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Assessment of Bio-Motor Ability between Men's University Football Players

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Abstract: The purposed of this study was to compare the bio-motor ability between National Sports University (NSU) men's football team and Dhanamanjuri University (DMU) men's football team. A total of forty players (20 from each university) were selected, all actively training for the All India Inter-University Men's Football Tournament for the 2024-25 season and the age of the subject were ranged between 18-25 years. Speed, agility and explosive strength were selected as bio-motor abilities and they were measured through 30m dash, arrow head agility test and standing broad jump respectively. Data were collected and examine statistically using independent samples t-test and the significant level was fixed at 0.05 level. The results showed no significant differences between the two universities in any of the bio-motor abilities tested (speed, agility, or explosive strength). Specifically, p-values for speed ($p = 0.176$), agility ($p = 0.688$), and explosive strength ($p = 0.054$) were all above the 0.05 significance threshold. This indicates that the players from both universities displayed comparable physical attributes in the measured parameters. The findings of the study concluded that there were no significant differences between the NSU and DMU men's football team on selected bio-motor ability.

Keywords: Football, Bio-motor, Speed, Agility, Explosive Strength

INTRODUCTION

Football, commonly known as soccer in some parts of the world, is one of the most widely played and followed sports globally. It requires a unique blend of skills, tactics, and physical attributes. As the sport continues to evolve, the demand for higher levels of athleticism and performance increases, prompting a deeper understanding of the physical capabilities required to excel. For football players, a balanced combination of strength, speed, endurance, flexibility, and coordination – collectively known as bio-motor abilities – plays a critical role in their performance on the field.

Bio-motor abilities refer to the fundamental physical qualities or traits that contribute to athletic performance, and in football, these abilities are essential for executing various skills like dribbling, passing, shooting, defending, and tactical positioning. These abilities are broadly categorized into strength, speed, endurance, agility, and flexibility. Football players rely heavily on these attributes to respond quickly to the dynamic nature of the game, maintain high levels of performance throughout the match, and recover rapidly from physical exertion.

Understanding the bio-motor abilities of football players is particularly important at the university level, where athletes are developing both their skills and physical conditioning. This assessment not only helps in identifying areas of improvement but also contributes to the design of training programs that enhance performance. Additionally, university players often exhibit a range of bio-motor abilities, and assessing these can aid in identifying potential talent for higher levels of competition. Moreover, maintaining optimal bio-motor abilities reduces the risk of injuries, ensuring the long-term health and well-being of players.

Despite the significance of these abilities in football, there remains limited research that compares the bio-motor profiles of university-level football players from different institutions. This study aims to fill that gap by assessing and comparing the bio-motor abilities of the men's football teams from National Sports University (NSU) and Dhanamanjuri University (DMU), two prominent universities in Manipur, India.

METHODS

Participants

The participants for this study consisted of forty male university-level football players (n=40), selected

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from two universities in Manipur, India: National Sports University (NSU) and Dhanamanjuri University (DMU). Twenty players were selected from each university, who were actively participating in training for the upcoming All India Inter-University Men's Football Tournament for the 2024-25 season. The age of the selected players ranged from 18 to 25 years.

Bio-Motor Variables and Testing Procedures

The study focused on three bio-motor abilities: speed, agility, and explosive strength. These abilities are essential for football players to perform at a high level of competition. The following tests were used to measure these abilities:

- Speed: The 30-meter dash was used to assess the players' sprinting speed. This test measures the time taken to cover a distance of 30 meters in a straight line.
- Agility: The Arrowhead Agility Test was employed to assess agility. This test requires players to change directions rapidly while running through a series of cones arranged in a specific pattern, mimicking the rapid direction changes often encountered in a football match.
- Explosive Strength: The Standing Broad Jump was used to measure explosive strength. This test assesses the players' ability to generate power and distance in a single jump, a key skill for actions like jumping to head the ball or making powerful sprints.

Statistical Analysis

The data collected from the participants were analysed using independent sample t-tests to compare the mean scores of the two groups (National Sports University and Dhanamanjuri University) for each bio-motor ability. The significance level was set at 0.05, and all calculations were carried out using SPSS software, a widely used tool for statistical analysis.

For better understanding, the variables and the tests used to measure the variables are shown in Table 1.

Table 1

PARAMETER	VARIABLES	TEST	UNIT
Bio-motor ability	Speed	30-meter dash	Seconds
	Agility	Arrow Head Test	Seconds
	Explosive Strength	Standing Broad Jump	Meters

RESULT AND FINDINGS OF THE STUDY

The results of the statistical analysis are presented in Table II. The independent t-test was used to assess differences between the two groups (National Sports University and Dhanamanjuri University) for the bio-motor abilities of speed, agility, and explosive strength.

Table 2

Variables	Group	N	Mean	Std. Deviation	t	df	Sig.(2-tailed)
Speed	NSU	20	4.52	0.19	1.38	38	.176
	DMU	20	4.61	0.21			
Agility	NSU	20	17.21	0.52	.405	38	.688
	DMU	20	17.30	0.82			
Explosive Strength	NSU	20	2.46	0.15	1.99	38	.054
	DMU	20	2.36	0.16			

The analysis revealed that there was no significant difference in speed between the football teams of National Sports University (NSU) and Dhanamanjuri University (DMU). The t-test result was t (38) = 1.38, with a p-value of .176, indicating that the difference in speed between the two teams was not statistically significant. Specifically, the mean speed score for NSU was 4.52 (SD = 0.19), while the mean score for DMU was 4.61 (SD = 0.21), and these averages were not found to differ significantly. The t-value of 1.38 was below the critical t-value of 2.042 at a 0.05 significance level for 38 degrees of freedom and the probability in the significance was $p < 0.176$, which was greater than 0.05, which further confirms no significant difference. Therefore, it can be concluded that the speed of the players from NSU and DMU was statistically similar, and no difference was observed between the two teams.

The analysis showed no significant difference in agility between the NSU and DMU men's university football teams. The t-test result t (38) = 0.405, p = .688) indicated no statistical difference, with NSU's mean agility at 19.21 (SD = 0.52) and DMU's at 17.30 (SD = 0.82). The t-value (.405) was lower than the critical value of 2.042 and the probability in the significance was $p < 0.688$, which was greater than 0.05, confirming no significant difference in agility between the two teams.

The analysis showed no significant difference in explosive strength between the NSU and DMU men's university football teams. The t-test result t (38) = 1.99, p = .054) indicated no statistical difference, with NSU's

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mean explosive strength at 2.46 (SD = 0.15) and DMU's at 2.36 (SD = 0.16). The t-value (1.99) was lower than the critical value of 2.042 and the probability in the significance was $p < 0.054$, which was greater than 0.05, confirming no significant difference in explosive strength between the two teams.

The graphical representation of mean of selected bio-motor variables are presented below in figure-1

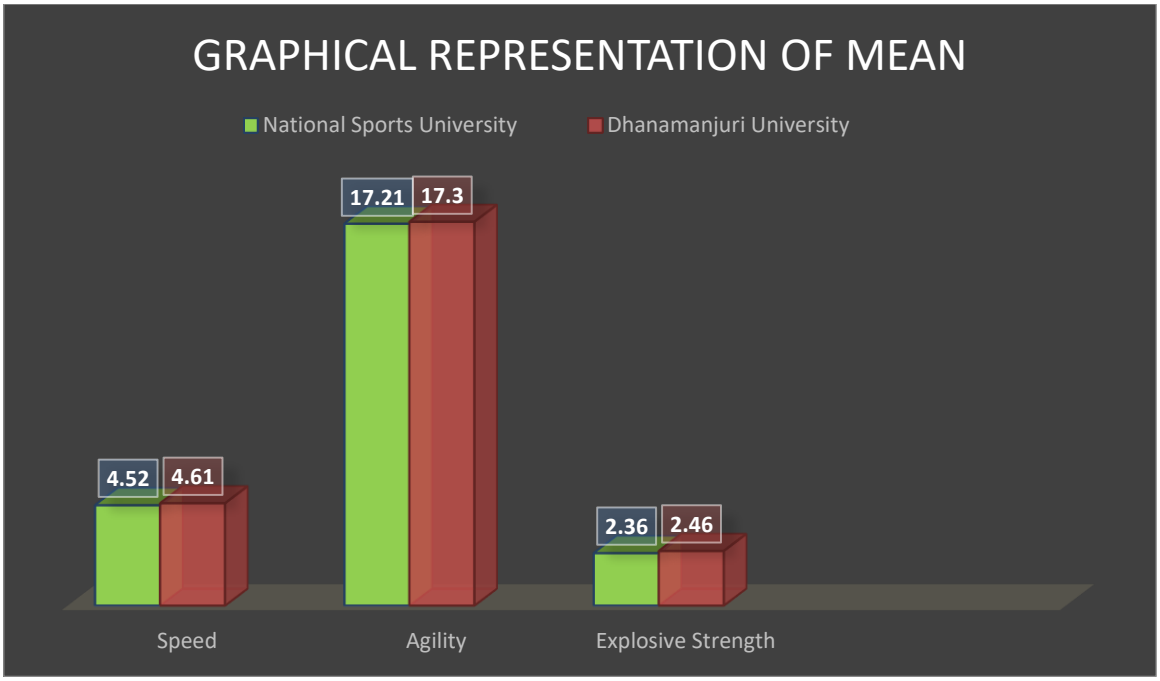

Figure 1: Graphical Representation of Mean of Selected Bio-Motor Variables

DISCUSSION

The findings of this study revealed no significant differences in the bio-motor abilities of speed, agility, and explosive strength between the men's football teams of National Sports University (NSU) and Dhanamanjuri University (DMU). These results suggest that both teams exhibit similar physical capacities in the measured areas, despite being from different universities.

In terms of speed, the study found no significant difference in speed between the National Sports University and Dhanamanjuri University teams, with mean and standard deviation (SD) of (4.52 ± 0.19) for NSU and (4.61 ± 0.21) for DMU. This aligns with the findings of Demissie and Mengistu (2017), who assessed the sprint performance of football players from the South Western Zone of the Ethiopian National League Football Clubs. Their results showed that forwards had the fastest sprint times (4.11 seconds) compared to midfielders (4.28 seconds) and defenders (4.56 seconds). Although their study focused on position-specific sprinting ability, they concluded that players who underwent similar training regimens tended to exhibit comparable sprint performance. This reinforces the idea that, at the university level, players from different teams with similar training environments often achieve comparable sprinting speeds.

In a study by Bangsbo *et al.* (2006), it was highlighted that university-level football players often show similar speed levels due to the structured and intensive nature of their training programs. Similarly, in Sekulic *et al.* (2013), research on university-level athletes indicated that players from different teams exhibited similar sprinting capabilities, as their physical conditioning was developed through similar training practices. Furthermore, Silvestre *et al.* (2006) found that players from different competitive levels, including university teams, had very similar sprinting performances after undergoing similar training. This suggests that when players train in comparable conditions, their sprint times tend to converge, which aligns with the results of the present study.

Finally, Singh and Kang (2013) studied the relationship between physical fitness and playing ability in inter-college level football players. They found that sprint performance did not vary significantly between players from different colleges, suggesting that sprinting speed is a characteristic that can be similarly developed when athletes are exposed to similar training regimens. The results of this study, therefore, support the idea that speed, as a bio-motor ability, is largely influenced by training consistency, which likely explains why NSU and DMU players performed similarly in this test.

Agility, a crucial attribute for football performance, also showed no significant difference between the teams. When assessing agility, the study found no significant difference between the two teams,

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with mean and standard deviation (SD) of (17.21 ± 0.52) for NSU and (17.30 ± 0.82) for DMU. A study by Sekulic *et al.* (2013), who explored the relationship between agility and football performance in university-level athletes. Their study indicated that agility, a crucial component for effective movement during matches, showed minimal variation between players from different teams, provided they had similar training backgrounds. Agility training is a key component of football conditioning, and when athletes undergo similar levels of training, their agility levels tend to converge, as seen in the present study.

Additionally, Pazzaglia *et al.* (2018) emphasized that agility is often developed through sport-specific training, which focuses on rapid changes of direction, a skill that is essential for football players. The study suggested that university-level players who trained under similar conditions demonstrated similar levels of agility, regardless of the institution. This finding is corroborated by Tsolakis *et al.* (2014), who found that agility, like speed, does not differ significantly between teams competing at similar levels, as their training regimens typically incorporate similar agility drills. Therefore, the results of the current study on agility are consistent with these previous findings, which suggest that the players from both universities possess comparable agility due to their similar training environments and competitive exposure.

Moreover, Singh, S. T et. al. (2022) found that agility performance was consistent among football players at the university level, especially when players were exposed to similar levels of conditioning and practice. The present study's results, which show no significant difference in agility between NSU and DMU players, further support this assertion, reinforcing the idea that agility is a physical attribute that can be similarly developed when players train in comparable conditions.

Explosive strength, measured by the standing broad jump, is another key bio-motor ability in football. The study also found no significant difference in explosive strength, as measured by the standing broad jump. NSU had a mean and standard deviation (SD) of (2.46 ± 0.15), while DMU had a mean and standard deviation (SD) of (2.36 ± 0.16). Research by Tsolakis *et al.* (2014), who highlighted the importance of explosive strength in football, particularly for actions like jumping, sprinting, and quick direction changes. Their research showed that explosive strength was relatively similar across teams that trained at comparable levels. Similarly, Pazzaglia *et al.* (2018) emphasized that strength training, particularly exercises focused on improving explosive power, tends to lead to similar levels of explosive strength among players at the same competitive level. This suggests that the training regimens at NSU and DMU are similarly effective in enhancing explosive strength, as indicated by the comparable standing broad jump scores between the two teams.

Furthermore, Silvestre *et al.* (2006) conducted a study on body composition and physical performance in men's soccer, concluding that players at higher levels of competition, including university-level athletes, often have similar explosive strength scores when exposed to similar strength training programs.

In addition, Singh *et al.* (2021) found that explosive strength played a significant role in football performance but showed no substantial differences between players from different teams when similar training practices were followed. This further supports the conclusion that players from NSU and DMU, who were both preparing for the same competitive event, exhibited similar levels of explosive strength, likely due to their comparable conditioning programs.

Further research could explore other bio-motor variables or consider longitudinal studies to track changes in physical capabilities throughout a season or after specific interventions. This would provide a deeper understanding of how bio-motor abilities evolve and contribute to football performance.

CONCLUSION

In conclusion, this study found no significant differences in speed, agility, and explosive strength between the football teams of National Sports University and Dhanamanjuri University. Both teams demonstrated comparable physical attributes in the tested bio-motor abilities, suggesting that similar training programs and competitive environments contribute to the development of these traits. Further research could expand on these findings by examining additional bio-motor variables or tracking changes over time.

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