Sedentary Behavior in Elementary School Children Associated with Body Mass Index

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Article Info	Abstract
	The increase of sophisticated technological advances affects community lifestyle patterns to be easier and sedentary, especially for elementary school aged children. They mostly spend their time for watching television, playing computer, and playing video games. Their reluctance to move leads to the lack of activity, which would cause obesity or overweight. However, not all of them show the prevalence of obesity. Therefore, the researcher aimed to determine the association between sedentary behavior and body mass index in elementary school children. The survey method was carried out by distributing digital questionnaires to 96 students through Google Forms. The instrument used was the Adolescent Sedentary Activity Questionnaire (ASAQ). Descriptive analysis of the correlation between the two variables was conducted. The results show that sedentary behavior was 96.9%, body mass index was 38.5%, and there was no relationship between sedentary behavior and body mass index in elementary school students. In the future, it is hoped that there will be further research with a better research design on sedentary behavior, body mass index, and their impacts.

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INTRODUCTION

Technological advancements are rapidly increasing and becoming more sophisticated and easy to use, started from the increase use of computers, gadgets, and the internet as well as the instant transportation, which is undeniable that these technological advances are useful for human life (Wahyudi & Sukmasari, 2018, hlm.14). As the result, it affects various aspects of life, such as the high technology television that pleases users ranging from high definition (HD) technology to smart television and gadgets used by all age groups from adults to children. Even, children can use gadgets to spend their time in their daily lives and are reluctant to move from the sophisticated screen (Toha et al., 2016, hlm. 59).

Gadgets have a lot of benefits and provide positive impacts for human life, but on the other hand, it might also provide a convenience in a negative way (Chusna, 2017, hlm.26). These conveniences make people less active, especially for children, because it causes addiction leading to laziness to move, lack of activity, and an increase in sedentary behavior. Sedentary behavior is a behavior expending very low energy, which is released only when doing light activity, and is not exactly the same as a lack of physical activity; sedentary behavior is all physical activities carried out outside of bedtime, where activities are dominated by sitting and lying and the stamina expended is very low or limited (Setyo dkk., 2015, hlm. 156). Currently, sedentary behavior has become a crucial issue in public health because of its negative effects on health, especially for children. Those who spend more time in sedentary behavior but are moderately physically active and those who are not active but spend less time in sedentary behavior have a similar risk of being overweight or obese (Sugiyama dkk., 2008, hlm. 1).

Obesity in children is burdensome because it can decrease their standard of living, such as leg growth disorders, sleep disorders, and other respiratory disorders. According to data from the Ministry of Health of the Republic of Indonesia (2016), obesity experienced by elementary school-aged children (aged 6-12 years) can cause metabolic and degenerative diseases, such as cardiovascular disease, diabetes mellitus, cancer, and osteoarthritis.

The research conducted on elementary school students in Yogyakarta and Bantul in 2013 showed that the sedentary behavior paradigm was the cause of obesity risk factors in elementary school students in these regions (Arundhana, dkk., 2016 hlm. 79). Obesity can be examined using the body mass index (BMI). BMI is able to describe excess body fat, easy, and applicable for large-scale population calculations. The assessment only requires 2 things, namely weight and height, both of which can be measured precisely by a person.

In Canada, children spend more than 6 hours on sedentary behavior a day in average (Colley et al., 2013, hlm. 8). While in Indonesia, the average number of inactive people is 33.5% (Riskesdas, 2018, hlm. p). This percentage is higher than in 2013 which was 24.1% (Riskesdas, 2013, hlm. p). In West Java, the percentage of less active children is 37.5%. This percentage is higher compared to other Java provinces (Riskesdas, 2018, hlm. p). Inactivity in children is often neglected even though carrying out activities is important to prevent children from various diseases, especially obesity which will affect their adolescent years.

In his research, Arundhana, et al. (2016) stated that obesity in children aged 6-8 years was 34.43%, in children aged 9-10 years was 46.72%, and in children aged 11-12 years was 17.21%. However, this study was administered in 2013. Because the research was conducted before the COVID-

19 pandemic, this must be different. In 2021, there has been a COVID-19 pandemic so researchers wanted to know the current level of sedentary and obesity in children.

It is important to conduct the research so that the occurring problems can be overcome. Based on the problems, the purpose of this study was to obtain data and information about the description of sedentary behavior and body mass index as well as the relationship between the two variables in elementary school children.

METHOD

This study used a descriptive-quantitative design. Descriptive method is a research method that is aimed to make a structured, real, and accurate description through the description of the sample or population as it is (Tanjung & Nababan 2016, hlm. 39). Quantitative research models emphasize the value of generalization and guarantee of a population (Delice, 2010). Thus, research with descriptive method is a study broadly explaining or describing incorporated data from a population.

The participants involved in this study were children aged 11-12 years from Tilil Public Elementary School in Bandung. This study used survey method using a questionnaire for collecting data to obtain information from the subject (respondents) (Siedlecki, 2020). In the survey method, instruments are used to collect direct information from respondents about their experiences, behaviors, attitudes, or perceptions (DeVellis, 2016). As it was impossible to meet participants directly, due to a pandemic situation throughout the world, the researchers used questionnaires distributed through Whatsapp class groups facilitated by teachers at the school.

The research instrument used in this study was the ASAQ instrument (Adolescent Sedentary Activity Questionnaire) by Hardy et al., 2007. It had been translated into Indonesian language and modified. The modifications included reducing questions irrelevant to the situation of students in Indonesia or the sample to be studied. This questionnaire could find out how long the activity was carried out in a week. Monday to Friday were referred to effective days and Saturday to Sunday called holidays. The questionnaire consisted of the same 11 questions. The results of the questionnaires related to sedentary activities in 7 days were then calculated. The data were then calculated into average in one day and categorized into 3 categories (Young et al., 2014, hlm. 22).

Body mass index is a simple measuring tool to calculate weight against height which is used to measure overweight or underweight in a person. Therefore, the researchers used the body mass index as the instrument of this study.

RESULT & DISCUSSION
Sedentary Behavior

Table 1. Descriptive Data of Sedentary Behaviour

Category	Frequency	Percentage	Cumulative Percentage
Low	1	0,8	0,8
Moderate	2	1,6	2,4
High	122	97,6	100,0
Total	125	100,0	

Based on **Table 1**, the results of this study show that, from 125 students aged 11 and 12 years, 122 (97.6%) had sedentary behavior categorized as high. Moreover, 2 (1.6%) of the students had sedentary behavior with moderate category, while 1 person (0.8%) had low sedentary behavior. It concludes that the majority of elementary

school children aged 11-12 years have high sedentary behavior.

Table 2 shows the results of BMI analysis. The results show that 41.6% of elementary school students had a very thin body weight, 22.4% of students had thin body weight, 29, 6% of students had normal weight, 1.6% of students were overweight, and 4.8% were obese. It concludes that most of the students had very thin body weight (52 students out of 125 students), some others were normal, and only 6 students who were obese.

Table 2. Descriptive Data of BMI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very thin	52	41,6	41,6	41,6
	Thin	28	22,4	22,4	64,0
	Normal	37	29,6	29,6	93,6
	Overweight	2	1,6	1,6	95,2
	Obese	6	4,8	4,8	100,0
	Total	125	100,0	100,0	

Relationship between Sedentary Behaviour and BMI

Table 3. Sedentary * BMI Cross tabulation

			BMI					Total	Kendall
			Very thin	Thin	Normal	Overweight	Obese		
Sedentary	Low	Count	0	0	1	0	0	1	
		% of Total	0,0	0,0	0,8	0,0	0,0	0,8	
	Middle	Count	1	0	1	0	0	2	
		% of Total	0,8	0,0	0,8	0,0	0,0	1,6	0,538
	High	Count	51	28	35	2	6	122	
		% of Total	40,8	22,4	28	1,6	4,8	97,6	
Total		Count	52	28	37	2	6	125	
		% of Total	41,6	22,4	29,6	1,6	4,8	100,	

Based on the data in Table 3, the value of sig. between sedentary behavior and BMI is 0.538, meaning that the value of sig. > 0.05. Therefore, H_0 is accepted. It concludes that there is no relationship between sedentary behavior and BMI.

DISCUSSION

The study conducted by researchers, entitled Sedentary Behavior in Elementary School Children Associated with Body Mass Index, was conducted at 032 Tilil Public Elementary School, Bandung City, on 125 students aged 11-12 years. The discussion of the research describes the problems and findings of the research, sedentary behavior, body mass index, and relationship between sedentary behavior and BMI.

Sedentary behavior is a behavior carried out while sitting, propping up, and lying down from waking up to before going to bed at night which is carried out continuously (Isnawatiningsih, 2021, hlm. p). Sedentary behavior can have negative impacts on health, thus sedentary behavior becomes an important issue in public health or wellness (Ochoa dalam Ludyanti, 2019, hlm. 24). Therefore, when the body position is in a state of sitting and lying, it is considered as a sedentary behavior. Based on the results of data processing, sedentary behavior has a high score with a value of 97.6%. It is in line with the research conducted by (Mitchell et al., 2009, hlm. 1600). A research states that sedentary behavior is considered high if it is >4 hours per day (Asare, 2015, hlm. 8). It exceeds the recommended duration of 2 hours a day to reduce its negative impact on health

(Pramita & Griadhi, 2016, hlm. p). The ease of accessing electronics can lead to high sedentary behavior in school-age children (Hale & Guan, 2015, hlm. 6). Another factor causing children to engage in sedentary behavior is the behavior of

parents who allow their children and consider it a normal habit (Hidding et al., 2017, hlm. 6). Therefore, in this study, children's sedentary activities were included in the high category.

Body Mass Index is one of the ways to find out the ideal weight vulnerability obtained from a person's weight and height to predict the risk of a person's health problems (Dhara & Chatterjee, 2015, hlm. 9). In this study, the researchers found that the body mass index of most of the children was very thin (41.6%). Riskesdas 2018 data show that, nationally, the prevalence of underweight in Indonesia is above the overall value (11.2%), consisting of 4.0% thin and 7.2% very thin. Community nutrition problems are the factors that trigger the emergence of malnutrition cases, considering food adequacy as an essential factor (Muhammad et al., 2018, hlm. 286). Lack of nutritional intake makes children thin which becomes one of the markers of nutritional conditions in children (Pahlevi, 2012, hlm. 123), thus the body mass index in the research conducted by researchers relates to these factors and shows children with very thin BMI category. This study found that the more vigorous activities and a longer time will require a large supply of food, where on the other hand, the low activity requires a low intake (Nengah, 2019, hlm. 65).

In addition, there was also no relationship between sedentary behavior and body mass index. This is evidenced by the results of the hypothesis test showing the value of sig. 0.538 between sedentary behavior and BMI. This means the value of sig. > 0.05, thus H_1 is rejected. Therefore, H_0 is accepted; there is no significant relationship between sedentary behavior and Body Mass Index. From the results of this study, it may be caused by several factors. The factors influencing the body mass index are not entirely studied, such as physical activity, genetics, metabolism,

socioeconomic status, and culture or habits. H_1 was rejected does not mean it is a failure. The fact is the higher the activity the higher the intake and vice versa (Nengah, 2019, hlm. 65). It is relevant to the research of (Aires, 2010, hlm. 58) stating that there is no relationship between sedentary behavior and body mass index, which could happen because researchers took data during the Covid-19 pandemic which made all activities unable to be carried out optimally and the area studied by researchers was in a red zone state. Therefore, if the children before the pandemic did a lot of activity, during the pandemic they were forced to stay at home and do sedentary behavior. As the results, the sedentary behavior was high and the body mass index was mostly very thin. Also, the population of this study was limited. If this study was conducted with a large population, different results might be obtained.

The results of the study are relevant to the study conducted by Paramita & Griadhi (2016) arguing that there was no relevant relationship between sedentary behavior and body mass index of students at Cipta Dharma Elementary School. The study has several similarities with the current study, including using the same instrument and conducting research on elementary school students. However, the study analyzed food consumed by students, while the researchers only examined the relationship in the current study. In the research conducted by (Walukouw et al., 2019, hlm. 134), it was stated that the relationship between sedentary behavior and BMI was not found, because the number of research subjects was inadequate. The findings of the study conducted by Setyo & Novitasari, (2015) showed that there was a relationship between sedentary behavior and obesity in children aged 9-11 years at Beji 02 Public Elementary School, Tulungagung Regency.

It happened because the study has many differences with this study. The research conducted by (Puspita & Utami, 2020, hlm. 115) carried out on elementary school students found that they spent more than 3 hours per day (high category). More vigorous activity and reduced sedentary behavior in children aged 9-12 years in Europe contribute to the benefits of preventing obesity compared to children who were less active and frequently engaged in sedentary behavior. (Ramadhani & Bianti, 2017, hlm. 31).

Therefore, based on the description of the analysis, sedentary behavior is not always correlated with body mass index. This is because each student or sample has a different sedentary behavior and body mass index.

CONCLUSION

Based on the results of research and data analysis, sedentary behavior in students was high, while the BMI of student was mostly in very thin category. There was also no relationship between the two variables in 032 Tilil Public Elementary School students aged 11-12 years.

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