Strength of Arm Muscles and Leg Muscles on Smash Ability in Club Volleyballgames Gareno District Luwu

Iis Saputri[1], Ahmad[2], Irsan Kahar[3]

Physical Education, Facultyof Teacher Traning and Education, Muhammadiyah University of Palopo , Jln. Jendral Sudirman, No Km.03.03. Binturu District.South Wara, Palopo City

Keywords	Abstract
Arms muscle strength an neck muscle strength, smash ability	This study aims to determine(1) The relationship between arm muscle strength and smash ability at Club Gareno district Luwu (2) The relationship between muscle streng and smash ability at Club Gareno district Luwu (3) smash ability on Club Gareno.This type of research uses the correlation method. The population in this study was the Gareno Club athletes, totaling 12 people. The sampling technique in this research used saturated sampling. The Instrumen for arm muscle strength is the push-up test, neck muscle strength is the squad jump test, and smash ability uses the smash test. The data analysis techniqye uses multiple regression tests with the help of the SPSS 26 program. The results of the research show that (1) There is a significant relationship between arm muscle strength and samash ability in Gareno ditsrict Luwu club athletes. Luwu, with a calculated r value of 0,575. (2) There is a significant relationship between muscle strength and smash ability in Gareno district Club athletes. Luwu, with a calculated r value of 0,974 (3) There is a significant relationship between arm muscle strength and cooling muscle strength on smash ability at Club Gareno district Luwu, with an fcount value of 83,276. (Ismoko & Sukoco, n.d.)

✉ Corresponding author :
Adress: Kota Palopo,91958
E-mail: iissaputri015@gmail.ac.id / 082347828480

INTRODUCTION

Physical education is a medium to encourage physical potential abilities, knowledge, reasoning, appreciation of values and habits of healthy living which culminate in stimulating balanced growth and development (Oktariana & Hardiyono, 2020).

Sports are the main source of entertainment, that's why there are sports supporters who are generally divided into several big people and can be broadcast more widely through sports broadcasts (Ferianto et al., 2020). Sport is a human physical activity which consists of various elements which include all activities or efforts to encourage, awaken, develop and develop the physical and spiritual strengths of every human being (Kahar et al., 2022).

The game of volleyball is a game played by twi teams, each team numbering 6people, each player has special skills, namely as a spike, quicer, Feeder, and libero, the main goal of this game istho hit the ball towards the opponent's court so that the opponent does not can return the ball. Voleyball is a fast-paced game, so the time to play

the ball is very limited, and if you don't master perfect basic techniques, there will be more technical mistakes (Loliana et al., 2022).

Smash is a complex movement, because it starts with the first step, a push to jump, hitting the ball while it is in the air and landing again after hitting the ball. Smash is the act of hitting the opponent's court with full force and jumping up and the ball enters the opponent's court (Pranopik, 2017). Smash is the ability of a group of muscles toovercome a load of resistance in carrying out an activity. Muscle strength is a combination of endurance and strength. Strength is a very important factor in carrying out activities and really determines the quality of a person's physicial condition (Syarifudin, 2020). Smash is hard, steep downwards, the speed of the ball going towards the opponent's court, so this blow requires strong leg muscle power in order to have a higher jumping capacity, so that the resulting smash is better (Maifa, 2021).

Arm muscles, the ability of a muscle or groupof muscles to handle the load when working, good arm muscle strength will make the strokes made when making shots more optimal and divr sharply and hard in volleyball (Nur et al., 2023).

Leg muscles are the precision of muscles to direct in a short time to give the object the bests momentum in the body in a complement to achievethe desired goal (Harman, Munawir, 2019). Leg muscles are a combination of speed and strength or ditect the maximum muscle force with maximum speed (Hidayat, 2020). Leg muscles are also a biomotor component that is inseparable from sports and a basic component for providing impetus to movements to make them effective and efficient (Ayu et al., 2020).

Research that is relevent to the research: This research was conducted by (Hidayat, 2020) entitled "The relationship between arm muscle strength and leg power on the smash ability of volleyball extracurricular at Junior High School

Kretek". This research uses a correlation research methofe, the method used in this researchis a survey method used in this research is a survey method, while the technique and data collection uses psychtion tests. The population in tis study were volleyball extracurrixular participants at Junior High School 1 Kretek, totaling 34 students

the formulation of the problem in this research is that the gareno club athletes in mario, ponrang

sub-district are not yet optimal in making a start and are still not optimal in the jump section so it is difficult to do a smash, often the ball does not cross or does not enter the opponent's area or the ball gets stuck in the net. To increase arm muscle strength, namely pull-up and push-up exercises, and leg muscle strength, namely skipping and squad jump exercises, are carried out continuously and regularly, so that by increasing the strength of the arm muscles and leg muscles, indirectly the smash ability of Gareno club athletes can increase. In general, there are several types of physical conditions, namely strength, endurance, speed and explosive power (Riswan, 2024) kondisi fisik merupakan salah satu pondasi dasar dalam meningkatkan kemampuan lainnya yang dimiliki oleh setiap atlit apabila ingin meraih prestasi (Wahyuni & Donie, 2020).

The purpose of this research is to find out whether there is a relationship between push-up training and increasing arm muscle strength, and squad jumps can increase leg muscle strength in the Volleyball game at Club Gareno, Luwu Regency.

METHODS

This research is correlational research. Correlational is research that is used to find out whether there is a contribution between two variables, Arikunto (2010:247) in (Anjarwati 2019). The research instrument used is a form of testing to determine the independent variable and dependent variable, where the independent variable is the strength of the arm muscles, and leg muscles, and the dependent variable is the ability to smash in volleyball (Sugiyono,2016) in (Ricky, 2020). Population is a generlized area consisting of objects that have characteristics determined by a researcher.The population in this study were all members of the Luwu Regency Gareno Club. So all members of the population were sampled, so the sample for this study consisted of 12 Gareno club members. The sampling technique in this research uses a saturated sampling technique, And the data collection technique in this research uses a test where the instrument in the research is carried out by means of a smash ability test, an instrument or tool data analysis technique used to obtain information about the research object. This research is quantitative research so the statistical data is processed via computer with Exceland SPSS 26 Program

RESULTS and DISCUSSION

1. Description of research data

A. Descriptive Statistics

In the form of descriptive statistics, simple statistical formulas are used, so thavalues can be obtained as a basis in the form of a frequency distribution table. The following is data in the form of a descriptive statistical table on test results for arm muscle strength, leg muscle strength and smash.

statistical table on test results for arm muscle strength, leg muscle strength and smash

Statistik			
	Kekuatan otot lengan	Otot tungkai	Kemampuan *smash*
N	12	12	12
Mean	24.17	28.75	23.67
Median	24.00	28.00	31.50
Std. Deviation	3.298	3.137	3.627
Range	12	13	14
Minimum	18	23	26
Maximum	30	36	40

based on the table above, the data depicts arm muscle strength, leg muscle strength and smash ability as follows:

1. Arm muscle strength, number of samples (N) was 12, obtained an average value (mean) 24.17, middle value (median) 34.00, Std. deviation 3,298, Range 12, minimum 18, maximum 30.

2. Leg muscle strength, number of samples (N) was 12, obtained an average value (mean) 28.75,

No	Nama	Kekuatan Otot Lengan	Otot Tungkai	Kemampuan *smash*
1	Dewi	18	31	32
2	Nur Ainun	22	27	31
3	Zaskia	28	30	36
4	Nur Indah Yani	22	28	30
5	Wiwin	24	23	26
6	Putri pabiri	25	29	33
7	Salsabila	26	31	36
8	Cici	30	28	35
9	Maryam	23	27	31
10	Mutia ulya	27	26	40
11	Nur Asmi	24	28	31
12	Zea	21	27	31

middle value (median) 28.00, Std.Deviation 3.137, Range 13, Maximum 23, Minimum 36.

3. Smash ability, number of samples (N) 12, obtained mean value 23.67, middle value 31.50, Std. Deviation 3,627, Range 14, Minimum 26, Maximum 40.

2. Analysis test results

a. Normality Test

Variabel	Shapiro-Wilk	Sig.	α	Keterangan
Kekuatan Otot Lengan	0.991	1.000	0,05	Normal
Kekuatan Otot Tungkai	0.915	0.250	0,05	Normal
Kemampuan *Smash*	0.943	0.544	0,05	Normal

Based on the table above, the data normality test results are as follows:

1. Arm muscle strength with a Shapiro-Wilk value of 0.991 and a significance level of 1.000 is greater than α 0.05, then it is declared normal.

2. Leg muscle strength with a Shapiro-Wilk value of 0.915 and a significant value of 0.250 is greater than α 0.05, so it is declared normal.

3. The smash ability of the Shapiro-Wilk value is 0.943 and the significance level is 0.544 which is greater than α 0.05, so it is declared normal.

B

b. Linearity Test

Table of Linearity Test Results

Hubungan	F	Sig.	Keterangan
Kemampuan smash Kekuatan Otot Lengan	1.612	0.438	Linier
Kemampuan smash Otot Tungkai	0.308	0.889	Linier

Based on the table above, the results of the linearity test on smash ability (Y) with arm muscle strength (X) are 1.612 at a significance of 0.438. This shows that the significant value is greater than 0.05, so the relationship between smash ability and linear arm muscle strength is stated. And the results of the linear test on smash ability (Y) with leg muscle strength (X) were 0.308 with a significance of 0.889. So this shows that the significant value is greater than 0.05, so the relationship between smash ability and leg muscle strength is stated to be linear.

3. Multiple Linear Regression Analysis

Table of results of multiple linear regression analysis

Based on the above, the multiple linear regression equation resulting from this research can be determined, namely, the regression coefficient for the arm muscle strength intensity variable is 0.434. And the regression coefficient for the leg muscle strength variable obtained a value of 0.932.

4. Hypothesis Test Results

a. Hypothesis 1

Table of Hypothesis Analysis Results 1

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std, Eror	Beta
1 Kekuatan Otot Lengan	0.434	0.085	0.394
2 Otot Tungkai	0.932	0.090	0.807

Hubungan	r hitung	r tabel (df 11)	sig	Keterangan
Kekuatan otot lengan dengan kemampuan *smash*	0.575	0.553	0.005	signifikan

The results from the table above show that the correlation coefficient for arm muscle strength obtained a calculated r value of 0.575 and a significant value of 0.05. Because the calculated

r value is 0.575 > r table 0.553 and the significant value is 0.005 < 0.05, then H0 is rejected, meaning that Ha1 which means "There is a significant relationship between arm muscle strength and smash ability in volleyball athletes at Gareno Club Luwu Regency is accepted. The correlation coefficient is positive, meaning that if the arm muscle strength is better, the smash ability will be better.

a. Hypothesis 2
   Table of Hypothesis Analysis Results 2

Hubungan	r hitung	r tabel (df 11)	sig	Keterangan
Kekuatan otot tungkai dengan kemampuan *smash*	0.895	0.553	0.000	signifikan

The results from the table above show that the correlation coefficient for leg muscle strength was obtained with a calculated r value of 0.895 and a significant value of 0.000. Because the calculated r value is 0.895 > r table 0.553 and the significant value is 0.000 < 0.05, then H0 is rejected, meaning that Ha1 which means "There is a significant relationship between leg muscle strength and

smash ability in volleyball athletes at Gareno Club, Luwu Regency is accepted.

c. Hypothesis 3
Table of Hypothesis Analysis Results 3

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	137.249	2	68.625	83.276	0.000
	Residual	7.417	9	0.824		
	Total	144.667	11			

Based on the table above, the Fcount coefficient is 83.276 and the sig value is obtained. 0.000 < 0.05 then Ho is rejected, so Ha3 means "There is a significant relationship between arm muscle strength and leg muscle strength on smash ability in volleyball athletes at Gareno Regency Club. Luwu, hypothesis accepted.

5. Coefficient of Determination (R2)

Table of Results of Determination Coefficient Analysis (R2).

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.974	0.949	0.937	0.908

From the table above, it is known that the Adjusted R Square (R2) is 0.949. It can be concluded that 94.9% of the arm muscle strength and leg muscle strength variables are related to smash ability, while the remaining 5.1% is influenced by other variables.

DISCUSSION

Based on the results of the research, it shows that there is a significant relationship between arm muscle strength and smash ability in volleyball athletes at Gareno Regency Club. Luwu, with value r count 0.575. And the relationship between leg muscle strength and smash ability, based on research, shows that there is a significant relationship with an r count of 0.895. Meanwhile, the relationship between arm muscle and leg muscle strength and smash ability from research results shows a significant relationship with an F count of 83.276.

This research is in line with research conducted by (Hidayat, 2020) entitled "The relationship between arm muscle strength and leg power on smash ability in volleyball extracurricular participants at Junior High School 1 KRETEK". This research uses a correlation research method, the method used in this research is a survey method, while the technique and data collection uses psychomotor tests. The population in this study were volleyball extracurricular participants at Junior High School 1 Kretek, totaling 34 students.

And the research carried out was (Nur et al., 2023) entitled "The relationship between arm muscle strength and hand-eye coordination on the accuracy of volleyball smashes at Senior High School 2 Luwu". The population in the study was 15 people. The data collected in this study included: Leg muscle strength tests, arm muscle strength tests, hand-eye coordination tests, and smash accuracy tests in volleyball games."

CONCLUSION

There is a significant relationship between arm muscle strength and smash ability. Leg Muscle Strength to Smash Ability also has a significant relationship, and Arm Muscle Strength and Leg Muscle Strength to Smash Ability have a significant relationship in Club Gareno Regency volleyball athletes. Luwu

REFERENCES

Anjarwati 2019, Sinica, A. P., Science, A. L., Stedmon, C. A., Markager, S., Bro, R., Fellman, J. B., Petrone, K. C., Grierson, P. F., D'Orazio, V., Traversa, A., Senesi, N., Lapierre, J. F., Frenette, J. J., Catalá, T. S., Mladenov, N., Echevarría, F., Reche, I., Science, E., … Qianheng, G. (2019). *Estuarine, Coastal and Shelf Science, 2020*(1), 473–484.

Ayu, G., Nina, A., Dewi, U., Putu, I. G., Adi, N., Jasmani, P., Fpok, R., & Pgri, I. (2020). *Jurnal Kejaora : Jurnal Kesehatan Jasmani dan Olah Raga. 5*(April), 14–19.

Ferianto, B., Kuntjoro, T., Studi, P., Jasmani, P., & Surabaya, U. N. (2020). *Rasisme dalam olahraga. 7*(1), 69–77.

Harman, Munawir, D. (2019). *Kontribusi Daya Ledak Otot Tungkai Dan Daya Ledak Otot Lengan Terhadap Kemampuan Smash Atlet Bulutangkis*. 293–300.

Hidayat, D. A. (2020). *Hubungan Antara Kekuatan Otot Lengan Dan Power Tungkai Terhadap Kemampuan Smash Pada Peserta*

Ekstrakurikuler Bola Voli Di Smp Negeri 1 Kretek. 5(3), 248–253.

Ismoko, A. P., & Sukoco, P. (n.d.). *Pengaruh Metode Latihan dan Koordinasi terhadap Power Tungkai ... Anung Probo Ismoko, Pamuji Sukoco 1*. 1(1), 1–12.

Kahar, I., Riswanto, A. H., Jalil, R., Aliah, H., Husain, S., & ... (2022). Pengenalan Teknik Dasar dan Aturan Bermain Bulutangkis pada Anak Usia 10 dan 12 Tahun di Desa Murante Kabupaten Luwu. *Abdimas …*, 207–215. https://pusdig.web.id/abdimas/article/view/168%0Ahttps://pusdig.web.id/abdimas/article/download/168/195

Loliana, L. L., Sutisyana, A., & Defliyanto, D. (2022). Pengaruh Latihan Multiple Box To Box Jump Terhadap Kemampuan Blocking Dalam Permainan Bola Voli Ekstrakurikuler Di Sman 5 Bengkulu Utara. *SPORT GYMNASTICS : Jurnal Ilmiah Pendidikan Jasmani*, 3(2), 253–266. https://doi.org/10.33369/gymnastics.v3i2.22598

Maifa, S. (2021). *Journal Pendidikan Jasmani Kesehatan & Rekreasi (PORKES) | 62*. 4(1), 62–68.

Nur, S., Ahmad, & Hidayat, R. (2023). Hubungan Kekuatan Otot Tungkai, Kekuatan Otot Lengan Dan Koordinasi Mata-Tangan Terhadap Ketepatan Smash Bola Voli. *Jurnal Pendidikan Olah Raga*, 12(1), 11–29.

Oktariana, D., & Hardiyono, B. (2020). Pengaruh Daya Ledak Otot Lengan, Daya Ledak Otot Tungkai Dan Kekuatan Otot Perut Terhadap Hasil Smash Bola Voli Pada Siswa SMK Negeri 3 Palembang. *Journal Coaching Education Sports*, 1(1), 13–24. https://doi.org/10.31599/jces.v1i1.82

Pranopik, M. R. (2017). Pengembangan Variasi Latihan Smash Bola Voli. *Jurnal Prestasi*, 1(1), 31–33. https://doi.org/10.24114/jp.v1i1.6495

Ricky, Z. (2020). Studi Eksperimen Pengaruh Latihan Jump In Place Terhadap Kemampuan Smash Bola Voli. *Jendela Olahraga*, 5(2), 150–159.

https://doi.org/10.26877/jo.v5i2.6230

Riswan. (2024). *Proposal*, 4–6.

Syarifudin. (2020). Korelasi Panjang Lengan Dan Kekuatan Otot Lengan Terhadap Jauhnya Lemparan Cakram Gaya Menyamping Di SMP Ganesha Denpasar. *Jurnal Pendidikan Kesehatan Rekreasi*, 6(1), 111.

Wahyuni, S., & Donie. (2020). VO2Max, Daya Ledak Otot Tungkai, Kelincahan Dan Kelentukan Untuk Kebutuhan Kondisi Fisik Atlet Taekwondo Sovia. *Kondisi Fisik*, 2, 1–13.

Lampiran

Lembar Pengesahan

LEMBAR PENGESAHAN

**KEKUATAN OTOT LENGAN DAN KEKUATAN OTOT TUNGKAI
TERHADAP KEMAMPUAN SMASH PADA PERMAINAN
BOLA VOLI CLUB GARENO KAB. LUWU**

disusun oleh:
Iis Saputri
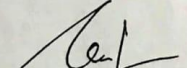**201210010**
Disetujui dan layak untuk diseminarkan

Pembimbing I,

Ahmad, S.Pd.,M.Pd.
NIDN: 0905038505   Tanggal 26-07-2024

Pembimbing II,

Irsan Kahar, S.Pd., M.pd
NIDN: 0926048604   Tanggal 26-07-2024

Mengetahui
Ketua Prodi Pendidikan Jasmani,