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The Effect of Sleep, Stress and Physical Activities Toward Obesity in Adolescent Aged 12-18 Years in Yogyakarta City

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Abstract

Obesity become worrying problem among adolescents, they who are obesed are 80% have the opportunity to experience obesity as adults and have higher risk of serious diseases such as cardiovascular disease, stroke, diabetes, asthma, and some types of cancer. According to the health profile of Yogyakarta Special Province in 2017 the prevalence of obesity was 19.1% occurs in adolescents. The city of Yogyakarta is an area that has many obese people compared to other districts with a prevalence of 4.81%. The purpose of this study was to analyze the effect of sleep patterns, stress and physical activity on the incidence of obesity in adolescents. This research was a quantitative research with a cross sectional approach. The research sample amounted to 109 respondents using the Simple random sampling technique. Instrument used was a questionnaire, observation and documentation. Analysis of calculations in this study used path analysis, it was found the results of sleep patterns with estimates of -0.539 (p = 0.702> 0.05) means that there is an indirect influence on the incidence of Obesity, stress variables indirectly affect the incidence of Obesity through other factors outside the path with coefficients lane is -0.055 (P = 0.963> 0.05) and physical activity variable with an estimate of -0.284 (p = 0.035 <0.05) there is a direct influence on the incidence of Obesity. The results of the study can be a consideration for improving health status by maintaining a healthy lifestyle, regulating sleep patterns, controlling stress and a lot of physical activity.

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INTRODUCTION

The increasing prevalence of overweight in children is a global public health problem, a new phenomenon that has occurred over the past three decades and can affect children's health in the short and long term (Swandari et al, 2017).

One of the nutritional problems that still occur today is obesity. Obesity is a problem that is quite worrying among teenagers. Obesity occurs when the body becomes obesed caused by excessive adipose tissue accumulation or a person's condition has a heavier weight than his ideal weight due to the accumulation of fat in his body (Proverawati, 2010).

Obesity problems have become a global pandemic around the world and declared by WHO as a chronic health problem. In the United States more than 50% of adults and more than 25% of children suffer from more weight and obesity. A very high percentage causes an epidemic of chronic disease. If the acceleration of obesity continues untill now, it is possible most of the population in the United States is obesed (Soegih & Wiramihardja, 2009).

According to data *Riskesdas* in 2018 obesity prevalence in 18-year-old adolescents has increased from 14.8% to 21.8%. Obesity in adolescents is important to note because adolescents who are obese 80% have the opportunity to experience obesity when they were adults. Adolescents who are obese throughout their lives will be at higher risk of experiencing several serious diseases such as cardiovascular disease, stroke, diabetes, asthma, and some types of cancer (Suryaputra, 2012). Obesity is found in many women compared to men (Hernandez, 2017).

According to the health profile of Yogyakarta Special Province in 2017 the prevalence of overweight and obesity by 19.1% occurs in adolescents. The Special Region of Yogyakarta is one of fifteen provinces with a very fat prevalence above the national prevalence, which is 7.6%. The city of Yogyakarta is an area where there are many obese people compared to other districts with a prevalence of 4.81%.

There are many factors that influence the incidence of obesity. Some studies also show that shortening one's sleep time can lead to obesity that has a relationship with the occurrence of several diseases related to lifestyle such as hypertension and diabetes mellitus. Adamkova et al (2009), in his study of a population with an age range of 18-65 years showed that respondents who slept less than 7 hours per day showed a higher Body Mass Index (BMI). In addition, he also confirmed a longer sleep time that is not accompanied by physical activity and reduced energy intake can also increase BMI. Short sleep patterns are very influential on diet because of increased grehlin and decreased / leptin resistance, so it is necessary to control sleep patterns in children and adolescents.

Stress is believed to be the main trigger for an imperfect appearance; stress creates a variety of physical problems that lead to fat body shape. Someone who is stressed often has difficulty in applying a correct and balanced lifestyle. A good lifestyle starts from food and beverage intake, as well as adequate nutrition, proper rest and regular exercise. Stress can cause obesity which is quite strong experienced by people with subconscious conflict or those who are "immature", can often be followed by abnormal anxiety. But only a few run away to food and end up with obesed (Misnadiarly, 2007).

Someone with less physical activity can increase the prevalence of obesity. Inactive people need fewer calories than people with high activity. Someone whose life is less active (sedentary life) or not doing balanced physical activity and consuming junk foods will tend to be obese (Proverawati, 2010).

METHOD

The design of this study was observational analytic research with non-experimental quantitative research, this research used cross sectional design. The

sampling technique in this study was simple random sampling. The populations in this study were students both male and female numbered 150 people. Determination of the sample size in this study was to use the *Slovin* formula with a total of 109 samples.

RESULT AND DISCUSSION

Table 1. Analysis of frequency distribution and characteristics of respondents

Characteristics	Category	Total	Percentage
Sex	Male	69	63.3
	Female	40	36.7
Age	12 y/o	11	10.1
	13 y/o	18	16.5
	14 y/o	19	17.4
	15 y/o	16	14.7
	16 y/o	20	18.3
	17 y/o	20	18.3
	18 y/o	5	4.6

Based on table 1, it is known that from 109 respondents, the majority of the sex respondents were male respondents, namely 69 respondents (63.3%), while female respondents were 40 respondents (36.7%). age range 16 and 17 years old which amounted to 40 respondents (18.3%) while the least found in respondents aged 18 years old (4.6%).

Table 2. Distribution of respondents Based on sleep patterns, stress and physical activity against obesity

Category	Total	Percentage
Sleep patern		
Poor	15	13.8
Less	91	83.5
Good	3	2.8
Physical Activity		
Low	14	12.8
Mild	51	46.8
High	44	40.4
Stress		
Low	102	93.6
Moderate	7	6.4
High	0	0%
Body Mass Index		
Obbesed	68	62.4
Ideal	41	37.6

Table 2 shows that there are 109 obesed respondents who experienced good sleep patterns amounted to 3 respondents (2.8%), while respondents who experienced poor sleep patterns amounted to 91 respondents (83.5%). Thus it can be stated that sleep patterns in adolescents who are obese in the category are not good. While for the category of mild physical activity there were 14 respondents (12.8%), while respondents who had moderate physical activity were 51 respondents (46.8%). Thus it can be stated that physical activity in adolescents who are obesed in the medium category. Respondents who experience obesity with BMI> 30 are numbered 68 respondents (62.4%) while respondents who are not obesed (overweight) with BMI> 25.00-29,9 totaled 41 respondents (37.6%).

Table 3. Influences between variables

Variables	Estimation	Probability	*R* Square
BMI←Sleep Pattern	-0.539	0.702	
BMI ←Stress	-0.005	0.963	
BMI ← Phisical Activity	-0.284	0.035	0.040

Indirect Effects of Sleep Patterns on the incidence of Obesity in Adolescents Aged 12-18 in the city of Yogyakarta

Based on the results of path analysis showed that sleep patterns indirectly affect the incidence of obesity through other factors outside the pathway with a path coefficient of -0.539 (P = 0.702> 0.05), the hypothesis that the effect of sleep patterns affects obesity is rejected. It can be said that sleep patterns do not directly affect obesity but sleep patterns indirectly affect obesity. This corresponds to the path of the arrow depicted on the path diagram after trimming.

Sleeping late is related to consuming more food than sleeping on time. The types of food consumed are in form of snacks and junk foods. This is what causes obesity. According to Saanin & Judith (2009) study, that a person with a sleep duration of <7 hours has a risk of suffering from obesity by 3.845 ** times greater than someone with a duration of sleep 7-9 hours (p = 0.0018).

This study highlights the sleep patterns of adolescents were less with a percentage of 83.5% due to irregular sleep schedule and had to do homework at night accompanied by playing games / gadgets before going to bed so as to make teenagers are hard to start sleeping. Another thing that makes teenagers sleep less than 8 hours is that they rarely do nap activities because of full day school.

According to the study of Angel et, al. (2013) the duration of night sleep in respondents who slept between 5-7 hours played a role. So that, sleep patterns changed, cause of the advance of technology, information, internet, games in various countries including Indonesia. This research showed that the short duration of sleep at night was related to an increase in diet which affected the overweight of the respondents.

Indirect Effects of Stress on the incidence of obesity in adolescents aged 12-18 years in the city of Yogyakarta

Based on the results of path analysis shows that stress indirectly affects the incidence of obesity through other factors outside the pathway with a path coefficient of -0.055 (P = 0.963> 0.05), the hypothesis that stated that stress affects obesity is rejected. It can be said that stress does not directly affect the incidence of obesity but stress indirectly affects the incidence of obesity. This corresponds to the path of the arrow depicted on the path diagram after trimming.

Widiantini & Tafal research (2014), stress was significantly associated with obesity (p value = 0.003). Stress can support the occurrence of obesity caused by behavior and metabolism. Research in Canada, found a significant relationship between obesity and jobs that have high stress. This is a result of the biological conditions and behavior of individuals who experience work stress. Obesity of workers can be caused by high work pressure and they cannot resist the thoughts that result from work stress. Stress can support obesity caused by behavior and metabolism and is an adverse psychosocial environmental impact. (Park, 2009).

The results of the correlation analysis in Purwanti et al. (2017) showed that there was a positive relationship between stress levels and body mass index in 2013 students. These results were in line with Sanlier's (2007) study, which found a significant relationship between depression and stress with index body mass and energy intake (Sanlier, 2007). However, this is contrary to the results of Suci's research (2016), which states that nutritional status has a weak correlation with stress levels (Suci, 2016).

Direct Effect of Physical Activity on the incidence of Obesity in Adolescents Aged 12-18 Years in the city of Yogyakarta

Based on the results of path analysis, Physical activity directly affects the occurrence of Obesity, this is supported by the path coefficient between physical activity against BMI with an estimate of -0.284 (P = 0.035 <0.05) then the hypothesis that physical activity has a significant effect and directly to the incidence of obesity is received.

The calculation results show that the physical activity variable influences obesity simultaneously is 4.0%, while the remaining 96.0% (100% -4.0%) is influenced by other variables outside of this model. From the results of the above tests it can be concluded that if physical activity is low then obesity will increase by 4.0%, this is supported by an estimated value of -28.4%.

In this study, adolescents who became respondents had average physical activity was moderate because the activities they did were in school and most of them only sat while receiving lessons. School activities started from 7 a.m to 3 p.m, while other activities such as their sports do when school holidays like playing soccer, running, swimming, or traveling with family. Teenagers tend to experience a decrease in physical activity. This can be seen from the habit that is often carried out by respondents, namely sitting during school hours, after school and at night they never do sports or activities that are classified as active. Activities that is long enough at school result them being lazy to do heavy activities such as exercise.

This research is in line with Aini's research (2013), it is known that the relationship between physical activity and the risk of over nutrition in adolescents who have the highest percentage is a sample with moderate to severe physical activity, 53% and 40% experiencing are over nutrition and (13%) did not experience of over nutrition. This shows that the incidence of over nutrition in adolescents who have moderate levels of activity is greater than in adolescents whose activities are mild. The type of mild physical activity that is often carried out by teenagers in a day is sitting, studying, watching TV, playing games, while the moderate activities that are often done namely school and heavy activities that are often carried out are playing futsal, soccer, basketball, volleyball and badminton. They generally have a moderate level of physical activity, because the activity that is often done is learning. Adolescents who lack physical daily activity can cause lack of energy. Therefore, if excessive energy intake without balanced physical activity, then a teenager is easily overweight. The occurrence of over nutrition is generally related to the energy balance in the body. Energy balance is determined by energy intake derived from energy-producing nutrients, namely carbohydrates, fats and proteins, while energy requirements are determined by basal energy, physical activity and *termiceffect of food* (TEF), which is the energy needed to process nutrients into energy (R Rachmad, 2009).

Other studies that do not support this study were conducted by Miko and Pratiwi (2017) they stated there is no effect of physical activity on obesity in adolescents. The results of this study are also in accordance with and shows that physical activity is not related to obesity (p = 1,000).

CONCLUSION

The conclusions in this study can be taken as follows: there is a direct influence on physical activity with obesity and the indirect effects of sleep patterns and stress on obesity through other variables.

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