

The effect of gemargarata gymnastics training on increasing students' vo2max abilities

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Abstract

Gemargartra gymnastics is a new exercise combined with traditional game movements. The aim of this research is to determine the effect of gemargartra gymnastics on VO₂max. The problem in this research is that the heart and lung capacity has not been measured when doing gemargartra exercises. The method of this research is experimental tests and measurements by giving treatment 01. The population in this study was grade 11 with a total of 35 people. The instrument in this research uses the bleep test and the data analysis technique uses the sample dependent t test through the requirements test. Based on data analysis in this study using the t test, these results were proven by a comparison of the average calculation results in the pretest and posttest t test groups ($32.8 < 37.6$) $t_{count} 17.78 > t_{table} 2.13$. And there was an increase in ability results between the pretest and posttest of 1.40, which means that the application of gemargartra exercises had an effect on increasing VO₂max. It was concluded that aerobic exercise can have an influence on body composition because when you train, the body will respond and if the exercise is done continuously, the body will adapt. gemargartra exercise can have a significant influence on increasing VO₂Max abilities.

Keyword: Effect of training; gemargartra gymnastics; VO₂Max

Abstrak

Senam gemargartra merupakan senam baru yang dikombinasikan dengan gerakan-gerakan permainan tradisional tujuan dari penelitian ini adalah untuk mengetahui pengaruh senam gemargartra terhadap VO₂max. Permasalahan dalam penelitian ini adalah belum terukurnya kapasitas paru jantung saat melakukan senam gemargartra Metode penelitian ini adalah experimental tes dan pengukuran dengan memberikan perlakuan 01, X ke Y hasil Vo₂max awal dan diberikan treatment selama 3 bulan setelah itu dilakukan tolak ukur untuk membandingkan hasil dari senam gemargartra. Populasi dalam penelitian ini adalah kelas 11 dengan jumlah 35 orang. Instrumen dalam penelitian ini menggunakan *bleep test* dan teknik analisis data menggunakan sample dependent t test melalui uji persyaratan. Berdasarkan analisis data dalam penelitian ini dengan menggunakan uji t, hasil tersebut dibuktikan dengan perbandingan rata-rata hasil hitung pada kelompok *pretest* dan *posttest* uji t ($32,8 < 37,6$) $t_{hitung} 17,78 > t_{tabel} 2,13$. Dan terdapat peningkatan hasil kemampuan antara *pretest* dan *posttest* sebesar 1,40 yang artinya penerapan senam gemargartra berpengaruh terhadap peningkatan Vo₂max. Disimpulkan bahwa latihan aerobik dapat memberikan pengaruh terhadap komposisi tubuh karena pada saat berlatih maka tubuh akan mendapat respon dan jika latihan dilakukan secara terus menerus maka tubuh akan beradaptasi. Senam gemargartra dapat memberikan pengaruh yang signifikan terhadap peningkatan kemampuan VO₂Max

Kata kunci: Pengaruh latihan; senam gemargartra; VO₂Max

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Introduction

Gymnastics is a very good sport for the body and one's physical fitness if we do the exercise correctly (Paramitha et al., 2022). Branches in various sports include athletics (running, jumping, and throwing), games (football, volleyball, badminton, takraw, and so on), gymnastics (gymnastics), aquatics (swimming), and self-defense (karate, martial arts, taekwondo, and so on). According (Jaya et al., 2018) gymnastics is divided into six groups, namely artistic gymnastics (senamartistik), sportive rhythmic gymnastics (sportive rhythmic gymnastics), acrobatic gymnastics (acrobatic gymnastics), sport aerobic (aerobic sport gymnastics), trampolining (trampoline gymnastics), general gymnastics (general gymnastics) these exercises are intended according to their respective groups with the aim of maintaining fitness so that people become healthy, fit, and independent, so that in their old age they can still carry out activities without limits and without having to depend on other people.

Based on the class of gymnastics, traditional gymnastics, namely the gemargatra gymnastics, is included in aerobic gymnastics (Purnamasari & Novian, 2021). The traditional gemargartra gymnastics is a new exercise combined with traditional game movements. The aim of this research is to determine the effect of gemargatra gymnastics on VO₂max. The problem in this research is that the heart and lung capacity has not been measured when doing gemargatra exercises. Here, the researcher will try to jointly implement gemargatra gymnastics activities in the school field. This activity is a form of commitment to support the gemargatra program, which has been launched by the NTB Province Education and Culture Office, and to participate in preserving culture through folk games and traditional sports in Nusa Tenggara Barat Province, especially in the school environment.

According to (Anam et al., 2023) furthermore, researchers also want to apply VO₂Max as a measure of physical fitness in school students, which will be very important and needed in carrying out an activity in the form of motion because VO₂Max is a concept used to find out how much oxygen the body can inhale and use during exercise. According (Pane, 2015) The VO₂max test is generally used to determine the aerobic endurance or heart fitness of athletes before and after an exercise program. According (Anam et al., 2021) If you want to increase your body's ability to absorb and use oxygen during exercise, there's nothing wrong with maximizing VO₂Max (Evitamala et al., 2022).

Here the researcher will review a traditional exercise, namely "physical development of gemar gatra gymnastics on increasing VO₂Max Ability in Tastura Az Zikro Vocational School Students". According (Hidayatullah et al., 2021) this is because the gemargatra gymnastics were not well known by the students at the school before in terms of music and movement. Therefore, the author really wants to develop gemargatra gymnastics for students at Tastura Az Zikro Vocational School. To increase the enthusiasm and interest of students in sports towards gymnastics and traditional culture, by developing existing gymnastics into more interesting and creative gymnastics, the music sparks enthusiasm.

Method

This type of research is a quasi-experiment. According (Darsi, 2018) this method is used based on the consideration that the nature of the research used is a process by providing treatment to the sample, namely, the VO2max test using the bleep test method, where the test is carried out on the sample before and after the sample. Receives treatment, the treatment given to the sample is exercise gemargatra, this research is quasi-experimental with the one-group *pretest-posttest design* model, experimental research carried out only in one group (Arwandi et al., 2020). This research uses experiments conducted in one group without using a comparison group (Abraham & Supriyati, 2022). Before being given the gemargatra gymnastics treatment, an initial test (*pretest*) was first held, and at the end, a final test (*posttest*) was given to determine the effect on increasing VO2Max abilities in students.

According to (Sari et al., 2022:229) population research is a generalization area consisting of objects or subjects that have certain qualities and characteristics determined by the researcher to be studied and then conclusions drawn. The population in this study were students of Tastura Az Zikro Vocational School, West Praya District, Central Lombok. The sample is part of the number and characteristics of the population. The sample in this research used purposive sampling, namely a sampling technique with certain considerations (Gunawan, 2022:37). The sample in this study amounted to 15 people.

The data collection technique in this research used an (*pretest*), then given treatment (treatment), and given a (*posttest*). The treatment was carried out in 16 meetings. This research instrument uses a test (VO2Max), namely the Bleep Test, running for 20 minutes for endurance. The data analysis technique in this research uses statistical tests, namely the paired t test with a significance level of 5%. The paired t test was used to determine whether or not there was an increase in students' VO2Max abilities. The rule used is that if the analysis results have a probability value (P) < 0.05 then it is said to be significant. On the other hand, if the (P) value is > 0.05 then there is no significant difference.

Before being analyzed using the t test, the analysis prerequisites test is first carried out, which includes a normality test and a homogeneity test. The normality test uses the kolmogorov smirnov test with the rule that if the value (P) is > 0.05 then the distribution is normal. Meanwhile, if the value (P) < 0.05 then the data is not normally distributed. Meanwhile, the homogeneity test uses the F test with the rule that if the value (P) is > 0.05 then the data group has a homogeneous variance, conversely if the value (P) < 0.05 then the data group has a heterogeneous variance.

Table 1. VO2 Max values for men

Male Vo2 Max value	Age				
	13-19	20-29	30-39	40-49	50-59
Very Bad	35,0	33,0	31,5	30,2	26,1
Bad	35,0-38,3	33,0-36,4	31,5-35,4	30,2-33,5	26,1-30,9
Enough	38,4-45,1	36,5-42,4	35,5-40,9	33,6-38,9	31,0-35,7
Good	45,2-50,9	42,5-46,4	41,0-44,9	39,0-43,7	35,8-40,9
Extraordinary	51,0-55,9	46,5-52,4	45,0-49,4	43,8-48,0	41,0-45,3
Superior	55,9	52,4	49,4	48,0	45,3

Table 2. Women's VO2 max values

Women's VO2 Max values	Age				
	13-19	20-29	30-39	40-49	50-59
Very Bad	25,0	23,6	22,8	21,0	20,2
Bad	25,0-30,9	23,6-28,9	22,8-26,9	21,0-24,4	20,2-22,7
Enough	31,0-34,9	29,0-32,9	27,0-31,4	24,5-28,9	22,8-26,9
Good	35,0-38,9	33,0-36,9	31,5-35,6	29,0-32,8	27,0-31,4
Extraordinary	39,0-41,9	37,0-41,0	35,7-40,0	32,9-36,9	31,5-35,7
Superior	41,9	41,0	40,0	36,9	35,7

Results and Discussion

Results

The subjects in this study were 15 class X students at Tastura Az Zikro Vocational School, Praya Barat District. This research was carried out beginning with *pretest* data collection on January 30, 2022, and ending with *posttest* data collection on March 11, 2022. The data collection in this study was the effect of the gemargatra gymnastics exercise on increasing VO2 Max ability in Tastura Az Zikro Vocational High School students in West Praya, Central Lombok. Endurance and Capacity Enhancement (VO2Max) the results of the Pretest endurance and increased ability (VO2Max) are presented in the table below:

Table 3. Cardiopulmonary endurance pretest results (VO2Max)

No	Name Initials	Age (Years)	Phase/Reverse	Estimation VO2 Max	Category
1	SB	17	6/6	35,0	Very less
2	HS	17	6/6	35,0	Very less
3	WK	17	6/6	35,0	Very less
4	L.UA	16	6/6	35,0	Very less
5	MA	17	6/6	35,0	Very less
6	AF	17	6/6	35,0	Very less
7	MK	16	6/6	35,0	Very less
8	JKM	17	6/10	36,4	Not enough
9	AM	17	6/8	35,7	Not enough
10	RA	17	6/10	36,4	Not enough
11	IB	17	6/8	35,7	Not enough
12	AQ	17	6/8	35,7	Not enough
13	AY	16	7/6	38,5	Enough
14	PV	17	7/8	39,2	Enough
15	HJ	16	7/6	38,5	Enough

From the data above, the pretest VO2 Max level can be described as an average of 36.1, while the highest score was 39.2, and the lowest score was 35.0. From these results we can present as follows

Table 4. *Pretest* VO2Max level interval class

No	Category	Student	%
1	Very less	7	35,0

2	Not enough	5	36,0
3	Enough	3	38,7
4	Good	0	0
5	Very good	0	0
6	Extraordinary	0	0
Amount		15	109,7

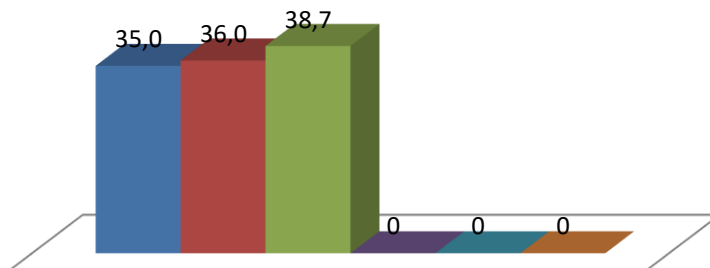


Diagram 1. *Pretest* VO2Max level results

Table 5. *Posttest* results for endurance (VO2Max)

No	Name Initials	Age (Years)	Phase/ Reverse	Estimation VO2 Max	Category
1	AF	17	6/8	35,7	Not Enough
2	HS	17	7/2	37,1	Not Enough
3	WK	17	7/2	37,1	Not Enough
4	MA	17	6/10	36,4	Not Enough
5	SB	17	6/10	36,4	Not Enough
6	MK	16	6/10	36,4	Not Enough
7	L.UA	16	6/8	35,7	Not Enough
8	AM	17	7/8	39,2	Enough
9	RA	17	7/10	39,9	Enough
10	JKM	17	7/10	39,9	Enough
11	IB	17	7/8	39,2	Enough
12	AQ	17	7/8	39,2	Enough
13	AY	16	9/6	45,2	Good
14	PV	17	9/11	46,8	Good
15	HJ	16	9/6	45,2	Good

From the data above, the *posttest* VO2Max level can be described as an average of 39.3, while the highest score was 46.8, and the lowest score was 35.7. From these results we can present as follows:

Table 6. *Posttest* VO2Max level interval class

No	Category	Student	%
1	Very less	0	0
2	Not enough	7	36,4
3	Enough	5	39,5
4	Good	3	45,7
5	Very good	0	0
6	Extraordinary	0	0
Amount		15	121,6

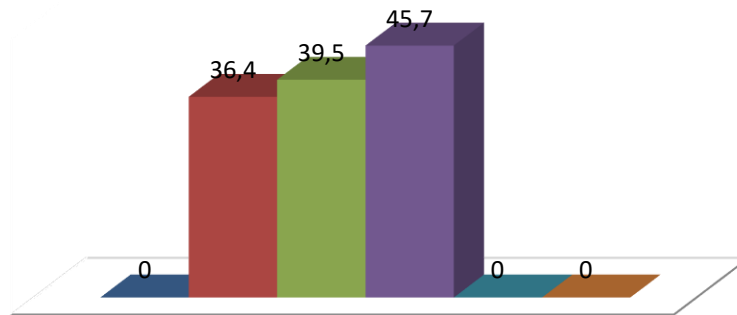


Diagram 2. Results level VO2Max *posttes*

Tabel 7. *Pretest* and *posttest* results

No.	Evaluator	Average Training Grade			Category
		Before	After	<i>N-Gain</i>	
1.	AG	36	77	0,67	Not enough
2.	BS	33	85	39,5	Enough
3.	CY	35	85	45,7	Good
4.	DA	39	71	0,52	Not enough
5.	EV	35	68	0,51	Not enough
Average		43,8	77,2	17,378	Kurang

The homogeneity test is useful for testing the similarity of samples, namely whether or not the sample variance taken from the population is uniform. Comparison of *pretest* and *posttest* in increasing VO2Max ability. If the results show a significant difference, gemargatra exercise has an influence on increasing the VO2Max ability of Tastura Az Zikro Vocational School students. The normality test is carried out to determine whether the variables in the study have a normal distribution or not. Calculation of the data normality test using the kolmogorov-smirnov Z formula, with processing using the help of a T-table. The results are as follows:

Tabel 8. Test normalitas

NO	Eksperimen	<i>P</i> (Sig.)	Sig.	Information
1	Pretest VO2 Max	0,411	0,05	Normal
2	Posttest VO2 Max	0,662	0,05	Normal

From the results of the table above, it can be seen that all data has a p value (Sig.) > 0.05, so the variables are normally distributed. Because all data is normally distributed, the analysis can be continued with parametric statistics.

Discussion

This study aims to determine the effect of the gemagatra gymnastics on increasing VO2Max ability in Tastura Az Zikro Vocational High School students. West Praya District,

Central Lombok. This research was conducted by giving the gemagatra exercise treatment to Tastura Az Zikro Vocational High School students. According to (Alim, 2012) date measurement was carried out twice, namely before (*pretest*) and after treatment (*posttest*) to find out how much influence the exercise of gemagatra gymnastics has. Based on the analysis that has been done, it shows that the gemagatra gymnastics has an influence on the VO₂Max ability of Tastura Az Zikro Vocational High School students. According to (Rahmawati & Huda, 2018) gemagatra gymnastics is proven to have a significant effect on increasing VO₂Max ability.

According to (Purnamasari & Novian, 2021) based on the results of the analysis, it is known that the average value of the data during the pretest and the average value of the posttest data. This shows that there is a significant increase in VO₂Max ability before and after being given the agogastric exercise. This happens because an activity that is carried out repeatedly and programmed for six weeks will have an effect on the immune system, heart and lungs, and so on which results in an adaptation effect, so that the exercise of gemagatra gymnastics has an effect on increasing VO₂Max. According to (Janah, 2017) (Suharti & Darisman, 2017) VO₂Max can increase if a person does exercises that are continuous. Exercises that use the basic principles of proper training will result in a good adaptation process in the body (Indrayana & Yuliawan, 2019).

One of the basic principles of exercise is continuity, meaning that it is continuous and can function to maintain fitness so that it does not decrease or even increase fitness levels optimally. According to (Cleopatra, 2015) aerobic exercise that is carried out continuously with a duration of 30 minutes or more is proven to increase cardiopulmonary endurance (VO₂Max). According to (Suryanto, 2012) state that human organs are always able to adapt to changes in their environment, so that human abilities can be influenced and improved through the training process. The condition of the body will change physiologically when doing measurable, directed, and programmed exercise. According to (Setiawan, 2014) these changes can be seen in the increase in the functional quality of the body, one of which is cardiopulmonary endurance (VO₂Max). According to (Tang & Thahir, 2020) aerobic exercise with a duration of 30 minutes or more and done correctly will have an effect on VO₂Max.

It can be seen that aerobic exercise (gemargatra) also has an effect on weight loss. This happens because the gemargatra exercise is performed three times a week, for six weeks with a continuous training model that makes body fat burn quickly. According to (Anam et al., 2023) in accordance with research conducted by moderate-intensity aerobic exercise given with a frequency of 3 times per week and a duration of 30 minutes can already affect weight loss. states that aerobic exercise has an element of fast motion so that all the large muscles will be moved, which causes the body to contract so that it has an effect on physical fitness and weight loss. Gymnastics has many physical benefits, including heart and lung fitness, avoiding disease, changing body composition, and increasing energy.

Summary

It was concluded that physical exercise or aerobic exercise can have an effect on body composition because, when practicing, the body will receive a response, and if the exercise is carried out continuously, the body will adapt. Based on the description above, it shows that gemargatra gymnastics can have a significant influence on increasing VO₂Max abilities, in Tastura Az Zikro Vocational High School students, Pray Barat District, Central Lombok. The implications of this research are very useful for female students to understand the benefits of exercising so that they have good fitness. With this gemargatra aerobics exercise, students at Tastura Az Zikro Vocational School, West Praya District, can avoid being overweight, excess fat, decreased body power, and other health problems. So with the benefits of aerobic exercise, female students have good endurance and have good fitness.

Author's Statement

A statement that the article created has never been published in another journal.

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