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Physical Fitness Factors as Handball Performance Predictors

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Abstract
The goal of the current study was to investigate the relationship between handball performance and physical fitness parameters. The subjects were ninety (N=90) male handball players between the ages of eighteen and twenty-five who were enrolled in various degree programs affiliated with Agra University in Uttar Pradesh. The physical fitness characteristics that were selected were speed, strength, power, agility, and flexibility. Speed was measured with a 50-meter sprint; core muscular strength was measured with bent knee sit-ups; power was measured with a standing broad jump; flexibility was measured with a forward bend and reach test; and agility was measured with a 30-meter shuttle run. Their playing skills were evaluated based on how well they performed. The Pearson product movement "r" was used to assess the inter correlation between them, and multiple linear regressions were used to predict the handball playing skill. The "F" ratio was found to be significant at the 0.05 level of confidence. Raiding ability (r=0.63), reaction ability (r=0.55), hand touch reach ability (r=0.54), toe touch reach ability (r=0.56), and absorption outcomes are among the physical fitness components that are shown to be significantly connected with handball skill performance. Strong correlations between the independent and dependent variables and the results are found in the data analysis.

Key words: physical fitness, handball performance.

I. Introduction

A condition of health and well-being, or more precisely, the capacity to carry out elements of everyday activities, jobs, and sports, is known as physical fitness. A healthy diet and moderate-to-intense exercise are often the keys to achieving physical fitness. In general, maintaining a healthy diet, engaging in moderate-to-intense physical activity, getting enough sleep, and following a structured recovery plan are all necessary for achieving physical fitness. Frequent attendance at training sessions improves. all the essential elements of psychological, physiological, and physical wellness. A European sport is handball. Two teams of seven players each compete in this team sport. (a goalie and six players from the out court) The current set of regulations was released in Berlin on October 29, 1917. These regulations were used for the inaugural international competitions for men in 1925 and women in 1930. Europe is where this game is most popular, and all of the medals have been won by European nations. (Kaur & Ranwat, 2023)

Any sporting activity requires a certain level of physical fitness. The ability of an athlete to perform well throughout any physical activity or sport is known as motor fitness. Because it permits more flexibility of movement and aids in maintaining the body's functional capacity for extended periods of time, motor fitness is crucial. Every country plays handball, which is the most popular sport in the world. Every player moves about on the ground a lot during the sixty-minute game. Due to the nature of the sport, players always move on their toes. Fitness is a prerequisite for using the talents in any game in real life. All players must be at the highest level of fitness for today's game, which calls for certain training and physical components. The ability of the bodily system to perform its functions satisfactorily is implied by physical fitness. It is among the fundamental components that are necessary for improved performance. Physical fitness metrics play an active part in improving players' performance in a variety of gaming fitness activities, including speed, strength, endurance, response time, balance, agility, and coordination. (Pandey, 2019)

II. Methodology

The data gathered for this study was on 90 male handball players between the ages of 18 and 25 who are enrolled in different degree programs at Agra University in Uttar Pradesh. A 50-meter sprint was used to gauge the subjects' speed; a bent knee sit-up was used to gauge their explosive abdominal muscle strength; a shuttle run was used to gauge their agility; a standing broad jump was used to gauge their explosive leg strength; and a forward bend and reach test was used to gauge the subjects' maximum range of forward flexibility and stretch ability of their hamstring muscles.

Finding

The relationship between the Independent and dependent variables were calculated and presented in the following tables.

Table-1

Performance variable	Fitness variable				
	Speed	Strength	Power	Flexibility	Agility
Raiding ability	0.41**	0.45**	0.36**	0.73**	0.60**

** Significant at 0.01 levels

Corelation of selected variables was shown in Table 1. Speed (r=0.41), strength (r=0.45), power (r=0.36), flexibility (r=0.73), and agility (r=0.60) all showed strong correlations with the raiding ability.

Table-2

Performance variable	Fitness variable				
	Speed	Strength	Power	Flexibility	Agility
Reaction ability	0.38**	0.48**	0.35**	0.67**	0.53**

** Significant at 0.01 levels

Results observed in table 2 indicate the corelation was significantly related to speed (r=0.38), strength (r=0.48), power (r=0.35), flexibility (r=0.67), and agility(r=0.53). There is highly correlated between the Reaction ability and independent variables.

Table-3

Performance variable	Fitness variable				
	Speed	Strength	Power	Flexibility	Agility
Hand touch	0.44**	0.54**	0.46**	0.53**	0.50**

** Significant at 0.01 levels

Results observed in table 4 indicate the corelation was Correlated significantly related to speed(r=0.44), strength (r=0.54), power(r=0.46), flexibility(r=0.53), agility(r=0.50), there is highly correlated between the hand touch reach ability and independent variables.

Table-4

Performance variable	Fitness variable				
	Speed	Strength	Power	Flexibility	Agility
Toe touch	0.38**	0.60**	0.33**	0.57**	0.47**

** Significant at 0.01 levels

Results observed in table 5 indicate the Pearson Product movement Correlation was significantly related to speed (r=0.38),strength (r=0.60), power (r=0.33), flexibility (r=0.57), and agility(r=0.47).There is highly correlated between the Toe touch reaching ability and independent variables.

Table-5
Multiple Linear Regression: Dependent Variable-Raiding ability

Fitness variable	Coefficient correlation	Sig.	F- value	R- Square value
Speed	0.10	0.91ns	23.99	0.63
Strength -	0.21	0.83ns		
Power	-0.60	0.54ns		
Flexibility	3.91	0.00**		
Agility	2.92	0.00**		

The results observed in co-efficient of correlation on table 5 mentioned here shows significant flexibility (r=3.91), and agility (r=2.92), significant at 0.001 level. The remaining factors like Speed, Strength and power have been observed significantly low at 0.01 level. The results analysis of variance shown on table (b) F- value-23.99, and the final value R- square is observed as 0.63.This consedered to be 63% varation as explained by using the independent variable.

Table-6
Multiple Linear Regression: Dependent Variable-Reaction ability

Fitness variable	Coefficient correlation	Sig.	F- value	R- Square value
Speed	-0.10	0.91ns	17.25	0.55
Strength	0.86	0.39ns		
Power	-0.60	0.54ns		
Flexibility	2.83	0.00**		
Agility	1.67	0.09ns		

The results observed in co-efficient of correlation on table 6 mentioned here shows significant flexibility (r=2.83) significant at 0.001 level. The remaining factors like Speed, Strength,power and agility have been observed significantly low at 0.01 level. The results analysis of variance shown on table (b) F- value-17.25, and the final value R- square is observed as 0.55. This consedered to be 55% varation as explained by using the independent variable.

Table-7
Multiple Linear Regression: Dependent Variable-Hand Touch

Fitness variable	Coefficient correlation	Sig.	F- value	R- Square value
Speed	0.87	0.38ns	16.58	0.54
Strength	1.92	0.00**		
Power	1.37	0.36ns		
Flexibility	0.46	0.58ns		
Agility	1.45	0.52ns		

The results observed in co-efficient of correlation on table 7 mentioned here shows significant strength (r=1.92) agility significant at 0.001 level. The remaining factors like Speed, power,flexibility and agility have been observed significantly low at 0.01 level. The results analysis of variance shown on table (b) F- value-16.58, and the final value R- square is observed as 0.54. This consedered to be 54% varation as explained by using the independent variable.

Table- 8
Multiple Linear Regression: Dependent Variable-Toe Touch

Fitness variable	Coefficient correlation	Sig.	F- value	R- Square value
Speed	-0.18	0.85ns	18.22	0.56
Strength	2.97	0.00**		
Power	-0.92	0.36ns		
Flexibility	0.54	0.58ns		
Agility	0.64	0.52ns		

The results observed in co-efficient of correlation on table (10) mentioned here shows significant strength (r=2.97) significant at 0.001 level. The remaining factors like Speed, power, flexibility and agility have been observed significantly low at 0.01 level. The results analysis of variance shown on table (b) F- value-18.22, and the final value R- square is observed as 0.56.This considered to be 56% variation as explained by using the independent variable.

III. Conclusion

Following conclusion has been established on the basis of research finding:
1. The result was indicated that components of physical fitness were related to the handball skill performance.
2. Physical fitness components were highly correlated to the handball performance.

3. The multiple linear regression equation was significant to the handball skill performance.

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