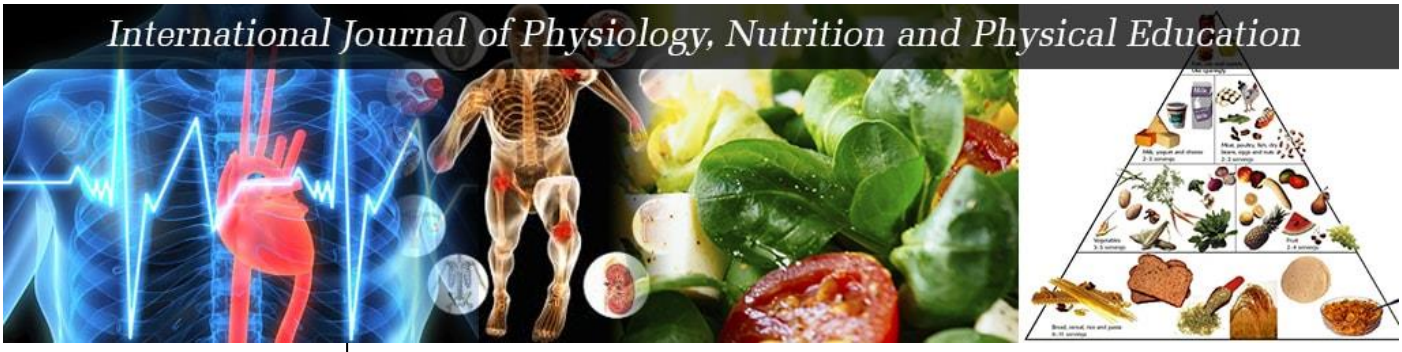

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A comparative study on selected motor fitness components and sports competition anxiety among short distance runners and broad jumpers

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Abstract
Athletic performance in short-distance running and broad jumping sports is highly linked to certain motor fitness components as speed, strength, power, agility, balance, flexibility, response time, and coordination. While short distance runners rely heavily on speed, agility, reaction time, and stride efficiency, broad jumpers need dynamic power, balance, coordination, and flexibility to succeed. The study aimed to examine the selected motor fitness components and competitive anxiety of male Short Distance Runners and Broad Jumpers in West Bengal.

Methodology: Total sixty District Level Male Athletes (N=60) of District purba Medinipur, Pachim Medinipur and Jhargram, West Bengal State were selected at randomly as subjects for the present study. The age limit of the subjects was 18-22 years. All the subjects were district level male Short Distance Runners and Broad Jumpers. They were divided into two equal groups such as Gr. SDR (n=30) and Gr. BJ (n=30). Selected motor fitness components such as speed, agility, leg explosive strength, reaction time and coordination and sports competition anxiety test (SACT) were employed to all the subjects of Gr. SDR and Gr. BJ and all the data were collected from the venues of districts level competitions. The data were analysed by t-test to find out the superiority among Gr. SBJ and Gr. BJ.

Results: The findings revealed that no significant difference was noted between Gr. SDR and Gr. BJ in speed, agility, reaction time and coordination. In contrast, broad jumpers outperformed short distance runners in leg explosive strength. The sports competition anxiety also showed no significance difference in result.

Conclusion: While short-distance runners and broad jumpers exhibit several common performance characteristics, each discipline demonstrates distinct strengths—sprinters showing marginal superiority in speed and agility, whereas broad jumpers excel in leg explosive power. In contrast, psychological factors such as competitive anxiety appear largely consistent across both groups.

Keywords: Motor fitness, strength, speed, coordination, anxiety.

Introduction
Athletics is often considered as the foundation of competitive sports and physical fitness owing to its enveloping and fundamental nature. Short-distance running and jumping events are main components of track and field, needs high levels of motor fitness such as speed, strength, agility, power, endurance, balance, flexibility, response time and coordination. Although short distance runners and broad jumpers have several similarities, their physical and psychological requirements differ, following on diverse motor fitness profiles. Short distance running (sprinting events) is a tremendously explosive, anaerobic event in which success is dependent on quick acceleration, stride mechanics, and maximal velocity, all of which are maintained by neuromuscular efficiency, agility, and response time. Broad jumpers, on the other hand, rely on explosive strength for takeoff while also requiring flexibility, balance, and coordination to complete complicated technical moves and combine approach speed with timing and control (Lees, Fowler, & Derby, 1993; Bridgett & Linthorne, 2006) [9, 7]. Research by Maćkała, Fostiak, & Kowalski (2015) [11] and Milanese *et al*. (2017) [15] shows that short distance runners thrive in speed, reaction time, and agility, whereas jumpers excel in explosive leg strength, flexibility, and balance.

Comparative studies focusing on short distance runners and jumpers were few in India, where athletes were frequently led in resource-constrained conditions. Creating event-specific motor fitness profiles can help guide targeted training, talent identification, and injury prevention, all while adding to the increasing body of sports performance research (Bompa & Buzzichelli, 2018). As a result, the current study intends to thoroughly analyze the motor fitness components of sprinters and jumpers in order to give evidence-based insights for athletic development, coaching, and long-term performance improvement.

Methodology

Total sixty District Level Male Athletes (N=60) of District purba Medinipur, Pachim Medinipur and Jhargram, West Bengal State were selected at randomly as subjects for the present study. The age limit of the subjects was 18-22 years. All the subjects were district level male Short Distance Runners and Broad Jumpers. They were divided into two equal groups such as Gr. SDR (n=30) and Gr. BJ (n=30). Selected motor fitness components such as speed, agility, leg explosive strength, reaction time and coordination and sports competition anxiety test (SACT) were employed to all the subjects of Gr. SDR and Gr. BJ and all the data were collected from the venues of districts level competitions. The data were analysed by t-test to find out the superiority among Gr. SBJ and Gr. BJ.

The study was restricted to the selected motor fitness components namely speed, agility, leg explosive strength, reaction time, coordination and psychological component namely sports competition anxiety test(SACT). Data were collected and recorded in different measures. All the selected components and the respective tests were presented in the tabular form below.

Table 1: Selected components and the respective tests

Name of the testing components	Name of the test	Measuring unit
Speed	50 yard dash	In second (time)
Agility	Shuttle run	In second (time)
Leg explosive strength	Standing broad jump	Distance (m)
Leg Reaction time	Lenson foot reaction time test	In second (time)
Coordination	Foot and eye coordination test	In second (time)
Sports Anxiety	SACT Inventory	Score in number

Statistical Analysis

Mean and standard deviation were used to analyse the data. To identify the significance of statistical difference between the two groups, t-test was used. Level of significance was set at 0.05 level of confidence.

Results of the study

Table 2: Tabular presentation of mean, SD and t test result of Motor Fitness of short distance runners and broad jumpers.

Motor fitness components	Gr. SDR		Gr. BJ		T test
	mean	SD	Mean	SD	
Speed	6.568	±0.31	6.885	±0.27	1.04
Agility	10.497	±0.31	10.171	±0.875	1.872
Leg explosive strength	2.138	±0.128	2.338	±0.1556	**2.67***
Reaction time	0.27	±0.037	0.31	±0.057	1.138
coordination	6.34	±2.61	7.45	±2.613	0.027

Significant at .05 level of confidence

Table-2 presents the mean speed scores of short-distance runners (6.568) and broad jumpers (6.885). The standard deviation (SD) for short-distance runners was ±0.31, while for broad jumpers it was ±0.27. The calculated t-value was 1.04, which was not found to be significant at the 0.05 level of confidence. The mean values of short distance runners and broad jumper for agility was 10.497 and 10.171. The SD of the short distance runner was ±0.31 and it was ±0.875 for broad jumpers. The t-value was 1.872. In this case, the t-value was also not significant. The mean leg explosive strength score was reported as 2.138 for short-distance runners and 2.338 for broad jumpers. The SD values were ±0.128 for short-distance runners and ±0.1556 for broad jumpers. The obtained t-value was 2.67 which was found to be significant at the 0.05 confidence. The above table presents the mean reaction time scores of short-distance runners (0.27) and broad jumpers (0.31). SD of reaction time for short-distance runners was ±0.037, while for broad jumpers it was ±0.057. The calculated t-value was 1.138, which was not found to be significant. The mean values of short distance runners and broad jumper for coordination was 6.34 and 7.45. The SD of the short distance runner was ±0.2.61 and it was ±0.2.613 for broad jumpers. The t-value was 0.027. In this case, the t-value was not significant at .05 level of confidence. For better understanding it was presented graphically in graph -01.

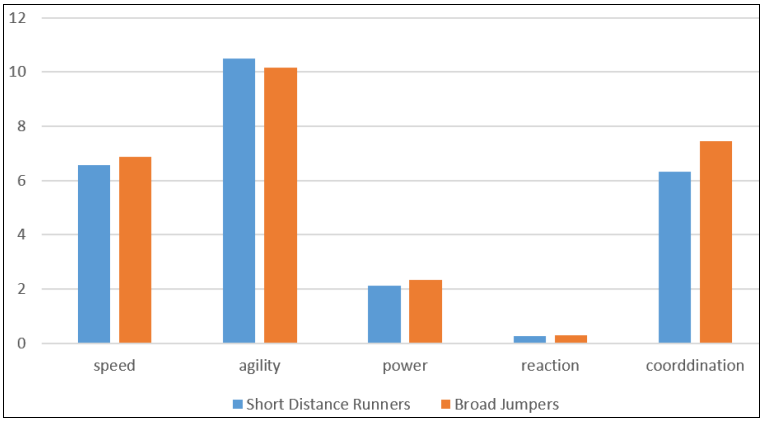

Fig 1: 05 level of confidence. For better understanding it was presented graphically in graph

Table 3: Comparison of SACT Scores between Gr. SDR and Gr. BJ (or similar, depending on the exact context of the study)

Psychological component	Gr. SDR		Gr. BJ		T test
	mean	SD	Mean	SD	
SACT	17.933	2.851	19	2.652	0.096

From the table no-3, it was observed that the mean of sports competition anxiety of short distance runners and broad jumpers groups were 17.933 and 19 respectively. The SD of the short distance runner was ±2.851 and it was ±2.652 for broad jumpers. Comparing the mean value of sports competition anxiety between short distance runners and broad jumpers groups, t-value was found 0.096 which was statistically not significant at 0.05 levels. For better understanding it was presented graphically in graph -02.

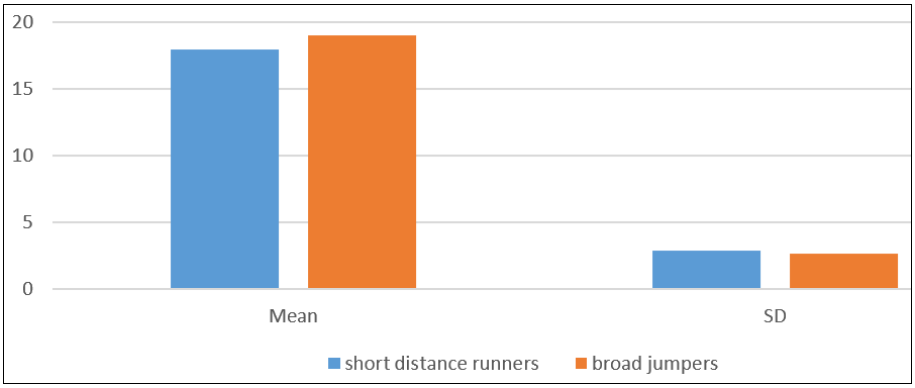

Fig 2: Comperison of Mean and Sd of Sports competition Anxiety Test

Discussion

From The table -2, it was clear that the result was not significant but the means performance level showed the short distance runner is better in speed than the broad jumper. Short distance runners train specifically for maximum running velocity and acceleration. Their workouts emphasize explosive starts, stride frequency, stride length, and sprint mechanics, all of which directly transfer to the 50-yard dash test. Broad jumpers, on the other hand, focus primarily on explosive horizontal force production for a single maximal effort jump. Although they also develop speed during their run-up, their training volume and intensity in pure sprinting are generally less than those of specialized short distance runners. Bompa, T. & Buzzichelli, C. (2018) Notes that sprint training develops explosive speed, start reaction, and acceleration more effectively than other track and field training forms. Kunz, H., & Kaufmann, D. A. (1981) [8] showed that sprinters produce significantly faster sprint times compared to athletes from other disciplines (e.g., jumpers), even though both require explosive strength. As the sprinting ability of sprinters is better than jumpers so the reflation of the results states exactly the same as the other researches did previously (Rakshit S and Dr. Bag S). The result of the present study has similarity with the above studies.

It is evident that the result on agility is not significant though their mean difference is existed. The mean difference indicate that the short distance runners are more agile than the broad jumpers of district level. It may be due to their involvement in rapid acceleration, deceleration, and change of direction in training drills, especially starts, turns, and quick stride frequency. Broad jumping, on the other hand, emphasizes explosive horizontal power and take-off technique. Apart from this it is evident from the different studies that short distance runners are more agile than the broad jumpers. Bompa, T. & Buzzichelli, C., Sheppard, J. M., & Young, W. B, Mero, A., Komi, P. V., & Gregor, R. J. and Lees, A. Were draw the conclusion the same at the present study. The result of the present study has also the similarity with the above studies but Mete, T. and Das, A. (2018) [14] observed that the jumpers is more agile than the sprinters in their study on state level player west Bengal.

From the above table value and graph representation, it was strong evidence that the absolute value of the calculated 't' of leg explosive strength surpasses the critical value (2.67>2.00), so the means are significantly different. Basically jumping performance directly related with leg explosive strength but short distance running performance also depends upon lower extremity and better running style so in that case jumpers are having more advantage than the short distance runners in terms of leg explosive strength. Mete, T. and Das, A. (2018) [14], Maulder, P. S. & Cronin, J. B. (2005) [12] Found that horizontal jumpers excel in standing broad jump performance due to their specific training adaptations. Many researchers show the same outcomes like as present one.

From the above table and graph, it is evident that the result on reaction time is not significant though their marginal mean difference is existed. Short distance runners rely heavily on fast reaction to the starter's signal to gain an advantage at the beginning of the race. Broad jumpers, although not as dependent on the starting signal for success, still require rapid neuromuscular responses in their approach run and take-off phase. Hence, their reaction times are also well-developed. Because both groups train speed and explosive movements, the difference in foot reaction time is marginal rather than significant. some of the researches the research made by Magill, R. And Anderson, D. 2016 [4], Baechle, T. R., & Earle, R. W. (2008) [1] shows the same outcomes like as present one.

In case of coordination, the result is also not significant and mean difference was minimum. Short distance runners require precise and rhythmic foot placement during stride cycles to maximize speed and minimize energy loss. Good eye-foot coordination ensures correct ground contact and stride frequency.Broad jumpers also rely on eye-foot coordination for an accurate approach run and exact placement on the take-off board. While short distance runners may have slightly better coordination due to stride pattern optimization, broad jumpers are almost equally skilled because of their need for precise approach mechanics and take-off accuracy. Bompa, T. & Buzzichelli, C. (2019) [2] Showed that sprinting and jumping athletes develop similar neuromuscular coordination patterns. Stady of Magill, R. and Anderson, D. (2016) [4] also

supported the result of the present study.

Here the psychological parameter (SACT) showed the same results i.e. absolute value of the calculated t is smaller than critical value, so the means are not significantly different. As all the athletes go throw hard training schedule so the psychological characteristics were showed not much difference.The result indicates that competition anxiety is a common psychological characteristic of explosive track-and-field events.Since no difference was found, anxiety cannot be considered a distinguishing factor between short distance runners and broad jumpers. Study of Martens, R. (1990) [6] and Weinberg, R. S., & Gould, D. (2019) [5] also supported the result of the present study.

Conclusion

Within the limitations of the present study and on the basis of findings the following conclusions are drawn:

1. In the speed and agility tests, short distance runners demonstrated marginal superiority, which is consistent with the demands of their discipline that emphasizes rapid acceleration, stride frequency, and directional quickness.
2. In contrast, the leg explosive power test clearly favoured the broad jumpers, reflecting the event's reliance on maximal power generation for take-off performance
3. On the other hand, the reaction time and coordination tests revealed no significant differences
4. The Sports Competition Anxiety Test (SCAT) pointed out no significant difference between the two groups, mean that psychological reaction to competitive situations are mostly similar in short and explosive track-and-field events.

On the whole, these results recommend that while short distance runners and broad jumpers both the groups share many common performance traits, each event also develops exclusive strengths. Short distance runners did well slightly better in speed-related abilities and broad jumpers outperforming in explosive power. Psychological characteristics i.e SACT appears to be a common factor, unaltered by the specific event.

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