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DIFFERENCES IN FITNESS LEVEL OF STUDENTS STUDYING BASKETBALL AND VOLLEYBALL IN COMMUNICATION SCIENCE STUDY PROGRAM UPN "VETERAN" YOGYAKARTA BATCH 2023/2024

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ABSTRACT

The objectives of this study were: 1) Assess the effect of basketball and volleyball on physical fitness levels. 2) Comparing the level of physical fitness between female and male students. 3) Assess the difference in the effect of basketball and volleyball on improving the physical fitness of female students. 4) Assess the difference in the effect of basketball and volleyball on improving the physical fitness of male students. 5) Testing the interaction between sports (basketball and volleyball) and gender on the improvement of physical fitness. The study used experimental method with purposive random sampling of 6 students per group. Data analysis techniques include T test, normality test (Kolmogorov-Smirnov), and variance homogeneity test (Levene's Test). The results showed: 1) The basketball branch (mean 3.655833333) provides a better increase in physical fitness than the volleyball branch (mean 2.71666666) with a mean difference of 0.939166666. 2) Female students (mean 3,844166667) experienced a better increase in physical fitness than male students (mean 2,528333333) with a mean difference of 0,657916667. 3) Women's basketball (mean 4,686666667) provides a better increase in physical fitness than women's volleyball (mean 3,001666667) with a mean difference of 1.685. 4) Men's basketball (mean 2.625) showed a better improvement in physical fitness than men's volleyball (mean 2.431666667) with a mean difference of 0.193333333. 5) There is no significant interaction between sport and gender on the improvement of physical fitness, with the value of Fhitung (1.45530676) smaller than Ftabel (4.35) at the 5% significance level.

KEYWORDS physical fitness, basketball, volleyball

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INTRODUCTION

The development of science and technology has caused human lifestyles to change, which has resulted in a decrease in physical strength (Gula, 2024; He & Zhou, 2024; Permana et al., 2024). Many activities now involve machines, so people, including university students, move less (Lach et al., 2021). While education is important for careers, physical activities such as sports are still necessary to keep fit (Nur & Malik, 2021).

Physical education teaches norms and values in sports, which govern human movement in accordance with the rules of a particular sport (Widiyanto et al., 2024). Adherence to these rules is important to achieve the required movement skills (Morina et al., 2021). Experiences in physical education help students understand and conform to these norms and values.

According to Dini Rosdiani (2012: 64), the purpose of sports education is to form knowledge, attitudes, personality, and physical fitness. UPN "Veteran" Yogyakarta includes sports courses such as gymnastics, volleyball, basketball, basket ball, and soccer in its curriculum (Allsabah & Putra, 2023; Fagaras et al., 2024). Through these sports, students are expected to gain good physical fitness and understand the importance of sports (Coffey et al., 2021; Frączek et al., 2024). Sports courses are expected to help students create simple exercise programs and do sports regularly outside of lectures, so that they can maintain good physical fitness (Xiang et al., 2022).

Characteristics of Sports Education

From this formulation, there are three main things that determine the characteristics of sports education, namely: physical activity, games and hard work.

a. Physical activity

As the first characteristic, what is meant by physical activity is human activity that requires movement of the body or body. If we describe body movement as a change in the position of the body or body. If we describe body movement as a change in the position of the body or body parts in relation to the outside space, the question arises as to what kind of body movement characterizes the sport. There are countless everyday gestures, from laughing, eating, hoeing to continuing into the river from the cliff, all of which are gestures. There seems to be a need for restrictions in this regard. Physical activity in sports is a highly integrated activity, meaning that the movements performed are a large number of movements supported by most or all of the body's muscles. Movements must be the opposite of large muscle movements are movements done in hand skills such as sewing, writing, weaving. These are not called sports movements.

b. The game

It is a form of activity that is done by following certain rules, commonly called game rules. To be clear, play is usually compared to work. The person doing the work is called the player.

c. Hard work

Hard work is also called striving, hard work or striving is closely related to earnestness. (Dini Rosdiani, 2012: 76-78)

The Nature of Physical Fitness

Definition of Physical fitness, in general, what is meant by physical fitness is in general what is meant by physical fitness is physical fitness (Phycal Fitness), namely the ability of a person to do daily work efficiently without excessive fatigue so that they can still enjoy their free time.

Physical fitness viewed from the physiological aspect is a functional capacity to improve the quality of life (Fox, 1987: 6). In the context above, fitness means total fitness, while physical fitness is one part of total fitness.

According to sports physiologists, physical fitness is a person's capacity to perform work with minimal effort (Mangi, 1987: 11). Physical fitness also means the capacity to be able to adjust to grueling exercise and quickly recover from that fatigue.

According to Djoko Pekik Irianto (2004: 2) In general, what is meant by fitness is physical fitness, namely the ability of a person to do daily work efficiently without excessive fatigue so that they can still enjoy their free time. Fitness is classified into groups:

a. Static Fitness: the state of a person who is free from disease and defects or called healthy.

b. Dynamic: the ability of a person to work efficiently that does not require special skills, such as walking, running, jumping, lifting.

c. Motor fitness: a person's ability to work efficiently which requires special skills. A runner is required to have the correct running technique to win the race, a soccer player is required to run fast while dribbling, a volleyball player must be able to jump while turning the body to smash, and others.

Components of Physical Fitness

Physical fitness is the ability of a person's body to perform daily work tasks without causing significant fatigue. To be able to achieve an excellent physical fitness condition a person needs to do physical exercise that involves physical fitness components with the correct training method.

According to H Amrum Bustaman (2003: 273) In physical fitness there are components that are divided into three groups, namely:

a. Health-related physical fitness

The basic components are interconnected with each other: cardiovascular endurance, muscle strength, muscle endurance, flexibility and body composition (ideal body weight, fat percentage).

b. Skill-related physical fitness.

As for physical fitness related to motor skills, there are six components, namely: balance, explosive power, speed, agility, coordination, reaction speed.

c. Wellness-related physical fitness.

Wellness is defined as a dynamic and integrated level of organ function that is oriented towards maximizing potential that is dependent on self-responsibility. Wellness is seen as a state of not being sick.

Benefits of exercise on physical fitness

According to Djoko Pekik Irianto (2004: 9) exercise is one of the most effective and safe alternatives to obtain fitness because exercise has multiple benefits, including physical benefits of increasing physical fitness components, psychological benefits are more resistant to stress, more able to concentrate, and social benefits increase self-confidence and means of interaction.

Introduction to Basketball

The game of basketball is played by two teams of 5 players each with a maximum of 7 substitutes. The game takes place on a hard court, either open or closed. Teams aim to attack and get the ball into the opponent's basket while preventing the opponent from scoring points. The game involves three main technical elements: passing and catching, dribbling, and shooting. These techniques create various variations in the game, such as chest passing, overhead passing, and jump passes.

The pivot technique in basketball means holding the ball with one foot moving while the other foot remains as a fulcrum. Dribbling against the rules includes going too far or dribbling with both hands. Shooting techniques involve various elements such as feints, jumps, and blocks. Although there are many techniques to master, mastering the three basic technical elements-passing, dribbling, and shooting-is the essential foundation of playing basketball.

Improving Physical Fitness Through Volleyball Sports

According to Muhammad Muhyi Faruq (2009: 21) several fitness components are often encountered and needed in volleyball games are: Agility, balance, strength, coordination, cardiovascular endurance, flexibility and speed.

The seven components of fitness will be seen in the explanation of each component in relation to volleyball games and sports. Various forms of movement activities in volleyball games require the involvement of these components.

a. Agility

Volleyball games require high agility for optimal performance. Players must be agile to move and use hand agility to block the opponent's shots so that the ball does not cross the net.

In a volleyball game, players must actively move to anticipate the direction of the ball, especially when receiving a jump serve that is difficult to predict. Players must also be agile to pick up balls that are tipped by opponents and fall in hard-to-reach places. Playing volleyball regularly can improve player agility.

High-quality games are full of interesting variations of the game, especially the variations of the ball hitters or spikers who are near the net, but who jump from the spiker as many as 2 players, the agility of each player to outwit the obstacles of the opponent is very important for the acquisition of numbers in the game. (Muhammad Muhyi Faruq, 2009: 22)

b. Balance

Body balance in a volleyball game is necessary for almost all movement activities because without it it is impossible to play well. At the time of passing the ball where the ball comes quickly and hard from the opponent's side, the balance of the body supported by the position of the two legs that are slightly opened wide, the knees of both kai bent is absolutely necessary. With such a position, no matter how hard the ball is hit from a serve or smash, it can be received properly and keep the player in the right position. (Muhammad Muhyi Faruq, 2009: 24)

c. Strength

Strength is very important in the game of volleyball. Players need adequate strength to complete the game well, such as hitting or smashing the ball hard, which is difficult for the opponent to block. Spikers need strength not only to hit the ball, but also to jump high and stay in the air, allowing them to hit the ball well.

Serving in volleyball requires strength to make it difficult for the opponent to receive. A strong and hard serve makes it difficult for the opponent to return the ball perfectly. The serve is now considered part of the attack, often done with a jump (jump service), and is difficult to predict the fall.

Blocking the opponent by raising both hands straight up and both legs pushing the body slightly up into the air, the urge to raise the body into the air requires enormous strength from a player. To increase the strength of a player can be done by increasing the portion of exercise especially for arm strength, such as doing push ups, running small while carrying a friend. (Muhammad Muhyi Faruq, 2009: 28)

d. Coordination

Volleyball is a team game that requires good coordination between players. The spiker must coordinate with the passer in order to jump according to the height and speed of the ball feed. Without clear coordination, fast and hard smashes will not be successful.

Good coordination between the spiker and the feeder is essential, especially when using high-level game strategies. The feeder must deliver the pass as per the request of the players in positions three and four. Without proper coordination, players can collide or fail to jump, causing the ball to be hit poorly and giving points to the opposing team.

Players can practice using certain codes so that a feeder when giving the code to all the spikers in front can all know and what to do with the code, without such coordination it is impossible for the cooperation of all spikers to run well. (Muhammad Muhyi Faruq, 2009: 30)

e. Endurance

Volleyball games are decided by winning sessions from 1 to 25, not by time like soccer. Therefore, players must have excellent endurance to avoid fatigue before the game is over, as fatigue can lead to defeat. Endurance is an important key to physical fitness for all players, and to optimize it, specific exercises are required.

Some forms of physical exercise that help optimize good endurance are by doing running activities with a certain distance, a physical training schedule that is long enough so that players are accustomed to games that require a long time. No matter how good the playing technique is, no matter how good the strategy the team has, if their physical condition is weak, it will be difficult to finish the game with satisfying results. (Muhammad Muhyi Faruq, 2009: 32)

f. Flexibility

Volleyball players who smash need good body flexibility, because the ball feed from the passer is not always right with the player's jump. Sometimes, players have to bend their body to reach the ball which is in a difficult position.

To find out the level of body flexibility a player can measure his flexibility by using a tool called a flexibility meter. Some forms of exercise that can help shape a good body are by stretching well enough. This means that during stretching do not do it hastily and not carelessly. (Muhammad Muhyi Faruq, 2009: 34)

g. Speed.

Volleyball players going for a smash need speed. When the ball is fed short, about one ball above the net, the spiker must run quickly to get ahead of the ball and hit it. Hand speed is also very important when hitting the ball in the air, as delay can reduce the power and accuracy of the hit, making it easier for the opponent to return the ball.

Developing the speed ability of players, especially volleyball players, can be done by doing sprints at certain distances such as doing sprints with a distance of 30 meters, then doing sprints with a distance of 100 meters. This can be done repeatedly so that it can improve a player's speed ability. To measure how fast you

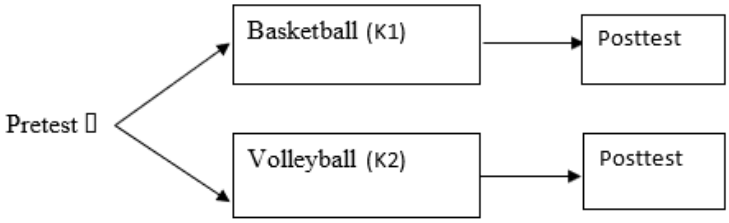
can use a stopwatch, so you will know how many seconds the running speed is. (Muhammad Muhyi Faruq, 2009: 35)

RESEARCH METHOD

Research Type or Design

This research is an experimental study that uses two treatment groups, group I basketball and group II volleyball. According to Suharsimi Arikunto (2006: 3) "Experiments are always carried out with the intention of seeing the effects of a treatment".

The research design used in this study is pre test and post test group.



Description:
Pretest

K_1K_1 : Experiment group 1

K_2K_2 : Experiment group 2

Treatment A : Basketball sport

Treatment B : Volleyball sport

Post test

Research Population and Sample

The population of this study were all students of the Communication Science Study Program of UPN "Veteran" Yogyakarta who took Sports II in the 2023/2024 academic year. The sample consisted of students who participated in basketball and volleyball, taken randomly from the population. The study involved 50 students who were the entire registered population.

Collection Techniques and Instruments

Data analysis techniques in this study include several steps, namely: prerequisite test analysis consisting of normality test and homogeneity test and difference test.

RESULT AND DISCUSSION

Data Description

Description of the results of data analysis of physical fitness results with the multi stage fitness test carried out according to the group being compared as follows:

Table 1. Data description of physical fitness results with *multi stage fitness test*

Treatment	Gender	Statistics	Initial test results	Final test results	Improved
Basketball Branch	Princess	Total	162,75	190,87	28,12
		Mean	27,125	31,81166667	4,686666667
		SD	3,676955262	6,215468607	1,371417758
	Son	Total	200,71	216,46	15,75
		Mean	33,45166667	36,07666667	2,625
		SD	10,85408909	13,29360749	1,300842035
Volleyball Branch	Princess	Total	151,6	169,61	18,01
		Mean	25,26666667	28,26833333	3,001666667
		SD	1,555634919	4,235569619	1,493725767
	Son	Total	213,82	228,41	14,59
		Mean	35,63666667	38,06833333	2,431666667
		SD	3,387041482	6,392245302	1,835597009

The results showed that basketball and volleyball have different effects on improving physical fitness. The group of students who participated in basketball experienced an average physical fitness improvement of 3.66, which was higher than the group who participated in volleyball. In addition, female students recorded an average physical fitness improvement of 3.84, which was higher than that of male students.

Table 2. Average value of physical fitness improvement.

No.	Treatment group	Physical fitness improvement score
1	A1B1	4,686666667
2	A1B2	2,625
3	A2B1	3,001666667

4	A2B2	2,431666667

Data Analysis

a. Normality Test

Before data analysis is carried out, the normality distribution needs to be tested. The data normality test in this study used the Lilliefors method. The results of the data normality test conducted on each group are as follows:

Table 3. Summary of Data Normality Test Results

Treatment group	N	Mean	SD	L_{count}	L_{table} 5%	conclusion
KP1	6	4,686666667	1,371417758	0,2804	0,319	Normally distributed
KP2	6	2,625	1,300842035	0,3233	0,319	Normally distributed
KP3	6	3,001666667	1,493725767	0,2649	0,319	Normally distributed
KP4	6	2,431666667	1,835597099	0,1662	0,319	Normally distributed

The normality test results show that the data from KP1, KP2, KP3, and KP4 are all normally distributed. The Lcount values for KP1 (0.2804), KP2 (0.32338), KP3 (0.2649), and KP4 (0.1662) are all smaller than the Ltable (0.319) at the 5% significance level.

b. Homogeneity Test

The results of the data homogeneity test between group 1 and group 2 are as follows:

Table 4. Homogeneity Test

∑ Group	N_i	SD^2_{gab}	χ^2_o	χ^2 table 5%	Conclusion
4	6	2,293402571	0,725733	7.81	Homogeneous variance

From the results of the homogeneity test, the value of $\chi 2$ o = 0.725733 was obtained, while with K-1 = 4 -1 = 3, the number $\chi(2)$ (table) 5% = 7.81, which turns out that the value of $\chi 2$ = 0.725733

is smaller than $\chi 2$ table 5% =7.81. So it can be concluded that between groups in this study have homogeneous variances.

Research hypothesis testing was carried out based on the results of data analysis and analysis of variance. The Newman-Keuls range test was taken as a mean test step after ANOVA.

Table 5. Summary of Average Physical Fitness Results

Variables	**A1**		**A2**	
Average physical fitness	**B1**	**B2**	**B1**	**B2**
Initial test results	27,125	33,45166667	25,26666667	35,63666667
Final test results	31,81166667	36,07666667	28,26833333	38,06833333
Improved	4,686666667	2,625	3,00166667	2,43166667

Table 6. Summary of Analysis of Variance Results A1 (Basketball) and A2 (Volleyball)

Source of variation	**dk**	**JK**	**RJK**	**F_o**	**F_t**
A	1	5,292204041 7	5,2922040417	2,30757758	4,35
Errors	20	45,86805	2,293402571		

Table 7. Summary of Analysis of Variance Results Gender (Female and Male)

Source of variation	**dk**	**JK**	**RJK**	**F_o**	**F_t**
B	1	10,38850417	10,38850417	4,52973439	4,35
Errors	20	45,86805	2,293402571		

Table 8. Summary of Two-Factor Analysis of Variance Results

Source of variation	dk	JK	RJK	F_o	F_t
Treatment average	1	243,6525375	243,6525375		
A	1	5,2922040417	5,2922040417	2,30757758	4,35 *
B	1	10,38850417	10,38850417	4,52973439	
AB	1	3,337604167	3,337604167	1,45530676	
Errors	20	45,86805	2,293402571		
Total	24	308,5389			

Tabel 9. Summary of Newman-Keuls Range Test Results.

		A2B2	A1B2	A2B1	A1B1	RST
	Average	**2,431666667**	**2,625**	**3,001666667**	**4,686666667**	
A2B2	2,431666667	*	0,193333333	0,57	2,255	1,823839168
A1B2	2,625		*	0,376666667	2,061666667	2,213337024
A2B1	3,001666667			*	1,685	2,448272239
A1B1	4,686666667				*	

Based on the results of the data analysis mentioned above, hypothesis testing can be carried out as follows:

Hypothesis 1

Basketball showed a better improvement in physical fitness than volleyball. The calculated F value (2.30757758) is smaller than Ftable (4.35), so the null hypothesis (Ho) is rejected. The average improvement in physical fitness for basketball was 3.655833333, while for volleyball it was 2.716666667.

Hypothesis 2

Female students have better physical fitness improvement than male students. The calculated F value (4.52973439) is greater than Ftable (4.35), so the null hypothesis (Ho) is rejected. The average improvement in physical fitness for female students is 3.844166667, while for male students is 2.528333333.

Testing Hypothesis 3

Female students' basketball (average 4.686666667) showed better physical fitness improvement than female students' volleyball (average 3.001666667). The difference in means (1.685) is smaller than the RST (2.448272239), so female student basketball is better than female student volleyball.

Testing Hypothesis 4

Men's basketball (mean 2.625) also showed better improvement in physical fitness than men's volleyball (mean 2.431666667). The mean difference (0.193333333) is smaller than the RST (1.823839168), so men's student basketball is better than men's student volleyball.

Hypothesis 5

There is no significant interaction between sport (basketball and volleyball) and gender. The calculated F value (1.45530676) is smaller than Ftable (4.35), so the null hypothesis is accepted.

CONCLUSION

The research conclusions are as follows: Basketball has a better effect on physical fitness than volleyball. Female students showed better improvement in physical fitness than male students. Among female students, basketball provided a better improvement in physical fitness than volleyball. Among male students, basketball also showed better improvement in physical fitness than volleyball. There is an interaction effect between sports (basketball and volleyball) and gender on improving physical fitness.

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