Aerobic Exercise Has Positive Effects on Menstrual Cycle

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Article Info	Abstract
	The purpose of this study was to determine the effect of aerobic exercise on obese women. The research design used was a pretest-posttest two treatment design. The subjects involved in this study were 22 women divided into 2 groups, including the aerobic dance group and the Zumba group. This study was conducted 3 times a week for 12 weeks with 65-85% intensity of the maximum pulse rate. Menstrual cycle data were obtained using the interview technique and menstrual questionnaire. The results of this study indicated that aerobic dance and Zumba did not affect the menstrual cycle. This study concludes that aerobic exercise is good to do because it does not affect the menstrual cycle.

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INTRODUCTION

Obesity is increasing worldwide every year (Aizawa & Helble, 2017). More than 650 million people are experiencing obesity, where 13% of them are aged 18 years and over (World Health Organization, 2019). An unhealthy lifestyle is one of the main factors causing obesity (Kapoor et al., 2019). Obesity could causes various diseases, such as hypertension, diabetes mellitus, cardiovascular disease, stroke, cancer (Sharafi et al., 2019), to death (Talmor & Bruce, 2014). In addition, obesity also affects the reproductive system of both men and women (Pasquali, Patton, & Gambineri, 2007).

The reproductive system will be disrupted in an obese person; although the problem can be experienced by both men and women, the percentage of reproductive disorders in women is higher than in men (Pickett-blakely & Uwakwe, 2016). The results of a study prove that adult women are at a higher risk of obesity (40.8%) than adult men (36.5%) (Hales et al., 2018). It has a significant effect on the percentage of men (8% - 30%) and women (8% - 52%) in Southeast Asia (Rachmi, Li, & Baur, 2017).

Obesity will increase in female at reproductive age (Lim, Han, Young, Hye, & Sook, 2019). The reproductive age of women is around 15 - 49 years (Badan Litbang Kesehatan, 2018). In reproductive age, reproductive disorders caused by obesity include oligomenorhae or amenorhae (Seif, Diamond, & Nickkho-amiry, 2015), anovulation, subfertility, infertility (Talmor & Bruce, 2014), and dysmenorrhea before menstruation. In the last 3 decades, obesity in women at reproductive age can affect fertility and pregnancy (Sermondade et al., 2019). Obese women have a risk of infertility 3 times higher than women with a normal body weight (Mitchell & Fantasia, 2016). Fertility can be predicted by assessing the menstrual cycle every month (Sermondade et al., 2019).

Menstruation is a bleeding caused by the shedding of the inner wall of uterus (Endometrium), where the endometrial lining is prepared to receive embryo implantation; this bleeding occurs periodically and the interval between menstruation is known as one menstrual cycle (Purwoastuti & Wahyuni, 2015). The menstrual cycle of women varies depending on the influencing factors (Sermondade et al., 2019), such as hormonal irregularities, nutrition, stress, reproductive disorders, lack of physical activity, weight gain, and obesity. Physical activity is known to have a positive effect on reducing obesity and reproductive disorders (Bo-Yeon Kim et al., 2017; Suprapti, 2019).

Physical activity affects reproductive hormones and ovulation (Ahrens et al., 2014). During performing physical activity, skeletal muscles produce and release myokines in autocrine, paracrine, and endocrine behaviors, thus the body's metabolism increases, which proliferates insulin sensitivity and fat oxidation (Alizadeh & Alizadeh, 2020). The increase of body fat is caused by the consumption of unhealthy and low nutrient foods (Ruano, Lucumi, Albán, Arteaga, & Fors, 2018), which is related to obesity that could cause reproductive disorders (Pasquali et al., 2007). This reproductive disorder occurs at ovulation time, thus it affects the menstrual cycle (Seif et al., 2015). Besides physical disorders, reproductive disorders affect psychological factors (Iersel, Kiesner, Pastore, & Scholte, 2016). Physical activity can reduce pain, relieve stress, and improve mood and health because physical activity can increase the release of several neurotransmitters, including natural endorphins (natural painkillers from the brain), estrogen, dopamine, and endogenous opiate peptides, change the reproductive hormone secretion, suppress prostaglandins from being released, and also increase the estrone-estradiol ratio (Kusumaningrum, Nastiti, & Dewi, 2019). However, physical activity with a high intensity is also associated with menstrual disorders, because there is a disturbance through the hypothalamic-pituitary-adrenal axis, such as hormone suppression and gonadotropin release since exercise-related hypothalamic dysfunction can delay menarche and disrupt the menstrual cycle by limiting luteinizing hormone (LH) and follicle stimulating hormone (FSH) secretions (Ahrens et al., 2014). In addition, physical activity can reduce chronic diseases (Shin, Lee, & Belyea, 2018).

It is recommended that adolescents and adults do physical activity for 60 minutes per day with moderate intensity to reduce hypertension and obesity (Towner et al., 2019). Endurance training focuses on aerobic exercise with a low intensity and a long duration (Bompa & Haff, 2009). According to researches, endurance training for lossing weight should be carried out 2-3 times per week (Tugusi, Manca, Bergamin, & Blasio, 2018), for 8-12 weeks (Delextrat, Warner, Graham, & Neupert, 2016), with 65 - 85% intensity (Giriwijoyo, 2017),

for 40 - 60 minutes in each session (Delextrat et al., 2016). Endurance training or aerobic exercises include walking, jogging, swimming, cycling, and aerobic dance (Hürter et al., 2019). Similar to aerobic dance, currently, there is a new interesting and popular activity named Zumba (Samy et al., 2019).

Aerobic and Zumba exercises are popular physical activities among women (Tugusi, Manca, Bergamin, & Blasio, 2018). Aerobic exercise reduces blood glucose level by increasing the glucose uptake (Shin et al., 2018). Aerobic exercise can increase insulin action, lipid profile, glycemic levels, and blood pressure, reduce the risk of cardiovascular disease, decrease body weight, and reduce mortality (Saghebjoo, Nezamdoost, Ahmadabadi, & Saffari, 2018). The high level of insulin can affect the reproductive system, which results in anovulation (Talmor & Bruce, 2014).

Based on previous research, aerobic exercise has benefits for menstrual disorders (Kannan, Chapple, Miller, Claydon-mueller, & Baxter, 2019). Meanwhile, another research states that Zumba has benefits for reducing pain during menstruation (Samy et al., 2019). The lack of research leads to the need for a more focused research on the effect of aerobic exercise on primary dysmenorrhea (Kannan et al., 2019). Therefore, the researchers wanted to know the effect of aerobic exercises, in this case aerobic dance and Zumba, on the menstrual cycle of obese women.

METHODS

Participants

The participants were 22 S Fitness Center members chosen through a purposive sampling by considering the set criteria. The criteria included active members of S Fitness Center, had a BMI> 25 kg / m2, aged 15-49 years, and experienced complaints during menstruation.

Sampling Procedures

Subjects were selected based on the criteria needed by researchers. The study involved 58 people who were interested in participating in the study, aged 20 - 42 years with no history of chronic diseases. Their body weight, body mass index, and body fat percentage were measured. The measurement found that 33 of them were obese and had menstrual complaints as well.

Furthermore, based on interviews and questionnaires, there were 28 subjects who had a commitment to participate in the training. However, when the research progressed, there were only 22 cooperative subjects participating in the research.

Materials and Apparatus

The instruments used in this study were a menstrual cycle and menstrual pain symptom questionnaire (Sinaga et al., 2017) and interviews. The first test was an interview which was aimed to find out the feelings and complaints experienced before and during menstruation and the purpose of being willing to participate in this research. The next test was filling out questionnaire items related to pain before to after menstruation, experienced symptoms, calculation of menstrual periods, and factors affecting menstrual disorders.

Procedures

The procedure of this research began with selecting subjects based on the criteria required by researchers at S Fitness Center. There were 22 obese female subjects who were willing to become research subjects. All subjects filled out and signed the consent form to become research subjects by following the rules set by the researchers. Furthermore, the researchers conducted interviews regarding the purpose of the willingness to be the research sample, the complaints, and symptoms of menstrual disorders. Next, the subjects filled out a questionnaire containing questions about menstrual disorders and the calculation of the previous 3-6 month menstrual period. After that, the subjects were divided into 2 groups, including Aerobic Dance group and Zumba group.

The training process was carried out 3 times per week, for 12 weeks, with 65 - 85% intensity for 60 minutes in each session. The intensity was increased after 3 times of meeting. The program included both aerobic dance exercise and zumba exercise. Before starting the exercise, the pulse rate was measured 80-100 times/minute, then the training process was started. After 10 minutes of warm-up, the pulse measurement was repeated until it ranged from 120-130 times/minute. In 45 minutes, the subjects performed core movements according to the intensity, then the pulse measurement was repeated. The next stage was cooling down for 5 minutes until the pulse dropped back to 110-120 beats/minute. The intensity was adjusted to the sit-

uation and conditions of the subject. Pulse measurements were taken before, during, and after training.

After completing 12 weeks of training, a final test was carried out to evaluate the study, where the final test was conducted by interviewing the subjects and filling out a questionnaire related to the changes they felt before menstruation and during menstruation after participating in this study. The next stage, the subjects filled out a questionnaire to compare the changes of symptoms they felt before menstruation and during menstruation after completing the training process, including for aerobic dance training and zumba training. After obtaining the data, the researchers conducted an evaluation by calculating the obtained data from both preliminary test and final test. The data analysis was then performed

Data Analysis

The data analysis of this study used the Statistical Package for Social Science (SPSS) VER application 16.0. The data analysis was conducted to determine the menstrual cycle using Paired Sample T-Test.

RESULT

After 12 weeks of aerobic dance and zumba trainings for obese women, the mean of menstrual cycle results from the initial test and final test, after 12 weeks of aerobic and zumba trainings, were obtained.

Table 1. The Steps of Nutrition Education Implementation based on The Type of Treatment

Group	Pretest		Posttest		Paired Sample T-Test
	Mean	SD	Mean	SD	
Aerobic Dance	31	3.01	31	3.85	0.789
Zumba	30	3.19	30	4.10	0.941

Table 1 describes the mean of initial menstrual cycle test of the aerobic dance group, which is 31 days with a standard deviation of 3.01. Meanwhile, the initial test mean of the Zumba group is 30 days with a standard deviation of 3.19. After the aerobic and zumba trainings, the mean of the final menstrual cycle test of the aerobic exercise group was 31 days with a standard deviation of 3.85. Meanwhile, the mean of final test of the zumba group was 30 days with a standard deviation
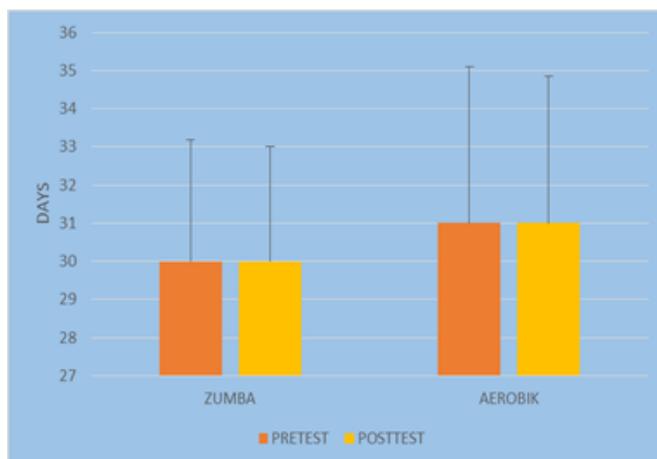
of 4.10.

Figure 1. The Comparison of Menstrual Cycle between Aerobic Dance Group and Zumba Group (Data Mean ± SD)

Figure 3 illustrates that there was no increase or decrease of the menstrual cycle in the two groups. Based on the statistics presented in Table 1, the aerobic group obtained sig. 0.394> α 0.05, while the zumba group obtained sig. 0.470> α 0.05. It concludes that Ho is accepted. It indicates that there is no effect of aerobic dance and zumba exercise on the menstrual cycle.

DISCUSSION

Based on the data obtained from endurance training on the menstrual cycle, there was no significant effect of Aerobic dance exercise and Zumba exercise on the menstrual cycle. The training in this study was carried out for 12 weeks. It resulted in a decrease of body mass index, but it had not had an effect on the menstrual cycle.

The menstrual cycle is influenced by hormonal changes (Sinaga et al., 2017), stress (Kandou, Tombokan, & Pangemanan, 2017), nutrition, and genetics (Simbolon, Sukohar, & Ariwibowo, 2016). These factors result in menstrual cycle differences in each subject. However, it appeared that all of the subjects gained a category improvement into the normal category. Normal menstrual cycle is 28-35 days, with 3 - 7 days of bleeding (purwoastuti & wahyuni, 2015).

Although the data did not yield an increase or decrease in menstrual cycles after endurance training, the subjects experienced positive psychological improve-

ments and a decrease in menstrual pain. Endurance training aims to reduce pain during menstruation (Kannan et al., 2019), because it has been proven that aerobic physical activity can affect the production of beta-endorphins which are mainly associated with changes in pain (Naugle, Fillingim, & Riley, 2012). In addition, there are also benefits of physical activity, including an increase in anti-inflammatory cytokines, which function to reduce pain (Leung, Gregory, Allen, & Sluka, 2016).

It is recommended that women in menstruation period do not do sports with excessive circular movement intensity (Kannan et al., 2019), because hormonal changes that cause weakness in the ligaments, especially the acl knee, occur during menstruation period (Julian, Hecksteden, Fullagar, & Meyer, 2017), while the sport with the lowest rotating and cutting movements is running (Kannan et al., 2019).

This study, actually, could produce greater changes in the menstrual cycle or pain during menstruation. However, there were limitations of the researchers in conducting this study, such as the limited period of the study, the less conducive situation and conditions, and the unpredictable condition of each subject. It would be better if the further research considers the situation and conditions of the sample and the process of the research and adds variables of the study, such as hormones, nutrition, and genetics, because these are factors that affect the menstrual cycle.

CONCLUSION

This study found that there was no significant difference of the effect of aerobic exercises, such as Aerobic dance exercise and Zumba exercise, on the changes of the menstrual cycle. Therefore, it concludes that aerobic exercise has a positive effect because it does not affect the menstrual cycle.

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