



IMPACT OF BADMINTON MATCHES ON SELECTED PHYSICAL VARIABLES AMONG ADOLESCENT ATHLETES

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ABSTRACT

Background: Badminton is a non-continuous, strenuous activity that entails recurrent high-intensity actions, abrupt changes in direction, lunges, hops, and fast arm motions. Thus, match play might result in swift modifications in chosen physical traits of young athletes. This study aimed to analyse the impact of badminton matches on selected physical variables among adolescents' badminton players. **Methods:** 12 male badminton players, aged between 17 to 21, were chosen from the Lakshmibai National Institute of Physical Education (LNIPE) Gwalior using purposive sampling. Each participant had about five years of active involvement in badminton and had taken part in the All India Inter-University competition. A pre-test and post-test experimental framework were utilised, without a control group. The identified physical metrics comprised flexibility, speed, jump height, Reactive Strength Index (RSI), and power. The Sit and Reach test were utilised to gauge flexibility, the Shuttle Run test to check speed, and a Jump Plate to evaluate explosive strength. After the pre-test, participants undertook three series of badminton match simulations, followed by the administration of the post-test. The mean and standard deviation were derived, and paired sample t-tests were utilised to evaluate the significant between pre-test and post-test scores at a significance threshold of 0.05. **Results:** Pronounced variations were detected in flexibility and shuttle-run performance after engaging in badminton matches. The Sit and Reach mean score improved from 14.1583 ± 2.91344 cm to 15.1083 ± 2.80404 cm, with a derived t value of -6.209 ($p < 0.05$). In a similar manner, the mean duration of the Shuttle Run reduced from 14.9067 ± 0.58035 to 14.4925 ± 0.48332 , producing an estimated t value of 2.855 ($p < 0.05$). Nevertheless, substantial variations were not detected in jump height ($t = -0.738$), Reactive Strength Index ($t = -0.894$), or power ($t = -0.988$), as these metrics were lower than the crucial t value of 2.201. **Conclusion:** The research reveals that engaging in badminton matches correlates with substantial instantaneous modifications in flexibility and shuttle-run performance among young badminton athletes, although jump height, reactive strength, and power did not present statistically significant improvements. The discoveries might support badminton trainers and physical education experts in grasping acute physiological responses to match scenarios and in formulating effective conditioning and recovery protocols for adolescent badminton athletes.

KEYWORDS : Badminton, Adolescent Athletes, Badminton Match, Flexibility, Reactive Strength Index, Power, Jump Height

INTRODUCTION

Badminton is perceived as a leisurely and gentle sport for youngsters, suitable for outside play and lacking in structural complexity. It is suitable for individuals of all ages, including both genders and those with disabilities. Novices can commence playing badminton promptly as the fundamentals are acquired swiftly. Badminton necessitates leaping, directional shifts, swift arm motions, and a diverse array of body positions, together with highly explosive actions executed inside a confined court space. Alterations in trajectory are essential following the majority of shots, and all actions must be executed swiftly with proficient technique and precision. Vertical and lateral leaps are more prevalent in every facet of the game. It was proposed that there exist correlations between power and velocity. Consequently, it is imperative that fitness evaluation programs align precisely with the specific requirements of the sport. In badminton, similar to other athletic disciplines, numerous training regimens have been established to enhance the fitness attributes of players. (Yuksel et al., 2015)

Badminton is an athletic endeavour marked by prolonged, vigorous motions alternated with intervals of relaxation. Badminton is a sport that requires a diet conducive to aerobic capacity, with a greater emphasis on anaerobic performance. Badminton involves brief maximal or submaximal exertions

with minimal rest intervals, similar to other racquet sports. Such sports are especially considered essential for agility, stamina, power, coordination, responsiveness, awareness, gameplay abilities, and technical proficiency. It is asserted that badminton, a competitive non-contact sport, necessitates bursts of energy, agile movements, rapid directional changes, and swift arm actions. Badminton is a sport involving a shuttlecock and a ball, where contestants aim to hit the ball over the net into the opponent's area while ensuring its return. Badminton, which is readily teachable, is accessible to both genders and individuals aged 7 to 77, making it a unique sport for all age groups. (Aktas et al., 2017)

Badminton is a physically taxing intermittent sport that necessitates competitors to execute repeated episodes of high-intensity actions, such as swift accelerations, decelerations, lunges, hops, and directional shifts. These activities can lead to prompt changes in specific physical parameters including heart rate, blood pressure, agility, speed, muscular endurance, and flexibility. Adolescence signifies a crucial phase of physical maturation, and consistent engagement in competitive badminton may exert unique physiological and physical requirements on young competitors. Consequently, evaluating the effects of a badminton match on certain physical characteristics in adolescent athletes might yield significant insights into the

immediate responses to competition and the physical requirements of the sport. The results could aid coaches, physical education experts, and sports scientists in formulating suitable training, recuperation, and conditioning regimens for young badminton athletes. Further, it was hypothesized that there would be a significant difference in selected physical variables among adolescent athletes before and after a badminton match.

METHODOLOGY

For the current investigation, twelve male badminton athletes were chosen as participants from LNIPE, Gwalior. Purposive sampling was employed to pick the players as participants, with their ages spanning from 17 to 21 years. All participants were engaged in badminton and possessed five years of active playing experience, additionally having competed in the All India Inter Varsity. This study employs an experimental research design featuring pretests and post-tests without a control group. The deliberate choice of a limited sample size was made to guarantee uniformity, as all individuals possess comparable traits. During the initial session, all participants will be subjected to a pretest of chosen physical factors. In the second session, following three sets of match simulations, the participants were subjected to a post-test analogous to the pretest of specific physical variables. The criterion measures for the chosen physical variables were displayed in table 1.

Table 1 Criterion Measure

Physical Variable	Test	Measurement
Flexibility	Sit And Reach	Centimeters
Speed	Time Gate	Seconds
Explosive Strength	Jump Plate	Jump Height
		Reactive Strength Index (RSI)
		Power
		Watt

Before the initiation of the research, the objectives and methods of the research were elucidated to all chosen participants, and their consent to engage was secured. The examination was performed in controlled settings, accompanied by appropriate guidelines and safety measures. The researcher thoroughly documented the pre-test and post-test measurements while ensuring the anonymity of participants' information was preserved throughout the investigation. The information gathered from the chosen badminton athletes during the pre-test and post-test was statistically examined to assess the impact of badminton match play on the specified physical variables. Descriptive statistics, such as the mean and standard deviation, were computed for every variable. The paired sample t-test was utilised to assess the significant difference between pre-test and post-test scores on selected physical variables of adolescent badminton athletes. The significance level was established at 0.05.

Finding

Table 2 Analysis of Pre-Test and Post-Test Results on Selected Physical Variables of Adolescent Badminton Athletes

Physical Variable	Test	N	Mean	SD	df	Cal. t
Sit & Reach	Pre-test	12	14.1583	2.91344	11	-6.209*
	Post-test	12	15.1083	2.80404		
Shuttle run	Pre-test	12	14.9067	.58035	11	2.855*
	Post-test	12	14.4925	.48332		
Jump Height	Pre-test	12	40.4125	6.66367	11	-.738
	Post-test	12	41.3833	7.44831		
Reactive Strength Index (RSI)	Pre-test	12	133.3608	40.41220	11	-.894
	Post-test	12	140.4133	39.04681		
Power	Pre-test	12	995.2333	256.47298	11	-.988
	Post-test	12	1124.30	482.79152		

*Significant at 0.05 level, tab.t = 2.201

The objective of this study was to investigate the immediate effects of badminton match play on specific physical variables in adolescent badminton players. The study involved twelve male badminton players aged 17 to 21. The paired sample t-test was employed to compare the pre-test and post-test scores, with a significance level established at 0.05. The acquired t values were contrasted with the referenced t value of 2.201 at 11 degrees of freedom. The results of the research are delineated below:

The average score for sit and reach rose from 14.1583 $\pm$ 2.91344 cm in the pre-assessment to 15.1083 $\pm$ 2.80404 cm in the post-assessment. The calculated t value was -6.209, exceeding the tabular value of 2.201 in absolute magnitude. Consequently, a notable disparity was observed between the pre-test and post-test results. The findings demonstrate that participating in badminton matches resulted in a notable immediate alteration in the players' flexibility performance.

The average shuttle-run duration diminished from 14.9067 $\pm$ 0.58035 seconds in the pre-test to 14.4925 $\pm$ 0.48332 seconds in the post-test. The calculated t value was 2.855, surpassing the critical value of 2.201. Consequently, a notable disparity was detected between the pre-test and post-test results. The reduced post-test duration signifies enhanced shuttle-run performance directly after the match-play scenario.

The average height rose from 40.4125 $\pm$ 6.66367 cm in the pre-assessment to 41.3833 $\pm$ 7.44831 cm in the post-assessment. The calculated t value was -.738, which fell short of the tabular value of 2.201. Consequently, the disparity between the pre-test and post-test scores lacked statistical significance.

The average Reactive Strength Index (RSI) rose from 133.3608 $\pm$ 40.41220 during the pre-test to 140.4133 $\pm$ 39.04681 in the post-test. The calculated t value was -0.894, which fell short of the tabular value of 2.201. Consequently, the disparity between the pre-test and post-test results was negligible.

The average power rose from 995.2333 $\pm$ 256.47298 W in the pre-assessment to 1124.30 $\pm$ 482.79152 W in the post-assessment. The calculated t value of -0.988 was inferior to the reported value of 2.201. Consequently, the disparity between the pre-test and post-test power levels was not statistically significant.

The findings indicated that badminton competition led to notable alterations in flexibility and shuttle-run performance, while no statistically significant variations were detected in jump height, reactive strength index, or power.

CONCLUSION

The current study's results indicated that a badminton match elicited notable immediate alterations in several physical characteristics among adolescent badminton players. Marked disparities were noted in flexibility, assessed via the Sit and Reach test, and in speed/agility performance, evaluated through the Shuttle Run test. The average post-test score for Sit and Reach was elevated, however the post-test Shuttle Run duration was reduced compared to the pre-test figures.

Nonetheless, the immediate impact of badminton competition was not statistically significant concerning jump height, reactive strength index, and explosive power. Despite the post-test average values for all three variables rising, the extent of the change was inadequate to achieve statistical significance at the 0.05 threshold.

Consequently, the proposition that "a notable disparity in specific physical variables among adolescent athletes exists

prior to and following a badminton match" was partially validated. The research indicates that engaging in badminton matches might prompt instant alterations in specific physical attributes, including flexibility and movement efficiency, although variables associated with explosive strength may exhibit relative stability right after the encounter. The results could benefit badminton coaches and physical education experts in comprehending the immediate bodily reactions linked to match play and in devising suitable warm-up, conditioning, and recovery protocols for young badminton players.

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