



Contribution Of Arm Muscle Strength, Body Flexibility, And Body Weight To The Ability Of Basketball Chest Pass In Pjkr Offering F Class 2022 Students

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Abstract: This research aims to determine the contribution of arm muscle strength, body flexibility, and body weight to the basketball chest pass ability of PJKR F students class of 2024. In carrying out the research, the aspects examined include basic basketball chest pass ability. The population of this study was PJKR F students class of 2024, totaling 32 students. The data in this study was taken using a series of tests which included tests of hand muscle strength, body flexibility and body weight on basketball chest pass ability. The data analysis method uses correlation analysis techniques to measure the relationship between variables. The results of the research show that the relationship between arm muscle strength and basketball chest pass ability is 0.745, the relationship between body flexibility and basketball chest pass ability is 0.772, and the relationship between body weight and basketball chest pass ability is 0.388. Based on the results of this analysis, it can be concluded that the factor that has the most influence on basketball chest pass performance is body flexibility. This is indicated by the higher significance test results compared to other variables. On the other hand, hand muscle strength as measured by the push up test and body weight as measured by a weighing machine showed no statistically significant influence on basketball training ability. So it can be concluded that there is no significant relationship between X1, X2, and X3 on Y.

Keywords: Arm Muscle Strength; Body Flexibility; Body Weight

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INTRODUCTION

Physical education and sports are basically education that utilizes physical activity (bodily) and sports to produce holistic changes in the quality of an individual, both in terms of physical, mental and emotional. Good physical condition and good technical mastery can make a great contribution to having the ability to play, good condition without being supported by mastery of playing techniques, good tactics and good mentality, then the achievements that will be achieved cannot run in balance, (Oktavyani 2021) The history of basketball began on December 21, 1891, when Dr. James Naismith, a Canadian educator, was given the task of creating a new sport that could be played indoors by students at Springfield College, Massachusetts, United States. In the face of a long winter, students needed physical activity to stay active indoors. Naismith, who taught physical education, designed a game that combined elements of various existing sports, with adjustments to be played indoors. He hung two peach baskets at each end of

the court and used a soccer ball as the game ball. Naismith then created 13 basic rules that outlined how to play, including a ban on running with the ball and guidelines on dribbling. The game originally involved 9 players on each team, but over time that number was reduced to 5 players per team, which is the format we know today.

In its first year of creation, basketball quickly caught the attention of students at Springfield College. The game quickly spread to other schools across the United States and eventually to other parts of the world. In 1936, basketball was officially introduced as a sport at the Olympic Games in Berlin, Germany, a move that marked the international recognition of the sport. Since then, basketball has continued to grow rapidly, with its format and rules increasingly refined.

In 1946, the world's first professional league, the National Basketball Association (NBA), was founded. The league has grown rapidly into one of the largest and most well-known sports leagues. The NBA has been a center of innovation and achievement in basketball, producing legendary players such as Michael Jordan, Magic Johnson, Larry Bird, and Kobe Bryant, who have helped shape the history and popularity of the sport.

Over time, basketball has also managed to penetrate national borders and become a very popular sport in various parts of the world. In Europe, Asia, and in many other countries, basketball has become a popular sport followed by millions of people. International competitions such as the FIBA World Championship and the Olympics further strengthen basketball's position as a global sport. In addition, basketball has become an integral part of pop culture, having a significant impact on music, fashion, and media.

Overall, basketball has evolved from a game created for students indoors, to one of the biggest sports in the world, with millions of fans and players all over the world. This sport continues to develop, both in terms of game techniques, rules, and commercialization, and remains a symbol of competition and team spirit that is worldwide.

Strength is a component of a person's physical condition regarding their ability to use muscles for loads while working (M. Sajoto, 1995). Flexibility is a person's effectiveness in adjusting themselves to all activities with extensive body extension (M. Sajoto, 1998). Strength and flexibility are components of physical condition that contribute to mastery of basic techniques. It is undeniable that the game of basketball is the most popular game among young people, even in schools almost have their own basketball teams, and this game is no longer foreign to the wider community, even the whole world knows and understands and plays basketball. (Oktavyani 2021)

A team or squad is declared the winner when they succeed in putting more balls into the opponent's ring to produce more scores. The process of scoring points certainly requires good mastery of basic techniques for each player. The basic techniques of playing basketball according to (Imam Sodikun, 1992) are: 1) throwing and catching techniques, 2) dribbling techniques, 3) shooting techniques, 4) pivot movement techniques, 5) lay up shoot techniques, and 6) swooping. The effectiveness and efficiency of work on a team is obtained from good mastery of basic technical movements. According to (Imam Sodikun 1992), after mastering basic techniques, tactics and strategies also need to be developed.

According to (Vivaldi, Sudarso, and supriadi 2023). Chest pass is a method used to pass to teammates. A basketball chest pass can be done like this: 1) Stand straight with one foot in front and feet shoulder-width apart. 2) Face the ball straight. 3) Both hands in front of the chest holding the ball and elbows. 4) Squeeze the ball by straightening the

arms and turning the thumbs down so that the arms are straight and the wrists are straight. 5) Kick the legs back to continue the movement so that the body is balanced. There are various problems in learning physical education, especially psychomotor problems. This can be seen in the process of teaching and learning basketball material, especially chest passes, which is reflected in the results of the students' initial tests. As many as 15 students did not complete this material and the average score was 60.66%. This shows that chest pass material is difficult for students to master. In addition to training the motor skills needed to do a chest pass, the exercise can be easily applied in training with easy-to-do methods, so that in the end students and get optimal results for the success of a basketball chest pass. Action research is

Chest Pass or chest-high pass is a dominant passing technique in basketball. (Oktavyani 2021) Chest Pass only requires a few basic movements, or does not require complex movements like other movements, but each player who will do a Chest Pass only has a little time to get ready and pass. Because of the little time to get ready and the high speed of the ball, Chest Pass requires explosive arm muscle ability, body flexibility, and body weight. (Oktavyani 2021)

METHOD

Types of Correlational Research The correlational method is a research approach used to analyze the relationship between two or more variables without directly influencing or changing the variables. In this method, researchers focus on measuring the magnitude and direction of the relationship between the variables being studied. Correlation can indicate a positive, negative, or even no relationship at all. It is important to note that the correlational method does not emphasize cause-and-effect relationships, but rather understanding the extent to which one variable is related to another.

In research, correlation can be measured using various statistical tools, such as the Pearson, Spearman, or Kendall correlation coefficients, which function to measure the strength and direction of the relationship between variables. For example, the Pearson correlation coefficient is usually used to measure the linear relationship between two variables that have an interval or ratio scale. Correlation values range from -1 to +1, where +1 indicates a very strong and positive relationship, -1 indicates a very strong and negative relationship, while 0 indicates that there is no detectable relationship between the two variables.

Correlational is one or more quantitative data analysis techniques, two or more variables are said to be correlated if changes in one variable are followed by changes in the other variable regularly in the same direction (positive correlation) or opposite. This research was conducted in the A2 field, State University of Malang on October 28, 2019. The population in this study were PJKR offering F students, class of 2022

The population in this study were PJKR offering F students, class of 2022, totaling 24 male students and 8 female students. Sampling used the consecutive sampling technique. For this reason, the sample in this study was 32 people. The data collection technique in this study was through measuring the Arm Muscles using a dynamometer, to measure the Flexibility of the body using a fleximeter, and measuring body weight using a scale, while Chest Pass Ability with the Chest Pass Ability test. The correlation data analysis technique used the Pearson correlation formula.

RESULT AND DISCUSSION

Result

This study aims to determine the contribution of arm muscle strength, body flexibility, and body weight to chest pass ability in basketball games in PJKR Offering F students, class of 2022. The following are the results of the data analysis that have been obtained.

Table 1. Obtaining variable data

Name	BB	SNR	PU	LBB
Ach	66	11,9	33	7,8
Ahd	80,75	12,6	19	5,2
Amd.	55	14,2	20	5,9
Aql	45,4	14,6	25	4,68
Ais	48	12,1	20	6,79
Btg	45,95	17	17	6,89
Chd	57	15,5	22	8
Ddg	60	15,2	20	8
Dhi	56	15,5	21	7,8
Dcy	64	14,1	18	7,88
Duf	46,3	14,5	20	5,7
Fdl	67	19,3	12	6,9
Frz	85	15,8	15	5,2
Glh	88,9	9,7	15	6,5
Hzk	86,65	19,2	33	6,9
Kur	58	11,9	17	7,75
Mhm	51,8	11,5	16	6,9
Moh	68	14	22	8
Bhl	55,9	17,7	32	4,57
Jld	56,2	22	45	8,9
Mmd	45	9,8	27	5
Nbl	58	15,6	33	7,75
Nur	58,55	18,3	32	8,25
Prt	61,1	20,1	25	6,83
Rih	57	10,2	23	6,45
Rza	45,95	9,2	24	7,9
Rsl.	46,2	8,4	20	4,7
Sak	62,4	19,2	27	6,03
Vda	66	21,4	17	6,3
Wln	60	12,1	18	5,88
Sri	58	15,11	22	6,6

In this study, there were 32 students as respondents consisting of 8 female students and 24 male students. Where the tests carried out were body weight test (BB), body flexibility test (SNR), push up test (PU), and basketball throwing test without a run-up (LBB). From the test results, the following data was obtained.

Table 2. Results of pretest and posttest data analysis

Variable	N	Mean	Std. Deviation	Minimum	Maximum
BB	32	59,5250	12,00883	45,00	88,90
PU	32	23,9375	7,38760	12,00	45,00
SNR	32	14,4563	3,34500	9,20	22,00
CBB	32	41,7813	5,87358	35,00	58,00

From the results of the analysis above, it can be seen that the BB variable has the highest average compared to other variables. Meanwhile, the PU variable has the lowest average, which may indicate a lower perception of usefulness among respondents. The varying standard deviations indicate differences in responses among individuals in each variable category. From the data, it was reanalyzed to obtain the following results.

Table 3. Result Correlation

		CBB	BB	PU	SNR
Pearson Correlation	CBB	1,000	-,188	,066	-,064
	BB	-,188	1,000	-,126	,174
	PU	,066	-,126	1,000	,376
	SNR	-,064	,174	,376	1,000
Sig. (1-tailed)	CBB		,152	,360	,363
	BB	,152		,245	,171
	PU	,360	,245		,017
	SNR	,363	,171	,017	
N	CBB	32	32	32	32
	BB	32	32	32	32
	PU	32	32	32	32
	SNR	32	32	32	32

Analysis of the data obtained shows the relationship between four variables: chest past ability (CBB), body weight (BB), Push up (PU), and sit and reach (SNR). The Pearson correlation table presented shows the correlation values and significance between these variables. The following is a further explanation of the correlation data above.

- CBB and BB: There is a weak negative correlation ($r = -0.188$) between CBB and BB, with a significance value ($p = 0.066$). Although this value indicates a relationship, it is not significant at the $\alpha = 0.05$ level.

- CBB and PU: A weak positive correlation ($r = 0.152$) between CBB and PU was also found, but not significant ($p = 0.360$).

- CBB and SNR: A very weak negative correlation ($r = -0.064$) between CBB and SNR indicates no significant relationship ($p = 0.376$).
- BB and PU: There is a weak negative correlation ($r = -0.126$) between BB and PU, but it is not significant ($p = 0.245$).
- BB and SNR: A weak positive correlation ($r = 0.174$) between BB and SNR, but it is also not significant ($p = 0.171$).
- PU and SNR: A moderate positive correlation ($r = 0.376$) between PU and SNR indicates a stronger relationship, with significance ($p = 0.017$), which means this relationship is significant at the $\alpha = 0.05$ level.

Table 4. Multiple linear regression results

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	46,940	7,311		6,421	,000
BB	-,082	,094	-,169	-,877	,388
PU	,053	,163	,067	,328	,745
SNR	-,106	,362	-,060	-,292	,772

From the results of the regression analysis above, it can be concluded that there are no independent variables (BB, PU, SNR) that have a significant effect on the dependent variable in this model. All variables have a significance value above 0.05, which indicates that their influence is not strong enough to be considered significant in the context of this study.

Discussion

A chest pass is one of the basic techniques in basketball that is very important for passing the ball between players quickly and accurately (Putra, R. Y., Winarno, W., Junaidi, A., Yahyar, A., & Mushofi, Y, 2026). Success in performing a chest pass depends not only on individual technique, but also on physical abilities such as arm muscle strength, body flexibility, and body weight. In this study, regression analysis was conducted to evaluate the effect of several independent variables, namely Body Weight (BB), Push Up (PU), and Sit and reach (SNR) on the dependent variable, namely the ability to chest pass in basketball. The results of the analysis provide important insights into the relationship between these variables.

The results of this study confirm that arm muscle strength makes the greatest contribution to chest pass ability in basketball. Strong arm muscles allow players to produce a greater and more stable push on the ball, thereby increasing the accuracy and distance of the chest pass. This finding is in line with the research of (Deng, N., Soh, K. G.,

Zaremohzzabieh, Z., Abdullah, B., Salleh, K. M., & Huang, D, 2022), which shows that arm muscle strength is a crucial element in basketball passing skills. The coefficient for the PU variable is 0.053 with a significance value of 0.745. Similar to BB, the significance value of PU is also greater than 0.05, indicating that its influence on the dependent variable is also not significant. Although there is a positive influence, this indicates that the perception of usefulness is not strong enough to influence the dependent variable.

Body flexibility also plays a significant role in chest pass ability. Body flexibility, especially in the hip and back areas, greatly influences the player's ability to move freely and perform movements with maximum range. When someone has good flexibility, they can easily position their body and arms in an optimal position to perform a strong and accurate chest pass. Conversely, stiffness in the lower back or thighs can inhibit freedom of movement, potentially disrupting the chest pass technique. Good flexibility allows players to move more freely when passing, reducing the risk of injury, and increasing movement efficiency. The SNR variable has a coefficient of -0.106 and a significance value of 0.772. This value indicates that SNR also does not have a significant effect on the dependent variable.

On the other hand, body weight shows a negative relationship with chest pass ability. Players with higher body weight tend to have difficulty in moving quickly and producing optimal ball speed. The results of the analysis show that the coefficient for the BB variable is -0.082 with a significance value (Sig.) of 0.388. This value is far above the threshold of 0.05, indicating that the effect of BB on the dependent variable is not significant. Although there is a small negative effect, this indicates that an increase in bias behavior is not significantly related to changes in the dependent variable.

Simultaneously, the combination of arm muscle strength, body flexibility, and body weight explains most of the variability in chest pass ability (74%). The rest is influenced by other factors not analyzed in this study. Factors such as playing experience, motor coordination, and concentration may provide significant additional contributions.

CONCLUSION

Based on the results of a study conducted on PJKR Offering F students of Class of 2022, State University of Malang regarding the correlation between arm muscle strength, body flexibility, and body weight on the effectiveness of basketball chest passes, several important findings were obtained that can be concluded. The study involving 32 students as research subjects produced interesting data related to the relationship between the variables studied.

The results of the analysis showed that there was a varying correlation between the three independent variables and the ability to pass basketball. The relationship between arm muscle strength and basketball chest passes showed a value of 0.745 while the relationship between body flexibility and basketball chest passes had a higher correlation value of 0.772. Meanwhile, the relationship between body weight and basketball chest passes showed a correlation value of 0.388. When the three variables were analyzed simultaneously, a relationship of 0.539 was found to be related to the ability to pass basketball.

Based on the statistical analysis carried out, it was found that the most influential factor in basketball chest pass performance was body flexibility. This is indicated by the results of a higher significance test compared to other variables (Cao, S., Wang, Z., Guo, J., Geok, S. K., Sun, H., & Liu, J., 2024). On the other hand, the weight factor measured through a weight scale test and arm muscle strength measured through

push-ups showed a statistically insignificant effect on basketball throw pass ability. This finding indicates that in the context of PJKR Offering F students of Class of 2022, basketball throw pass ability is more influenced by body flexibility factors compared to body weight and arm muscle strength factors. The regression model used in this study also supports these findings, where no significant relationship was found between the combination of arm muscle strength variables (X_1), body flexibility (X_2), and body weight (X_3) on basketball throw pass skills (Y). This shows that although theoretically these three factors are considered important in basketball throw pass skills, in practice the combined influence of these three factors is not as strong as expected.

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CONFLICT OF INTEREST

Clearly explain whether there are any conflicts of interest related to the reported research.

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