ORIGINAL ARTICLE

Physical Therapy Journal of Indonesia (*PTJI*) 2023, Volume 4, Number 2: 182-185
E-ISSN : 2722-6034 ; P-ISSN : 2722-0125

The effect of yoga and zumba exercises in increasing VO2 max

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Received: 2023-04-16
Accepted: 2023-06-05
Published: 2023-07-30

ABSTRACT

Background: Someone with a healthy and fit body is likely to be able to do a high level of physical activity. Physical exercise can improve physical fitness and has an important element, cardiorespiratory endurance. One way to measure cardiorespiratory endurance is by measuring the maximum volume of oxygen consumption, called VO2 max.

Methods: This type of research uses a quasi-experimental type, namely two pre-and post-test design research groups. The type of quasi-experimental research design uses two groups of subjects, namely group A, who are given yoga exercises, and group B, who are given zumba exercises, with a total of 30 respondents. The cardiorespiratory endurance was measured with the beep test.

Results: Based on the paired sample t-test, the San Zumba yoga group had a result of $p<0.05$. Whereas in the independent sample T-Test test, the results of $p<0.05$, it can be concluded that there is a significant difference in the increase in the yoga and zumba groups.

Conclusion: There are differences in the effect of giving yoga and zumba exercises on increasing VO2 max values.

Keywords: BMI, VO2 max, health, yoga exercises, zumba exercise.
Cite This Article: Arsy, Y.A., Multazam, A., Marufa, S.A. 2023. The effect of yoga and zumba exercises in increasing VO2 max. *Physical Therapy Journal of Indonesia* 4(2): 182-185. DOI: 10.51559/ptji.v4i2.123

INTRODUCTION

Health is a state of complete physical, spiritual, mental, and social well-being likely to lead a social and economic productive life. Being fit is the body's ability to carry out daily activities using full energy and enthusiasm to enjoy free time and carry out sudden and unexpected activities.[1] Someone with a healthy and fit body will likely be able to do physical activity. Physical exercise can improve physical fitness and has an important element, cardiorespiratory endurance. One way to measure cardiorespiratory endurance is by measuring the maximum volume of oxygen consumption, which is called VO2 max.[2]

VO2 max is the maximum volume of oxygen or a level of body ability expressed in liters per minute or milliliters per minute per kilogram of body weight.[3] Someone with good fitness has a higher VO2 max value so that they can do stronger activities. VO2 max is an aerobic capacity that can describe the motor ability of a person's aerobic process.[4] VO2 max can be increased through physical exercise, which must be done using aerobic exercise because it has a load that can increase the heart and lungs.[5] High and low VO2 max affect physical condition and physical fitness. Therefore, physical exercise must be carried out to increase VO2 max.[6] VO2 max can be increased using exercises carefully and following accurate training principles and methods to achieve the expected goals.[7]

Yoga is an exercise that combines physical exercise accompanied by meditative breathing techniques as an intervention for the mind in the body and can be trusted to help improve the quality of VO2 max.[8] Yoga practice is defined as stretching and breathing control exercises as mind and body intervention.[9] The benefits of yoga are that it can strengthen the heart and lungs and increase VO2 max. In addition to yoga, there is also zumba, which is important in maintaining VO2 max by burning fat and maintaining balance.[10] Zumba gymnastics is a method of implementing high-intensity interval training (HIIT), which is a cardiorespiratory exercise performed in a short time at a high intensity so that it can help integrate the basic components of cardiorespiratory endurance fitness, muscle strength, and flexibility.[11]

METHODS

This type of research uses a quasi-experimental type, namely two groups of pre and post-test design research. The type of quasi-experimental research is a research design using two groups of subjects: group A, who are given yoga exercises, and group B, who are given zumba exercises. The yoga and zumba group will take measurements before and after doing yoga and zumba exercises. This research used the bleep test measuring instrument from March to April. Respondents in this study amounted to 30 respondents; 15 respondents were members of yoga exercises, and 15 were members of zumba exercises. Sampling in this study used a purposive sampling technique based on predetermined inclusion and exclusion criteria. Data collection used informed consent using the bleep test measuring instrument to measure VO2 max. After that, data processing and analysis were carried out using the paired sample t-test

and independent sample t-test using the statistical package for the social sciences (SPSS) 25 computer program.

RESULTS

The characteristics of the respondents observed in this study were age, gender, body mass index, and VO2 max value.

Figure 1 shows the characteristics of the research that included 30 respondents participating in yoga and zumba exercises with the following characteristics: 16 respondents aged between 17-25 years (53%) and 14 respondents aged 26-35 years (47%). Body mass index respondent data in this study had the characteristics of respondents with a normal BMI of 17-23 Kg/m2 (100%).

Figure 2 shows a difference between the VO2 max values before and after yoga and zumba exercises. The result is an increase in the VO2 max value before and after treatment, but zumba exercises increase more than yoga exercises.

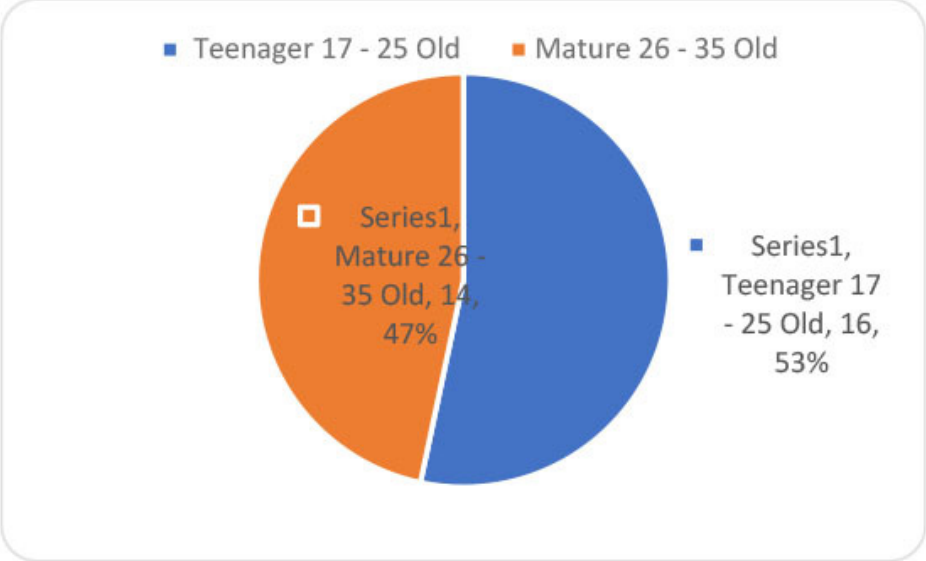

Figure 1. Characteristics by age.

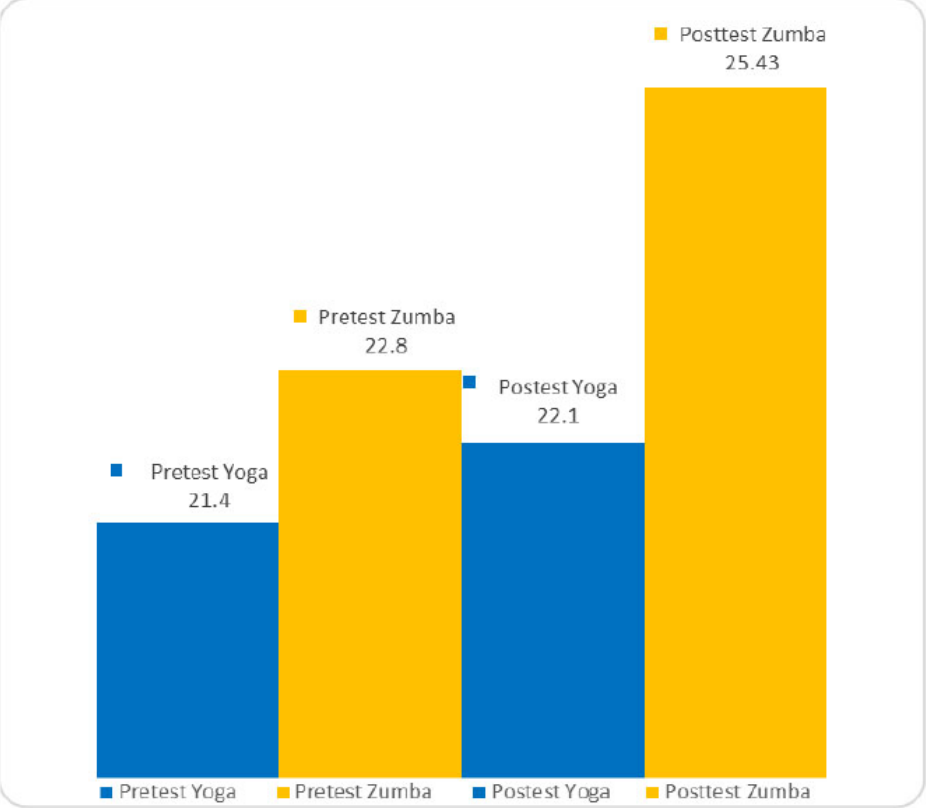

Figure 2. Characteristics of respondents based on VO2 max value.

DISCUSSION

Based on the age of the respondents in the respondent characteristics diagram based on age, it was found that 30 respondents with a range of adolescents aged 17-25 years were 16 people (53%), and adults aged 26-35 years were 14 people (47%). Respondents to yoga exercise were 15 people with a larger age range in adulthood, namely nine people, compared to teenagers, who were only six people. Yoga exercises are more in demand by those aged 25 years and over because, at that age, physical fitness will increase until it reaches a maximum at the age of 25-35 years. Then, there will be a decrease in the functional capacity of the whole body, but if you exercise diligently, this decrease can be reduced completely.[12] All respondents were female. There were also 15 respondents to Zumba gymnastics with a wider age range in their teens of 8 people than adults who were only 7. Zumba gymnastics is much liked and in demand by young people. Zumba has fast movements so that it can burn calories and fat and can maintain heart health.[13]

All respondents have a normal body mass index because body composition can affect the VO2 max value. VO2 max can be expressed in several milliliters of oxygen. Differences in a person's body composition result in different consumption.[14] So, obesity tends to reduce VO2 max.[15] Yoga exercises can be used to reduce and maintain body mass index because they will affect cardiorespiratory endurance in a better direction. Zumba exercises can burn accumulated fat to eliminate around 500-800 calories in 35 to 52 minutes.[16] Zumba moves can burn fat, be healthy for the heart, and improve balance and flexibility.[17]

Yoga exercises can affect cardiorespiration, as indicated by decreased blood pressure and pulse at rest.[18] Yoga exercises can increase muscle contractions, causing increased oxygen demand. Each yoga movement includes breathing arrangements to meet

oxygen needs.[19] Yoga exercises require the process of fulfilling energy needs. Namely, to move requires more oxygen (O2) which is obtained by inhaling the air around and outside the body through the respiratory system. Through the respiratory system, the oxygen obtained is used to break down glycogen into carbon dioxide (CO2) and water (H2O), which will produce adenosine trifoliate (ATP) and produce further energy.[20] Doing yoga exercises can increase the power of platelets on the fibrinogen's and adenosine diphosphate (ADP) layers' surface to cause aggregation.[21] The results of research conducted by Windiastomi (2014) stated that adipose cells are cells rich in blood vessels and innervation, which are important for the body in maintaining energy balance needs, energy storage in the form of lipids, energy mobilization in response to hormonal stimuli and changes in secretory signals. The main energy storage is stored in the form of triglycerides which can affect VO2 max.[22]

Zumba gymnastics uses the basic principles of aerobic exercise with the aim of training that requires calorie consumption and increases the cardiorespiratory system and whole-body muscle strength.[23] Zumba has power movements that cause contractions in large muscles and heart muscles. Fast movements burn calories and fat and can nourish the body and cardio.[24] Zumba exercises can increase VO2 max more than 2x because zumba exercises require extra energy, namely burning 1000 calories, while aerobics only burns 600 calories.[25] During exercise, pulmonary blood pressure increases due to increased cardiac output, so many previously closed pulmonary capillaries exist. Approximately 15% of the 300 million alveoli during exercise are tense/open. Normal paras increase 11 ventilation.[26] When the alveoli are open, it facilitates the diffusion of air with the blood capillaries so that more and more alveoli are open, so the process of taking up oxygen is also increasing. Doing zumba exercises can increase platelet adhesion to the surface of the fibrinogen and ADP layers, causing aggregation.[27]

The limitations of this study are the small sample size and only using one VO2 max measuring instrument. Other measuring instruments with a larger sample can be used as input in further research.

CONCLUSION

This study concluded that there were differences in the effect of giving yoga and zumba exercises on increasing VO2Max values. For future researchers, it is hoped that they can control respondents' activities outside of the research time and further develop research on yoga and zumba exercises. Respondents are expected to continue to practice yoga and zumba exercises regularly to maintain their VO2 max.

ACKNOWLEDGEMENT

The author would like to thank the Kirana Sumenep Gymnastics Studio respondents who have given time permission and are willing to be respondents during this research. Thanks to the research supervisor for his guidance and support during this research.

CONFLICT OF INTEREST

The authors declare there is no conflict of interest in this study.

ETHICAL CONSIDERATION

Before starting the study, the authors got the samples granted informed permission.

FUNDING

This research did not receive funding from any institution.

THE AUTHOR'S CONTRIBUTION

YAA developed the study design, collected and analyzed the data, and drafted the manuscript. AM and SAM interpreted the data analysis and drafted the manuscript.

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