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A DISCRIMINANT ANALYSES OF SPECIFIC FITNESS TESTING PROFILES OF CRICKET PLAYERS

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Abstract:
The main purpose of the study was to compare the four different group cricket player's skill wise, for the purpose total 38 players were recruited and further they were divided in four different groups as per their skills. It was predicted that all four groups will be different in their motor fitness profiles, for the purpose discriminant analyses was carried out and probability level was set for 0.05 levels. The results indicated that all four groups were different to each other in their motor fitness variables, but Vertical jump was the only variable which contributed significantly highest degree in separating the groups to each other. It was concluded that one can identify the cricket player's skill wise on their motor fitness level and efficiency. Further, it was recommended to make specific motor fitness test compulsion in talent identification and in specific training programme of cricket player's skill wise.

Keywords: specific fitness, cricket players, discriminant analyses

1. Introduction

Cricket has developed into an industry allowing many individuals to pursue a career as a professional athlete, However, the majority of participants in cricket never go on to reach the elite sporting level and thus do not become professionals. As the game of Cricket is ever changing, players and teams focus now more than ever on developing as top-class athletes. With modern cricket, players can be expected to tour for up to eleven months of the year; therefore, physical fitness is increasingly important. Cricket is unique in that there are three different game formats, namely T20, One Day, and multiple-day (test and first-class) cricket, in which the physiological demands vary greatly. The need for cricketers to maintain levels of fitness which are similar to those are generally held by athletes for other sport has long been continues issue (Chandu Lamani, 2018).

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Despite the fact that cricket is an established sport with a long history, it has received little scientific attention, it does not have a specific motor fitness battery of cricket specific fitness tests and relies on the tests and norms of other sports. The specific fitness demands of the sport are therefore not fully understood. Specific fitness testing are important predictors of successful sporting performance. Talent identification is important in ensuring that the best players compete at the highest level of organized sport. It is a well-known fact that in some sports movement performance can be predicted by the athletes.

Specific fitness is also a key requirement for cricket players. In order to be effective in cricket, all players must possess:

- The common characteristics of power and strength for batting, throwing and sprinting;
- The ability to jump for delivery stride and while catching and diving
- Speed and agility (for running as every player gets the opportunity to become a batter and then a runner) also in fielding.

2. The Purpose of this Study

To main purpose of the study was to analyse and compare the Specific motor fitness variables among Fast bowler, Spin bowlers, Batsman and Wicket keeper, who are actively participating in state, Inter University and BCCI senior Domestic Tournaments?

2.1 Statement of the Problem

Specific motor fitness variables could effectively discriminate between the groups of Batsman, Wicket keeper, Fast bowlers and Spin bowlers.

2.2 Significance of the Study

The findings for the study will be directly applicable to contemporary cricket players. The outcome should assist coach to formulate game tactic, and provide conditioning coaches with the evidential base to enhance the physical demands of players, using formal and specific training program. Finally, this study should help sports scientists in their design of preparation strategies for designing new training models.

3. Materials and Methods

Subjects for the study were cricket players of Goa, Fast bowlers (N=10), Spin bowlers (N=10) Batsman (N=13) and Wicket keeper (N=05), in each group**.** The total samples were 38 and was purposively selected. These subjects studied in various colleges and departments of Goa University; they were active in cricket participation with regular coaching / training in their respective regional coaching centres. The subjects were recruited as per experience of playing minimum 3 years of BCCI, University and college matches. Their age was ranged between 19 to 24 years of age.

3.1 Variables

Below mentioned specific motor fitness measurements were obtained during each testing session. The measurements were all recorded in the metric system. Necessary content was obtained from all coaches and managers of the respective clubs to test their players and obtain data (BCCI- NCA) fitness testing protocols were followed for taking 06 motor fitness measurements (Table 1).

Table 1: List of specific motor fitness variables measured and recorded

Sr. No.	Variables	Units
01	Run-a-three	Nearest 0.001 seconds
02	Vertical jumps	Cm (to last 0.5cm)
03	Seat & reach	Cm (to last 0.5cm)
04	Pull-ups	Number of repetitions
05	Push-ups	Number of repetitions
06	Abdominal crunches	Number of repetitions

3.2 Statistical Analysis

Each of the four groups were Fast bowlers (N=10), Spin bowlers (N=10) Batsman (N=13) and Wicket keeper (N=5), in each group). To test the hypotheses that related to specific motor fitness variables discriminant analysis was used to obtain the difference between the groups with these descriptive statistics percentage of variance, canonical correlation, Wilks-lambda, Chi-square values, group centroids and classification results were calculated to obtain the required result of the present investigation. SPSS Version 21.0 was used for computation. For statistical analyses, the level of significance was set at 0.05.

4. Results of the Study

The results of the statistical analyses of the data are presented below in relation to the hypothesis stated earlier. All the variables were entered stepwise into the discriminant analyses.

Table 2: Means, SD, & Univariate F ratios of specific motor fitness variables of Batsmen, Wicket keeper, Fast bowler and Spin bowler

Variables	Batsmen Mean & SD	Wicket Mean & SD	Spin bowler Mean & SD	Fast bowler Mean & SD	F-ratio
Vertical jump	49.15 ± 4.95	50.60 ± 8.56	48.90 ± 5.70	42.50 ± 6.09	**3.29***
Run-a-three	9.65 ± 0.41	9.60 ± 0.33	9.70 ± 0.23	9.78 ± 6.10	0.49
Pull ups	6.31 ± 2.78	6.20 ± 1.30	8.00 ± 1.89	6.20 ± 0.24	1.48
Push ups	35.38 ± 9.03	40.40 ± 9.56	44.80 ± 12.77	38.70 ± 2.15	1.76
Abdominal crunches	65.23 ± 15.83	51.40 ± 13.16	65.40 ± 10.46	63.50 ± 7.27	1.32
Seat and reach	15.33 ± 3.92	15.10 ± 2.84	15.90 ± 4.41	14.35 ± 15.51	0.29

*$p<0.05$

The obtain value in the Table 2, indicates that the only Vertical jump variable showed significant F-Ratio, therefore, the data was subject to post-hoc analyses to locate the significance difference between means.

Table 3: Difference between means and their significance obtained upon post-hoc analyses for Batsmen, Wicket keeper, Fast bowler and Spin bowler

Variable	Batsmen v/s Wicket keeper	Batsmen v/s Spin bowler	Batsmen v/s Fast bowler	Wicket keeper v/s Spin bowler	Wicket keeper v/s Fast bowler	Spin bowler v/s Fast bowler
Vertical Jump	-1.45	0.25	**6.65***	1.77	**8.10***	**6.40***

*p<0.05

The values of Table 3 demonstrated that, there was a significant difference between Batsmen and Fast bowler similarly between Wicket keeper and Fast bowler, and Spin bowler and Fast bowler. It was interesting to notice that fast bowlers performed significantly better compare to other counterparts.

Table 4: Percentage of variance, canonical correlation coefficient, Wilks lambda & Chi-square for the three functions of discriminant analysis for Batsmen, Wicket keeper, Fast bowler and Spin bowler

Function	Percentage of variance	Canonical correlation	Wilk's lambda	Chi-square
1. (Batsmen, Wicket keeper, Fast bowler and Spin bowler)	66.7%	0.677	0.371	**31.706***
2. (Wicket keeper, Fast bowler and Spin bowler)	22.8%	0.473	0.685	12.125
3. (Fast bowler and Spin bowler)	10.6%	0.343	0.882	4.012

*p<0.05

Table 4 demonstrated that, discriminant value of Function 1 was significant as indicated by Chi-square Function 1. The Chi-square value of Function 1 was well beyond the 0.05 probability level. The Wilks lambda Function 1 suggested that, the function provided modest degree of separation between groups. The canonical correlation indicates that 66.7% of the variance group Function 1, 22.8% Function 2, and 10.6% Function 3 could be explained by the discriminant function.

Table 5: Canonical discriminant functions evaluated at group means for Batsmen, Wicket keeper, Spin bowler and Fast bowler

Specific category of player	Function		
	1	**2**	**3**
Batsman	-.170	-.356	.408
Wicket keeper	1.247	-.767	-.520
Spin bowler	.792	.710	.046
Fast bowler	-1.195	.136	-.316

The values of Table 5 indicate that, the centroids of Group 1 were different as compared to other groups, therefore, it was concluded that the Function 1 separated Batsman from Wicket keeper, Spin bowlers from Fast bowlers. Function 2 separated Fast bowlers to Wicket keeper and Spin bowlers. Similarly, Function 3 separated Wicket keeper with Batsman.

Table 6: Pooled within Group Correlation between Discriminant Variables & Canonical Discriminant Functions (loading) for Batsmen, Wicket keeper, Fast bowler and Spin bowler

	Function		
	1	2	3
Pull ups in number	.216	**.555***	.136
Pushups in number	.235	**.540***	-.431
Run a three in sec	-.164	**.233***	-.198
Crunches in numbers	-.158	.373	**.644***
Vertical jump in cms	.504	-.280	**.633***
Flexibility in numbers	.136	.097	**.231***

The analyses indicate that the Function 1 there was no significant difference; in Function 2 the variables Pull-ups, Push-ups, and Run-a-three were powerful enough to discriminate the four groups. In Function 3 the variables Abdominal crunches, Vertical jump and Seat and reach were powerful enough to discriminate the four groups. The size of the discriminant loading that, Pull-ups and Push-ups made highest contribution in Function 2 and in Function 3 Abdominal crunches and Vertical jump made the contribution respectively.

Table 7: Classification results for Batsmen, Wicket keeper, Fast bowler and Spin bowler

Group	Predicted group membership				Total
	Batsmen	**Wicket keeper**	**Fast bowler**	**Spin bowler**	
Batsmen	10 (76.9%)	0 (0%)	1 (7.7%)	2 (15.4%)	13
Wicket keeper	0 (0%)	3 (60%)	1 (20%)	1 (20%)	5
Fast bowler	5 (50%)	0 (0%)	5 (50%)	0 (0%)	10
Spin bowler	10 (10%)	0 (0%)	20 (20%)	70 (70%)	10

The classification results of Batsman were 76.9%, Wicket keeper 60%, Fast bowler 50% and Spin bowlers 70% were found more than the chance of occurrence of 37.5% hence, the hypothesis was accepted as an accurate classification. The classification results have shown that 65.8% of the grouped cases were correctly classified; therefore, the discriminant function indicates that the hypothesis, which was stated that "specific motor fitness variables could effectively discriminate between the groups of Batsman, Wicket keeper, Fast bowlers and Spin bowlers" was well supported.

5. Discussion

Despite the growing interest in cricket players research, there is scant evidence about the Specific Motor Fitness factors determine success in this kind of sport. In the present investigation only one variable (Vertical jump) has been considered for discriminant loading. The differences in the results between groups may be due to the different levels of competition, they participate and compete, and also, they have different patterns of training and coaching techniques that improved over a period compared to other groups.

6. Conclusion

It is clear that success in any sport, including cricket is multi-factorial and it is determined by a number of interacting physiological, morphological and physical and motor fitness and skill variables. The conclusion is made, according to the aims of the study that was set for the study:

Discriminant analyses of specific motor fitness variables of Batsmen, Wicket keeper, Fast bowler and Spin bowler showed significant difference in specific motor fitness variables. Vertical jump made the highest contribution in three different functions which were significantly separated from each other. 65.8%% of the cases correctly classified as the chance of occurrence and all four groups classified correctly more than the chance occurrence of 37.5%. The present investigation clearly demonstrates that specific motor fitness characteristics seem to be important factors that differentiate all the groups, and one can identify the cricket player's skill wise on their motor fitness level and efficiency.

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