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The Effect of Stick Dance Exercise to VO2 Max on ANC Semarang Gymnastic Studio Member

Andi Nurcahyo[1*], Yudhi Purnama[2]

[1]Civil Engineering, Semarang University, Indonesia
[2]Physical Education Health and Recreation, Universitas Wahid Hasyim, Indonesia

ABSTRACT

VO2 max is a critical indicator of cardiovascular fitness and aerobic capacity. Stick dance exercise is a low-impact, high-intensity activity that combines dance movements with resistance training. This study aimed to investigate the effect of stick dance exercise on VO2 max in ANC Semarang Gymnastic Studio members. Methods: This experimental study involved 30 randomly assigned participants to either a control group or an experimental group. The experimental group performed stick dance exercises for 12 times, while the control group did not participate in any exercise program. The results showed that the experimental group significantly increased VO2 max compared to the control group. The increase in VO2 max was 4,8% in the experimental group, indicating a substantial improvement in cardiovascular fitness. Stick dance exercises can effectively improve VO2 max in individuals new to exercise or with limited mobility. Implications and The findings of this study have implications for the development of exercise programs that cater to diverse populations. Stick dance exercises can be valuable to existing exercise programs, particularly for individuals seeking low-impact, high-intensity activities.

Keywords: Stick dance; Exercise; VO_{2max}

Correspondence:
*School of Sports and Exercise Medicine, University of Health and Allied Sciences, Ho (00233), Ghana; E-mail: fkusi@uhas.edu.gh

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INTRODUCTION

Aerobic capacity or VO_2 max is an important indicator in assessing a person's physical fitness, especially in physical activities that require cardiorespiratory endurance. O2max is the maximum volume of oxygen that the body can use per minute per kilogram of body weight during maximum physical activity. This value reflects the efficiency of the heart, lungs, and muscles in supplying and using oxygen. VO_2 max describes the body's maximum ability to absorb, transport, and use oxygen when intense physical activity is performed (Wilmore, 2004; Bahtra et al., 2023). Increasing VO_2 max has significant benefits in improving physical performance and overall health, including reducing the risk of cardiovascular disease (Basset, 2000). Physical activity that is done routinely can increase a person's physical endurance VO2 max (Candra & Setiabudi, 2021). Prescribing exercise intensity relative to a physiological threshold (e.g., ventilatory threshold) is shown to increase cardiorespiratory fitness response rates compared to when intensity is anchored relative to a maximum physiological value (e.g., maximum heart rates). It is, however, uncertain whether the increased response rates are primarily attributable to reduced

response variability, greater mean changes in cardiorespiratory fitness or both (Meyler et al., 2021).

Increasing VO2max can be achieved by improving the training quality for young players through planning and scheduling a regulated training, including the regulation of duration-intensity-recovery, with training methods adjusted to the age and personality of the player (Ahmad, 2022). Good cardiorespiratory conditioning can help improve their endurance, performance, and recovery during training and competition (Marsuna et al., 2024).

Various forms of aerobic exercise have been shown to be effective in increasing VO_2 max, such as running, cycling, and aerobic gymnastics (Wilmore, 2015). One form of physical activity that is currently developing is stick dance, a dance that involves rhythmic movements using sticks as aids. Stick dance not only has artistic and entertainment value, but can also be used as a fitness exercise that involves many muscle groups and stimulates the work of the cardiovascular system (Hidayat, 2023). Stick dance, as a form of exercise that combines dance movements and resistance training using sticks, is now starting to be widely used as an alternative form of physical exercise that is fun and has a positive impact on fitness .

Stick dance is a combination of body language and body shape, or body shaping. Its creation uses sticks, and movements with choreography in one musical unity. Not only does it burn fat, this sport also trains cardio intervals which can help burn fat and can help improve a healthier immune system (Sulistyaningsih, 2023). Previous studies have shown that rhythmic dancing can have a positive effect on increasing aerobic capacity. For example, a study by (Domene, HJ Pummel, 2016) showed that Zumba dance significantly increased VO_2 max in adult participants after eight weeks of training. Aerobic dance that is done regularly can improve physical and mental health. In addition, it has a positive impact on social relationships and increases self-efficacy. Aerobic dance is recommended as a recreational sport (Sport et al., 2023).

Examined the effect of a two- and three-day-per week aerobic dance program on the maximal oxygen uptake (Vo2max) of 18 college women. The women in the three-day-per week classes increased their Vo2 max by 10%. The women in the two day-per week classes did not increase their Vo2 max significantly. These results suggest that aerobic dance classes should be held three days per week in order to obtain an increase in Vo2 max of the participants (Knutzen, 2002). However, specific research on stick dance as a form of aerobic exercise and its effects on VO_2 max is still very limited.

This study is very important to examine the effect of stick dance training on increasing VO_2 max in ANC Semarang gym members, because with busy work hours, it is necessary to maintain fitness with physical activity with stick dance to increase VO2max capacity (Sonhaji et al., 2023) .

METHOD

This study uses an experimental method with a two-group pretest-posttest design, involving 2 groups given a pretest and a posttest. This method is used because this type of research is experimental in which there is an experiment on something to determine the effect or impact of a treatment (Tanjung, 2021), namely stick dance. The following is a design chart for a two-group pretest-posttest type of research.

Involving 30 of ANC Semarang Gymnastic members selected using random sampling technique. The research sample was given a pretest before being divided into 2 groups, using the bleep test. Then the group division used the ABBA Technique, group A as the experimental group and group B as the control group. The experimental group will be given

stick dance training treatment for 12 meetings on January-Februari 2025, while group B will not be given treatment.

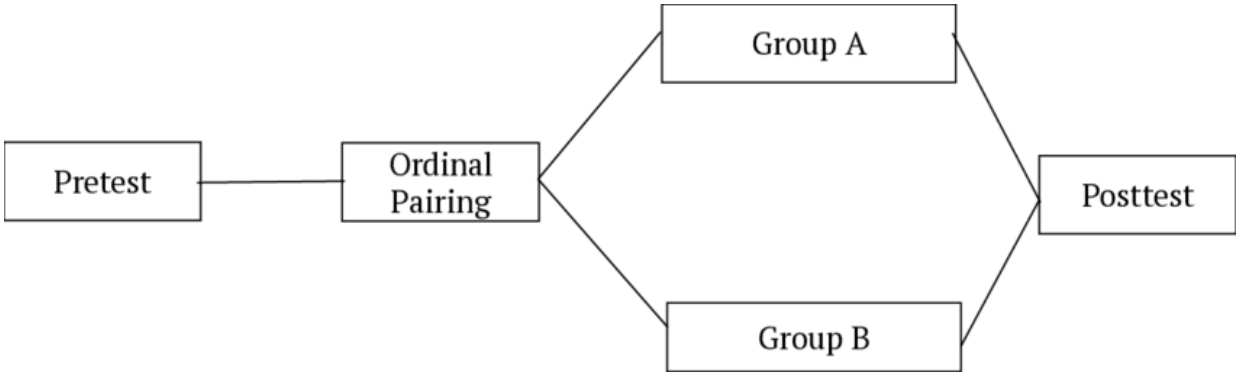

Figure 1. Two-Group Pretest-Posttest Design
(Rusli et al., 2024)

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Data collection techniques in this study used observation, testing and documentation (Girang Permata Gusti, 2023). Researchers observe members, then measure VO2max capacity with a bleep test, divide groups and finally conduct a final test after treatment. The experimental group was given stick dance treatment which was carried out at the ANC Semarang gymnastics studio, with the address Jl. Muradi, Taman Lebdosari Number 8, RT 5/RW 6, Kalibanteng Kulon, West Semarang District, Semarang City, Central Java 50135. While the bleep test was carried out in the Kalibanteng Kulon village field.

Data analysis was performed using the Shapiro-Wilk normality test and the paired sample t-test hypothesis test using SPSS version 27.

RESULTS

Pretest and posttest data consist of the results of the VO2max study. Pretest data were collected during the initial activities before the sample was given treatment (stick dance), and posttest data were collected after the sample was given treatment (stick dance). Table 1 shows the data obtained by the researcher.

Table 1. MFT Data with Beep Test Pretest-Posttest

No	Age	Pretest				Posttest			
		Levels	Return	Score	Category	Levels	Return	Score	Category
EKSPERIENTAL GROUP									
1	26	6	5	34,8	poor	7	2	37,1	below average
2	28	8	6	41,9	average	8	7	42,2	average
3	32	7	4	37,8	below average	8	3	40,9	average
4	35	8	2	40,5	average	8	6	41,9	average
5	38	5	5	31,4	below average	6	1	33,3	below average

6	25	10	7	48,9	above average	10	6	48,6	above average
7	29	7	1	36,8	below average	7	5	38,1	below average
8	30	6	4	34,4	poor	7	2	37,1	below average
9	30	8	3	40,9	average	8	5	41,5	average
10	26	9	7	45,6	above average	10	1	47,1	above average
CONTROL GROUP									
11	33	5	1	29,9	very poor	6	1	33,3	poor
12	34	5	4	31	poor	5	3	30,6	poor
13	25	6	5	34,8	poor	7	1	36,8	poor
14	29	7	2	37,1	below average	6	5	34,8	poor
15	27	9	6	45,2	above average	9	7	45,6	above average
16	35	8	5	41,5	average	8	5	41,5	average
17	27	7	4	37,8	below average	7	6	38,5	below average
18	30	6	3	34	poor	6	4	34,4	poor
19	34	7	2	37,1	below average	7	3	37,5	below average
20	26	9	8	45,9	above average	9	4	44,6	above average

Table 2. Maximal Oxygen Uptake Norm for Men (ml/kg/min)
Source: (Wood, 2025)

	Age (years)					
Rating	18-25	26-35	36-45	46-55	56-65	65+
Excellent	> 60	> 56	> 51	> 45	> 41	> 37
Good	52-60	49-56	43-51	39-45	36-41	33-37
Above average	47-51	43-48	39-42	36-38	32-35	29-32
Average	42-46	40-42	35-38	32-35	30-31	26-28
Below average	37-41	35-39	31-34	29-31	26-29	22-25
Poor	30-36	30-34	26-30	25-28	22-25	20-21
Very poor	< 30	< 30	< 26	< 25	< 22	< 20

From the table above, it can be concluded that the final category in the experimental group contains 4 samples of the average VO2max category, 4 samples below average and 2 sample above average. While in the control group there are 5 samples of the poor VO2max category, 2 samples below average, 2 samples below average, 1 sample average and 2 samples above average. The next step is to make descriptive statistical data processing which is presented in the table below.

Table 3. Beep Test Data Descriptions Eksperiental Group

Descriptive Statistic

Variable	N	Mean	Std.	Min	Max
MFT Pretest	10	39,3	5,35	31,4	48,9
MFT Posttest	10	41,19	4,47	33,3	48,6

The table above shows that the average VO2max result at the time of the pretest was 39.30 ± 5.35. The lowest VO2max result at the time of the pretest was 31.4 and the highest value was 48.9. Furthermore, the average VO2max result at the time of the posttest was 41.19 ± 4.47. The lowest VO2max result at the time of the posttest was 33.3 and the highest result was 48.6. There was an increase based on the results of the pretest and posttest so that there was a significant increase.

Furthermore, before continuing the data analysis, a prerequisite test is required. The prerequisite test carried out is a normality test to determine whether the data is in a normal distribution level or not. The normality test in this study used the Shapiro-Wilk Test because the sample used was less than 30 people. The results of the normality test on the MFT pretest and posttest data can be seen in the following table.

Table 4. Test of Normality

	Group	Shapiro-Wilk Statistic	df	Sig.	Result
MFT	Pretest Eksperiental Group	.973	10	.917	Normal
	Posttest Eksperiental Group	.944	10	.600	Normal
	Pertest Control Group	.943	10	.581	Normal
	Posttest Control Group	.937	10	.517	Normal

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Based on the table above, it is known that the significance value (p-value) produced by the experimental group and the control group, both pretest and posttest, is greater than 0.05 so that the data is considered to be normally distributed. The next step is to conduct a hypothesis test using the paired sample t-test in analyzing the difference between the two average scores obtained from the same sample. The data from the paired sample t-test can be seen in the following table.

Table 4. Paired Samples Test

Eksperiental Group	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
MFT Pretest – MFT Posttest	-.86000	2.48247	.78503	-1.096	9	.002
Control Group	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
MFT Pretest – MFT Posttest	-.44000	1.49384	.47239	-931	9	.376

Based on table 4 above, the sig. (2-tailed) value is 0.002. If the sig. value is less than 0.05, then Ho is rejected and Ha is accepted, meaning that stick dance can have an effect on increasing the VO2max capacity of ANC Semarang gymnastics studio members. While in the control group, the sig. (2-tailed) value of 0.376> 0.05 means that there is no effect because no special treatment was given to the control group, although the average increased.

Long-term intensive training can improve a person's endurance performance from Vo2max capacity (J. Lee, 2021). The training method used in this study was through stick dance to determine its effect on the VO2max capacity of ANC Semarang gymnastics studio members. Based on the results of the study, the sample underwent a stick dance training program for 12 meetings for 4 weeks, training was carried out 3 times a week. The results of the calculation of the average VO2max during the pretest and posttest showed a very good increase (Purnama & Ainun, 2021).

The final category in the experimental group contains 4 samples of the average VO2max category, 4 samples below average and 2 sample above average. The average pretest score increased from 39.3 to 41.19 during the posttest, which was 1.89 or 4.8%. This shows that there is an influence of stick dance on VO2max capacity. Thus, gymnastics instructors can use stick dance exercises to increase the VO2max capacity of their gym members.

CONCLUSION

The conclusion of this study is that members of the ANC Semarang gymnastics studio received an increase in VO2max of 4.8% from an average of 39.3 ml/kg/minute at the pretest to 41.19 ml/kg/minute at the posttest. Suggestions for other gymnastics studio trainers can use stick dance to increase the VO2max capacity of their respective members.

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CONFLICT OF INTEREST

The author declares that there is no conflict of interest in conducting this research, whether financial, personal, or professional, which could affect the results and objectivity of the study.

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