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A Study on the Relationship Between Motor Fitness and Sports Performance in Elite Female Cricket Players of Bangladesh

Farjana Akter Boby

Department of Physical Education and Sports Science, Jashore University of Science and Technology, Jashore, Bangladesh

Email address:
farjanaboby77475@gmail.com

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Abstract: Motor fitness and athletic performance are important concepts in sports and physical activity. While motor fitness is a general concept that applies to a wide range of physical activities, athletic performance is specific to a particular sport or activity. Athletes require a high level of motor fitness to perform at their best, but motor fitness alone does not guarantee athletic success. The current investigation aimed to examine the relationship between female cricket players' motor fitness and athletic performance. For this study, a total of 30 elite female cricket players who earned spots in the Divisional Cricket Camp were chosen as participants. The motor fitness variables, including agility, abdominal strength endurance, speed, arm strength, and cardiovascular endurance, were assessed using the shuttle run (4X10 Yard), sit-ups, 50-yard dash, medicine ball throw, and 9-minute run/walk tests, respectively. The correlation between motor fitness parameters and sports performance among female cricketers was investigated using Pearson's Product-Movement Correlation Test (PMC) through SPSS software. The results showed that there was a significant positive correlation between motor fitness and sports performance in elite female cricket players. The current study's findings showed that abdominal strength, speed, and cardiovascular endurance variables all favorably influence cricket players' ability to perform better in competition. But arm strength and agility had negligible correlation with better athletic performance among elite female cricketers. These findings suggest that improving motor fitness, especially abdominal strength, speed, and cardiovascular endurance, may improve sports performance in elite female cricket players. Therefore, coaches and trainers should consider incorporating motor fitness training programs into their training regimes to enhance the performance of female cricket players.

Keywords: Motor Fitness, Sports Performance, Elite Female Cricketers

1. Introduction

Motor fitness and athletic performance are closely related concepts [1]. Motor fitness refers to the capacity of an individual's neuromuscular system to perform a task or activity. This can include agility, balance, coordination, power, reaction time, speed, and strength [2]. On the other hand, athletic performance refers to an individual's ability to perform in a specific sport or athletic activity. While motor fitness is important for overall health and well-being, it is also a key factor in athletic performance. Athletes must possess a high level of motor fitness in order to excel in their sport [3]. In order to improve motor fitness and athletic performance, athletes engage in specific training programs designed to enhance these components [4]. For example, a sprinter might perform plyometric exercises to improve power and speed, while a basketball player might incorporate agility drills into their training regimen. Motor fitness and athletic performance are closely intertwined concepts that require specific training and conditioning to optimize performance [4]. According to various research studies, players' motor fitness components vary from game to game, position to position, and male to female athletes, affecting sports performance [5]. The most comprehensive test of all components of physical fitness was motor fitness. Motor fitness refers to the body's motor system (muscles, bones, and joints) ability to perform physical tasks and movements. Cricket, like many other sports, requires a high level of

motor fitness, as players need to perform various activities such as running, throwing, and swinging a bat [6]. A player with good motor fitness will be able to perform these movements with speed, power, and accuracy [7]. Additionally, good motor fitness can help prevent injuries by keeping the body in good physical condition [8]. Therefore maintaining a good motor fitness level is essential for cricket players. The effectiveness and time spent on the tasks accomplished in the past served as a gauge of a person's physical fitness. This work may be done in an industry, on a farm, or outside. People may need to become more familiar with human anatomy or physiology fundamentals. Still, they can assess and be amazed by the incredible speed, strength, and endurance displayed [9]. One should consider other crucial components while evaluating motor fitness, such as aggressiveness, learning speed, collaboration, and education [4]. Motor fitness is an essential aspect of cricket performance as it affects a player's ability to perform specific skills, such as batting, fielding, and running [10]. Good motor fitness can help a player maintain proper form, increase speed and power, and improve endurance. This can lead to better performance on the field, such as faster running between wickets, more substantial hits, and more accurate throws [11]. Additionally, good motor fitness can help reduce the risk of injury. A well-rounded training program that includes exercises to improve strength, endurance, flexibility, and power is essential for maintaining good motor fitness in cricket players. Due to the nature of modern cricket, played quickly, players and viewers find the game immensely enjoyable. As it is an action-packed game, the team and the individual players must constantly adjust to new circumstances [12]. Like many other sports, motor fitness is integral to cricket performance. Motor fitness rises by performance level [13]. Improving and maintaining motor fitness or condition may be the most crucial aim of sports training [14]. In cricket, fitness hasn't always been regarded as being as important as it is in other sports. In any sport, the importance of fitness cannot be emphasized. Physical fitness will improve athletic performance. Cricket, however, is a sport that also puts your physical stamina, mental tenacity, and gaming abilities to the test [15]. Along with having a significant influence on all facets of the game, motor fitness is essential for aggressive fielding and quick bowling, including over-arm tosses, dashing between wickets and hitting. Performance evaluations of motor fitness are based on several parameters [16]. The goal of the current study, which took into account the significance of motor fitness and sports performance, was to examine the association between certain motor fitness factors and sports performance among high-performing female cricketers.

2. Methodology

2.1. Subjects

A total of thirty (N=30) female cricket players who earned spots in the Divisional Cricket Camp were chosen at random as participants for the present investigation. They ranged in age from 16 to 25. The participants were told not to exercise vigorously for at least 24 hours before the fitness test and not to consume a big meal 1-2 hours before the fitness test. Each fitness test was finished after the advised warm-ups of running and stretching. The essential precautions were taken to prevent injury during testing. Each and every participant provided written consent to take part in the study.

2.2. Variables

The motor fitness variables, including agility, abdominal strength, speed, arm strength, and cardiovascular endurance, were assessed using the shuttle run (4X10 Yard), sit-ups, 50-yard dash, medicine ball throw, and 9-minute run/walk tests, respectively.

2.3. Equipment and Tools

The following instruments and tools were used for collecting data in the present study:

1) 400m running track
2) An area having a starting and finishing line on a track
3) Digital stopwatch for measuring time
4) Different cones
5) Marker
6) Mats
7) 4-6 piece Wooden Blocks
8) Steel tape for measuring distance
9) Whistles
10) Medicine Ball (3kg) etc.

3. The Procedure of Data Collection

Shuttle run (4X10 Yard): With marking tape, lines were drawn 10 yards apart. The two blocks were positioned near and outside the starting line; they were not utilized as the starting line. On the "Go" signal, the test subject run from the starting line to the first block, picked it up, run back to the starting line and placed it behind the line, go to the second block, pick it up, run back to the starting line and put it behind the line, etc. There were two trials allowed [17].

Figure 1. *Shuttle run.*

Sit-ups: Explained the test to the participant and demonstrated how to perform a proper sit-up. The participant should lie on the floor with their knees bent and feet flat on the floor. The hands should be placed behind the head but not interlocked. The participant should perform as many sit-ups as possible until they can no longer complete a full sit-up [17].

Figure 2. *Sit-up.*

Note: It was essential to ensure that the participant performed the sit-ups correctly, with the hands placed behind the head and the legs remaining bent throughout the movement.

50-yard dash: Used markers or tape to mark the start and finish line, ensuring that they are 50 yards apart and clearly visible. Used a measuring tape to measure the distance between the start and finish line and a stopwatch to time the participants as they ran the 50m dash. Gave the participants a clear starting signal and began timing as soon as they crossed the start line. Stop timing when they crossed the finish line. Record the time for each participant and keep a record of their performance. Repeated the test for each participant and used the average of their three best times as their final score [17].

Figure 3. *50-yard dash.*

Medicine ball throw: Made sure that the subject stood behind and not in front of the line. Then throw the medicine ball as far as she can from her chest, making sure not to bend her legs. Measured how far she threw the medicine ball. Two trials were permitted. The score was the Maximum distance covered by two trials.

Figure 4. *Medicine ball throw.*

9-minute run/walk test: The 400m track was marked, and starting and finish lines were established. A stopwatch and a pen and paper to record the time were also ready. Participants should be informed of the purpose and procedure of the 9-minute run. They were physically prepared and wore appropriate running shoes. Participants were instructed to stay within the track, avoid running into other participants, and stop immediately if they felt pain or discomfort. The timer was started as soon as the participant crossed the starting line. The participant was monitored throughout the 9-minute run to ensure they stayed within the track and did not exceed the 9-minute time limit. The time was recorded in seconds when the participant crossed the finish line.

4. Analytical Procedure

The correlation between motor fitness parameters and sports performance among female cricketers was investigated using Pearson's Product-Movement Correlation Test (PMC) trough SPSS software. The significance level was chosen for this investigation at 0.05, which was considered acceptable.

5. Results and Interpretation

The correlation between several motor fitness parameters and athletic performance among elite female cricketers has been demonstrated in table 1.

Table 1. *Correlation between several motor fitness parameters and athletic performance among elite female cricketers.*

SL	Variables	Correlation (r)	P-value (sig.)
1.	Medicine Ball Throw	.187	.322
2.	Sit-Ups	.438*	.015*
3.	Shuttle Run	.063	.742
4.	50 Yard Dash	.463**	.010**
5.	9-minute Run/Walk	.364*	.048*

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The findings on the correlation between motor fitness and athletic performance among elite female cricket players are shown in Table 1. Here athletic performance was shown to be

significantly correlated with motor fitness ($p<0.05$). Considering motor fitness and its component factors, there is a substantial correlation, i.e., Sit-Ups with r =.438 and p-value (sig) =.015*, 50 Yard Dash with r =.463 and p value (sig) =.010**, 9 minute Run/Walk with r =.364 and p value (sig) =.048*. Furthermore, there was no correlation with the sub-variables that was not statistically significant ($p>0.05$) i.e. Medicine Ball Throw with sporting accomplishments as the result r =.187 and p-value (sig) =.322, Shuttle Run with r =.063 and p-value (sig) =.742.

Thus, it is clear that having greater abdominal strength, speed, and cardiovascular endurance all contribute to improved cricket performance skills.

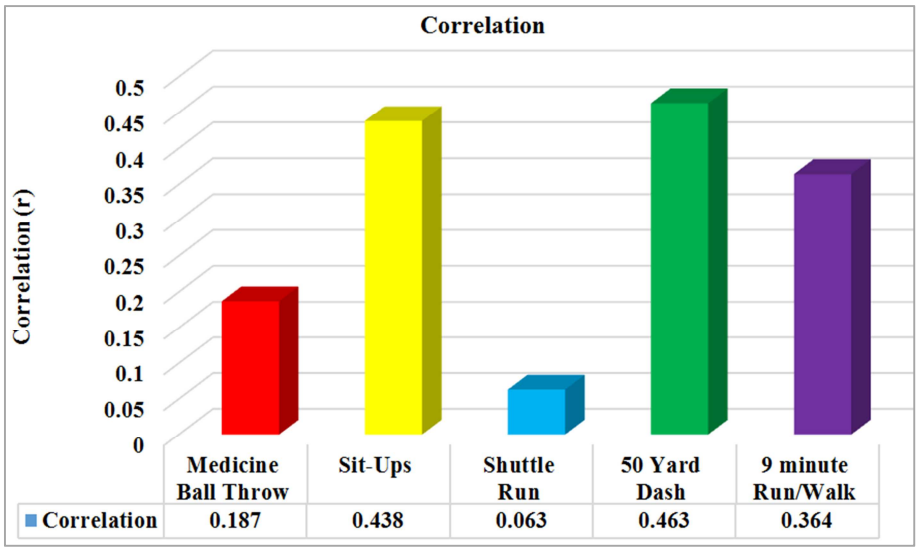

Figure 5. *Graphical representation of the correlation between several motor fitness parameters and athletic performance among elite female cricketers.*

6. Discussion

Motor fitness, which includes physical attributes such as strength, power, speed, endurance, and flexibility, is positively correlated with cricket performance [16]. Stronger players can hit the ball harder and farther, while faster players can cover more ground in the field and steal more runs [18]. Endurance is essential for maintaining intensity throughout the game, and flexibility allows for a more excellent range of motion in the batting and bowling motions. Therefore, improving motor fitness can lead to improved performance in cricket [12]. Regarding the sub-factors of abdominal strength, speed, and cardiovascular endurance, the data on the association of motor fitness variables with athletic performance among female cricketers demonstrated a clear significant correlation. Furthermore, the motor fitness sub-variables, arm strength, and agility were shown to have a negligible correlation with athletic performance [19]. Good motor fitness can help a player maintain proper form, increase speed and power, and improve endurance. This can lead to better performance on the field, such as faster running between wickets, more potent hits, and more accurate throws [11]. Therefore, to perform cricketing abilities efficiently with the necessary elegance, precision, and long period, it is vital to have the maximum degree of abdominal strength, agility, explosive leg power, speed, and cardiovascular endurance [16]. Since arm strength and agility are also crucial components of cricket performance, particularly for pace bowlers, it was found that there was a negligible correlation between these two variables. However, this correlation may have needed to be improved because the current study focused on batters and all-rounders rather than pace bowlers. The results of this study concur with the research of Kumar et al.(2019), who made it abundantly evident that the association between playing ability and motor fitness was significant [20]. The results of this study are also consistent with those of Chandrasekaran et al. (2012) [21], who found that playing ability relies greatly on physical fitness and a stress-free state of mind. Therefore, according to the researcher's opinion of this study, improving motor fitness can lead to improved performance in cricket.

7. Conclusion

The study concluded that abdominal strength, speed, and cardiovascular endurance variables influence cricket players' ability to perform better in competition. But arm strength and agility had negligible correlation with better athletic performance among elite female cricketers. The results of the tests helped the researcher identify the fundamental motor skills that are primarily accountable for the success of the performance of situational motor skills, and as a result, the researcher believes that this paper can contribute to safer and more effective planning and programming of training with female cricket players. Consequently, it is suggested that coaches, sports trainers, and athletes engaged in sports training should observe closely how their athletes' motor fitness is improving.

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