pre and post tests for a control group and a specialized training and plyometric training group

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	**Pre test**	1.50	0.03	0.45	26.00*
	Post test	1.61	0.04		
Control group	**Pre test**	1.51	0.04	0.06	1.37
	Post test	1.52	0.04		

**Importance level 0.05 level degree of freedom (2.14, 1 and 14)*

College-level women's ball badminton players' means of prior to and after the test arm explosiveness values are compared using the 't' ratio, which is shown in Table II. Before and after training, the experimental group's mean values were 1.50 and 1.61, respectively, whereas the control group's means were 1.51 and 1.52, respectively. Assuming a 0.25 level of assurance, the computed "t" ratio of 26.00 was statistically significant for 1 degree of flexibility and 14 participants, surpassing the crucial table value of 2.14. This result clearly indicates that plyometric workouts and game-specific training had a considerable impact on the experimental group's arm explosive power. On the other hand, the calculated "t" ratio of 1.37 was not of statistical importance for one degree of mobility and 14 individuals at a 0.25 level of assurance because it was less than the significant table value of 2.14. This outcome unequivocally shows that the control group's arm explosive power did not significantly increase after the intervention.

The pre-test mean values for the experimental and control groups' arm explosive power are displayed in the bar diagram.

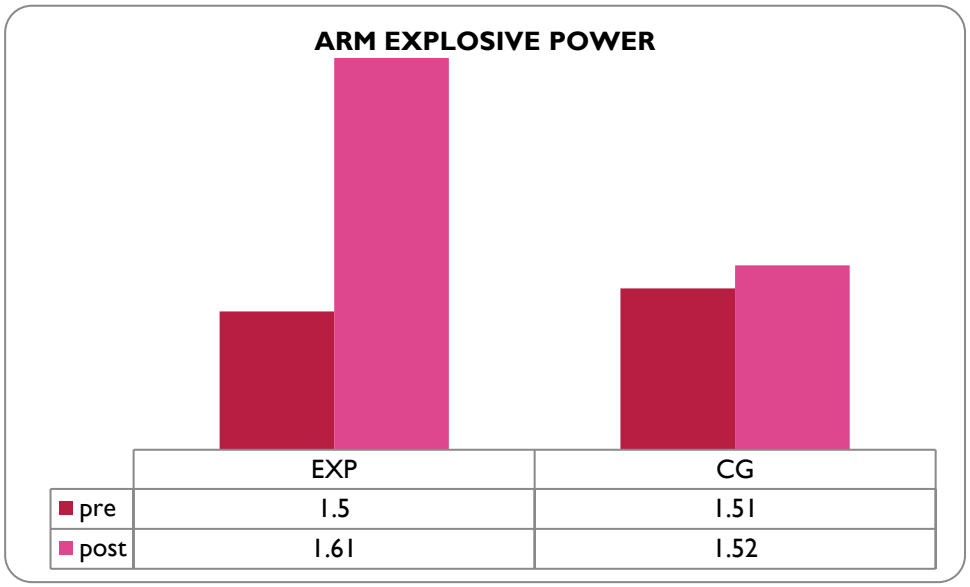

Figure 3. Arm power improvement

Figure 3 displays the experimental and control groups' pre-test and post-test arm explosive power scores, demonstrating a notable improvement in the experimental group following training.

5. DISCUSSION ON FINDING

The results of the study show that, when compared to the control group, the experimental group—which included participants in plyometric exercises and game-specific training—improved significantly in the chosen variables, including arm explosive power and agility. Additionally, the study shows that the improvements made by the plyometric training and game-specific training groups are noticeably better than those made by the control group. For additional information on this subject, see Mala and Pushpa's paper, "Effect of Specific Skill Training with Yoga on Skill Performance Variables of School-Level Volleyball Players." The study's findings highlight the benefits of plyometric workouts and game-specific training for arm explosive power and agility, underscoring their efficacy in improving athletic performance.

6. CONCLUSIONS

The data analysis yielded the following findings:

1. College-level women's ball badminton players' physical fitness metrics, particularly their arm explosive power and agility, significantly improved in the experimental group, which was made up of people who received plyometric exercises and game-specific instruction.

2. Conversely, among collegiate women's ball badminton players, the control group showed no gains in physical fitness metrics such arm explosive power and agility.

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