Physical activity and sedentary life of students

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Abstract

Background: Modern technology has changed human’s lifestyle into a sedentary lifestyle. The 2018 Riskesdas data shows that in Indonesia, 67% of children aged 10-14 years old have an inactive lifestyle. Aim: To get a description of physical activity level and a sedentary lifestyle of elementary school students. Settings and Design: The research uses descriptive qualitative methods, involving students of an elementary school, teachers and parents. Methods and Material: Measurements in this study used the International Physical Activity Questionnaire (IPAQ) and the ASAQ (Adolescent Sedentary Activity Questionnaire). Statistical analysis used: Data were analyzed using One-sample T test with a confidence level of 95%. The data analysis techniques used in qualitative research included transcripts of the results of interviews, data reduction, analysis, and data interpretation. Results: The results of measurements through the Metabolic Equivalent (METs) found that the average respondents were 11.2 (± 1.01) years old, height 145.1 (± 3.1), body weight 38.5 (± 6.5). The average physical activity level is in the low category, or with a number of 502.2 (± 24.3) METs. Meanwhile, the sedentary lifestyle is in a high category. The highest sedentary activity was watching television with a mean value of 214.5 minutes / day each with a standard deviation of 29 minutes / day. Conclusions: The physical activity of elementary school students is in the low category with a sedentary lifestyle that belongs to a high category because it has duration of more than 3 hours a day.

Keywords: Physical Activity, Sedentary Lifestyle, Student.
Key Messages:

Children who have a low level of physical activity, the impact is not optimal in their growth period, and various diseases at an early age, resulting in a decrease in life expectancy. Good physical activity habits need to be introduced from an early age, namely from childhood.


Introduction

A lifestyle is currently experiencing many changes, including a traditional lifestyle which is shifted to a temporary lifestyle so that the risk of nutritional status is increasing. School-aged children tend to prefer temporary activities such as playing on the computer, playing on a smartphone, and watching television (1). Doing sedentary activities for too long results in an energy imbalance, this is because the energy input in the body is greater than the energy output so that it has an impact on status over nutrition or obesity (2,3).

Nutritional status is due to multiple factors, namely behavioural factors (eating habits, physical activity, and sedentary activity) and genetic factors. Environmental conditions, economic conditions, and cultural factors support both of them (4,5). Obesity and physical activity are closely related because of the accumulation of body fat due to an imbalance between total energy expenditure and total energy intake that occurs in the body. The high intake of energy and nutrients is the output of excessive food consumption, while the low energy expenditure is the output of a lack of physical activity characterized by lack of exercise (6,7).

The level of a person's physical activity has an impact on fitness (8,9). Therefore, WHO continues to promote movements to stimulate people so they are not lazy about physical activities. The lack of physical activity can have an impact on diseases such as cardiovascular disorders (5). Children who have a low level of physical activity, the impact is not optimal in their growth period, and various diseases at an early age, resulting in a decrease in life expectancy (2). There is another risk of low levels of physical activity, namely exposure to non-communicable diseases (2). According to the World Health Organization (WHO), deaths due to non-communicable diseases are expected to continue to increase, and will be more at risk for developing countries. More than 70% of the global population is at risk of dying from Non Communicable Diseases (NCDs) (5,10). PMT is referred to as cancer, heart disease, stroke and diabetes. Overall, it is predicted that by 2030 the mortality rate due to NCDs will reach 52 million people per year (5,10).
The level of physical activity of the Indonesian people is still worrying. In 2018, there were 33.5% of Indonesians who were in the category of lack of physical activity, or those who exercised less than 150 minutes in a period of one week \(^{(1)}\). This figure increased compared to 2013 which amounted to 26.1% \(^{(1)}\). The Eastern Mediterranean Region (EMR) stated that there were lifestyle changes that had an impact on reducing levels of physical activity and changing behaviour \(^{(3,12)}\).

Good physical activity habits need to be introduced from an early age, namely from childhood. Therefore, it is important to map the level of physical activity from an early age, so as to immediately know the level of physical activity of elementary-school-aged children. Thus, efforts to increase physical activities in elementary school students should immediately be made. This research is expected to be a consideration for policy makers in preparing curriculum or teaching and learning processes in elementary schools, which are related to physical activities, fitness and public health.

**Subjects and Methods**

This study used a qualitative descriptive method with purposive sampling technique, involving student respondents from Labschool Elementary School, UNNES Semarang. The criteria for respondents are elementary school students with an age range of 10 to 12 years. There were a total of 44 5th grade students of elementary school who had become respondents. Measurements in this study used the International Physical Activity Questionnaire (IPAQ) and the ASAQ (Adolescent Sedentary Activity Questionnaire). The IPAQ consists of three main points. The first one is personal data, namely age, height, weight, and a list of medical history. The second is regarding daily physical activity habits, ranging from low to strenuous physical activity \(^{(13–15)}\). The third are questions that are supporting data based on the results of questions in part two. The output of IPAQ is Metabolic Equivalent (METs) \(^{(13–15)}\). IPAQ consists of three criteria - low, medium and high levels of physical activity. Low physical activity levels with METs below 600, moderate or medium physical activity levels 600 to 3000, and high physical activity levels above 3000 \(^{(13–15)}\).

The ASAQ (Adolescent Sedentary Activity Questionnaire) was used to record all activities of the respondents during the past week, including 5 effective days and 2 school holidays. Students were given a list of activities which was filled in the number of minutes when carrying out these activities. The results of the questionnaire were then added up the total activity in 7 days, averaged in one day, then classified into Low (<2 hours / day), Medium (2-5 hours / day), and High (> 5 hours / day) \(^{(2,16-18)}\). Data were analyzed using One-sample T test with a confidence level of 95%. The data analysis techniques used in qualitative research included transcripts of the results of interviews, data reduction, analysis, data interpretation and triangulation \(^{(19)}\). From the results of data analysis, conclusions could be drawn.
Results

The results of measurements through Metabolic Equivalent (METs) found that the mean of the respondents was 11.2 (± 1.01) years old, height 145.1 (± 3.1), body weight 38.5 (± 6.5). Then, for the average level of physical activity was in the low category or with a number of 502.2 (± 24.3) METs while most sedentary activities (57%) were in the high category, which was carried out for more than 5 hours per day.

Table 1: Elementary School Student Data

<table>
<thead>
<tr>
<th>No</th>
<th>Variables</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>11.2 (± 1.01)</td>
</tr>
<tr>
<td>2</td>
<td>Height</td>
<td>145.1 cm (± 3.1)</td>
</tr>
<tr>
<td>3</td>
<td>Weight</td>
<td>38.5 kg (± 6.5)</td>
</tr>
<tr>
<td>4</td>
<td>METs</td>
<td>502.2 (±24.3)</td>
</tr>
<tr>
<td>5</td>
<td>Sedentary Activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low (&lt; 2 hours/day)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Moderate (2-5 hours/day)</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>High (&gt; 5 hours/day)</td>
<td>57%</td>
</tr>
</tbody>
</table>

In childhood, sedentary behaviour is a strong risk factor for causing overweight and obese children. Temporary activity measured using the ASAQ (Adolescent Sedentary Activity Questionnaire) obtained results as shown in Table 2.

Table 2: Mean and Deviation Standard of Elementary School Student’s Sedentary Activities

<table>
<thead>
<tr>
<th>No</th>
<th>Sedentary Activities</th>
<th>Mean minutes/day</th>
<th>Deviation Minutes/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Watching TV</td>
<td>314.5</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>Watching video/film</td>
<td>74.5</td>
<td>19.6</td>
</tr>
<tr>
<td>3</td>
<td>Using computer for game</td>
<td>75.4</td>
<td>21.3</td>
</tr>
<tr>
<td>4</td>
<td>Using computer for school homework</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Doing homework without computer</td>
<td>101</td>
<td>20.5</td>
</tr>
<tr>
<td>6</td>
<td>Reading books</td>
<td>54</td>
<td>12.9</td>
</tr>
<tr>
<td>7</td>
<td>Joining courses</td>
<td>107.3</td>
<td>9.8</td>
</tr>
<tr>
<td>8</td>
<td>Ride a vehicle (motorbike, car, public transportation)</td>
<td>27.2</td>
<td>7.6</td>
</tr>
<tr>
<td>9</td>
<td>Doing handicrafts</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Playing on Gadget</td>
<td>110.9</td>
<td>14.7</td>
</tr>
<tr>
<td>11</td>
<td>Playing music</td>
<td>64</td>
<td>10.5</td>
</tr>
</tbody>
</table>

In this study, activity was classified into 3 categories including low, medium, and high. The categorization results were obtained from the mean number of times within 7 days. Based on table 3, the lowest activity is using computers for task purposes and making handicrafts, each of which has a mean of 0 minutes / day and a standard deviation of 0 minutes / day. Meanwhile, the highest activity is watching television with a mean value of 314.5 minutes / day each with a standard deviation of 29 minutes / day.
From the results of interviews with several students, as a qualitative data collection, the following results were obtained. Respondents did a lot of activities that didn't make the body tired. Physical activities that are done by students at school, such as playing romp with friends and playing traditional games such as betengan, cat-mouse and fishing, both during sports lessons and during recess, have been discarded by many children, with the reason of being tiring. During recess, students prefer snacking in the canteen or chatting with friends in class to jumping rope or chasing and others.

Student's participation in extracurricular activities is still low because extracurricular activities are carried out after teaching and learning activities are over. Children prefer to go home because they are tired of studying. During sports lessons, in between lessons / during breaks, students immediately sit and joke with their friends during exercise hours which are still ongoing. After school and at home the children only do activities such as playing cell-phones (games) and watching television for hours. Games that are commonly played by children such as playing a chasing game, soccer, kites with peers in home surroundings have now been replaced by Gadgets, which can be easily done anywhere and anytime.

**Discussion**

1. **Physical activity**

   Physical activity is any activity that involves physical activity and voluntary movement that burns calories and causes a person to work harder than normal \(^{(20,21)}\). According to the U.S. Department of Health and Human Service, physical activity is any movement produced by contraction of the skeletal muscles which increases energy expenditure above the basal level and refers to body movements that improve health \(^{(22-24)}\). Thus it can be concluded that physical activity is movement done by humans because of the contraction of the skeletal muscles which burn calories and function to maintain and improve body health \(^{(6,25)}\). Inadequate physical activity is a major risk factor independent of health. An active lifestyle will reduce the risk to public health \(^{(26)}\). It can start in childhood. Children have a strong imagination to perform various physical activities \(^{(12,27)}\).

   Physical activity is needed to maintain the body's basal metabolism so that it does not decrease and does not become a surplus of energy which can lead to obesity \(^{(28,29)}\). In principle, nutrition excess occurs because of an imbalance between the amount of energy intake and the energy that is expended every day. The energy released depends on a person's activity. Advances in science, technology and economics have created an environment with a sedentary or sedentary lifestyle, as a result of which food input cannot be metabolized properly so that the excess of energy intake is stored in fat tissue \(^{(6)}\). In this study, it is known that most students have attended full day school so that the proportion of time they have for activities in school is longer. In addition, the type of physical activity
done also tends to be light physical activity compared to moderate or strenuous physical activity. Obese children tend to be less active than children with a normal BMI (7,30).

Basically, humans need movement in everyday life to carry out all activities to meet the needs of life. A person is free to move at work, during playing or in sports. Likewise, children aged 6-12 years old need a lot of movement activities for growth and development of the body. Childhood is a time when children spend more time playing. This is often found in elementary-school-aged children during school breaks, when going home from school, and in the afternoon when hanging out with their peers. Elementary school children are individuals who have a high sense of curiosity and all new things in the surrounding environment makes them motivated to find out and try or imitate them. In this case, parents also play an important role in supervising and directing their children to be active in positive activities, where will form good mobility (26,31,32). However, along with the development of the era in which science and technology have been known by children from an early age, like gadgets with online games, they tend to play gadgets rather than playing outside with their peers.

2. Sedentary Activity

Over time, the development of increasingly advanced technology can facilitate all human’s works in various aspects. It can also make humans less active in carrying out activities than before. Almost all children spend more time doing screen-based activities such as watching television, playing on play stations, computers / laptops, all of which are included in the sedentary lifestyle, rather than playing outside the home, cycling, walking, and so on (33,34). The meaning of behaviour is different from the lack of physical activity or not exercising, but while it is all activities that are carried out at other times than at bedtime, where the dominant position is sitting and lying down so that the release of energy is too little. Advances in technology such as television, computers and the internet will cause children to be lazy to move. One of the risk factors for obesity in elementary school children is sedentary behaviour (21,35). The result of watching television using electronic devices for more than 1 hour per day can contribute to obesity in children (36,37). Supported by a research on children who spend most of their time doing daily activities in a lying or sitting position, for example reading, watching television, doing home assignments, playing games, applying gadgets or just relaxing to spend time, will increase the risk of living through status of over nutrition (obesity and overweight) (5,21,38). Not only on weekdays but also on weekends, children can spend 10-12 hours doing activities in a sitting and lying position (10,39). In childhood, a sedentary behaviour is a strong risk factor causing children to be overweight and obese. If this condition occurs continuously, eating can deteriorate the condition.
Conclusion

1. The average level of physical activity was in the low category, or with a number of 502.2 (± 24.3) METs.
2. Most sedentary activities (57%) were in the high category, which was carried out for more than 5 hours per day.
3. The highest activity was watching television with a mean value of 314.5 minutes / day each with a standard deviation of 29 minutes / day.

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