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by Musamus Journal Of Physical Education And Sport (mjpes)

Submission date: 23-May-2025 06:50AM (UTC+0530)
Submission ID: 2682619157
File name: Final_Article_Feri.pdf (1.18M)
Word count: 3007
Character count: 14594

Unusamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 7, No. 1, January 2025, Pg. 426-433
DOI: 10.35724/mjpes.v7i1.7050

Relationship between Height, Arm Muscle Strength, Balance, and Hand Eye Coordination to the Accuracy of Petanque Shooting Results of *Club Rop* Sorop Are Sumenep Athletes

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Abstract

Objective. This study aims to determine the relationship between height, arm muscle strength, balance, and hand-eye coordination on the accuracy of shooting results in petanque athletes at Club ROP SOROP Are, Sumenep Regency.

Materials and Methods. The research method used is quantitative with a descriptive correlational analysis approach. The research population consisted of 15 athletes of Club ROP SOROP Are Petanque, Sumenep Regency, all of whom were sampled using total sampling techniques. Data analysis was carried out using correlation tests and coefficients of determination to see the relationship between independent variables and dependent variables.

Results. The results of the study showed a significant relationship between height and shooting accuracy ($p = 0.047 < 0.05$) with a coefficient of determination of 2.71%. No significant relationship was found between arm muscle strength and shooting accuracy ($p = 0.112 > 0.05$; $R^2 = 1.83\%$) or between balance and shooting accuracy ($p = 0.131 > 0.05$; $R^2 = 1.66\%$). Meanwhile, hand-eye coordination had a very significant relationship with shooting accuracy ($p = 0.000 < 0.05$) with a coefficient of determination of 8.51%. Simultaneously, the variables of height, arm muscle strength, balance, and hand-eye coordination had a significant effect on shooting accuracy ($p = 0.000 < 0.05$).

Conclusion. The conclusion of this study is that height and hand-eye coordination have a significant influence on the accuracy of shooting results in petanque athletes. In addition, the combination of the four physical variables together contributes significantly to the shooting performance of Club ROP SOROP Are athletes, Sumenep Regency.

Keywords : Height, Arm Muscle Strength, Balance, Hand Eye Coordination, Shooting Results , and Petanque .

Introduction

Physical elements are one of the main requirements in improving sports achievement (Hanief & Purnomo, 2019). According to (Nurhidayah & Graha, 2017) although each sport has a dominant physical element, participants usually receive training in all physical components to strengthen the sport, Athletes must prepare themselves psychologically, technically, strategically, and physically, in order to achieve their goals. The physical conditions of the *petanque sport* according to (Hanief & Purnomo, 2019) are as follows; height posture, coordination and focus between the eyes and hands, arm muscle strength,

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hand squeeze, and wrists must have good flexibility, arm and palm length, and the last is balance.

In *petanque* there are 2 playing techniques, namely *shooting* and *pointing* . *Pointing is* a way to throw the bosi close to the boka. *Shooting* is to move the opponent's bosi away from the boka by aiming at the opponent's bosi and pushing it far. To direct the iron ball (bosi) to the target, it is necessary to use arm muscle strength, hand-eye coordination, wrist flexibility, and balance (Hanief & Purnomo, 2019). These factors can affect the accuracy of athletes in *shooting* . In addition, another factor is height.

According to the results of observations on Sumenep *petanque athletes* . Researchers observed that there were weaknesses in athletes when throwing the ball, namely height factors, lack of swing, balance and lack of accuracy in directing the ball to the target. So in this case the researcher wants to know "The Relationship Between Height, Arm Muscle Strength, Balance, and Hand Eye Coordination to the Accuracy of *Petanque* Sports *Shooting Results for Club Rop SOROP Are* Sumenep Athletes "

Materials and Methods

Study Participants.

This study involved 15 participants who were all athletes from the Petanque Club ROP SOROP Are, Sumenep Regency. The sampling technique used was total sampling, namely all members of the population (15 athletes) were used as research samples.

Study organization.

This study uses a quantitative method with a descriptive correlational analysis approach to determine the relationship between independent variables (height, arm muscle strength, balance, and hand-eye coordination) with the dependent variable (shooting accuracy). Data were collected to describe how these physical factors relate to the shooting accuracy of petanque athletes.

statistical analysis

Data analysis using descriptive correlation analysis method which aims to describe and measure the strength of the relationship between independent variables and dependent variables (Sugiyono, 2009). The correlation coefficient is calculated using the following formula (Arikunto, 2010) .

$$r = \frac{n\sum XY - (\sum X)(\sum Y)}{\sqrt{[n\sum X^2 - (\sum X)^2][n\sum Y^2 - (\sum Y)^2]}}$$

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Information:

rrr = correlation coefficient between variables X and Y

∑XY\sum XY∑XY = sum of the multiplication of item score X with item score Y

∑X\sum X∑X = sum of scores of variable X

∑Y\sum Y∑Y = sum of scores of variable Y

nnn = number of subjects

The independent variables in this study were height, arm muscle strength, balance, and hand-eye coordination, while the dependent variable was the accuracy of the shooting results.

Results

Data from the results of height tests, arm muscle strength, balance, hand-eye coordination, and shooting results of petanque athletes from Club ROP SOROP Are Sumenep are shown in **Table 1.** Research Description

No	Variables	N	Min	Max	Mean	SD	Variance
1	Height	15	150	167	159.00	5,099	26,000
2	Arm muscle strength	15	24	42	31.40	5,369	28,829
3	Balance	15	22.48	120.05	58.7133	31.85347	1014.644
4	Hand eye coordination	15	6	26	17.07	6.239	38,924
5	Shooting	15	10	34	21.53	7.120	50,695

The research data description shows:

1. The height of athletes ranges from 150 cm to 167 cm with an average of 159 cm.
2. Arm muscle strength (number of push-ups in 60 seconds) ranged from 24 to 42 with an average of 31.40.
3. Balance (sustaining time on the standing stork test) ranged from 22.48 seconds to 120.05 seconds with an average of 58.71 seconds.
4. Hand-eye coordination (throwing and catching the ball) ranged from 6 to 26 with an average of 17.07.
5. Shooting accuracy ranged from 10 to 34 with an average of 21.53.

Data Prerequisites

1. Normality Test

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The purpose of the normality test is to determine whether the independent and dependent variable data are normally distributed. Data is considered normal if the significance value is > 0.05. The results are presented in the table below.

Table 2. Normality Test

No	Variables	Asymp.Sig	Status
1	Height	0.490	Normal
2	Arm muscle strength	0.574	Normal
3	Balance	0.060	Normal
4	Hand eye coordination	0.523	Normal

All independent variables are normally distributed because the significance value is > 0.05.

2. Linearity Test

The linearity test aims to determine whether the relationship between the independent variable and the dependent variable is linear. The results are in the table below.

Table 3. Linearity Test.

No	Variables	Sig. Value	α = 0.05	Information
1	X1Y	0.108	0.05	Linear
2	X2Y	0.341	0.05	Linear
3	X3Y	0.522	0.05	Linear
4	X4Y	0.892	0.05	Linear

All independent variables have a linear relationship with the shooting accuracy variable.

3. Hypothesis Test (Correlation Test)

The correlation coefficient is calculated by the product moment test. If the significance value is <0.05 then there is a significant relationship. The results are in the table below.

Table 4. Correlation Test.

No	Variables	Sig Value	Coefficient of Determination
1	Height	0.012	35.3%
2	Arm muscle strength	0.012	34.7%
3	Balance	0.100	13.3%
4	Hand eye coordination	0,000	59.8%

Discussion of Results

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1. Height (X1) has a significant relationship with shooting accuracy (Y), with a significance value of 0.012 < 0.05 and a determination coefficient of 35.3%.
2. Arm muscle strength (X2) also has a significant relationship with shooting accuracy, with a significance value of 0.012 < 0.05 and a determination coefficient of 34.7%.
3. Balance (X3) does not have a significant relationship with shooting accuracy because the significance value is 0.100 > 0.05.
4. Hand-eye coordination (X4) has a very significant relationship with shooting accuracy, with a significance value of 0.000 < 0.05 and a determination coefficient of 59.8%.

These results indicate that height and hand-eye coordination play an important role in the accuracy of petanque shooting results for athletes from Club ROP SOROP Are, Sumenep Regency.

Discussion

This study aims to examine the relationship between anthropometric variables and motor skills—namely height, arm muscle strength, balance, and eye-hand coordination—with shooting accuracy in petanque sports in FOPI Sumenep athletes. The findings in this study will be discussed based on the results of the analysis and their relevance to previous studies.

Descriptive analysis (Table 1) showed that the sample of 15 athletes had moderate variation in all measured variables, with hand-eye coordination and shooting accuracy showing relatively high standard deviations. This indicates that there are quite striking differences between individuals. Normality and linearity tests showed that all independent variables (height, arm muscle strength, balance, and hand-eye coordination) were normally distributed and had a linear relationship with the dependent variable (shooting accuracy), thus meeting the assumptions for parametric analysis.

Correlation analysis showed that there was a significant positive relationship between height and shooting accuracy ($p = 0.012$), with a coefficient of determination (R^2) of 35.3%. This suggests that athletes with taller body postures may have biomechanical advantages in shooting, such as better leverage or wider field of vision. This finding is in line with the results of a study by Aisyah et al. (2020) which showed that height had a significant effect on shooting performance in petanque sports in athletes from the ANOA Kendari club.

Similarly, arm muscle strength showed a significant relationship with shooting accuracy ($p = 0.012$, $R^2 = 34.7\%$). This finding supports the results of the study by Alpen

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(2023), which found that arm muscle strength had a significant relationship with shooting results in petanque athletes at UIR. This suggests that physical strength, especially in the arms, plays a role in the stability and control of power needed for accurate throwing.

In contrast, balance did not show a significant relationship with shooting accuracy ($p = 0.100$). Although the average balance score was quite high, it did not appear to have a significant effect on shooting results in this sample. This finding is contrary to previous research by Mudhalifa (2018), which showed a significant relationship between balance and shooting performance in petanque. One possible reason for this is that balance may not be a major differentiating factor in this group of athletes, or that the variation in balance ability among participants was too small to affect the results. According to Andika (2019), poor balance can cause body instability and affect the direction of the throw; however, this did not appear to be the case in this study.

The strongest relationship was found between eye-hand coordination and shooting accuracy ($p = 0.000$, $R^2 = 59.8\%$), indicating that this variable plays a central role in determining performance. This finding is in line with the results of a study by Sani & Hulfian (2022), which showed a strong correlation between eye-hand coordination and shooting accuracy in petanque at the MBC Club. Good eye-hand coordination is essential in petanque because it improves timing and spatial accuracy, allowing athletes to throw more precisely.

Overall, these findings suggest that height and hand-eye coordination are significant predictors of shooting accuracy in petanque, while arm muscle strength also makes a significant contribution. However, balance did not show a significant relationship, which may be due to contextual factors or specific characteristics of the sample. These results emphasize the importance of specific physical and coordinative training to improve petanque performance, especially with a focus on strengthening arm muscles and improving hand-eye coordination.

Conclusions

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1. There is a positive and significant relationship between the height variable and the accuracy of the petanque shooting results of *the SOROP Are Sumenep Club Rop* athletes . With a significance value of 0.012 <0.05 with a coefficient of determination of 35.3%.
2. There is a positive and significant relationship between the arm muscle strength variable and the accuracy of the petanque shooting results of the *SOROP Are Sumenep Club Rop* athletes . With a value of significance 0.012 < 0.05 with a determination coefficient of 34.7% .
3. There is no positive and significant relationship between the balance variable and the accuracy of the petanque shooting results of *the SOROP Are Sumenep Club Rop* athletes . With a significance value of 0.100> 0.05 with a determination coefficient of 13.3%.
4. There is a positive and significant relationship between the hand-eye coordination variable and the accuracy of the petanque shooting results of *the SOROP Are Sumenep Club Rop* athletes . With a significance value of 0.000 <0.05 with a determination coefficient of 59.8%.
5. There is a positive and significant relationship between the variables of height, arm muscle strength, balance, and hand-eye coordination on the accuracy of the *shooting results of the petanque* sport *of the SOROP Are Sumenep Club Rop* athletes . With a significance value of 0.014 <0.05 with a coefficient of determination of 55.8%.

References

Aisyah, Siti, Sawali, L., & Saman, A. (2020). *Relationship between Height and Shooting Accuracy in Petanque Games at ANOA Club, Kendari City* . *2* (2), 105–116. http://ojs.uho.ac.id/index.php/Penjaskesrek/article/download/14000/pdf

Alpen, J. (2023). Relationship of Arm Muscle Strength to Shooting Accuracy at Petanque Uir UKM. *Dharmas Education Journal (DE_Journal)* , *4* (2), 588–594. https://doi.org/10.56667/dejournal.v4i2.1122

Arikunto .S. (2010). *Research Procedures: A Practical Approach* . Jakarta: Rineka Cipta

Hanief, YN, & Purnomo, AMI (2019). Petanque: What are the physical factors that determine his achievements? [Petanque: What are the physical factors that determine his achievements?]. *Jurnal Keolahragaan* , *7* (2), 116–125.

M. Andika. (2019). The Relationship between Dynamic Balance and the Accuracy of 8 Meter Shooting Throws in Athletes at the Jakarta State University, Faculty of Sports Science,

Petanque Club. *Journal of Sports Science, Jakarta State University* , *1* (1), 1–10.

Mudhalifa. (2018). The Relationship of Arm Muscle Strength, Eye-Hand Coordination and Balance to Shooting Accuracy in Petanque Sports in Athletes. *Simki-Techsain* , *02* (04), 3–10. http://simki.unpkediri.ac.id/mahasiswa/file_artikel/2018/eb423450b8723201a961bebdc089d336.pdf

Nurhidayah, D., & Graha, AS (2017). Physical Condition Profile of Athletes of the Yogyakarta State University Pencak Silat Student Activity Unit in the Competition Category. *Medikora* , *16* (1), 1–16. https://doi.org/10.21831/medikora.v16i1.23475

Sani, A., & Hulfian, L. (2022). Relationship Between Arm Muscle Strength and Hand Eye Coordination with Shooting Accuracy in Petanque Sports at MBC (Masbagik Bocce Club). *ארץ*, *6* (8.5.2017), 2003–2005. https://dataindonesia.id/sektor-riil/detail/angka-konsumsi-ikan-ri-naik-jadi-5648-kgkapita-pada-2022

Sugiyono. (2009). *Quantitative, Qualitative, and R&D Research Methods* . Bandung: ALFABETA.

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