Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 6 Issue 1 (2026)

Associations between Body Composition Indicators and Lower-Limb Explosive Performance in Elite Algerian Basketball Players

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Abstract

This study aimed to examine the associations between body composition indicators and lower-limb explosive performance in elite Algerian basketball players. A correlational research design was adopted, involving senior male players competing at the national elite level. The sample consisted of players with a mean age of 26.89 ± 5.92 years, mean height of 1.89 ± 0.08 m, and mean body mass of 83.23 ± 12.62 kg. Body composition was assessed using bioelectrical impedance analysis, focusing on body fat percentage (BF%) and total body water percentage (TBW%). Lower-limb explosive performance was evaluated using squat jump (SJ) and countermovement jump (CMJ) tests.

The results revealed significant negative correlations between BF% and SJ ($r = -0.525$, $p = 0.018$) as well as CMJ performance ($r = -0.455$, $p = 0.044$). Conversely, TBW% showed significant positive associations with SJ ($r = +0.526$, $p = 0.017$) and CMJ ($r = +0.454$, $p = 0.044$). These findings highlight the importance of body composition monitoring in optimizing explosive performance among elite basketball players.

Keywords

Body composition; Explosive performance; Vertical jump; Basketball players; Lower-limb power; Elite athletes

1. Introduction:

Anthropometric assessment constitutes a fundamental scientific approach in the field of sport sciences, as it provides a quantitative and objective description of human body dimensions, proportions, and structural characteristics. It focuses on the measurement and analysis of body size, shape, and segmental relationships, allowing for a precise understanding of morphological features that distinguish individuals and athletes across different sports disciplines **(Houar, 2014; Bougachout et al., 2019)**. These measurements are widely employed to establish physical profiles, monitor growth and development, and support both performance evaluation and talent identification processes.

In the context of competitive sport, anthropometric and morphological characteristics are considered essential determinants of athletic performance. Numerous studies have demonstrated that elite athletes exhibit specific body dimensions and proportional patterns that correspond to the biomechanical and physiological demands of their sport. Consequently, morphological assessment has become an indispensable tool for coaches, trainers, and researchers seeking to optimize performance and guide athletes toward the most suitable playing positions and training strategies.

Beyond external body dimensions, body composition assessment represents a central component in evaluating athletes from nutritional, functional, and health-related perspectives. Body composition refers to the relative proportions of fat mass, fat-free mass, muscle mass, and total body water within the body. Achieving high-level athletic performance requires an optimal balance between these components, particularly in sports characterized by high-intensity, intermittent efforts such as basketball **(Lloret-Linares & Oppert, 2009; Al-Hazzaa, 2009).**

Several investigations have emphasized that excessive body fat negatively affects athletic performance by increasing inert mass, reducing movement efficiency, and impairing neuromuscular coordination. Conversely, adequate levels of fat-free mass and optimal hydration status are associated with improved force production, power output, and recovery capacity. For this reason, indicators such as body fat percentage (BF%) and total body water percentage (TBW%) are frequently used in sports research to assess athletes' physical readiness and performance potential.

Basketball is a team sport characterized by repeated high-intensity actions, including sprinting, rapid changes of direction, jumping, and physical contact. Among the various physical attributes required for success in basketball, lower-limb explosive power plays a decisive role. Players are constantly required to perform vertical and horizontal jumps during key game situations such as rebounding, blocking, jump shooting, and dunking. Consequently, the ability to generate maximal force in the shortest possible time represents a critical determinant of competitive performance in basketball **(Al-Satari, 2011; Toubal & Ben Lakhal, 2015).**

Vertical jump performance is widely recognized as a valid and reliable indicator of lower-limb explosive power. Previous studies have reported that basketball players perform a considerable number of jumps during official matches, with estimates reaching approximately (46 ± 12 jumps per game). This highlights the importance of explosive strength not only for isolated actions but also for repeated performance throughout the duration of competition, under conditions of fatigue and tactical constraints.

Explosive power is defined as the capacity of the neuromuscular system to produce high levels of force at high contraction velocities. It results from the interaction between muscle mass, muscle fiber characteristics, neural activation, and biomechanical efficiency. In basketball, explosive power is closely linked to technical execution, tactical effectiveness, and overall playing efficiency, making it one of the most important physical qualities to be developed and monitored **(Cometti, 2006; Mekrani, 2011).**

Despite the acknowledged importance of explosive power in basketball, the relationship between body composition indicators and explosive performance remains insufficiently documented, particularly in elite basketball populations at the national level. While some studies have reported negative associations between body fat percentage and jumping ability, others have emphasized the positive contribution of hydration status and lean mass to power-related performance. These inconsistencies underline the need for further research examining the specific relationships between body composition indicators and lower-limb explosive power in basketball players.

Therefore, the present study aims to investigate the relationships between selected body composition indicators—namely body fat percentage (BF%) and total body water percentage (TBW%)—and lower-limb explosive power, as assessed through vertical jump performance.

By providing a detailed examination of these relationships, this study seeks to contribute to a deeper understanding of the role of body composition in explosive performance among elite basketball players and to offer scientific evidence that may support training optimization, performance monitoring, and athlete profiling in competitive basketball.

2. Research Problem, Objectives, and Hypotheses

2.1 Research Problem

In high-performance basketball, physical preparation is a determining factor in achieving competitive success, particularly in relation to neuromuscular capacities such as strength, speed, and explosive power. Among these capacities, lower-limb explosive power is considered a key physical attribute, as it directly influences vertical jump performance, which is essential for executing a wide range of offensive and defensive actions during the game.

Despite the growing interest in physical performance analysis in basketball, the scientific literature reveals a relative lack of consensus regarding the specific influence of body composition indicators on explosive performance. While some studies have reported that excess body fat negatively affects jump performance by increasing non-functional mass, others have highlighted the positive role of hydration status and fat-free mass in optimizing force production and neuromuscular efficiency.

Furthermore, most available studies have focused on general athletic populations or on sports with continuous physical demands, whereas research specifically addressing elite basketball players—particularly at the national level—remains limited. This gap is even more pronounced when considering the combined analysis of body fat percentage (BF%) and total body water percentage (TBW%) in relation to lower-limb explosive power.

From a practical standpoint, coaches and physical trainers frequently rely on vertical jump tests to evaluate explosive power, yet these assessments are often interpreted without sufficient consideration of underlying body composition characteristics. As a result, training interventions may lack individualization, and performance optimization strategies may fail to account for morphological and physiological differences among players.

In light of these considerations, the central research problem of the present study can be formulated as follows:

To what extent are selected body composition indicators—specifically body fat percentage (BF%) and total body water percentage (TBW%)—associated with lower-limb explosive power in elite basketball players?

2.2 Research Questions

Based on the above problem statement, the study seeks to answer the following specific research questions:

1. Is there a statistically significant relationship between body fat percentage (BF%) and lower-limb explosive power, as assessed through squat jump (SJ) and countermovement jump (CMJ) performance?
2. Is there a statistically significant relationship between total body water percentage (TBW%) and lower-limb explosive power in elite basketball players?
3. Do variations in body composition indicators correspond to meaningful differences in vertical jump performance among players?

These questions are examined through descriptive and correlational analyses, the results of which are presented and interpreted using both numerical data and graphical representations.

2.3 Research Objectives

The general objective of this study is to analyze the relationship between selected body composition indicators and lower-limb explosive power among elite male basketball players. More specifically, the study aims to:

- Describe the anthropometric and body composition characteristics of the study sample.
- Determine the descriptive statistics of body composition indicators (BF% and TBW%) and explosive power variables (SJ and CMJ.
- Examine the relationship between body fat percentage (BF%) and lower-limb explosive power using correlation coefficients and regression analysis.
- Analyze the relationship between total body water percentage (TBW%) and lower-limb explosive power.
- Provide a scientific interpretation of the observed relationships in light of existing literature on body composition and explosive performance in team sports.

2.4 Research Hypotheses

Based on the theoretical background and previous empirical findings, the study proposes the following hypotheses:

- **H1:** There is a statistically significant negative relationship between body fat percentage (BF%) and lower-limb explosive power, such that higher BF% values are associated with lower vertical jump performance (SJ and CMJ).
- **H2:** There is a statistically significant positive relationship between total body water percentage (TBW%) and lower-limb explosive power, indicating that better hydration status is associated with higher jump performance.
- **H3:** Body composition indicators (BF% and TBW%) collectively contribute to explaining variations in lower-limb explosive power among elite basketball players.

These hypotheses are tested using correlational statistical methods, and the results are subsequently discussed with reference to biomechanical, physiological, and training-related considerations.

3. Methodology

3.1 Research Design

The present study adopted a **descriptive correlational research design**, which is considered appropriate for examining the relationships between variables as they naturally occur, without any experimental manipulation. This design was selected in order to analyze the associations between selected body composition indicators and lower-limb explosive power in elite basketball players, while preserving the ecological validity of the sporting context.

The correlational approach allows for identifying the strength and direction of relationships between morphological and physical performance variables, providing meaningful insights into how body composition characteristics may influence explosive performance in basketball.

3.2 Participants

The study sample consisted of **elite male basketball players** competing in the senior category. Participants were intentionally selected based on their competitive level and regular participation in official championships.

All participants were free from injury at the time of testing and had no medical conditions that could affect performance or body composition measurements. Prior to data collection, the objectives and procedures of the study were clearly explained to the players, and informed

consent was obtained in accordance with ethical standards for research involving human participants.
The descriptive characteristics of the study sample are presented in **Table 1**.

Table 1. Descriptive characteristics of the study sample

Variable	Mean ± SD
Age (years)	26.89 ± 5.92
Height (m)	1.89 ± 0.08
Body mass (kg)	83.23 ± 12.62

These data indicate that the sample represents adult basketball players with anthropometric characteristics consistent with elite-level performance in this sport.

3.3 Instruments and Measurement Tools

3.3.1 Body Composition Assessment

Body composition indicators were assessed using **bioelectrical impedance analysis (BIA)**, a non-invasive and widely used method in sports science research. This technique estimates body composition components by measuring the resistance and reactance of body tissues to a low-level electrical current.
The following body composition indicators were measured:
- **Body Fat Percentage (BF%)**
- **Total Body Water Percentage (TBW%)**

Measurements were conducted under standardized conditions to enhance reliability and reduce measurement error. Participants were instructed to:
- Avoid intense physical activity prior to testing
- Maintain normal hydration status
- Refrain from eating for several hours before measurement
- Undergo measurements at similar times of the day

3.3.2 Assessment of Lower-Limb Explosive Power

Lower-limb explosive power was evaluated using vertical jump tests, which are considered valid and reliable indicators of explosive strength in basketball players.
The following tests were administered:
- **Squat Jump (SJ):** performed from a static semi-squat position without a preparatory countermovement.
- **Countermovement Jump (CMJ):** performed with a rapid downward movement followed by an immediate vertical jump.

Each participant performed multiple trials for each test, and the best performance was recorded for analysis. Jump height was expressed in centimeters (cm) and used as an indicator of lower-limb explosive power.

3.4 Testing Procedures

All measurements were conducted in a controlled indoor environment to ensure consistency of testing conditions. The testing session was organized as follows:
1. Anthropometric measurements and body composition assessment
2. Standardized warm-up
3. Performance of vertical jump tests (SJ and CMJ)

Adequate recovery time was provided between jump attempts to minimize the effects of fatigue and ensure maximal effort during each trial.

3.5 Statistical Analysis

Data were processed using appropriate statistical software. Descriptive statistics, including means and standard deviations, were calculated for all variables. The descriptive statistics of body composition indicators and explosive power variables are presented in To examine the relationships between body composition indicators and lower-limb explosive power, **Pearson's correlation coefficient (r)** was used. The coefficient of determination (r^2) was calculated to estimate the proportion of variance explained.

The level of statistical significance was set at **$p \leq 0.05$**.

4. Results

4.1 Descriptive Analysis of Body Composition and Explosive Power Variables:

The descriptive statistical analysis of body composition indicators and lower-limb explosive power variables is presented in **Table 2**. This table summarizes the central tendency and dispersion measures (mean, standard deviation), as well as the minimum and maximum values observed among the study participants.

As shown in **Table 2**, the mean body fat percentage (BF%) of the sample was **15.61 ± 5.14%**, with values ranging from **6.4%** to **24.0%**, indicating noticeable inter-individual variability in fat mass levels among elite basketball players. The mean total body water percentage (TBW%) was **59.20 ± 3.61%**, with a minimum value of **53.2%** and a maximum value of **65.7%**, reflecting differences in hydration status and fat-free mass distribution.

Regarding explosive power variables, the mean squat jump (SJ) height was **37.87 ± 7.36 cm**, while the mean countermovement jump (CMJ) height reached **41.11 ± 8.02 cm**. These results indicate that CMJ performance exceeded SJ performance, which is consistent with the contribution of the stretch–shortening cycle during the countermovement jump.

Table 2. Descriptive statistics of body composition and explosive power variables

Variable	Mean	SD	Max	Min	Range
Body Fat (%)	15.61	±5.14	24.0	6.4	17.8
Total Body Water (%)	59.20	±3.61	65.7	53.2	12.5
Squat Jump (cm)	37.87	±7.36	49.7	24.2	25.5
Countermovement Jump (cm)	41.11	±8.02	57.0	32.4	24.6

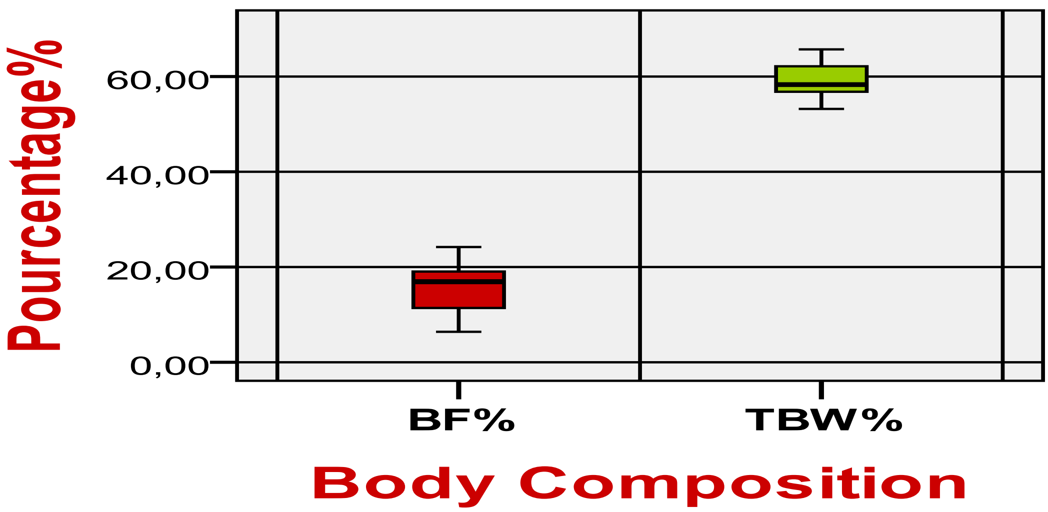

Figure 1. Distribution of body composition indicators—body fat percentage (BF%) and total body water percentage (TBW%)—among the basketball players included in the study.

Figure 1 illustrates the distribution of body composition indicators among the basketball players. The results show a relatively moderate body fat percentage alongside a higher total body water percentage, reflecting a body composition profile typical of competitive basketball players.
The body composition profile presented in Figure 1 highlights a favorable balance between fat mass and total body water, which may partially explain the observed levels of explosive performance. Higher TBW% values are commonly associated with greater fat-free mass and improved neuromuscular efficiency, whereas relatively lower BF% reduces non-functional body mass during explosive movements.

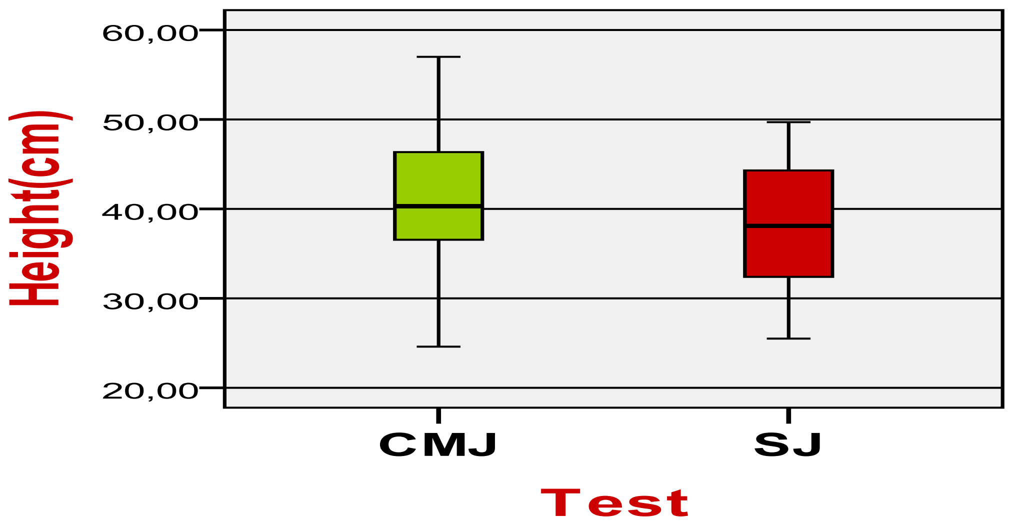

Figure 2. Distribution of vertical jump height (cm) in the countermovement jump (CMJ) and squat jump (SJ) tests among the basketball players.

Figure 2 illustrates the distribution of vertical jump height for both the countermovement jump and squat jump tests. The results show higher median and maximum values for CMJ compared to SJ, indicating superior performance when a preparatory countermovement is allowed.
The distribution patterns observed in Figure 2 confirm that basketball players achieve greater jump heights in the countermovement jump than in the squat jump. This difference reflects the effective use of the stretch–shortening cycle and enhanced neuromuscular coordination, which are essential components of explosive performance in basketball.

4.2 Relationship Between Body Fat Percentage and Lower-Limb Explosive Power

The relationship between body fat percentage (BF%) and lower-limb explosive power was examined using Pearson's correlation coefficient. The results of the correlation analysis are presented in **Table 3**.

As shown in **Table 3**, a statistically significant negative correlation was observed between body fat percentage and squat jump performance (**r = −0.525**, $p = 0.018$). The coefficient of determination (**r² = 0.275**) indicates that approximately **27.5%** of the variance in SJ performance can be explained by variations in body fat percentage.

Similarly, the correlation between body fat percentage and countermovement jump performance was also negative and statistically significant (**r = −0.455**, p = 0.044), with an **r² value of 0.207**, suggesting that body fat percentage accounts for approximately **20.7%** of the variance in CMJ height.
These findings demonstrate that higher levels of body fat are associated with lower vertical jump performance, reflecting the negative impact of non-functional mass on explosive movement efficiency.

Table 3. Pearson correlation coefficients between body fat percentage (BF%) and vertical jump performance

Test	r	r²	p-value
Squat Jump (SJ)	−0.525*	0.275	0.018
Countermovement Jump (CMJ)	−0.455*	0.207	0.044

* Significant at $p \leq 0.05$
The inverse relationship between body fat percentage and lower-limb explosive power is further illustrated in **Figure 3**, which presents the linear regression between BF% and vertical jump height.

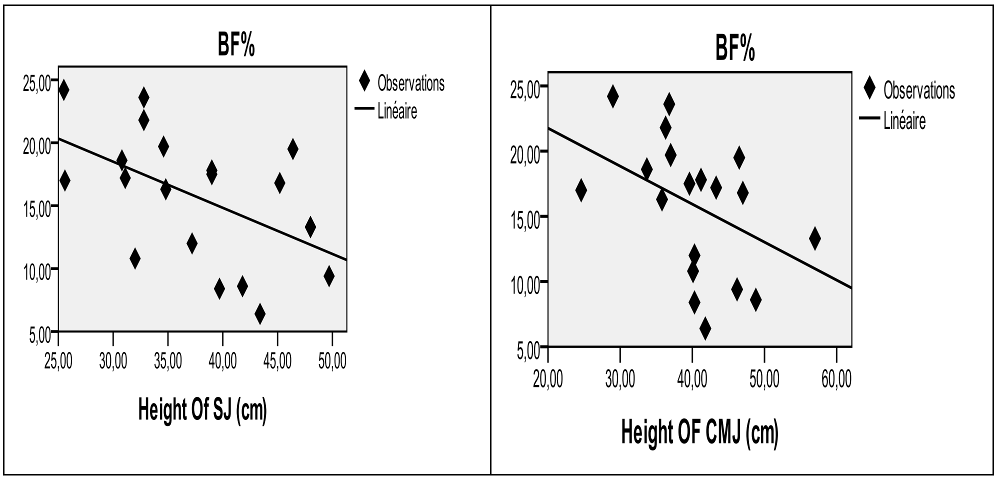

Figure 1. Linear relationship between body fat percentage (BF%) and vertical jump performance (SJ and CMJ)
This figure shows a clear downward trend, indicating that increases in body fat percentage are associated with reductions in vertical jump height.

4.3 Relationship Between Total Body Water Percentage and Lower-Limb Explosive Power

The relationship between total body water percentage (TBW%) and lower-limb explosive power was also examined using Pearson's correlation analysis. The results are presented in **Table 4**.
As indicated in **Table 4**, a statistically significant positive correlation was found between TBW% and squat jump performance (**r = +0.526**, p = 0.017). The coefficient of determination (**r² = 0.276**) suggests that approximately **27.6%** of the variance in SJ performance can be attributed to differences in total body water percentage.
In addition, the correlation between TBW% and countermovement jump performance was positive and statistically significant (**r = +0.454**, p = 0.044), with an **r² value of 0.206**, indicating

that TBW% explains approximately **20.6%** of the variance in CMJ height.
These results indicate that higher total body water levels, which are closely related to fat-free mass and muscle hydration, are associated with superior explosive power performance in basketball players.

Table 4. Pearson correlation coefficients between total body water percentage (TBW%) and vertical jump performance

Test	r	r²	p-value
Squat Jump (SJ)	+0.526*	0.276	0.017
Countermovement Jump (CMJ)	+0.454*	0.206	0.044

* Significant at $p \leq 0.05$
The positive relationship between total body water percentage and explosive power is illustrated in **Figure 4**, which depicts the linear regression between TBW% and vertical jump performance.

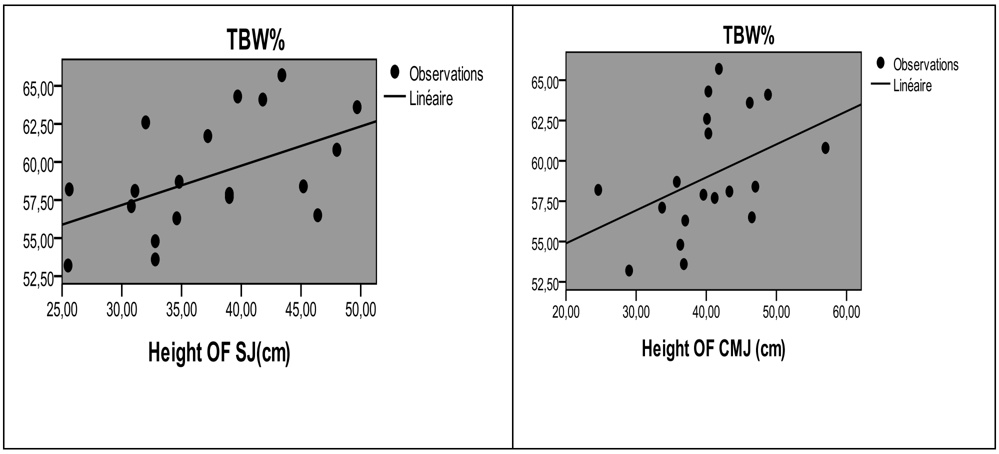

Figure 2. Linear relationship between total body water percentage (TBW%) and vertical jump performance (SJ and CMJ)

This figure highlights the beneficial role of optimal hydration status and lean tissue composition in enhancing lower-limb explosive power.

5. Discussion :

5.1 Body Fat Percentage and Explosive Power

The results revealed a statistically significant negative relationship between body fat percentage and lower-limb explosive power, as assessed through squat jump (SJ) and countermovement jump (CMJ) performance. As presented in **Table 3** and illustrated in **Figure 3**, higher BF% values were associated with lower vertical jump heights. These findings support the first research hypothesis and are consistent with previous research indicating that excess fat mass negatively affects explosive performance by increasing non-functional body mass **(Slater et al., 2006; Ackland et al., 2012).**
From a biomechanical perspective, increased body fat contributes to greater inert mass that must be accelerated during explosive movements such as jumping. This additional mass does not contribute to force production, thereby reducing the power-to-weight ratio, which is a critical determinant of explosive performance **(Tanner, 1990; Markovic & Jaric, 2007)**. Consequently, athletes with higher BF% values may experience diminished jump performance despite possessing adequate muscle strength.
These results are consistent with findings reported in basketball and other team sports, where

inverse relationships between body fat percentage and vertical jump performance have been observed **(Ostojic et al., 2006; Nikolaidis et al., 2015).** Excess adiposity has been shown to impair neuromuscular coordination, reduce relative strength, and increase energy expenditure during high-intensity actions, all of which negatively affect explosive tasks **(Heymsfield et al., 2015).**

Furthermore, the coefficient of determination values observed in the present study (**$r^2 = 0.275$ for SJ and $r^2 = 0.207$ for CMJ**) indicate that body fat percentage explains a substantial proportion of the variance in explosive power performance. Similar magnitudes of explained variance have been reported in previous studies examining the relationship between body composition and jump performance in elite athletes **(Santos et al., 2014; Cormie et al., 2011).**

5.2 Total Body Water Percentage and Explosive Power

In contrast to body fat percentage, total body water percentage exhibited a statistically significant positive relationship with lower-limb explosive power. As shown in **Table 4** and **Figure 4**, higher TBW% values were associated with better performance in both SJ and CMJ tests. These findings confirm the second research hypothesis and are in agreement with previous studies highlighting the role of hydration status and fat-free mass in power-oriented performance **(Sawka et al., 2007; Judelson et al., 2007).**

Total body water is closely related to lean body mass, particularly skeletal muscle tissue, which contains a high proportion of intracellular water. Adequate hydration is essential for maintaining optimal muscle contractile properties, neuromuscular transmission, and metabolic efficiency **(Cheuvront & Kenefick, 2014)**. Even mild dehydration has been shown to impair muscle power output, reaction time, and coordination, all of which are critical for explosive actions in basketball **(Judelson et al., 2007; Casa et al., 2010).**

The positive associations observed in the present study suggest that players with higher TBW% values—reflecting greater muscle mass and better hydration—are better equipped to generate rapid force and achieve higher jump performance. Comparable findings have been reported in studies examining hydration status and neuromuscular performance in team-sport athletes **(Maughan & Shirreffs, 2010; Volpe et al., 2011).**

The coefficients of determination obtained (**$r^2 = 0.276$ for SJ and $r^2 = 0.206$ for CMJ**) further indicate that TBW% is a meaningful predictor of explosive power. This supports the notion that hydration-related variables should be considered alongside traditional body composition measures when evaluating performance capacity in elite athletes **(Sawka et al., 2007; Cheuvront & Kenefick, 2014).**

5.3 Practical Implications for Training and Performance Optimization

The combined analysis of body fat percentage and total body water percentage highlights the multifactorial nature of explosive performance in basketball. While reducing excess body fat may improve the power-to-weight ratio and movement efficiency, ensuring adequate hydration and lean mass preservation is equally important for maximizing force production and neuromuscular efficiency **(Ackland et al., 2012; Heymsfield et al., 2015).**

From a practical standpoint, these findings emphasize the importance of integrating body composition assessment with physical performance testing in elite basketball environments. Regular monitoring of BF% and TBW%, in conjunction with vertical jump testing, may assist coaches and strength and conditioning professionals in identifying individual limitations and optimizing training and nutritional strategies **(Slater et al., 2006; Santos et al., 2014).**

6. Conclusion

The present study aimed to examine the relationship between selected body composition indicators and lower-limb explosive power in basketball players. Based on the analysis of body fat percentage (BF%), total body water percentage (TBW%), and vertical jump performance (squat jump and countermovement jump), several important conclusions can be drawn.

The results clearly demonstrated that body fat percentage is negatively associated with explosive power performance. Players with higher BF% values exhibited lower jump heights in both SJ and CMJ tests, indicating a reduced power-to-weight ratio. This finding confirms that excess fat mass represents a non-functional load that impairs explosive actions requiring rapid force production and efficient acceleration of body mass. Consequently, controlling body fat levels appears to be a key factor in optimizing explosive performance in basketball.

In contrast, total body water percentage showed a positive relationship with explosive power. Higher TBW% values were associated with superior vertical jump performance, reflecting the close link between hydration status, lean body mass, and neuromuscular efficiency. Adequate hydration and a higher proportion of fat-free mass seem to support optimal muscle contractility and rapid force generation, which are essential for explosive movements frequently performed in basketball.

Taken together, these findings highlight the multifactorial nature of explosive performance in team sports. Explosive power is not solely determined by neuromuscular or technical factors, but is also strongly influenced by body composition characteristics. The balance between fat mass and lean mass plays a decisive role in determining an athlete's ability to generate high levels of power relative to body weight.

From a practical perspective, the results of this study emphasize the importance of integrating body composition assessment into the regular monitoring of basketball players. Periodic evaluation of BF% and TBW%, combined with explosive power testing, can provide valuable information for coaches, strength and conditioning professionals, and sports scientists. Such an integrated approach may support individualized training and nutritional strategies aimed at enhancing performance while reducing the risk of excessive body mass or inadequate hydration.

Finally, this study contributes to the growing body of evidence supporting the role of body composition as a fundamental determinant of physical performance in basketball. Future research should extend these findings by including larger samples, longitudinal designs, and additional indicators of muscle mass and regional body composition to further clarify their contribution to explosive performance across different competitive levels.

7. Practical Recommendations

Based on the findings of the present study, several practical recommendations can be proposed for coaches, strength and conditioning professionals, and sports scientists working with basketball players.

First, regular assessment of body composition should be integrated into the performance monitoring process. Specifically, periodic evaluation of body fat percentage and total body water percentage can provide valuable insights into players' physical readiness and their potential to generate explosive power. Monitoring these variables throughout the season may help detect unfavorable changes that could negatively affect performance.

Second, training programs aimed at improving explosive power should be accompanied by strategies targeting optimal body composition. Reducing excess body fat through individualized training loads and appropriate nutritional interventions may enhance the power-to-weight ratio, thereby improving vertical jump performance and other explosive actions such as sprinting and rapid changes of direction.

Third, hydration strategies should be considered an essential component of performance optimization in basketball. Ensuring adequate hydration before, during, and after training sessions and competitions may help maintain total body water levels, support neuromuscular function, and preserve explosive power capacity. Coaches and support staff are encouraged to implement hydration monitoring protocols, particularly during periods of high training load or competition density.

Fourth, the combined use of body composition indicators and field-based explosive power tests (such as squat jump and countermovement jump) is recommended for talent identification and player profiling. This integrated approach allows for a more comprehensive evaluation of physical potential than performance tests alone, particularly when distinguishing between players with similar technical skills.

Finally, strength and conditioning programs should be individualized according to each player's body composition profile. Athletes presenting higher fat mass may benefit from interventions emphasizing metabolic conditioning and body mass optimization, whereas players with adequate body composition but lower explosive power may require greater focus on neuromuscular and plyometric training.

Overall, applying these recommendations in a systematic and evidence-based manner may contribute to improving explosive performance, optimizing physical preparation, and supporting long-term athletic development in basketball players.

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