Sedentary Lifestyle as a Risk Factor for Obesity in Stunted Adolescents at SMPN 1 and 2 Pasar Kemis, Tangerang

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ABSTRACT

Short stunted stature is a condition where z-score for height per age is less than -2 SD. Stunted children have a risk of 3,4 times being obese adolescents. In stunted adolescents, there is a disruption of the fat oxidation process that can cause obesity. In addition, stunted adolescents are less active than non-stunted. The purpose of this study was to determine whether a sedentary lifestyle is a factor that increases the risk of obesity in stunted adolescents. This study is an analytical study with a cross sectional research design. The participants are 63 adolescent selected by purposive sampling. Measurement include z-score height per age and BMI per age. Sedentary lifestyle is determined using modified Adolescent Sedentary Activity Questionnaire (ASAQ) and it categorize high if ≥ 5 hours per day. Data was analyzed by Chi-square. Proportion of stunted obesity in SMPN 1 and 2 Pasar Kemis in Tangerang District is 44.4%. There was significant relationship between sedentary lifestyle and obesity in stunted adolescent ($p=0,001$). Sedentary lifestyle are factors that increase the risk of stunted obesity in adolescents of SMPN 1 and 2 Pasar Kemis in Tangerang District. From the results of this study, it is hoped that institutions will continue to provide guidance and outreach to students so that obesity does not occur stunted.

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INTRODUCTION

Stunted is growth failure caused by chronic undernutrition or infection disease. Stunted was defined by anthropometry height by age below -2 standard deviations (SD) WHO standard. Proven with small height body posture. An estimated 178 million children in the world are too short based on age compared to the growth of WHO (World Health Organization) standards [1, 2].

The prevalence of stunted adolescent (age 13-15 years old) in Indonesia is 25,4% and in Banten Province is 24.4% according to Riskesdas 2018 whereas target of RPJMN 2020-2014 is decreasing prevalence of stunting into 19% [3,4]. It showed that stunted in Indonesia

is high. Previous research in SMPN 1 dan 2 Pasar Kemis showed 35% student had z-score height-by age below -2 SD.

Previous research explained stunted adult might have impaired fat oxidation. According to Barker hypothesis, growth failure is relevant to lack of internal organ tissue, quality and cell amount such as endocrine disruption. Endocrine disruption affects process of lipid oxidation [5]. Stunted low rate lipid oxidation, especially when fasting and 30 minutes after food consumption. Low-rate lipid oxidation will increasing fat body. High fat intake affect fat deposition formed rapidly [6]. Hence, stunted adolescent tend to have obesity at high risk. Recent researched in Indonesia show that stunted children had 3, 4 times risk long-term effects on nutritional status (obese in adulthood outcome) [7].

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Stunted adolescents who are obese were defined by z-score BMI-per age $>2SD$ and height-per age $<-2SD$ [8]. Factors traditional lifestyle to sedentary lifestyle, sedentary lifestyle is life pattern with low activities and consumes high intake calorie with low nutritious foods [9, 10]. They caused energy imbalances of intake and output.

Sedentary lifestyle tend to grow rapidly in society. Previous researched showed that the older age adolescents the lower physic activities. There is growing evidence about adolescents 15 years old spend most of their time with sedentary lifestyle (go to school with motorcycle, lack of activities/plays outside with friends, stay at home playing computer or video games, and watch tv) [11]. Sedentary lifestyle predicted as one caused of obesity factors in stunted adolescents, effect of impaired lipids oxidation and low resting energy expenditure [12].

Based on the introduction, researcher interested to research relationship between sedentary lifestyle and obesity in stunted adolescent at SMPN 1 and 2 Pasar Kemis, Tangerang.

METHOD

The study was an analytical observation with cross-sectional method. Subjects were 63 students SMP 1 and 2 Pasar Kemis Tangerang with purposive sampling. Inclusion criteria were stunted adolescent with z-score height-per age $<-2sd$ and obesity with z-score BMI-per age $>2sd$. Exclusion criteria were adolescent stunted who were consuming drugs for weight gain and grow taller.

The instrument for this study was Adolescent Sedentary Activities Questionnaire (ASAQ) to examine duration of sedentary activities [13]. ASAQ had 11 category of sedentary activities such as watch TV, watch video/DVD, played games in computer, did homework in computer, did tasks without computer, read, had course, walked around, did hobbies, had conversations, and play music instrumental. ASAQ had reliability value 0.57 – 0.86, good validity and could identify 3 dimension of sedentary behavioral (type, duration, frequency).

The Analysis was using univariate analysis to described stunted obesity and sedentary lifestyle. The data were using

bivariate analysis with chi square test to investigate of the relationship between sedentary lifestyle with stunted obesity in adolescents.

RESULTS AND DISCUSSION

The proportion of stunted adolescents who are obese is 44.4 percent. Stunted adolescents in the study were measured by comparison of height and age. Obesity is measured using a comparison of BMI with age. Sedentary lifestyle in this study was measured using ASAQ instruments with categories low (<5 hours per day) and high (≥ 5 hours per day). Table 1 shows that the majority of respondents had low sedentary lifestyle characteristics, which amounted to 50.8 percent.

Table 1. Distribution of Characteristics of Research Subjects

Charateristics	f	%
Stunted Adolescent		
Obesity	28	44.4
Non Obesity	35	55.6
Sedentary Lifestyle		
High	31	49.2
Low	32	50.8

Based on table 2 shows that there is a relationship between sedentary lifestyle and obesity in stunted adolescents ($p=0,001$). The proportion of stunted obesity was more in the high sedentary lifestyle group (33.3%) compared to the low sedentary lifestyle group (11.1%). Odd ratio value in this study is 7,500. This means that stunted adolescents who have sedentary lifestyle ≥ 5 hours per day risk 7.5 times becoming obese.

The results of this study are in accordance with the opinions of Amini [2] and Fuadianti [14], that sedentary lifestyle has a positive relationship with obesity. This is because sedentary lifestyle is one of the triggers for obesity. Sedentary lifestyle is expected to further encourage obesity in stunted adolescents, due to impaired fat oxidation and low basal energy calculations (Resting Energy Expenditure). But the result was not in line with Yulia, et al who found that there was no significant difference between total sedentary time between group on school days ($p>0.05$),

but there was a considerable difference between the proportion of sedentary time in a day ($p < 0.05$). The proportion of the sedentary activity-time in day in children with nutritional

status was lower than the overweight children [15].

Tabel 2. Results of the Analysis of the Relationship between Sedentary Lifestyle and Obesity in Stunted Adolescents

Sedentary Lifestyle	Stunted Adolescent				Total		OR	p-value	CI (95%)
	Obesity		Non Obesity		n	%			
	n	%	n	%					
High (≥ 5 hours/day)	21	33.3	10	15.9	31	49.2	7.500	0.001*	2.431-23.142
Low (< 5 hours/day)	7	11.1	25	39.7	32	50.8			

*significant at $p < 0.05$

The high sedentary lifestyle in adolescents can be caused by the existence of various means and facilities of technological advances, one of which is social media, causing adolescent to be lazy to move [16]. The use of social media is an activity that makes adolescent have to sit settled for a long time. The use of social media for a long time, will cause someone to be lazy to move so that the use of energy becomes low [17].

Stunted adolescents with sedentary lifestyle ≥ 5 hours per day have a 7.5 times greater risk of becoming obese compared to < 5 hours per day. Sedentary lifestyle is one of the mild physical activities. Physical activity affects only one third of a person's energy expenditure of normal weight, but for people who are overweight physical activity has a very important role. At the time of exercise calories will burn, then with a lot of exercise more calories will be lost for the body's metabolism and energy expenditure. Calories indirectly affect the basal metabolic system. People who sit all day will experience decreased basal metabolic system. Lack of movement activity will cause a great cycle, obesity makes sports activities very difficult and cannot be enjoyed and the lack of exercise will directly affect the decline in the person's basal metabolic system [18]. So adolescents stunted with sedentary lifestyle ≥ 5 hours per day at 7.5 times the risk of becoming obese due to a decrease in the basal metabolic system in the body and consequently a buildup of fat. If this happens continuously it will cause obesity.

CONCLUSION

From the results of the study it can be concluded that the proportion of stunted

adolescents who are obese is equal to 44.4 percent. There was a significant relationship between sedentary lifestyle and the incidence of obesity in stunted adolescents ($p = 0.001$) and CI (2,431-23,142). Stunted adolescents who have sedentary lifestyle ≥ 5 hours per day have a 7.5 times risk of becoming obese compared to sedentary lifestyle < 5 hours per day.

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