

The Impact of Water Aerobics and Aerobics Dance on Body Mass Index and Fat Percentage

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Abstract—Every individual fitness level will decline as age and weight will increase as the food energy gets from the food consumed every day will accumulate as a reserved fat. To improve the healthy lifestyle of one of them through physical activity, especially through sports activities. The type of exercise that can lose weight is water aerobics. Aerobic is an alternative for all adults who do not like sports on land and can be done by all ages. This research aims to observe the impact of water aerobics and aerobics dance on body mass index and fat percentage. This treatment was carried out 3 times a week for 6 weeks with the same intensity of 65% until 85% from the maximal pulse rate. The population used in this study were active university students, with a sample of 20 students divided into 2 groups of measles 1 (water aerobics) and group 2 (aerobic dance). The design in this study was *Randomized Pre-test Post-test Control Group Design* with sampling techniques accidental sampling. The research instrument used was a test of height, weight, and skinfold calliper. After analysed water aerobics and aerobics dance impact on body mass index and fat percentage. Another result found that water aerobics and aerobics dance training for 6 weeks can increase calorie expenditure which can reduce weight.

Keywords: *aerobics dance, body mass index, fat percentage, water aerobics, women university students*

I. INTRODUCTION

A passive lifestyle causes the biggest health problem in the society these days which keeps on increasing as someone gets older [1]. An individual's level of fitness will decrease and the weight will increase because the energy gotten from the foods consumed every day will be piled up as a reserved fat. Fatness and obesity contributed to heart disease, hypertension, diabetes, and other kinds of cancer, which also leads to difficulty in psychosocial and psychic [2]. The risk of obesity may lead to various degenerative diseases like Diabetes Mellitus, Hypertension, Hypercholesterol, and metabolic disorders which need further examination, clinically or by a laboratory test [3]. Body composition depends on the type of physical activity we daily do and also our dietary habit we consume.

One of the exercises which supposed to maintain body composition health for the society, and also applicable for everyone with affordable cost is aerobics dance that can be done three times a week for eight weeks [4]. According to Myers aerobics dance causes weight loss and decreases fat inside the body [5]. It is recommended to do aerobics dance regularly because it will give a significant effect on health if it is done properly and regularly [6].

Water aerobics is a popular activity these days. Water aerobics is one of movements done inside the water by using a shallow swimming pool [7]. Water aerobics and water fitness are kinds of aerobics that involve a long-period dynamic exercise with a medium intensity. The activity depends on the participant's age, health condition, and needs [8]. Water aerobics usually combine various techniques from aerobics including walking or running, going back and forth, jumping jacks, and some hand movements. According to research done by Niu, water aerobics can reduce blood pressure on overweight and obesity female that has hypertension [1]. This activity is recommended for obesity patient, elderly or parents, and pregnant women [8]. This activity minimalizes a crash because it is done inside the water; making this sport usually urged for people who had an injury or susceptible of muscle injury [4], at least 90% of the bodyweight supported by the water, so the risk of getting a bone or muscle injury is very small. As a heavy motion will be lighter due to that fact, there is a possibility for more variation of motion to be added. But, research that reveals the impact of water aerobics on women university students' body composition is still limited.

Therefore, this research aims to find out about the impact of water aerobics and aerobics dance on body mass index and fat percentage. Seeing research done by Kantyka about The Effect of Aqua Aerobics on Body Composition, Body Mass, Lipid Profile, and Blood Count in Middle-aged Sedentary Women stated that the experimental group showed a significant result on fat-free mass folds, muscle mass, and body fat percentage [8]. After 14 weeks of aqua aerobics program, it caused a significant statistic difference on the baseline, red blood cells, and the amount of haemoglobin for women at the age of 50 until 60.

II. METHODS

A. Research Design

The research design adopted in this research is by an experiment using Randomized Pre-test and Post-test Group Design that compares the treatment between two groups. According to Fraenkel, the first group is being called as experiment group and the second group is control group [9].

B. Participant

This research involved two instructors and 20 university active students divided into two groups; group 1 with water aerobics and group 2 with aerobics dance. Accidental sampling was used as a technique to take the sample by deciding it coincidentally and they can be used as a sample if they are suitable as the data source for the research. Besides that, other criteria that should be fulfilled are: active university students, female, not actively exercises or not participating in sports activity, wants to lose weight, overweight or obesity or has a BMI with an average of 23.7.

C. Instrument

Research instrument conducted in this research was by using test 4 site Skinfold Calliper to measure body fat density and measure the body height by using a stadiometer installed on the wall with no shoes allowed [10,11]. An accurate body weight measurement can be achieved when the sample uses a light outfit which makes the whole process easier. When the measuring happens, the sample is not allowed to wear a footwear [12]. Body Mass Index (BMI) can be calculated by using:

$$BMI = \frac{Weight (Kg)}{Height (m) \times Height (m)} \quad (1)$$

A normal BMI is 18-25. Someone is considered as thin if the BMI is less than 18 and fat if the BMI is more than 25. If the BMI is more than 30, it is considered as obesity [3].

To determine body fat folds, the researcher used skinfold calliper [13]. According to Mackenzie this test only needs for measurement on biceps, triceps, sub scapula, and suprailiaca [14]. Thenceforth, the result will be noted according to the shown scale and the researcher sums all of them.

A normal fat percentage for women at the age of 16 until 29 will be between 14-23,7. If the result is less than 14, it means that the fat percentage is deficient and if it is more than 14, it should be watched out because excessive fat causes various diseases. Wolters stated that normal fat inside a man's body is 15-20% and 20-25% for woman [15].

D. Treatment

Six weeks of treatment by water aerobics and aerobics dance exercise had the same intensity of 65% until 85% with a maximal pulse rate. With 20 university students as the sample, the activity was implemented for 45 minutes which includes 10 minutes of warm-up, 25 minutes of main activity, and 10 minutes of cool-down. Aerobics dance and water aerobics activities included in this research started with a warm-up

(marching), then continued with Neck Extensor and Flexor Stretch, Neck Muscle Movements. The next part would be for arms with Elbow Extensor (Triceps Brachii) Stretch, Finger Flexor, and Extensor Stretch. Then went to the next part for the waist with Hip Movement, Seated Lower-Trunk Lateral Flexor Stretch, and legs with Ankle rotation, Quadricep Stretch. Inti Single-step + butterfly, V step, Double Step, Mambo, jumping jack, Double Step diagonal + cross squat + tap, jogging, knee up + shoulder press, heel touch + biceps, Hicking + Chest, Toe touch + pumping at 120-130 BPM. The last part would be a cool-down activity.

E. Procedure

First of all, the researcher decided the population that would be observed and the sample would be explained the purpose and objectives of the research. The sample would receive an agreement paper if they agreed to be involved in the research. Next, Body Mass Index text pre-test was done by measuring the sample's height and weight, then the data would be calculated with BMI formula. The fat percentage test would be measured by using a skinfold calliper and it was done by using four measurements. Those were biceps, triceps, subscapular, and supra iliac [14]. Next, the treatment began and conducted for six weeks of training, both for water aerobics and aerobics dance with the same intensity of 65% until 85% from the maximal pulse. The activities conducted for 25 minutes and began with 10 minutes to warm-up and another 10 minutes for cool-down. This training carried out for three times a week in six weeks according to ACSM guidelines [16]. After 6 weeks of training, the researcher held a final test with the same test material as the pre-test.

F. Analysis statistic

Research statistics used paired sample t-test and independent sample t-test for this research.

III. RESULT AND DISCUSSION

Sample of 20 university students divided into two groups: group 1 (water aerobics) and group 2 (aerobics dance).

Group	Pre-test		Post-test		Paired Sample t-test	Independent Sample t-test
	Mean	Sidev	Mean	Sidev		
IMT Water Aerobic	24.60	2.608	24.27	2.705	.002	0.189
IMT Aerobic Dance	23.11	1.840	22.74	1.691	.024	
Body Fat Water Aerobic	28.92	2.073	25.95	2.811	.000	0.857
Body Fat Aerobic Dance	28.15	1.443	23.05	3.177	.002	

Body composition analysis on the first group was obtained with the score of BMI mean=24.60 and a standard deviation of 2.608. Meanwhile, for the post-test, this group has a BMI mean

of 24.27 and a standard deviation of 2.705. The body fat results came out with a mean of 28.92 and a standard deviation of 2.073 for pre-test and a mean of 25.95 with a standard deviation of 2.811 for the post-test. For another group, group two, the pre-test score obtained for BMI mean is 23.11 and has a standard deviation of 1.840. The post-test has a BMI mean of 22.74 and a standard deviation of 1.691. The body fat results also came out for this group with a mean of 28.15 and a standard deviation of 1.443 for the pre-test and a mean of 23.05 along with a standard deviation of 3.177 for the post-test.

From the table above, the paired sample t-test score comes out with a BMI of $.002 < 0.05$ for water aerobics. Thus, the data was significant. The BMI for aerobics dance was $.024 < 0.05$ which concludes that this data is also significant. The same thing goes to the body fat score with the result of $.000 < 0.05$ for water aerobics and $.002 < 0.05$ for aerobics dance. According to the data processing result, there is an independent sample t-test score on body mass index with a result of $0.189 > 0.05$ that makes the data not significant. With a body fat score of $0.857 > 0.05$, it can be concluded that the data is not significant.

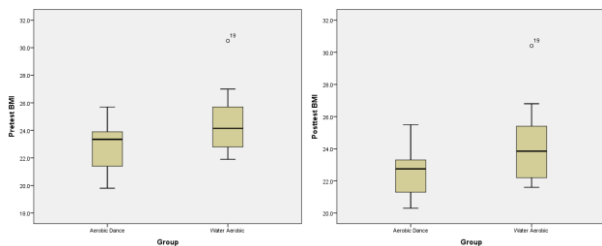


Fig. 1. Graphic data of pretest and posttest BMI from water aerobics group and aerobics dance group.

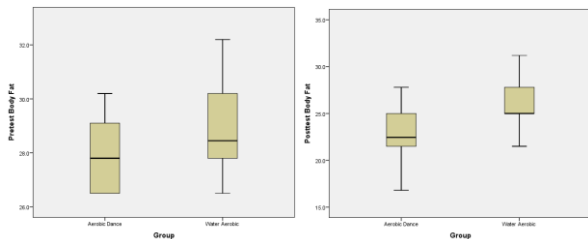


Fig. 2. Graphic data of pretest and posttest body fat from water aerobics group and aerobics dance group

This founding, the sample participated in water aerobics and aerobics dance program for six weeks and it caused a reduction in body composition. There is also a founding in the BMI pre-test for water aerobics with a mean of 24.60 and 24.27 for the post-test. Meanwhile, for aerobics dance, a mean score of 23.11 was obtained for the pre-test and 24.27 for the post-test. Body Fat results also showed both for aerobics dance and water aerobics. The water aerobics has a mean of 28.92 for the pre-test and 22.74 for the post-test. For the aerobics dance, the treatment obtains a mean result of 28.15 and 23.05 for the post-test.

Based on the result of data analyst conducted by researchers on water aerobics and aerobics dance, that both activities have a significant impact on body mass index and fat percentage. Other result state that aerobics dance activity has

been shown to significantly increase calorie expenditure which can help to reduce body weight, body fat, and cholesterol levels [17]. According to research Myers Aerobics exercise reduces fat mass in women, in losing weight and reducing body fat it is recommended to exercise regularly [5]. But currently the type of physical activity that is popular is water aerobics. There are a lot of researches who observed at water aerobics, one of them is water aerobics exercise are performed in creating endurance and developing muscle strength [7]. Besides water aerobics around 90% of body weight is supported by water, so the risk of bone or muscle injury is very small [4]. Water aerobics is useful for weight loss, besides water aerobics can reduce blood pressure in overweight and obesity in hypertensive women [18]. From some references showed above, all of them match with the result of this research that water aerobics and aerobics dance are proven to reduce body mass index and fat percentage.

The literature displays such abundant proof on the benefit of water-based exercise on the body, especially for body mass, body composition, muscle strength, flexibility, and VO2max.

IV. CONCLUSION

This research aims to test the impact of water aerobics and aerobics dance on the body mass index and fat percentage. A treatment conducted for six weeks with 20 university students as the sample divided into two groups. According to the data processing result and the data analysis, it appears that there is an impact that significantly increases. It also means that aerobics dance has an impact on body mass index and fat percentage because this physical activity was conducted regularly and it affected the body composition. From the data result of water aerobics impact on BMI and fat percentage, there is a change in weight because there is a decreasing in weight and body fat, which happens to the other aerobic sports that have a lot of benefits. One of them is to achieve an ideal body. However, the next result shows that there is no difference found from both of them because both aerobics dance and water aerobics are effective to lose body composition.

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