



## Aerobic in water is better than aerobic on land in the treatment of overweight teenage women

Gian Lisuari Adityasiwi<sup>1\*</sup>, Yoga Handita<sup>2</sup>, Marti Rustanti<sup>2</sup>

### ABSTRACT

**Background:** Having a beautiful body is a teenage woman's dream, but those who are overweight have difficulty losing weight because of an imbalance between energy intake and energy use. To prove that aerobics in water is better than aerobics on the land to lose weight teenage women.

**Methods:** We included overweight teenage overweight women. The research design used randomized pre and post-test designs. The research subjects were 22 overweight teenage women 18 – 21 years old and divided into two groups. Subjects get treatment three times a week for eight weeks. The first group received aerobics in

water, and the second group received aerobics on land. The body weight measurement using Camry scales.

**Result:** Based on the resulting test for aerobic in water, the  $p=0.01$ , and the result for aerobic in land  $p=0.624$ . Aerobic in water values with  $p<0.05$ , which states that aerobic in water has a significant effect on weight loss. However, aerobics on land results in a  $p>0.05$ , meaning that it is not significant for weight loss.

**Conclusion:** Aerobic in water is more effective than aerobic on the land to lose weight for teenage women.

**Keywords:** aerobic on the land, aerobic in water, overweight.

**Cite this Article:** Adityasiwi, G.L., Handita, Y., Rustanti, M. 2023. Aerobic in water is better than aerobic on land in the treatment of overweight teenage women. *Physical Therapy Journal of Indonesia* 4(1): 41-44. DOI: [10.51559/ptji.v4i1.72](https://doi.org/10.51559/ptji.v4i1.72)

### INTRODUCTION

The World Health Organization WHO (2005) states that globally, about 1.6 billion adults aged over 15 years experience being overweight (overweight), and approximately 400 million of them are categorized as obese.<sup>1</sup> By 2015, an estimated 2.3 billion adults will experience overweight, and 700 million will be obese.<sup>2</sup> Basic Health Research (*Riskesdas*) Indonesia (2010) states that the number of overweight and obese in the adult population over the age of 18 years the amount of 21.7%, of which 11.7% (27.7 million people) are obese.<sup>3</sup> Based on gender, the prevalence of obesity in women was higher (26.9%) than male (16.3%).<sup>4</sup> The higher level of per capita household expenditure tends to the higher prevalence of obesity.<sup>5</sup>

Based on Directorate of Community Nutrition in 1997 states that of about 210 million people in Indonesia in 2000, the estimated amount of overweight population reached 76.7 million (17.5%), and obesity amounted to more than 9.8 million (4.7%).<sup>6</sup> Based on these data, it can be concluded that overweight and obesity in Indonesia have become a big problem that requires serious treatment.

The aim of physiotherapy based on the World Confederation for Physical Therapy in 2011 relates physical therapy to identifying and maximizing quality of life and movement potential in promotion, prevention, treatment/intervention, habilitation,

and rehabilitation.<sup>7</sup> Health development is currently directed toward promotion and prevention by not ignoring curative and rehabilitative efforts.<sup>8</sup> Physiotherapy can take on the role of promotion and prevention, overcoming the adverse effects and the risk of obesity.<sup>9</sup> People who actively exercise will have a better body for sports and can burn more energy so that the fat deposits have not formed.<sup>10</sup> The problem is that most people who are already obese consider sport felt it was too late. However, some studies prove that obese people can still lose weight by exercising.<sup>11</sup>

Some ways to treat obesity include exercise, diet, and psychological therapy. From the research, physical exercise is much better compared to other interventions.<sup>12</sup> Physical exercise (sports) influences decreased levels of fat and cholesterol in the blood. Without doing any exercise, it is likely to get an attack heart disease will be more.<sup>13</sup>

Aerobic exercise means movement with oxygen. Aerobic can do on land and water.<sup>14</sup> In this experiment, aerobic on land with aerobic dance and aerobic in water with Aqua Zumba. Aerobic dance is a form of exercise accompanied by music with dance movements, ballet, and jazz. Aerobic dance is an exercise that has benefits for losing weight.<sup>15</sup> Zumba is a fusion of aerobics, agile and dynamic with a sexy Latin dance that can do exercise more fun.<sup>16</sup>

Zumba is one of the dance fitness categories with fast-tempo music and movements, making it

<sup>1</sup>Departement of Physical Therapy, STIKES Bethesda Yakkum Yogyakarta, Indonesia;

<sup>2</sup>Departement of Physical Therapy, Poltekkes Surakarta, Indonesia;

\*Corresponding to:

Gian Lisuari Adityasiwi;  
Department of Physical Therapy,  
STIKES Bethesda Yakkum  
Yogyakarta;  
[gian@stikesbethesda.ac.id](mailto:gian@stikesbethesda.ac.id)

Received : 2023-03-02

Accepted : 2023-03-26

Published : 2023-04-25

effective for burning calories.<sup>17</sup> Zumba has several branches, one of which is aqua zumba, which integrates philosophy zumba with water sports. Aqua zumba is classified as an aerobic exercise, called aquarobic means a cardiovascular exercise that is so effective for burning calories.<sup>18</sup>

## METHODS

Aerobic on the land has been carried out at the Politeknik Kesehatan Kampus II Surakarta, while the aerobic in water was performed in Swimming Pool Tirta Space Surakarta. The study design used two groups, pre-test and post-test design, with randomization. The study was conducted with two groups where group I was treated with aerobic exercise in the water, and group II was treated with aerobic exercise on land. The number of subjects taken at 22 with the randomization technique will be divided into two groups: the first group received treatment aerobic in water as many as 11 people, and group II received treatment aerobic on the land in as many as 11 people.

This study used the scaling and stadiometer tools to measure respectively the body weight and height to calculate the body mass index of subjects. In addition to the 2 tools measured, this study will use the skinfold caliper used for the measurement parameters change of treatment has been given. Subjects in this study were 18, 19, 20, and 21 years old. The subject is at most 19 years old in both group I and group II, with the number 6 (54.5%) in each group. Weight division is divided into four

classes. The number of subjects in the range of 67.3 to 80.5 kg in groups I and II together. Group II was not found subjects in the range of 80.6 to 93.8 kg and 93.9 to 107.1 kg.

Overweight BMI class divisions are divided into three classes: overweight, obesity, type I obese, and type II obese. In groups I and II, type I obese were found of 7 people (63.6%) were found in group II and 5 (45.5%) in group I. Determining the sample of the research was conducted through an initial screening with measurement of height and weight, then put into the formula BMI. Subjects who may be the subject of research is that having a BMI of more than 23.

The purpose of the research is to support the development of knowledge for physiotherapists in applying weight loss methods to overweight teenage women, which can prove existing theories regarding weight loss by doing aerobic activities on land and aerobics in the water. Before the study began, the sample first explained the purpose of the study. Then the sample was instructed to sign an informed consent as evidence of being willing to be a sample during the study. This research has received approval from the Research Ethics Commission of the University. The study sample signed informed consent before the research procedure was carried out.

## RESULTS

The research subjects were 22 overweight teenage women 18 – 21 years old. As shown in [Table 1](#), the mean age, weight, height, and BMI were 19,18 years; 68,22 kg; 157,86 cm; 27,33  $\text{kg}/\text{m}^2$ , respectively.

The first group was given aerobic exercises, and group II became the control group. The result is no significant weight loss and BMI between groups I and II, as shown in [Table 2](#). This indicates that the two groups are homogeneous study subjects.

**Table 1. Characteristic Sample Study.**

Characteristics	Age	Weight	Height	BMI
N	22	22	22	22
Mean	19,18	68,22	157,86	27,33
Maximum	21	100,10	165	38,57
Minimum	18	54,8	151	23,05
SD	0,853	10,694	4,324	3,873

**Table 2. Distribution Sample Study.**

Characteristics		Group I		Group II	
		Frequency	Percent	Frequency	Percent
Age (years)	18	1	9,1 %	3	27,3 %
	19	6	54,5 %	6	54,5 %
	20	3	27,3 %	1	9,1 %
	21	1	9,1 %	1	9,1 %
Body Weight (kg)	54,0-67,2	4	36,4%	6	54,5%
	67,3-80,5	5	45,5%	5	45,5%
	80,6-93,8	1	9,1%	0	0%
	93,9-107,1	1	9,1%	0	0%
Body Massa Index (BMI)	Risk Obese	3	27,3 %	3	27,3 %
	Obese I	5	45,5 %	7	63,6 %
	Obese II	3	27,3 %	1	9,1 %

**Table 3. Data Analysis.**

Characteristics	Group I	Group II
Homogeneity Test ( <i>p</i> -value)		.063
Pre and Post Test ( <i>p</i> -value)	.010	.624
Difference Post Test ( <i>p</i> -value)		.168
Mean Before	72.44	64.01
Mean After	70.50	63.66
Difference Mean	2.68%	0.54%

The multivariate data analysis in Table 3 showed a *p*-value= 0.063 in the homogeneity test. There were significant differences between the pre-test and post-test of group I and the pre-test and post-test of group II. However, there was no significant between the mean difference after treatments of group I and group II.

## DISCUSSION

The subjects who began the study are 22 people who are semester students 2, 4, and 6 of the Ministry of Health Polytechnic Surakarta. Basic Health Research (Risksedas) Indonesia (2010) states that by sex, the prevalence of obesity in women is higher compared to males.<sup>5</sup> Because of this fact, this study used female subjects. The purpose of this study was to compare aerobics in water and aerobics on the land toward decreasing body weight in overweight teenage women.

Based on research data, are reduced BMI by 0.46. This matter is in line with research conducted by Shenbagavilli et al. (2008) studied 30 obese men for 8 weeks to split into 2 groups.<sup>19</sup> The first group was given aerobic exercises, and group II became the control group, and the result was no weight loss and BMI significant (*p* < 0.01). From the test results, Levene's test of the state before treatment scored 0.261 (*p* > 0.05), which means a significant difference between the body weight of Group I to Group II. This indicates that the two groups are homogeneous study subjects, which means departing from the same state.

Wilcoxon test results before and after the treatment given to Group I obtained a value of *p* = 0.01 (*p* < 0.05). It shows no difference, which means there is a significant effect of giving aerobic treatment in water to decrease body weight in overweight teenage women. In the Wilcoxon test results before and after a given treatment group II *p* value = 0.624 (*p* > 0.05). It shows that there is no difference, which means there is no significant effect of giving aerobic treatment on the land to decrease body weight in overweight teenage women. To prove the fourth hypothesis regarding better treatment in reducing body weight, it is

necessary to calculate the mean difference between before and after treatment in each group.<sup>20</sup> The result of the study is aerobics in water is better than aerobics on land.

Aerobics in water is psychological in the form of recreation and entertainment so clients don't feel bored.<sup>21</sup> Aerobic in water is safe for the knee joints and waist, especially for those who are overweight. A body that is immersed in the water up to the neck bears about 10% of the body weight, a body that is immersed up to the chest accounts for about 25-35% of the body weight, and a body that is immersed to the waist bears about 50% of the body weight.<sup>22</sup> Additional reference material in science regarding the handling of overweight problems in women by being given aerobics in water so that it can be developed in the future.

The limitation of this research is the small number of samples. In addition, this study did not control for caloric input, which could bias these results. I suggest that future studies have a longer research time with various types of samples, not just for young women.

## CONCLUSION

This study confirmed that aerobics in water was more effective than aerobics on land in losing weight for teenage women. This result is based on the data that has been presented and the explanations that have been described.

## ETHICAL CLEARANCE

The Commission for Research Ethics, STIKES Bethesda Yakkum Yogyakarta.

## CONFLICT OF INTEREST

This study does not have any conflict of interest.

## ACKNOWLEDGEMENT

The authors thank all parties involved in this analytical observational research.

## FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## AUTHOR CONTRIBUTIONS

GLA, YH conceived the study design and data collection and drafted the manuscript; MR collected the data and revised the manuscript.

## REFERENCES

1. WHO. Preventing chronic diseases: a vital investment: geneva: a community-based survey in Haikou. PLoS ONE, 2005;13(6), 1–11.
2. Schmidhuber PS and Josef., Obes chronic dis. Expert Paper, 2011:1–33.
3. Tjepkema M., Adult obesity in Canada: measured height and weight. Nutr Find from Can Community Heal Surv. 2005;1(82):1–32.
4. Bushnik T. Women in Canada : a gender-based statistical report the health of girls and women. Stat Canada. 2016;(89):10-15.
5. Kemenkes RI., Profil kesehatan Indonesia 2010. 2010. 58:p. 30-35
6. Sulistyowati LS, Andinisari S, Ramayulis R., Buku obesitas-1. kemenkes ri. 2015. 1–50 p1-10.
7. Wickford J, Duttine A. Answering global health needs in low-income countries: considering the role of physical therapists. World Medical & Health Policy. 2013 Jun;5(2):141-60.
8. Ramadhani NAR., Literature review: the role and effects of hospital health promotion on health politics. Indones J Public Heal. 2021;16(2):327.
9. WHO. Integrating diet, physical activity and weight management services into primary care [Internet]. World Health Organization. 2016. 38 p. Available from: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0016/324304/Integrating-diet-physical-activity-weight-management-services-primary-care.pdf?ua=1](http://www.euro.who.int/__data/assets/pdf_file/0016/324304/Integrating-diet-physical-activity-weight-management-services-primary-care.pdf?ua=1)
10. Agatha S, Aryantari S, Thanaya P, Putu L, Sundari R, Hendra M, et al. Overview of musculoskeletal disorders in undergraduate students. Physical Therapy Journal of Indonesia. 2022;3(2):49–53.
11. Marcinkiewicz A. Attitudes to obesity findings from the 2015 British social attitudes survey. Br Soc Attitudes 2016;25(1):5-10. Available from: <http://www.bsa.natcen.ac.uk/media/39130/bsa-33-attitudes-to-dementia.pdf>  
<http://www.bsa.natcen.ac.uk/media/39132/attitudes-to-obesity.pdf>
12. Meti B. The impact of exercise (physical activity) and healthy lifestyle (eating) among the youth: a literature review. Rev Res. 2019;8(4):1–12. Available from: <http://oldror.lbp.world/UploadedData/7143.pdf>
13. Marcinkiewicz A., Heart and stroke foundation of canada. living well with heart disease. Indones J Public Heal. 2016.2(5);104.
14. Colzato LS, Loeffler J, Cañal BR. Aerobic exercise. theory-driven approaches to cogn enhanc. Indones J Public Heal 2017;214–23.
15. Saputri H, Sin TH. The effect of low impact aerobic exercise, mixed impact and training motivation on weight loss percentage of army wives at batalyon infantry 133 YS Padang. 2020;464(Psshers 2019):839–47.
16. Saputri IA. Hubungan senam zumba dengan indeks massa tubuh. Rev CENIC Ciencias Biológicas [Internet]. 2016;152(3):28. Available from: <file:///Users/andreataquez/Downloads/guia-plan-de-mejora-institucional.pdf>  
[http://www.revistaalad.com/pdfs/Guias\\_ALAD\\_11\\_Nov\\_2013.pdf](http://salud.tabasco.gob.mx/content/revista%0Ahttp://www.revistaalad.com/pdfs/Guias_ALAD_11_Nov_2013.pdf)  
<http://dx.doi.org/10.15446/revfacmed.v66n3.60060>  
<http://www.cenetec>.
17. Cahya AS, Rahayu S, Mukarromah SB, Sumartiningsih S. The effects of zumba and strong by zumba on body fat and circumference in women aged 20–40. J Sport J Penelit Pembelajaran. 2021;7(3):430–41.
18. Agatha, Stanisela., Thanaya, S.A.P., Sundari, L.P.R., Nugraha, I.P.M., Overview of Musculoskeletal Disorders in Undergraduate Students: Literature review. Physical Therapy Journal of Indonesia. 2022; 3(2).
19. Goenadi DH, Santi LP. Kontroversi Aplikasi dan standar mutu biochar. J Sumberd Lahan. 2020;11(1):23.
20. Fall JS. Solutions to homework 5. 2001;2(May):18–21.
21. Bure A. Physical activity in the water and the human body. J Sport J Penelit Pembelajaran. 2019.4(2):1-10 Available from: <https://www.theseus.fi/handle/10024/167487>
22. Winter EM, Jones AM, Davison R, Bromley PD, Hecser TH. Sport and exercise physiology testing. The British association of Sport and Exercise Sciences Guide. 2007. 1–284 p.



This work is licensed under a Creative Commons Attribution