Rhythmic Gymnastics Effectively Reduce Body Mass Index in Weight Loss for Preschool

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Keyword: Rhythmic gymnastics, Weight Loss, Preschool

Abstract: A child who experiences problems of excessive nutritional value when he is an adult will cause dangerous diseases such as cardiovascular disorders and diabetes. Being overweight can also affect a child's intelligence. In children with overweight status, intelligence can experience a decrease due to a decrease in creativity and limitation when doing activities due to body conditions that are not free to move, so that makes children lazy to do something. Rhythmic gymnastics (Rhythmic gymnastics) increases the ability of muscles to produce energy aerobically and undergoes a metabolic process whose source of energy comes from burning fat. The purpose of this study was to determine the effect of rhythmic gymnastics training on decreasing body mass index of RA Muslimat Tarbiyatunnasi'in Paculgowang students in Jombang. The research design used was the One Group Pre-test Post Test Design with a sample of 22 people, then BMI was measured using BMI / U, and the nutritional status was obtained using the Z-score formula. This research was tested with the Wilcoxon test and obtained a significance value smaller than 0.05 (0.00 <0.05) this means that H0 is rejected and H1 is accepted. Conclusion: There is an effect of rhythmic gymnastics on the decrease in body mass index. Keywords: Body Mass Index, Rhythmic gymnastics, RA Muslimat Tarbiyatunnasyi'in.

1 INTRODUCTION

Indonesia is a developing country that has a problem with dual nutritional status. The problem of dual nutrition that is being experienced by Indonesia includes the problem of undernutrition and the problem of over nutrition. The problem of obesity in Indonesia based on data taken by Riskesdas in 2007 up to 2013, children aged 5-12 years tend to increase. In 2007 the level of obesity at the age of 5 to 12 years was 6.4%. Increase that number in 2010 as much as 9.2%. Riskesdas in 2013 obtained data in the form of the prevalence of obesity aged 5 to 12 years, ages 13 to 15 years, and ages 16 to 18 years stated in sequence, namely 8.8%, 2.5%, 1.6% (*Riset Kesehatan Dasar*, 2018). From this data, the results obtained in the form of obesity and obesity are more common in pre-school children compared to adolescents. The problem of over nutritional status in Indonesia is still relatively serious, with a prevalence of 18.8% with 10.8% with the nutritional value of fat and 8.8% with the nutritional value of obesity. National prevalence results in Indonesia show excess weight for the age group of 6-14 years in men is 9.5%,

while for women, it is 6.4% (Ermona and Wirjatmadi, 2018).

Obesity can occur if there is an imbalance between incoming energy intake with outgoing energy intake so that it will accumulate into excessive fat. The causes of obesity and obesity in children are excessive food intake, such foods as fast food, sugary drinks, high-calorie unhealthy snacks that exist in the school environment, and are not matched by the habit of consuming enough vegetables and fruit (Frutuoso *et al.*, 2016). Also, other causes of obesity in early childhood are not given breast milk during infancy. At the time of the baby, the child is given formula milk with a dose that is not appropriate or exceeds that required by the child. Children between 4 and 7 years old are vulnerable to be affected by more nutrition (Bobo-Arce and Méndez-Rial, 2013). Therefore, children aged 4 to 7 years need to get more attention related to eating patterns to form good eating habits (Ayu and Sartika, 2011). In children who experience more nutritional problems is a problem serious. The problem of nutritional value in children can increase the risk of various kinds of chronic diseases (Hecht, 2015).

Poor physical activity can result in the occurrence of over nutrition, which, in principle, is where more nutrition occurs due to an imbalance between the incoming energy and the energy that is released every day (Fernandez-Villarino, Bobo-Arce, and Sierra-Palmeiro, 2013). The energy that will be released by the body depends on one's daily activities with advances in increasingly sophisticated technology, creating a situation where lifestyle changes become sedentary or less mobile. As a result, food that will enter the body cannot be processed properly by the body, and food intake is stored in the form of fat tissue (Andini, 2016).

Characteristics of good physical activity given to early childhood, namely by (1) giving a variety of movements to get new experiences. Learning like forms of games and competitions. (2) stimulates the development of the five senses in children. (3) developing imagination or fantasy, and (4) moves to the rhythm/song or story (Paiman, 2009).

Research conducted (Prihatin, 2016) explains the benefits of rhythmic gymnastics. According to Mukhloid (2014), rhythmic gymnastics can reduce and burn excess fat in the body, improve the appearance of certain, such as the thighs of the arms, abdomen, and legs, increase lung endurance, and heart. Sean Cadence is a program for weight loss. If you practice with a mild intensity will increase your appetite, and if you practice with a heavy intensity will suppress hunger because there is a lot of blood circulating in the active muscle area and not in the stomach area (Andini, 2016). Also, rhythmic gymnastics can increase flexibility, balance, coordination, agility, endurance, and able to do other activities or sports (Kadi, Halida and Yuniarni, 2018).

2 METHODS

This study uses quasi-experimental with one group pretest and posttest design approaches that aim to determine the effect of rhythmic gymnastics on decreasing body mass index of RA Tarbiyatunnasi'in Jombang students who are overweight (Hilgers, Heussen and Stanzel, 2018). The number of respondents in this study was 22 people. The sampling technique is purposive sampling with several inclusion and exclusion criteria. Respondents measured body weight and height then calculated using BMI / U and using a Z-score to classify the nutritional value in children. The training program provided five meetings a week. The time duration is 30 minutes. This research conducted from February to March 2019. Analysis of the data used to test the

hypothesis in this study was to use the Shapiro Wilk test (Warner *et al.*, 2018).

3 RESULT AND DISCUSSION

Sample characteristics can be seen in the following graphic image:
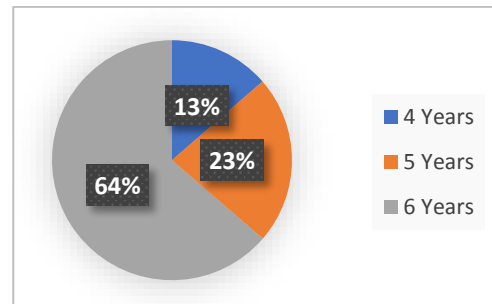
3.1 Characteristic based on Age

Figure 1: Characteristics by Age

Characteristics of respondents by age who experienced the most nutritional value in the age range of 6 years with a number of 14 people with a percentage of 63.6%.
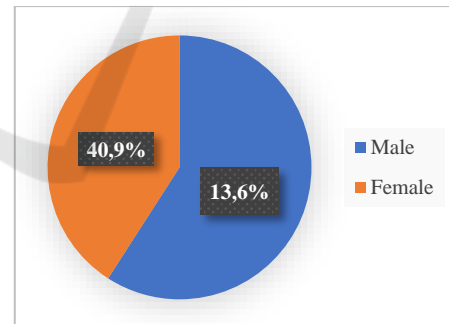
3.2 Characteristics Based On Gender

Figure 2: Characteristics Based on Gender

Characteristics of respondents by sex who experienced more nutritional value there was male sex amounted to 13 people with a percentage of 9.1%.

3.3 Identification of Body Mass Index Values Before and After Giving Gymnastic Exercise

Table 1: IMT Values Before and After Treatment

Body Mass Index	Before Intervention "Rhythmic gymnastics"	After Intervention "Rhythmic gymnastics"
Normal	0 %	40,9 %
Overweight	90,9 %	50,0 %
Obesitas	9,1 %	9,1 %
Result	100 %	100 %

Based on the above table, the characteristics of respondents based on nutritional value after rhythmic gymnastics given the results in the form of respondents with grades normal nutrition as many as 9 people (40.9%), respondents with overweight nutritional value as many as 11 people (50%), respondents with nutritional value of obesity as much as 2 people (9.1%).

3.4 Normality Test

Table 2: Normality Test

Group	Shapiro - Wilk		
	Statistic	Df	Sig(2-tailed)
Pre-Test	0,86	22	0,00
Post Test	0,91	22	0,07

The normality test is done using the Shapiro-Wilk test with a significance value of the pre-test intervention group that is 0.00 P <0.05) and post-test 0.07 (P <0.05), it can be concluded that the normality test uses Shapiro- Wilk shows the data distribution is not normal.

3.5 Hypothesis Test Results

Table 3: Wilcoxon Test Results.

	n	α	p
the effect of rhythmic gymnastics on the decrease in body mass index	22	0,05	0,00

Hypothesis test results using the Wilcoxon test showed that there were significant differences after doing rhythmic gymnastics exercises to decrease the value of body mass index with a value of Sig = 0.00 (P <0.05), which means it can be concluded that H0 is rejected and H1 is accepted. So, there is the effect of rhythmic gymnastics exercises on students' body mass index decline

Overweight and obesity in children occur due to poor diet and also low levels of physical activity (Cyrilla *et al.*, 2017). Diet is one of the triggers of obesity, which is to consume food in large quantities and exceeds the body's daily nutritional needs (KEMENKES RI, 2012). These foods have characteristics such as high calories, high glucose, high carbohydrates, high fat but low in fiber. From the results of research conducted by (Warhamny, Laenggeng and Moonti, 2018), children with more nutritional status have a poor diet due to the number of types and amount of food consumed is not healthy and the mother's lack of understanding about balanced nutrition. Mothers are more likely to provide fast food, fatty foods and also foods that are high in carbohydrates. Not only food, but the high consumption of formula milk also cause obesity in children.

Children with less physical activity can also result in the occurrence of more nutritional value. If a poor eating pattern is not matched by physical activity, there will be an imbalance between the energy that enters and the energy that goes out. So that energy will be stored in the body in the form of fat. (Warhamny, Laenggeng and Moonti, 2018). The impact of increasingly sophisticated technology makes children reluctant to do physical activities such as exercise, playing in the park with friends. Children tend to prefer not to do many activities such as watching television, playing video games where for hours. These habits are sometimes also offset by the availability of snacks, so children enjoy it for hours (Era, 2012).

Overweight occurs as a result of the disruption of the homeostatic mechanism that controls the energy balance in the body. Fat tissue is the biggest place to store energy. The storage energy of triglycerides is through the process of lipogenesis. Regulation of energy balance requires a sensor of energy storage in adipose tissue. The control mechanism originating from the hypothalamus carries out further integrase. Where, the process will determine the body's intake and energy expenditure need (Utami, 2017).

Lipogenesis is a process of fat deposition and includes the process of fatty acid synthesis, and then the triglyceride synthesis will occur in the liver in the mitochondrial region, cytoplasm, and also in adipose tissue. The process of lipogenesis is partly mediated by hormones that can inhibit (for example, growth hormone, Leptin) or stimulate (such as insulin) lipogenesis. Insulin stimulates lipogenesis by

increasing glucose uptake in adipose tissue through glucose transporters to the plasma membrane, activating lipogenic and glycolytic enzymes, and causing SREBP-1 (Sterol Regulatory Element Binding Protein-1) increases expression and action of glucokinase enzymes that result in increased metabolic concentrations, and causes SREBP -1 (Sterol Regulatory Element Binding Protein-1) increases expression and action of glucokinase enzymes that result in increased metabolic concentrations. Glucose. Leptin, by the contrary, works, limiting fat storage by reducing food input (increasing expression of the Corticotropin-Releasing Factor gene in the hypothalamus resulting in decreased food requirements) and influencing specific metabolic pathways in adipose and other tissues. Leptin sends signals to the brain about the amount of fat storage. This hormone stimulates the release of glycerol from adipocytes by stimulating fatty acid oxidation and inhibiting lipogenesis (Utami, 2017).

Lipolysis is the process of chemical decomposition and release of fat from fat tissue. Hormone Sensitive Lipase (HSL) enzyme causes the hydrolysis of triglycerides into free fatty acids and glycerol. Fatty acids then undergo a process of re-esterification, then released into the blood circulation, formed into ATP (Adenosine Triphosphate), and then brought into the circulation of blood, which will then become a source of energy for tissues in need. The hormone insulin inhibits the mobilization of fatty acids from fatty tissue. Energy expenditure is determined by physical activity, metabolic rate, and thermogenesis. The metabolic part of energy expenditure includes the work of the individual cardio-respiratory. Physical activity increases energy expenditure by activating skeletal muscle work (Utami, 2017).

The results of research on the benefits of rhythmic gymnastics, according to Mukhloid (2014) in (Prihatin, 2016) is rhythmic gymnastics can burn excess fat in the body so that it is good as a program for weight loss. Rhythmic gymnastics is also able to improve the appearance of several parts of the body, such as hips, thighs, waist, abdomen, arms, and legs. In line with research conducted by Faridah (2012) that rhythmic gymnastics can reduce weight and also increase muscle flexibility. Rhythmic gymnastics can lose weight because it is aerobic exercise.

Copra (1996), in Silalahi (2017), rhythmic gymnastics is one of the aerobic exercises. Aerobic exercise is an exercise that requires oxygen as a form of energy that is done continuously, rhythmically, by involving large muscle groups. Sharkey in (Andini,

2016) aerobic exercise can increase the function and capacity of the respiratory and cardiovascular systems and blood volume, but the most significant changes occur in the muscle fibers used during exercise. Aerobic exercise increases the ability of muscles to produce energy aerobically and changes the metabolic process from carbohydrates to fat.

Aerobic exercise can overcome excess cholesterol as well as achieve a good level of physical fitness and can improve functional abilities (Richmond, 2012). When exercising, movements in the body can occur because of the muscles contract. Muscle contractions require ATP (Adenosine Tri Phosphate). Energy obtained from potential energy is in the form of energy stored in food in the form of chemical energy. The energy will be released after the metabolism of food is processed in the body. The process of aerobic energy metabolism is a metabolic process that occurs within the mitochondria and requires the presence of oxygen (O2) so that the process can run perfectly to produce ATP (Joyner and Coyle, 2008). When exercising, both of the body's energy stores, namely carbohydrate (blood glucose, glycogen) deposits, as well as fat deposits in the form of triglycerides, will contribute to the rate of aerobic energy production in the body. Kusumaningtyas (2011) explained that energy stores would be used by the body, namely carbohydrate storage (glucose, glycogen), fat, and protein. Among the three, savings carbohydrates and fats are the main energy sources during the aerobic process. The aerobic system requires oxygen to break down glycogen/glucose into CO and H2O through the Tricarboxylic acid cycle (TCA) and electron transport systems (Awaliyah, 2014).

The aerobic system is used for sports that require more than 3 minutes of energy, such as marathon running and 1500-meter freestyle swimming. There are three stages of chemical reactions that always occur in the aerobic system, namely aerobic glycolysis, the Krebs cycle, and the electron transport system (Hecht, 2015). The aerobic system can be used for the breakdown of glycogen and fat which can be used for large ATP resynthesis without the formation of side effects, which can cause muscle fatigue, as in the lactate system (Frutuoso *et al.*, 2016). The production of body heat that is produced during the breakdown of glycogen or fat, half of it is used for ATP resynthesis to become ATP energy. Some are released as heat stored in the body, and others are lost out (Adiwinanto, 2008). If the intensity of the activity rises, carbohydrates are used, whereas if the duration (length of time) of the activity increases, then fat is used, and when carbohydrates

and fats are used up, the protein will be used (Sari, 2016).

4 CONCLUSIONS

The use of body fat in activities will cause a reduction in stored fat. The demolition of stored fat requires far more oxygen when compared to unloading carbohydrates. In aerobic exercise, the intensity of energy needed by the body is at a mild level, and due to sufficient time, the cardiovascular system is still able to meet the oxygen needs of the working muscles, so fat oxidation is the main energy source for muscle contraction. The use of body fat in aerobic activity will cause a reduction in stored fat so that it automatically reduces overall body weight.

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