

The Correlation Between Physical Composition and Smash Proficiency in Badminton Players at MAN Pangkep

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Abstract

Objective. To ascertain the association between physical structure and smashing capability.

sports. This research is a qualitative descriptive study.

Materials and Methods. The study population comprised all MAN students. Pangkep possesses 47 badminton players. The sample for this study comprised 30 participants selected by the Simple Random Sampling methodology utilizing the lottery method.

Results. A substantial correlation exists between multiple physical variables and smash capability in badminton. The criteria encompass height, arm length, leg length, chest circumference, thigh circumference, and weight. All of these criteria substantially influence a player's capacity to execute a successful smash.

Conclusion. This study concludes that there is a significant relationship between body structure (height, arm length, leg length, chest circumference, thigh circumference, and body weight) with smash ability in MAN Pangkep badminton players. Good body structure contributes positively to the effectiveness of smash strokes.

Keywords : Body Structure, Smash Ability, Badminton Player, MAN Pangkep Students

Introduction

Subarkah and Marani, 2020 Badminton necessitates exceptional physical capabilities. The movement pattern in badminton necessitates speed, strength, explosive power, endurance, flexibility, balance, coordination, and height, complemented with tactical acumen to execute assaults that challenge opponents and secure points. This physical condition will enhance fundamental technical skills in badminton. Kinasih et al. (2021)

According to James Poole (Rahman et al., 2021), badminton encompasses several fundamental skills, including serve, netting, drive, lob, and smash. The fundamental techniques mentioned can be executed from above the head, the side of the body, and below. The overhead strokes comprise lob strokes and smash strokes. Among the fundamental techniques of overhead strokes mentioned, the primary subject of this study is the smash stroke.

Mansur et al. (2020) Upon thorough observation, the smash stroke in badminton consists of rapid and forceful motions, indicating that: "The smash stroke represents a

player's ability to secure points in a match." Moreover, Setiawan et al. (2024) asserted that whereas other strokes may be employed to deceive the opponent, compromise their position, or expand their playing area, the smash stroke is designed to forcefully direct the ball into the opponent's court.

Phomsoupha and Laffaye, 2015 To enhance the efficacy of smash strokes in badminton, it is essential to focus on the mechanics of the smash stroke movement. The smash stroke movement is mostly influenced by the upper limbs, hence the physical attributes examined in this study include height, arm length, leg length, chest circumference, thigh circumference, and weight. It is anticipated that the body's height structure will facilitate the capacity to deliver powerful strikes.

The optimal or standard height is a crucial factor for success in badminton, particularly in executing smash strokes. An excellent physique is typically characterized by an athletic build and favorable physical attributes. (Hidayat et al., 2024) This aligns with Waluyo's (2012) assertion that individuals with a tall and robust body typically exhibit athletic capabilities, including strength, speed, cardiovascular endurance, and muscular endurance, among others. An optimal height will facilitate an elevated reach and the requisite strength to execute a powerful smash deep into the opponent's court.

Sajoto (Kuswoyo & Betaubun, 2019) defines strength as a component of physical condition that pertains to a player's capacity to utilize their muscles to bear a burden throughout exertion. The strength of arm muscles is a physical attribute that must be cultivated to meet the demands of the smash movement. The power of arm muscles will ensure a stable drive of the shuttlecock, facilitating precise and steep smashes directed towards the opponent's court. If arm muscular strength is inadequate, it results in insufficient thrust on the shuttlecock, leading to smashes that are weaker, slower, and less precise.

Materials and Methods

Study Participants

Sugiyono, 2012 The study population comprised 47 badminton-playing students from MAN Pangkep. The sample for this study comprised 30 participants selected by the Simple Random Sampling methodology utilizing the lottery method. (Sugiyono, 2017).

Study organization

This research use the "Descriptive" research method utilizing regression tools to examine the contributions between variables. and another, the regression research design used is the "Regression Model", as follows: (Arikunto, 2010) .

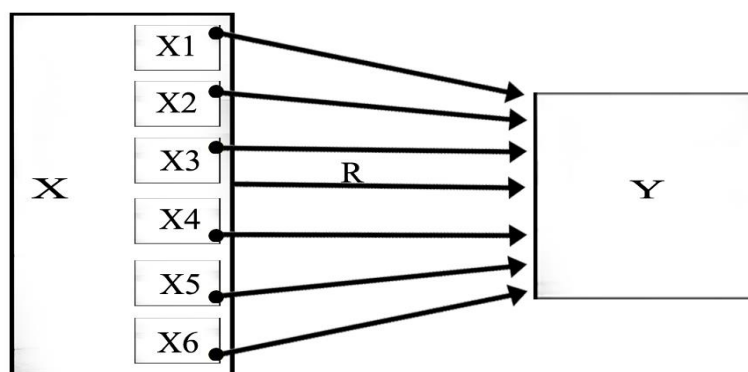


Figure 1. Research Design

Description: Body Structure

X = Body structure

X1 = Height

X2 = Arm length

X3 = Leg length

X4 = Chest circumference

X5 = Thigh circumference

X6 = Body weight

Y = Smashing ability

R = Combination of X1, X2, X3, X4, X5, and X6 against Y

statistical analysis

This study's hypothesis will be evaluated using empirical data collected in the field. The data will undergo analysis through descriptive statistics providing an overview (mean, standard deviation, variance, maximum, and minimum values) and inferential statistics employing Spearman correlation methods to evaluate the hypothesis. Kolmogorov-Smirnov tests were conducted to assess data normality. All data analyses were conducted utilizing the SPSS software.

Results

An overarching overview of the research data. A descriptive analysis was performed on data about height, arm length, leg length, chest circumference, thigh circumference, weight, and

smash stroke proficiency in badminton. Descriptive analysis encompasses total value, average, range, maximum, and minimum. This statistical data is anticipated to yield a comprehensive overview of height, arm length, leg length, chest circumference, thigh circumference, weight, and smash stroke proficiency in badminton. The outcomes of the descriptive analysis for each variable in this study are presented in Table 1.

Table 1. Results Analysis Height, Arm Length, Leg Length , Chest Circumference , Thigh Circumference, Weight and Smashing Ability in Badminton Games .

Variables	N	R span	Mini mall	Maximum	Average	S. Devi asi
TB	30	16.00	158.00	174.00	166,0667	4.46390
PL	30	11.00	67.00	78.00	72,1333	3.00268
PT	30	10.00	80.00	90.00	84,4000	2.79901
LD	30	11.00	69.00	80.00	74,0333	2.88257
LP	30	5.00	45.00	50.00	47,2333	1,30472
BD	30	5.00	47.00	52.00	49,2667	1,20153
KPS	30	15.00	3	15	10,1000	3.56564

(source: spss 15 data processing)

Information :

TB : Height **LD** : Chest Circumference
PL : Arm Length **BD** : Body Weight
PT : Leg Length **KPS** : Smash Punching Ability
LP : Thigh Circle

Table 1 presents data on height, arm length, leg length, chest circumference, thigh circumference, body weight, and badminton smashing ability, from which the following conclusions can be drawn:

- 1) Height: average 166.0667, standard deviation 4.46390, minimum 158.00, maximum 174.00, range 16.00.
- 2) Long arm had an average of 72.1333, a standard deviation of 3.00268, a minimum of 67.00, a maximum of 78.00, and a range of 11.00.
- 3) Leg length: average 84.4000, standard deviation 2.79901, minimum 80.00, maximum 90.00, range 10.00.
- 4) Chest circumference: average 74.0333, standard deviation 2.88257, minimum 69.00, maximum 80.00, range 11.00.

- 5) Thigh circumference measurements yielded an average of 47.2333, a standard deviation of 1.30472, a minimum of 45.00, a maximum of 50.00, and a range of 5.00.
- 6) Body weight recorded: average 49.2667, standard deviation 1.20153, minimum 47.00, maximum 52.00, range 5.00.
- 7) The acquired smash striking capability has an average of 10.1000, a standard deviation of 3.56564, a minimum of 3, a maximum of 18, and a range of 15.00. Results of descriptive data analysis The above is just a general description of the data on height, arm length, leg length, chest circumference, thigh circumference, weight and smash ability in badminton . The above data does not yet describe how the research variables are related or interconnected . To prove whether there is a significant relationship between the independent variables, namely height, arm length, leg length, chest circumference, thigh circumference, weight and smash ability in badminton , further testing is needed, namely by testing the normality of the data.

Discussion

A theoretical elucidation of the theories and frameworks underpinning this research is required in response to the outcomes of data analysis employing statistical methodologies.

- 1) The statistical research results indicate a substantial association between height and the ability to execute a smash in badminton. The findings of this study substantiate and reinforce prior theories and research when aligned with the foundational framework. The effectiveness of smash motions in badminton is influenced by the height attained during the execution of the motion. Students of sufficient height will be capable of executing a smash in badminton with ease. Height is an anthropometric factor that influences students' limb utilization during physical activities, hence enhancing overall playing ability. Height will also influence the capacity of the arms to augment speed. The findings of the second hypothesis test indicate a correlation between the arm length of Man Pangkep pupils and their proficiency in executing a smash in badminton. Height is crucial in the smash movement, as pupils must be capable of reaching the shuttlecock in both a suspended position and while preparing to strike it.
- 2) The statistical analysis results indicate that arm length significantly influences the ability to execute a smash in badminton. The findings of this study substantiate and

reinforce prior theories and research when aligned with the foundational framework. The length of the arm facilitates the execution of a smash in badminton when analyzing the motion involved in the smashing technique. In badminton, students with elongated arms can execute a smash rapidly. The structure of the body is crucial for overall health enhancement. The length of an arm is a physical attribute that influences a student's capacity to swiftly retrieve the shuttlecock during activity. The length of one's arm also influences the potency of the shot. The length of the arm is crucial in the smashing technique, as it enables trainees to grasp swiftly for a precise and rapid shot. Every pupil must possess this skill, particularly while executing a smash. The development of arm length is essential as it contributes to the velocity of shuttlecock retrieval. For optimal bodily function, the interrelation of arm length is essential to enhance mobility. Consequently, an incisive and rapid smash can be attained by the proper utilization of arm length. Moreover, a direct smash to the opponent's court must be executed swiftly to yield an unforeseen impact. Extended arms will enhance the velocity of seizing the shuttlecock during rapid smashes directed at the opponent's territory. The findings of the third hypothesis test indicate a substantial link between the leg length of Man Pangkep pupils and their badminton smashing skill.

- 3) The statistical research results indicated a substantial association between leg length and smash proficiency in badminton. The findings of this study fundamentally corroborate and reinforce prior theories and research when connected to the foundational framework. The smash movement pattern is predicated on the associated motion, hence the leg length factor enhances the smash in badminton. Students with long legs can swiftly spring and seize the shuttlecock during the smash maneuver. Leg length is a characteristic that signifies a body structure capable of rapid movement, hence optimizing spatial utilization. Students capable of swiftly retrieving the shuttlecock possess adequate leg length. Consequently, leg length will significantly enhance smashing capability.
- 4) The statistical analysis results indicate a substantial association between chest circumference and the ability to execute a smash in badminton. The findings of this study substantiate and reinforce prior theories and research in relation to the foundational framework. The chest circle component enhances the capacity to

execute a smash in badminton while analyzing the motion process of smash movements.

- 5) Students with an optimal chest circumference will find it simpler to execute an accurate and powerful smash in badminton. Chest circumference is a crucial anthropometric parameter that enhances arm mobility, enabling precise and powerful smashes. Chest circumference also influences students' limb functionality during tasks. Furthermore, chest circumference will encompass the capacity of the arms to direct the shuttlecock towards the opponent's territory. Chest circumference plays a crucial role in the smash movement, as pupils must direct the shuttlecock in a poised and elevated position to execute an accurate and forceful smash. Every pupil must possess this condition, particularly when executing a smash.
- 6) The statistical analysis results indicate a substantial association between thigh circumference and the ability to execute a smash in badminton. The findings of this study substantiate and reinforce prior theories and research in relation to the foundational framework. Students with substantial thigh circumference can effectively execute a smash in badminton by analyzing the mechanics of the smash motion involved. Thigh circumference is a crucial aspect of body composition that enhances endurance in jumping, stability during landing, and precision in executing sharp smashes, hence improving students' limb functionality during physical activities. Moreover, thigh circumference influences students' leg capability to jump and strike the shuttlecock towards the opponent's territory. The significance of thigh breadth is paramount in the smash movement, as pupils must possess the stamina and balance to leap and reach the shuttlecock while maintaining a ready position and a suspended posture for an accurate and precise smash. Every student must fulfill this requirement, particularly while executing a smash.
- 7) The statistical research results indicate a substantial association between body weight and the ability to execute a smash in badminton. The findings of this study substantiate and reinforce prior theories and research in relation to the foundational framework. The effectiveness of smash actions in badminton is contingent upon the motion process, wherein proper body weight significantly enhances the capacity to execute a smash. In badminton, pupils with optimal body weight will find it easier to execute a jump during a smash. Body weight is a

factor of body composition that influences students' capacity to utilize their physique during jumping activities. Body weight also influences the jumping velocity required to strike the shuttlecock towards the opponent's territory. The significance of body weight is important for the smash movement, as pupils must swiftly jump to intercept the shuttlecock while maintaining a poised stance for an effective smash. Every pupil must possess this condition, particularly when executing a smash.

Conclusion

This study concludes that there is a significant relationship between body structure (height, arm length, leg length, chest circumference, thigh circumference, and body weight) and smash ability among badminton players at MAN Pangkep. Struktur tubuh yang optimal berkontribusi secara positif terhadap efektivitas pukulan smash

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