



Physical Fitness and Motivational Dynamics of North East Indian Collegiate Volleyball and Basketball Players

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ABSTRACT:

The study aims to investigate the physical fitness and motivational dynamics of North East Indian collegiate volleyball (n=20) and basketball (n=20) players. Selected physical fitness parameters along with motivational dynamics were assessed using the Sports Motivational Scale (SMS-28). Statistical analyses revealed that significant differences have been found in speed between volleyball (9.72 ± 1.07) and basketball (8.92 ± 1.19) players ($p=0.048$), whereas no significant differences were found in strength endurance ($p=0.393$), agility ($p=0.867$) and power ($p=0.513$) between volleyball and basketball players. With no significant difference in motivation dynamics, the study explored relationships among various motivational sub-scale and physical fitness parameters. The findings indicate that the intermittent activity pattern of basketball game contributes to a significant difference in speed, in comparison with volleyball players. In case of other physical fitness parameters and motivational dynamics, it becomes apparent that both sports involve analogous levels of strength endurance, agility, power, and collective motivations for personal advancement, team achievement, external acknowledgment, rewards, pursuit of mastery within both sporting domains. The study provides valuable insights into the distinct profiles of volleyball and basketball players in the North East Indian collegiate context, contributing to the understanding of athlete characteristics and informing personalised training and motivational strategies for optimal performance.

Key Words: Physical fitness, Speed, Motivation, Volleyball, Basketball, SMS-28.

Introduction:

Physical fitness is a cornerstone of athletic performance and well-being, particularly for athletes involved in high-intensity sports like volleyball and basketball. In the context of North East Indian collegiate athletes, the intersection of physical fitness and motivational dynamics offers a rich and complex area for academic exploration. The North East region of India, comprising Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim, is known for its diverse cultural heritage and strong sporting traditions, having produced athletes who have achieved national and international success (Nongmeikapam, Yumnam, & Thokchom, 2016). For collegiate volleyball and basketball players, physical fitness includes essential components such as cardiovascular endurance, muscular strength, flexibility, and agility, which are critical for enhancing athletic performance, preventing injuries, and ensuring sustained sports participation (Bompa & Haff, 2009). Motivation, both intrinsic and extrinsic, plays a crucial role in driving these athletes, with intrinsic motivation stemming from a personal passion for the game and extrinsic motivation influenced by external rewards, recognition, and support systems (Deci & Ryan, 2000). For North East Indian collegiate athletes, motivation is often deeply rooted in cultural pride and the desire to elevate their region's status through sporting achievements (Singh, Sharma, & Karmakar, 2018). Understanding the interplay between physical fitness and motivational dynamics is essential to develop effective training programs, fostering a supportive sporting environment, and enhancing athletic performance and well-being. This study aims to investigate the physical and motivational attributes of amateur volleyball and basketball players in North East India, comparing fitness levels and motivational factors, exploring correlations between these variables, and identifying challenges and opportunities influenced by cultural, socio-economic, and resource access factors (Sengupta & Dutta, 2017). This study aims to provide a comprehensive analysis of amateur volleyball and basketball players in the North East region of India by addressing three primary objectives. Firstly, it compares selected physical variables, namely speed, endurance, agility, and power, between volleyball and basketball players. Secondly, it examines the motivational attributes of these athletes across seven sub-scales to identify differences between the two sports. Lastly, the study explores the relationship between the players' physical characteristics and their motivational attributes, providing insights into how these factors interact to influence athletic performance and development. Through this analysis, the research seeks to enhance the understanding of the unique physical and psychological profiles of North East Indian

collegiate athletes, contributing to the broader discourse on sports science and athlete development. Through this research, the study seeks to contribute to the broader discourse on sports science and athlete development, offering insights into the unique context of North East Indian collegiate volleyball and basketball players.

Methodology:

Research Design: This study adopts a descriptive-comparative research design to explore the selected physical fitness and motivational dynamics (SMS-28) of collegiate volleyball and basketball players in Northeast India.

The participants: A cohort of college-going basketball (n=20) and volleyball (n=20) players were randomly selected from various club tournaments held in the north-eastern region of India. Each participant was screened to ensure they were free from any chronic diseases and fully informed about the study's purpose, procedures, and potential benefits. Additionally, written consent was obtained from each player, indicating their willingness to participate in the study. The research protocol and procedures were thoroughly reviewed and approved by the institutional ethics committee of ICFAI University, Tripura, in accordance with their established guidelines for academic and research ethics, ensuring the integrity and credibility of the research findings.

Data collection procedure: Demographic characteristics along with selected physical fitness components have been measured through non-invasive methods, such as speed (50m dash), endurance (Plank), agility (4*10m shuttle run), power (squat). For motivational dynamics, Sports Motivation Scale (SMS-28) has been used.

Statistical Analysis: Descriptive statistics were used to summarize the data. The outcomes of the SMS-28 (qualitative) were converted to quantitative data for further analysis. The Shapiro-Wilk test was employed to understand the distribution pattern of the data. The majority of the data set was found to be normal, so parametric Student's t-tests were applied to compare differences between volleyball and basketball players. A correlation matrix (Pearson's correlation coefficient) was used to explore relationships between physical fitness components and motivational factors.

Results:

Table 1: Demographic characteristics of the volunteers

Parameters	Volleyball (n=20)	Basketball (n=20)	P value
Age (years)	19.2±1.7	19.7±1.9	0.471
Height (cm)	172.7± 2.7	172.2± 2.4	0.571
Body Mass (kg)	64.2±4.1	62.9±5.6	0.376
BMI (kg/m ²)	21.63±1.5	21.21± 1.7	0.782

The table 1 compares demographic features of volleyball and basketball players, focusing on age, height, body mass, and BMI. Volleyball players are slightly younger on average than basketball players, though this difference is not statistically significant. Similarly, there are no significant differences in height, body mass, or BMI between the two groups. Overall, no significant demographic distinctions exist between volleyball and basketball players based on the reported analysis.

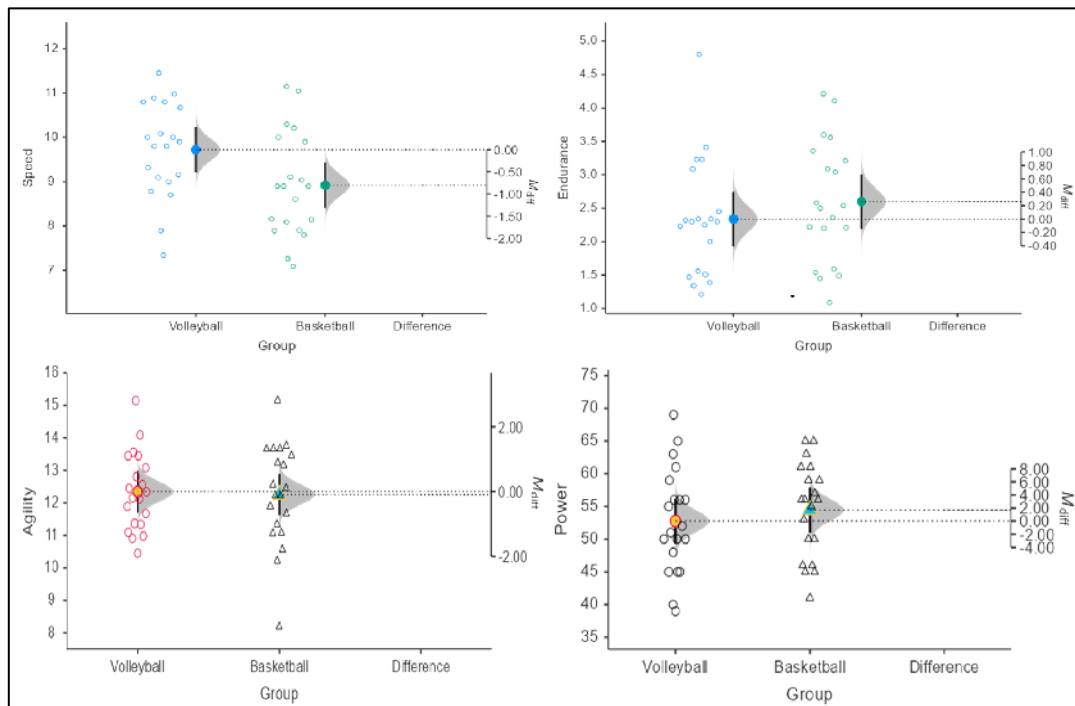
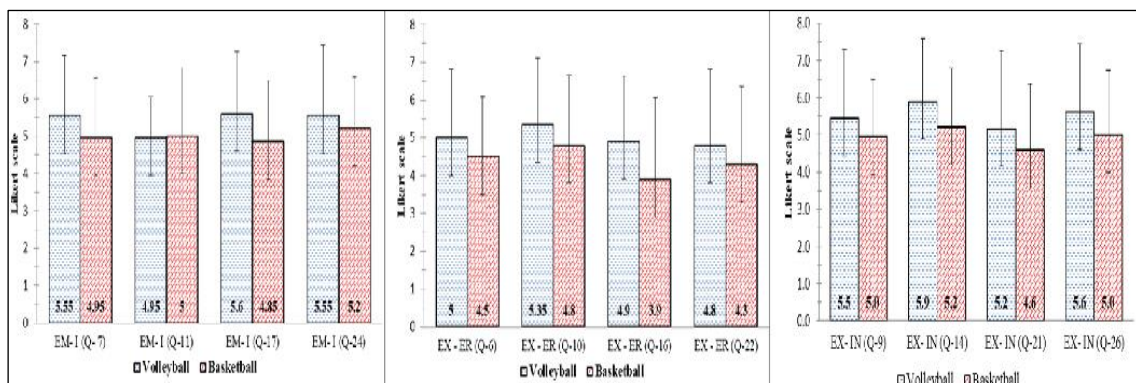


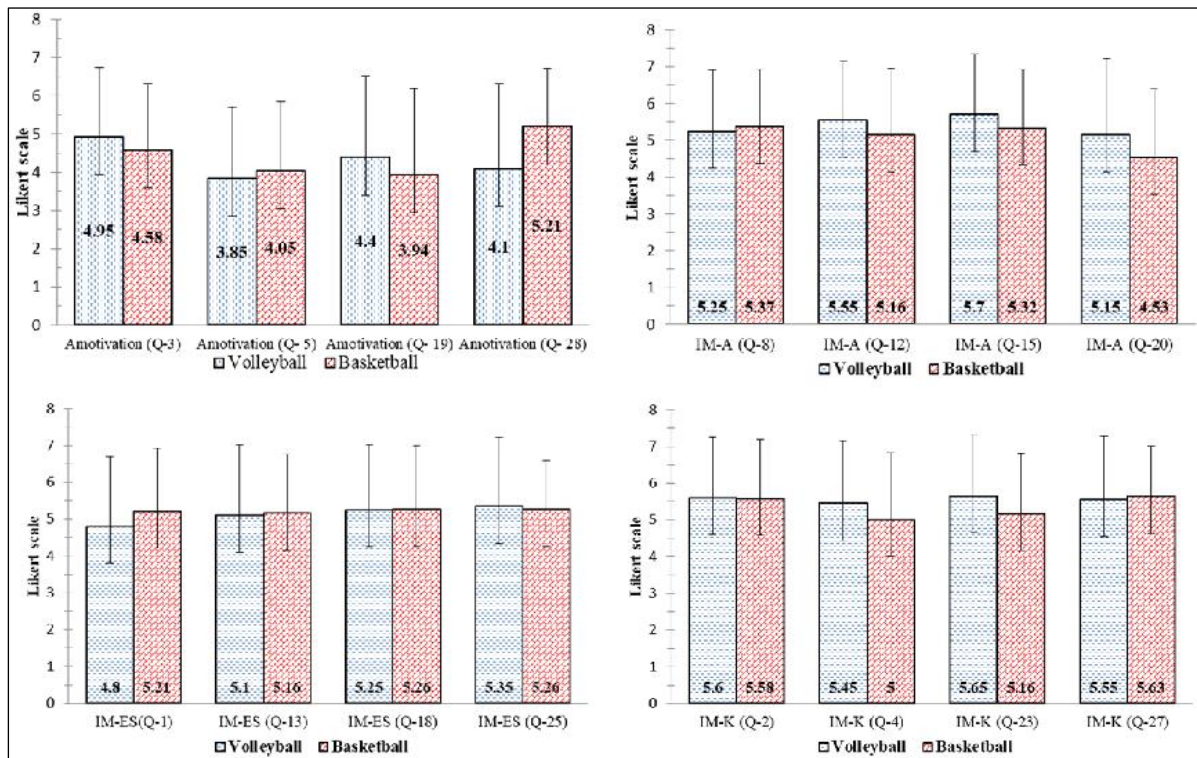
Figure 1: Comparison of physical Fitness characteristics between the groups

The figure 1 compares physical fitness parameters between volleyball and basketball players. Volleyball players are significantly slower ($p=0.048$) in speed 9.72 ± 1.07 sec compare to basketball players 8.92 ± 1.19 sec. However, overall physical performance qualities of volleyball and basketball players appear to be similar in terms of endurance, agility, and power measurements.



EX-I= Extrinsic motivation innovation, EX-ER= Extrinsic-external regulation, EX-IN= Extrinsic motivation- introjected
 Figure 2: Graphical representation of extrinsic motivation subscale (SMS-28) between the groups

In Figure 2, a discernible variation in the extrinsic motivation sub-scale is evident. However, despite the observable differences, the overlapping standard deviations preclude the observation of any statistically significant differences.



IM-A= Intrinsic motivation- to accomplish, IM-ES= Intrinsic motivation- to experience stimulation, IM-K= Intrinsic motivation- to know
 Figure 3: Graphical representation of amotivation and instinctive motivation subscale

In Figure 3, minimal variation is observed in the amotivation and intrinsic motivation sub-scales between volleyball and basketball players.

Table 2: Comparison of motivational sub-scale (SMS-28) between the groups

Parameters	Mean difference	t-Statistic	p	Cohen's D effect Size
Amotivation	0.0368	0.0228	0.982	0.00729
EM- I	1.9658	1.0141	0.317	0.32488
EX - ER	2.8395	1.4237	0.163	0.45609
EX- IN	3.4158	1.6055	0.117	0.51433
IM-A	2.0184	1.0343	0.308	0.33135
IM-ES	0.3421	0.1792	0.859	0.05742
IM-K	1.7763	0.9507	0.348	0.30458

The above table (Table 2) presents a statistical comparison of different motivational sub-scales from the Sport Motivation Scale (SMS-28) and shows that none of the motivational sub-scales have statistically significant differences between the groups ($p > 0.05$). However, some sub-scales, particularly EX-ER and EX-IN, have moderate effect sizes, suggesting that

there might be practically relevant differences even if they are not statistically significant in this sample.

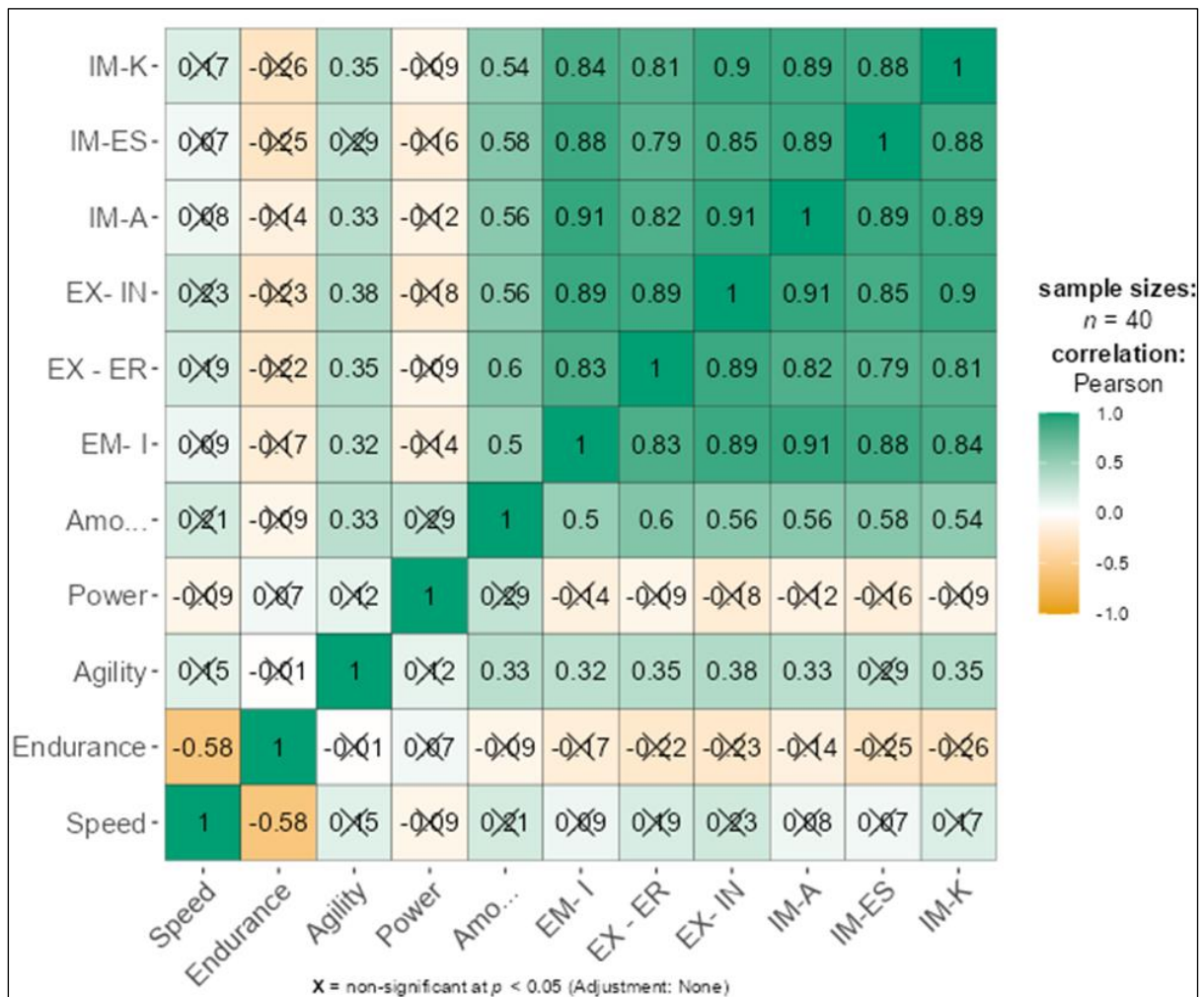


Figure 4: Correlation matrix of physical and motivational variables

The figure 4 (correlation matrix) offers a comprehensive overview of the interrelationships among various characteristics of basketball players. Analysis reveals certain patterns, particularly among physical performance attributes like speed, endurance, agility, and power, suggesting interconnectedness within these aspects among basketball players. Additionally, psychological parameters such as EM-I, EX-ER, EX-IN, IM-A, IM-ES, and IM-K demonstrate correlations, suggesting potential links between various elements of mental motivation and performance.

Discussion:

Study on selected physical and motivational attributes between amateur volleyball and basketball players in the North East region of India provides a comprehensive analysis of key factors influencing athlete performance and motivation. Through detailed examination of anthropometric parameters, including age, height, body mass, and BMI, the study reveals

remarkable similarities between the two groups, suggesting that athletes in both sports share common physical characteristics. Furthermore, the investigation into motivational attributes sheds light on the nuanced motivational profiles of volleyball and basketball players, highlighting similarities and differences in motivational factors such as external and intrinsic motivation. These findings contribute to a deeper understanding of the multifaceted nature of athlete development and performance optimization in the context of regional sporting dynamics in the North East region of India. It is notable that while the Indian census data for 2021 indicates an average height of 5 feet 8 inches for individuals within these age groups, the average height of men in the North East region of India is slightly lower, recorded at 5 feet 6.5 inches. These findings underscore the uniformity in physical attributes among athletes participating in volleyball and basketball, irrespective of minor regional variations. Such uniformity may hold significant implications for the development of training and conditioning programs adapted to meet the needs of athletes in both sports. Coaches and trainers can capitalize on this understanding to devise comprehensive fitness and nutrition plans aimed at optimizing performance while accommodating the shared physiological characteristics prevalent among players in these two sports within the North East region of India.

According to findings of the study Basketball players exhibiting shorter sprint times compared to their volleyball counterparts. Similar findings also exposed by Basu et al. (2019). The study revealed that university level male Volleyball players exhibited relatively lower speed compare to handball and basketball players. This discrepancy underscores the unique locomotor demands inherent in each sport. Basketball's dynamic nature necessitates rapid changes in direction and pace, contributing to the observed faster sprint times among basketball players. In contrast, volleyball's intermittent bursts of speed and emphasis on precise positioning and timing may lead to slightly longer sprint times for its players. Understanding these distinctions is pivotal for coaches and trainers to modify sport-specific training regimens aimed at optimizing athletes' performance and agility. Moreover, such comparative analyses offer valuable insights into the broader discourse on athletic development and optimization across diverse sporting disciplines. However, it's noteworthy that the sprinting ability of the volunteers in this study appears to be lower compared to both district and inter-state levels of basketball players in Uttar Pradesh, as documented by Tiwari, Singh, and Singh (2012). This difference highlights potential variations in athletic capabilities across different populations and shows the importance of considering regional and contextual factors in athletic performance assessments and training interventions.

The study reveals only a trivial difference in power performance. This suggests a similarity in the frequency of high-intensity power movements despite the contrasting demands of each sport. However, the investigations by Suma and Giridhara Prasath (2022) and Tiwari, Singh, and Singh (2012) present contrary findings, highlighting significant disparities in power output between the two athlete groups. Moreover, Dhokrat (2012) propose that while explosive power may not markedly differ between volleyball and basketball players, the latter excel in strength and endurance parameters due to the dynamic nature of their sport, characterized by intermittent explosive actions interspersed with sustained physical exertion periods. These collective insights underscore the multidimensional nature of athletic performance and the necessity for comprehensive assessments to capture the intricate interplay of physiological variables across diverse sporting disciplines.

The analysis of motivational subscales between volleyball and basketball players reveals some differences in mean scores, with volleyball players generally scoring higher across most parameters, such as external motivation (introjected and external regulation), intrinsic motivation (accomplishment and knowledge), and identified regulation. Despite these differences, both sports exhibit similar levels of variability in responses, suggesting that the motivational profiles of athletes in these two sports are more alike than different. This underscores the need for tailored motivational strategies that address the nuanced needs of players in both volleyball and basketball. The study by Kumar et al. (2017) on the motivational factors influencing athletes' sports participation provides significant insights into the intrinsic and extrinsic motivations of athletes across various disciplines. Athletes exhibit high intrinsic motivation, particularly in their desire to learn, accomplish goals, and experience stimulation. Extrinsic motivation is also strong, with identified regulation being the most prominent. Notably, amotivation is low, suggesting a strong commitment across these sports. This comprehensive understanding of motivational dynamics underscores the importance of fostering both intrinsic enjoyment and extrinsic rewards to maintain high engagement and performance levels among athletes. Similarly, the study "Coping and Sport-Motivation of Adolescent Handballers in Debrecen" by Kovács et al. (2016) explores how motivations for playing handball evolve among adolescents, distinguishing between intrinsic and extrinsic factors. Initially, external motivations such as peer influence, physical fitness concerns, and future aspirations are predominant. Adolescents engage in the sport for enjoyment, skill mastery, social interaction, and the excitement it brings. Over time, intrinsic motivations like personal satisfaction, a sense of belonging to a team, and overall enjoyment of the game become more significant. This shift underscores the importance of supportive

social environments in sustaining long-term motivation. For coaches and educators, this understanding emphasizes the need to adapt motivational strategies, enhance support systems, and address both physical and psychological needs to foster enduring engagement and personal development in young athletes. Additionally, a study by Kucukibis and Gul (2019) examined the motivation levels of sports high school students in team sports versus individual sports using the Sports Motivation Scale (SMS-28). The results showed no significant difference between team sport and individual sport athletes in intrinsic motivation categories. However, a significant difference was found in amotivation, with individual sport athletes displaying higher levels of amotivation compared to their team sport counterparts. These findings suggest that while both groups share similar intrinsic and extrinsic motivational profiles, individual sport athletes may experience higher levels of amotivation, possibly indicating a greater challenge in sustaining motivation without the support of a team environment.

Conclusion:

The study explores the association selected physical and motivational attributes between amateur volleyball and basketball players in the North East region of India offers a comprehensive analysis of key factors influencing athlete performance and motivation. Through detailed examination of anthropometric parameters, including age, height, body mass, and BMI, the study reveals significant similarities between the two groups, suggesting common physical characteristics among athletes in both sports. Furthermore, the investigation into motivational attributes highlights nuanced motivational profiles, with volleyball players generally scoring higher on various motivational scales, yet these differences are not statistically significant. The findings underscore the uniformity in physical and motivational attributes among these athletes, despite minor regional variations in height. This uniformity has practical implications for the development of training and conditioning programs that cater to the shared physiological characteristics of volleyball and basketball players in the region. The study also reveals significant differences in speed, with basketball players exhibiting faster sprint times due to the sport's dynamic demands. However, differences in power performance are minimal, indicating similar high-intensity movement frequencies in both sports. Additionally, the analysis of motivational subscales suggests the need for tailored strategies to enhance both intrinsic and extrinsic motivation among athletes. These insights are crucial for coaches, trainers, and sports administrators in developing programs that optimize athlete performance and foster sustained engagement in volleyball and basketball in the North East region of India.

Conflict of Interest: The authors declare no conflict of interest for this study.

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