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Footwork Training in Colleges' Female Badminton Players: Focusing Performance Outcomes of Strength and Agility

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Contents:

Abstract: *Variety of research has shown that footwork training could be beneficial for various aspects of fitness components required for the game of badminton. The main purpose of the current study is to test whether footwork training is beneficial for the strength and agility of colleges badminton players. The sample of the study consisted of 40 college badminton players who were equally divided into two different groups n=20 Experimental Group (EG) and n=20 Control Group (CG). A pre-test and post-test experimental research design was used to conduct the study. Handgrip dynamometer was used to measure the strength of the participants while, Illinois Agility Test (IAT) was applied to measure the agility of the participants. Paired sample-test was used to test the hypotheses. Results indicated significant improvement in the agility of the experimental group (p < .05), however; the control group did not produce any significant improvement (p > .05. It is concluded that footwork training that continued for 6 weeks produced effective results on strength and agility of badminton players at the college level.*

Key Words: Footwork Training, Strength, Agility, Badminton Players

Introduction

Badminton is a sport that has been a source of pride for Pakistan. This is evidenced by accomplishments at both the regional and international levels. Ghazala Siddique, Huma Javeed, Mahoor Shahzad, and Palwasha Bashir competed in the South Asian Games, Asian Games, and Commonwealth Games, among other competitions. Despite the fact that the championship is presently experiencing ups and downs, the achievements are currently experiencing ups and downs. Coaching, however, which begins at a young age, is still being developed. The numerous regional and national championships that are contested on a regular basis attest to this. As a result, consistency in instruction is required through ongoing training.

Athletes can attain success in sports if they master all aspects of training, including physical,

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technical, tactical, and mental. However, before the athlete receives physical, tactical, or mental training, it is preferable that the athlete be taught solid fundamental techniques (Young et al,. 2015). Racket holding, punching, standing posture, and footwork techniques are the basic badminton techniques. Aside from racket gripping techniques, one of the most crucial techniques to be taught the first time is footwork (Subarkah, Ari & Ika Novitaria, 2018).

Badminton is the world's fastest racquet sport, with singles rallies that are even faster and doubles rallies that are even faster. Players must respond swiftly and change directions quickly as they move across the court picking smashes and changing directions (Manikandan, 2016). To play shots and predict the opponent's next move, players must be swift on their feet. As a result, players must respond swiftly and move across the court quickly, picking smashes and shifting directions all across the court. To shift the tide of any badminton game, speed, agility, and quick actions are required. When it comes to winning at the highest level, speed is crucial. To fool their opponents, professional players are known to speed and change their pace (Manikandan, 2016).

The ability to get from point A to point B as soon as feasible is known as speed. The ability of a person to move the body in quick succession with his own will and according to the demand of the situation is known as agility. While the word quickness provides clarification regarding the smooth and soft movement of the body in a single unit of time to accomplish the desire task. The three elements listed above will improve the dynamics of the players' position and stance in the relevant sport. On the court, speed and agility are essential for success. Change in the direction during running and sporting event is very difficult in quick succession but a little bit of changes with the position help a lot during the sprint situation (Chandrakumar, & Ramesh, 2015).

It's important to remember that if a player practices when weary or exhausted, his or her speed and agility will not improve. A player should focus on speed and agility while he or she is relatively fresh yet has had a good warm-up. All sports benefit from workouts that improve speed and agility (Xu & Bin, 2015). These workouts help with acceleration, deceleration, foot speed, quickness, and changing directions. Speed and agility drills will give your players a leg up on their competitors. These exercises are essential for enhancing athletic talents, avoiding injury, and boosting self-esteem (Chandrakumar, & Ramesh, 2015). Short sprints (5-10s), cone exercises, and ladder drills can help you enhance your speed and agility. When playing at the highest level, players must be lightning-swift on the court (Tyrväinen & Henri, 2015).

To sustain extended rallies and matches, badminton also necessitates excellent hand-eye coordination, flexibility, and physical fitness. While playing badminton, nearly every muscle in our body is utilized. Badminton necessitates a combination of whole body parts strength in a single sport. The strength a sports person gets from the lower body parts improves mobility, upper body strength improves shot quality. As a result, adequate training is critical for developing strength and endurance, which leads to peak performance in the game (Akbari et al., 2018).

Footwork skills are considered crucial, especially for newcomers, because the badminton foot serves as a support for the body to position the body in a posture that enables for successful punch motions. With good methods, a good, nimble, fast footwork movement can assist the athlete in restoring the opponent's shuttlecock. Because it can reach the opponent's shuttlecock, the player can even position the shuttlecock in a difficult-to-reach location. As a result, a badminton player must have excellent footwork (Akbari et al., 2018).

Footwork is the regulation of the body's movement in order to place the movement and strike the shuttlecock in the correct location. Players with good footwork can get to the point of receiving the ball faster, giving them the opportunity to manipulate the shuttlecock's return and thus score points. To get effective and correct footwork, the expertise of good footwork must be cultivated and trained in a methodical and orderly manner (Young et al,. 2015). Footwork is used to come closer to the shuttlecock's fall position (Alhusin & Syahri, 2007), so that the player may simply punch Another discovery is that the shuttlecock is managed by the body's location in relation to the shuttlecock through the use of footsteps (Ardyanto & Sofyan, 2018). Another research study Purnama, Sapta and Kunta (2010) has stated that in badminton, footfall act as a support for the body to move in all directions swiftly, allowing the body to be positioned in such a way that effective punch movements can be performed.

The aforementioned definition emphasizes the need of proper footwork training. This is supported by a number of studies, Incorporating Split Step Hop Timing and Lower Extremity Kinetics Analysis in Badminton Start Footwork (Hsueh et al., 2016). According to the findings, the leg that was moving in the opposite direction had a substantially higher tower extremity horizontal push-off force than the other leg. Split step hops happen at the same time as the opponent strikes the shuttlecock. The major push leg was the one that was in the opposite direction of the movement. This demonstrates that for players who utilise the right grip, the right foot is always at the end of the step, or each stride is taken with the right foot, according to the main concept of footwork.

In addition, Heng-Wen Lin, et al., (2015) completed research named Biomechanical Analysis of Badminton Different Forward Steps. The study's findings show that 3-step movement takes much less time than 2-step movement. The 3-step forward badminton footwork seemed to be a superior strategy for conducting net play defensive strokes in the supporting phase of two style forward steps.

Footwork Teaching of College Badminton Elective Course is another study undertaken by Chao-Chen (2014). According to the findings of the study, badminton footwork is a vital aspect of badminton technology, and learning and mastering the rapid and accurate manner is crucial to badminton success. People generally focus on technique study while ignoring footwork training in the process of acquiring badminton technology; nevertheless, research results cannot be assured.

As a result, in order to develop effective footwork, players must receive precise and systematic footwork instruction. This will allow them to perform well when playing badminton. The researchers are interested in doing study on exercise models utilized for badminton footwork training in light of the aforementioned issues. As a result, it can provide trainers with an alternative method of teaching footwork to their athletes.

Objectives

To check the effects of footwork training on performance parameter of strength in college female badminton players.

To check the effects of footwork training on performance parameter of agility in college female badminton players.

Hypotheses

H_1. There is a statistically significant effect of footwork training on performance parameter of strength in college female badminton players.

H_2. There is a statistically significant effect of footwork training on performance parameter of agility in college female badminton players.

Methods and Materials

Participants

The present research work consisted of 40 participants. These participants were divided into two equal groups. Every group consisted of 20 participants having same age, gender and same exercise protocol. These participants were chosen from Government Degree College for women 90-Military Lines (ML) district Layyah.

Research Design

This study consisted of pre-test and post-test experimental research design. The other kind of research design was not appropriate for this study. The following design is given for easy understanding.

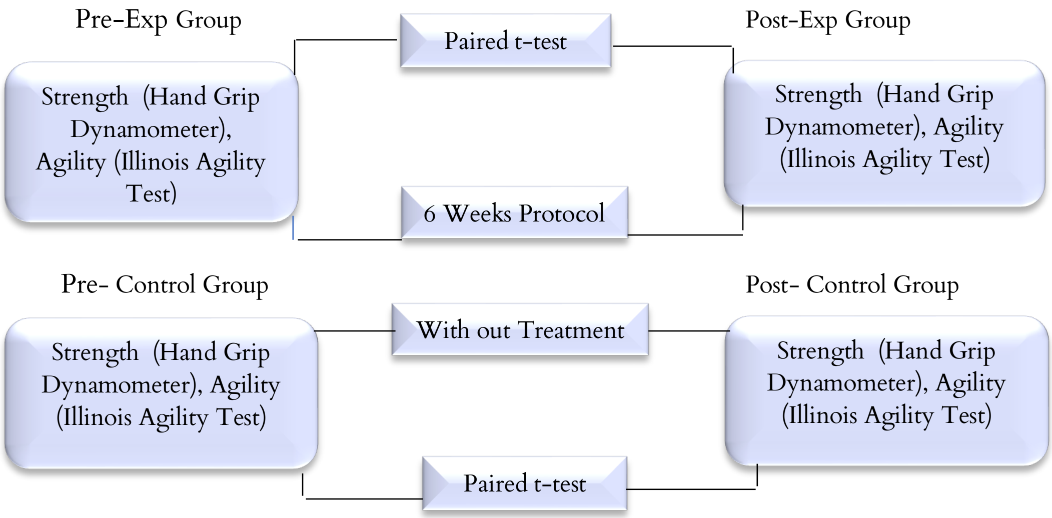

Figure 1

Variables

Independent Variable

Footwork training

Dependent Variables

Strength
Agility

Procedure and Measurement

The present study included two variables that are strength and agility. Agility of the subjects was measured through Illinois Agility Test (IAT). The IAT was measured through Marking cones, flat non-slip surface, stop watch, measuring tape. The strength was measured through hand-grip dynamometer. Further detail of the variables and apparatus/test have been given in the below table.

Table 1. Variables and Apparatus used

Sr. No	Variables	Apparatus
1	Strengthh	Han d- grip Dynamometer
2	Agility	Markin g cones, flat non—slip surface, stop Irvatda measuring tape

Results and Discussion

Descriptive

Table 2. Showing the frequencies of participants group wise

Groups	Frequency	Percent	Valid Percent	Cumulative Percent
Control Group	20	50.0	50.0	50.0
Experimental Group	20	50.0	50.0	100.0
Total	40	100.0	100.0	

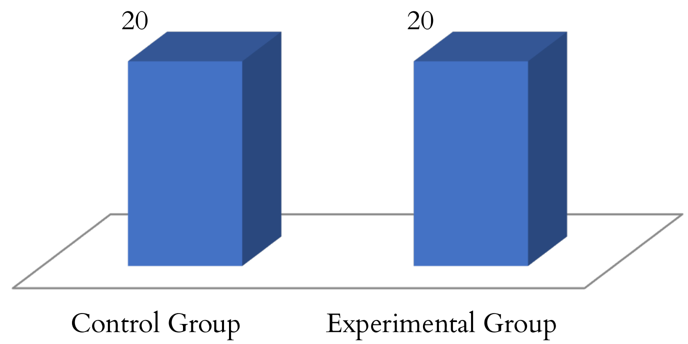

Figure 2: Bar graph of groups (Experimental group and control group)

Table 2 showed that there total 40 respondents in the study through randomization the participants divided into two different groups. Total respondents in control group were 20 as well as total respondents in experimental group were 20.

Table 3. Showing the descriptive of Anthropometric measures and research variables of the respondents

Research Variables	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Age (years)	40	17.9750	1.27073	.207	.374	-1.131	.733
Height (cm)	40	156.9000	9.87304	-1.247	.374	1.069	.733
Weight (kg) pre	40	46.3500	3.05966	.448	.374	-.379	.733
Body Mass Index	40	19.0824	3.08983	1.542	.374	2.831	.733
Pre- Agility	40	23.0250	1.44093	-.208	.374	.744	.733
Post- Agility	40	21.0500	1.92087	.200	.374	-.426	.733
Pre- Strength	40	22.4250	1.25856	.422	.374	.996	.733
Post- Strength	40	27.1500	5.15677	.053	.374	-1.884	.733
Valid N (listwise)	40						

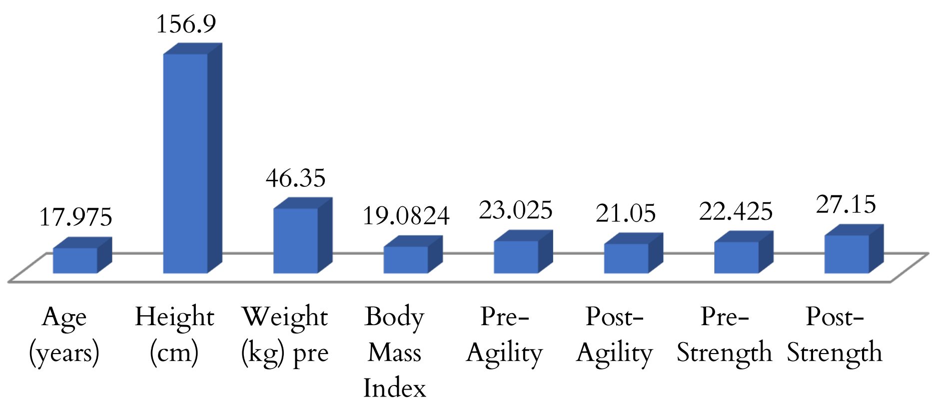

Figure 3: Bar graph of mean regarding research variables

Table 4.2 showing the descriptive detail of all research variables. The mean age of the all respondents was 17.97±1.27. The mean height was 156.90±9.87cm, the mean weight was 46.35±3.05kg, the mean BMI was 19.08±3.08, the mean pre agility score was 23.02±1.44 sec, post agility score was 21.05±1.92 sec. the mean of pretest strength was 22.42±1.25 kg and mea of posttest strength was 27.15±5.15 kg. Some researchers recommended that data is considered to be normal if Skewness is between -2 to +2 and Kurtosis is between -7 to +7 as suggested by the researchers (Hair et al., 2010; Bryne, 2010). The current results of Skewness and Kurtosis were normal for hypotheses testing.

Table 4. Age, Height, Weight and BMI differences between the control group and experimental group

Testing Variables	Groups	N	Mean	Std. Deviation	t	Sig.
Age (years)	Control Group	20	17.9500	1.23438	-.123	.903
	Experimental Group	20	18.0000	1.33771		
Height (cm)	Control Group	20	157.0500	10.31338	.095	.925
	Experimental Group	20	156.7500	9.67838		
Weight (kg)	Control Group	20	46.9000	3.47775	1.141	.261
	Experimental Group	20	45.8000	2.54641		
Body Mass Index (BMI)	Control Group	20	19.2732	3.13637	.386	.701
	Experimental Group	20	18.8915	3.11175		

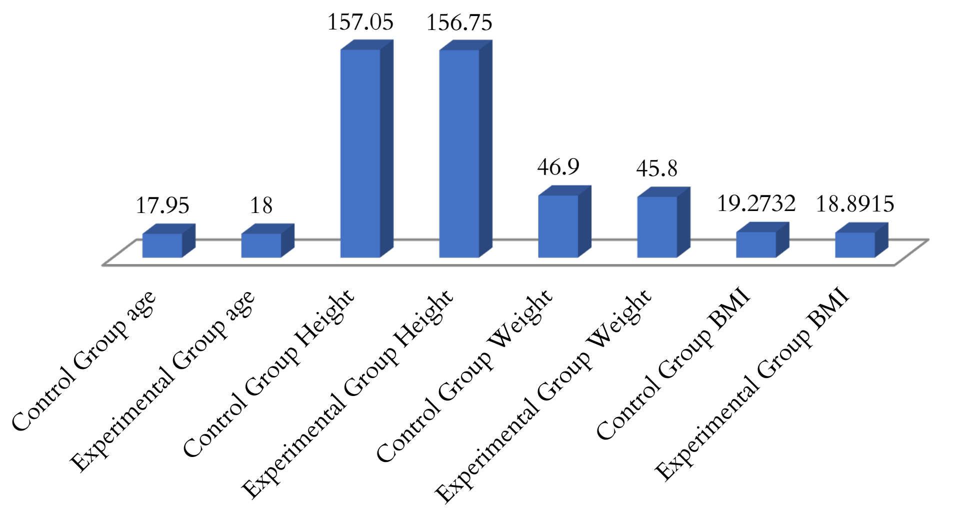

Figure 4: Bar Graph of the mean of age, height, weight and BMI

In Table 4 an independent sample t-test was applied to measure the difference between the control group and experimental group in age, height, weight and Body Mass Index. The sig. value for all variables appears as age (.903), height (.925), weight (.261) and Body Mass Index (.701) which were lesser than the set critical value 0.05. According to the results no statistically significant difference found between the age, height, weight and BMI of the control group and experimental group.

Testing of Hypothesis

Table 5. Differences between Pre and Post of Control Group and experimental group in Agility

Measurements	Pretest agility	Posttest Agility	T	Sig.
	Mean ± SD	Mean ± SD		
Experimental group	23.15±1.30	19.80±1.36	7.667	.000
Control Group	22.90±1.58	22.30±1.55	2.259	.066

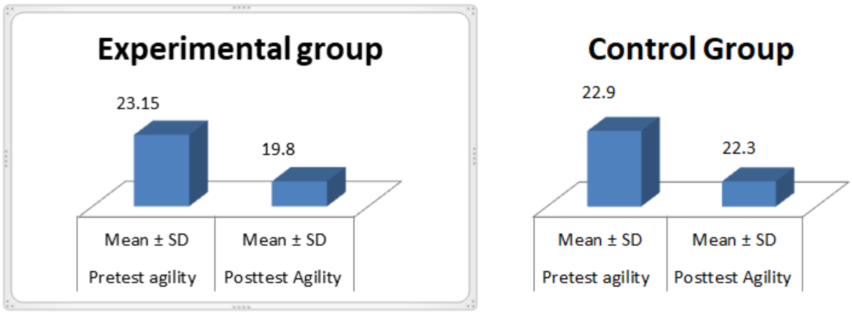

Figure 5: Bar graph of the mean of the experimental group and control group in agility and strength (post-test differences)

In Table 4.4 a paired sample t-Test was applied to measure the difference between the pre-test agility score and post-test agility score of control group and experimental group. A statistically significant difference was found between the pre-test and post-test score in agility (.000 < 0.05) of the experimental group. No stitiscally significant difference found between the pre-test and post-test score of the control group in agility (.066 < 0.05). According to the results the experimental group improve agility than the control group after the 8 weeks of treatment. Hence the alternative hypothesis is true.

Table 6. Differences between Pre and Post of Control Group and experimental group in Strength

Measurements	Pretest strength	Posttest strength	T	Sig.
	Mean ± SD	Mean ± SD		
Experimental group	22.50±1.39	32.10±1.41	-20.322	.000
Control Group	22.35±1.13	22.20±1.00	1.000	.330

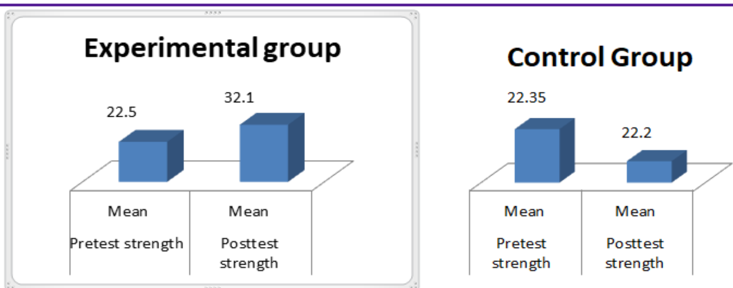

Figure 6: Bar graph of the mean of the experimental group and control group in agility and strength (pre-test to post-test differences)

In Table 6 an paired sample t-Test was applied to measure the difference between the pre-test strength score and post-test strength score of the control group and experimental group. Statistically significant difference was found between the pre-test and post-test score in strength (.000 < 0.05) of the experimental group. No stitiscally significant difference found between the pre-test and the post-test score of the control group in strength. According to the results the experimental group improve strength than the control group after the 8 weeks of treatment. Hence the alternative hypothesis is true.

Discussion

The current study was conducted to evaluate the effects of a footwork training program on the strength and agility of college badminton players. After data analysis, it has been found that footwork training that continued for 6 weeks has improved the physical parameters of strength and agility of badminton players. The t-Test analysis revealed significant differences in the comparison of baseline to post-test. The results obtained through the current study indicated that footwork training is effective to bring desirable change in strength and agility of college-level badminton players. Similar findings have been obtained in a study Loureiro et al., (2017) who conducted a study to assess badminton players by stimulating specific movements and conditions of uncertainty as one of the specific agility test. Their findings indicated a significant difference in agility between badminton players and other athletes. Another study highlighted that shadow training has a significant influence on the physical parameters of badminton players (Lanuezl & Wilson, 2008). One study conducted to examine the effect of exercise program in motor variables. Results indicated that participants who underwent through specific exercise group produced higher score on motor variables of agility as compared with those who included in non-specific exercise intervention (Azmi, 2018). A study to examine the motor fitness of cricket players indicated significant improvement in an experimental group after exercise hat extended for 12 weeks [55]. However, finding of the study indicated no significant advantages of high intensity multi-shuttle training model except some improvement in the experimental group.

Essentially, footwork enables athletes to deliver a variety of punches when striking or returning a punch. This is due to the efficiency of the striking power, where proper footwork makes it easier for the shuttlecock to remain in front of the position at all times. According to Donie (2009), good and accurate actions will result in the following benefits: 1) It will be able to rapidly move to any place or direction on the field to return the opponent's strike. 2) It will be able to achieve the maximum blow angle because it allows us to move fast before the cock down; 3) It will be more effective and efficient in the application of power, 4) It will have more freedom in unleashing a variety of punches that are rapid, strong, accurate, and diversified, and 5) it will be able to return a punch from a difficult posture. Grice (1996) agrees, claiming that previous relevant research has provided competitors with useful information such as the appropriate split step timing and which leg should be the primary push-off leg to begin footwork. In badminton, the split step is a crucial footwork ability. Kuntze, Mansfield, and Sellers (2010) looked at the three different badminton footwork patterns and discovered that the step-in lunge could help reduce the muscle demands of lunge recovery.

As a result, it's critical to provide an athlete with a footwork combination practice method that follows the principles of simple to complex, easy to tough, step-by-step striking footwork practice as the foundation and footwork combining exercise as the emphasis of focused practice. A coach should focus on thoroughly studying and mastering various footwork, as well as strengthening and improving the athlete's ability to run the court using various methods, as well as strengthening and improving the various steps, adjusting skills, and improving the training. As a result, the students maintain their current agile footing and continue to enhance their badminton technique and strategies. Badminton footwork is a fundamental and crucial technique in the game of badminton, allowing players to change positions fast while maintaining superb motor control. Understanding lunge kinematics is beneficial not just for badminton performance but also for injury prevention. The goal was to compare the kinetic responses of different badminton players when doing a right forward lunge.

Conclusion

According to the findings of the study, 6 weeks of selected footwork workouts dramatically increased the strength and agility of collegiate badminton players. Based on the findings, it is hypothesized that specific footwork drills are an effective way to achieve desired changes in agility and reaction speed in badminton players. Badminton is a fast-paced sport in which players must react quickly to each return shuttlecock. Having solid footwork is one approach to respond swiftly to the shuttlecock. Because the player's failure to return the shuttlecock delivered by the opponent is generally due to a delay in footwork, the player might lose points. As a result, a more diversified footwork training model is required so that athletes are not bored when they must practice footwork. The footwork training model used in this study is an exercise model that considers the level of movement, starting with easy actions and progressing to more challenging movements. Furthermore, athletes find this exercise model appealing.

Recommendations

1. The physical parameter of strength has an important role in the game of badminton. Therefore, the trainer and athletes as well give proper attention to developing the important variable of strength.
2. Likewise, the component of agility is no less important in the game of badminton. This is owing to the fact that badminton necessitates quick movements and changes of direction, necessitating accurate and quick footwork. As a result, badminton coaches must pay attention to their athletes' footwork in order to address the issue of agility.
3. As a result, it is recommended that all badminton trainers pay close attention to the athlete's footwork techniques so that the athlete's agility can progress appropriately.
4. It is also recommended that the coaches and athletes may select and adjust appropriate training program to increase physical parameters of strength and agility.

Future Directions

1. The current study was conducted among college female badminton players. One can further study by selecting male badminton players.
2. The study at hand was conducted to examine the effect of footwork training on the strength and agility of badminton players. Another research is suggested to examine the effect of the multi-shuttle training model of the physical parameters of badminton players.
3. In the current, the researcher selected female players from a college. One can select school children to investigate the effect of any specific exercise on various physical parameters of players.

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