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Relationship of linear sprint and agility with selected psychomotor components in the district level cricket players

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Abstract

Cricket is an intermittent team game where the players need an ultimate fitness level. Psychomotor and physical fitness in cricket game meet the demands of batting, bowling, and fielding skills. Sprint occurred repeatedly in batting, bowling and fielding, and is helping players perform better. The purpose of the present study was to identify the importance of psychomotor ability in Bangladesh and its relationship with the sprint and agility of 35 male district level cricket players. Subject's age ranged between 17 to 18 years. Psychomotor ability was assessed by Eye Hand Coordination Test, Nelson Hand Reaction Test, and Distance Perception Jump Test. Sprint test was evaluated by 50 Yard Dash and agility was assessed by Shuttle Run test. Data were analyzed using Pearson coefficient correlation and multiple equation correlation. High correlation between Eye Hand Coordination Test with 50 Yard Dash was found as one of the notable tests. The study also highlights a high degree of combined correlation between psychomotor ability in young cricket players and 50 yard dash test. Therefore, while selecting cricket players for the youth team psychomotor ability and 50 Yard Dash would be taken into consideration along with the batting, bowling and fielding skills.

Keywords: Psychomotor, cricket, sprint, shuttle run

1. Introduction

In Bangladesh, there are various intermittent ^[1] team sports. Cricket and Soccer are the most popular game requiring brain function ^[2], intelligent movement ^[3], motor fitness ^[4], and dynamic pattern of movement ^[5, 6]. Batting, Bowling, Fielding all those skills needed for repetitive sprinting ^[7, 8, 9]. So, the cricket game involves different components of psychomotor ^[10]. Psychomotor ability is characterized as a broad range of actions that require physical movement related to the processing of conscious intuitive thoughts. Psychomotor performance may be measured by speed accuracy (reaction time) and kinesthetic perception ^[11]. To perform bowling and batting, players involve with 'run-up' and 'running between the wickets' ^[12, 13]. In the modern cricket game, running between the wickets is in the crease an art of on-strike and the non-strike batsman. Therefore, motor fitness, perception, cognition are important elements ^[14, 15] for batting, bowling and fielding skills. On the other side, successful 'running between the wickets' depends on efficient psychomotor ability and high sprinting capabilities. Authors Nicholls and his team (2001) ^[16], therefore, emphasize visual perception that is related to psychomotor ability. Nicholls (2001) and his team stated that, "During visual perception, features such as color and motion are analyzed separately. This is illustrated by the fact that lesions in discrete regions of the brain result in selective loss such features, rather than an overall reduction in quality of visual images" (p.427).

Researchers ^[17], found that repeated high intensity shuttle running for batting related skills is very significant. Researchers found this result with cognition. Goble (2016), stated that prolonged batting with frequent shuttle running fatigues amateur batters and adversely affects cognitive capacity of a higher order. Previous research ^[18] has shown that there were significantly better psychomotor variables such as eye-hand coordination and visual reaction time compared to players with traditional training. In evaluating the significant impact of visual skill fitness training (VSFT), the combined effect of visual abilities and running exercises was observed as they help to improve the psychomotor variables relative to the

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control group in cricket players. However, researchers [19] showed that for optimum output a certain level of stress is needed. Too little anxiety expresses itself for results in anger and unchallenged emotions, such that cognitive ability and stress run in the same direction. It is therefore proven that a wide variety of actions involving physical activity are linked to conscious cognitive processing. Agility with quick change of direction is necessary for acrobatic fielding in cricket. (Bishop *et al.*, 2020) [20] showed that off-season in cricket provides ample time to substantially develop the physical qualities required for the challenging in-season sport. According to [21] healthy activity programme have a significant effect for maintaining and improving kinesthetic perception and self-concept of 12 and 14 year school students. The kinesthetic sense has been popularly named the sixth sense, since it is the first recognized addition to the original five senses required by cricket and soccer players. In modern cricket coach used several psychomotor, physiological, and physical protocols for youth talent identification. Those tests are used in district-level cricket players in Noakhali, Bangladesh because of accessibility. Present study decides on psychomotor parameter as its importance in cricket game.

2. Aim of the Study

The aim of this study was to analyze the relationship between Linear Sprint and selected psychomotor ability of district level cricket players. The study also analyzes the relationship between Agility and selected psychomotor ability of district level cricket players.

3. Methods

3.1 Selection of Subjects

Total 35 male district level cricket players were selected randomly from Noakhali District Sports Association, Noakhali, Bangladesh. The age of the subjects ranged between 17 to 18 years.

3.2 Selection of variables

Keeping the feasibility criterion in mind, the present research was selected the following variables for the present study.

3.2.1 Independent Variables

- Eye Hand Coordination Test (Ball Transfer)
- Nelson Hand Reaction Test
- Distance Perception Jump Test

3.2.2 Dependent Variables

- 50 Yard Dash (Speed)
- Shuttle Run (Agility)

3.3 Criterion Measures

The criterion measures that was used in this study for the purpose of collecting necessary data is presented in the table 1.

Table 1: Tools selected to administrate the tests

Name of the Protocol	Purpose	Unit
Eye Hand Coordination Test	To measure the coordinating ability	sec.
Nelson Hand Reaction Test	To measure the reaction ability	cm
Distance Perception Jump Test	To measure the kinesthetic perception	inch
50 Yard Dash	To measure speed	sec.
Shuttle Run	To measure the agility	sec.

3.4 Administration of Tests

3.4.1 Eye Hand Coordination Test (Ball Transfer)

Mainly two lines were set up with a two basket, about 10 meters apart, and the end line basket has a 10 ball. On the signal "ready", the participant places their forefoot behind the starting line. On the signal "Go!" the participant runs to the other basket and picks up a ball and returns to put it behind the preliminary line and keep the ball above the basket, then returns to pick up the second ball and pick up a total of 10 balls. After all the balls (ten balls) are done the subjects run back across the line with it. The best time in nearest seconds was recorded.

3.4.2 Nelson Hand Reaction Test

The tester kept the stick timer close to the top, letting the thumb and index finger hang in between the subjects. The subjects were guided to look at the zone of focus and say by catching the stick when it is released to respond. When the subject caught the timer, the score was read just above the upper edge of the thumb. The five slowest and five fastest trails from 20 trails were discarded, and an average of the middle ten was recorded as the final score.

3.4.3 Distance Perception Jump Test

Without a practice trial, the performer was instructed to sense the distance between the two lines. The blindfold was noticeable on the subject's eyes and the subject was instructed to jump from behind the preliminary line and try to land as near as possible to the target line with the feet. Ten trials were given for each participant. Distance was measured from the target line to the farthest heel of each jump and recorded in nearest inches.

3.4.4 50 Yard Dash

Subjects may take any position behind the starting line subject wish. On the command, "Go" subject is to run as fast as he can across the finish line. The subject is asked not to slow down until he is past the finish line. The best time in nearest seconds was recorded.

3.4.5 Shuttle Run (Agility)

The subject begins on the signal "go" behind the starting line and runs to the blocks (a piece of wood 2"×2"×4"), picks one up, returns to the starting line, and places the block behind the line, then repeats the process with the second block. The scoring is the necessary length of time (up to the nearest tenth of a second) to complete the course. The subject is allowed to rest (5 min) in between the two trails. Record only the best trial.

3.5 Statistical Procedure

Firstly to find out correlation between independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) and dependent variable (50 Yard Dash), product moment method of correlation was used. The study also find out correlation between independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) and dependent variable (Shuttle Run), product moment method of correlation was used. Secondly to study the joint contribution of independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) and dependent variable (50 Yard Dash) multiple correlation was used. The study also finds out joint contribution of independent variables (Eye Hand Coordination Test, Nelson

Hand Reaction Test, Distance Perception Jump Test) and dependent variable (Shuttle Run) multiple correlation was used.

4. Results

The demographic status that was used in this study is presented in the table 2.

Table 2: Demographic status of the subjects

	17 to 18 years	
	Mean	SD
Age (years)	17.74	1.09
Experience (years)	2.51	1.09
Stature (cm)	164	0.26
Weight (kg)	59.58	7.40
BMI (kg/m ²)	20.23	2.22
Resting heart rate (beats per minute)	79.2	8.72
Resting systolic blood pressure (mmHg)	124.25	9.81
Resting diastolic blood pressure (mmHg)	76.4	8.36
Socio economic status	average	

The performance status that was found from this study is presented in the table 3.

Table 3: Performance status of the subjects

Variables	Mean	SD
Eye Hand Coordination Test	59.97	3.30
Nelson Hand Reaction Test	9.42	2.18
Distance Perception Jump Test	2.96	1.49
50 Yard Dash	7.02	0.37
Shuttle Run	11.28	1.12

Table 4: correlation between independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) and dependent variable (50 Yard Dash)

S.N.	Independent Variables	Correlation coefficient
1.	Eye Hand Coordination Test	0.718*
2.	Nelson Hand Reaction Test	0.220
3.	Distance Perception Jump Test	0.424*

*Significant at 0.05 level; $r(33) = 0.325$

Table-4 clearly indicates a high significant relationship between 50 Yard Dash and selected independent variable-Eye Hand Coordination Test and moderate level relationship between 50 Yard Dash and selected independent variable-Distance Perception Jump Test as the correlation coefficient value were found greater than the tabulated value at 0.05 level of significance while in case of Nelson Hand Reaction Test no significant relationship were found.

Table 5: correlation between independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) and dependent variable (Shuttle Run)

S.N.	Independent Variables	Correlation coefficient
1.	Eye Hand Coordination Test	0.348*
2.	Nelson Hand Reaction Test	-0.027
3.	Distance Perception Jump Test	0.122

*Significant at 0.05 level; $r(33) = 0.325$

Table-5 clearly indicates a moderate significant relationship between Shuttle run and selected independent variable- Eye Hand Coordination Test. While in case of Nelson Hand Reaction Test and Distance Perception Jump Test no significant relationship were found.

Table 6: Joint contribution of independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) in predicting dependent variable (50 Yard Dash) and Joint contribution of independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) in predicting dependent variable (Shuttle Run)

Criterion Variable	Independent Variables	Coefficient of Multiple Correlation
50 Yard Dash	Eye Hand Coordination Test	0.739*
	Nelson Hand Reaction Test	
	Distance Perception Jump Test	
Shuttle Run	Eye Hand Coordination Test	0.356*
	Nelson Hand Reaction Test	
	Distance Perception Jump Test	

*Significant at 0.05 level; $r(33) = 0.325$

Table 6 indicates that high significant relationship was found between criterion variable (50 Yard Dash) and independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test) as coefficient of multiple correlations was found 0.739* which is higher than the tabulated value. Table 5 also showed that low significant relationship was found between criterion variable (Shuttle Run) and independent variables (Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test).

5. Discussion

In the present study it was hypothesized that there may be relationship between Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test and 50 Yard Dash of district level cricket players in Bangladesh, the hypothesis is partially accepted due to the reason because there was lower correlation found between 50 Yard Dash and Nelson Hand Reaction Test whereas present study showed a higher correlation between 50 Yard Dash and selected independent variable- Eye Hand Coordination Test but moderate relationship also indicate on selected independent variable- Distance Perception Jump Test with 50 Yard Dash test. The study was also hypothesized that there may be relationship between Eye Hand Coordination Test, Nelson Hand Reaction Test, Distance Perception Jump Test and Shuttle Run of district level cricket players in Bangladesh and its describe moderate relationship between Eye Hand Coordination Test and Shuttle Run whereas present study showed a very poor correlation between Nelson Hand Reaction Test, Distance Perception Jump Test with Shuttle Run. Similar research, however, also revealed a moderate level relationship between repeated sprint capability with repeated shooting test in Bangladesh's same age soccer players [22]. Researchers [23] found that, greater ranges of joint motion connected to longer moves. Cricketers exhibit similar sprint kinematics irrespective of the fielding position. Researchers [24] noticed that athletes had a higher degree of coordination skills. In addition to coordination cricket players need cricket specific speed testing [23]. After all of the present study debate, it is found that the Eye Hand Coordination Test was highly needed affecting the 50 Yard Dash test. Psychomotor ability has a greater impact compared to shuttle run on 50 Yard Dash.

6. Conclusions

Based on the findings and within the limitation of the study following conclusions were drawn:

- There was high statistical significant relationship (combined) found between selected psychomotor

components and 50 Yard Dash test.

- There was high statistical significant relationship found between Eye Hand Coordination Test and 50 Yard Dash test.
- There was low statistical significant relationship (combined) found between selected psychomotor components and Shuttle Run test.

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