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Physical activity of high school students in the city of Cilegon, Banten Province

Sendy Mohamad Anugrah[1], Rian Triprayogo[2], Ida Zubaida[3]

[1,2,3]Program Studi Ilmu Keolahragaan, Universitas Sultan Ageng Tirtayasa
Jl. Jenderal Sudirman Km.3 Cilegon 42435, Banten
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Abstract

Lifestyle in adolescence is very important to know to determine the development of a person's adult health level. The main objective of this study was to map the level of physical activity of high school students in Cilegon. This study used a survey study method of 3185 participants of high school level consisting of 985 males and 2200 females who participated in this study. Data on students' physical activity levels were obtained using a paper-based online IPAQ questionnaire. The results of this study indicated that the BMI categories for males were 37.5% *underweight,* 37.3% *normal,* 9.8% *overweight,* and 15.4% *obese*, while for females were 35.7% *underweight,* 46.4% *normal, 9.3% overweight,* and 8.6 *obese*. The findings in this study provided evidence that the BMI of high school students in Cilegon was in the normal or *healthy weight* category. However, in the BMI category, there were still many research subjects who were in the *obese* category. This was because the physical activities carried out by students were in a *low* category. The high percentage of the *low* activity category was feared that the subjects of this study would affect their health condition in the future.

Keywords: obesity, physical activity, mapping, BMI.

INTRODUCTION

In the current era of globalization, people, especially adolescents, tend to be less mobile, so that adolescents tend to be silent rather than active (sports) (Al-Nakeeb, Dodd, Lyons, Collins, & Al-Nuaim, 2014; Al-Nakeeb, Lyons, Dodd, & Al-Nuaim, 2015). Besides, excessive eating patterns lead to obesity and result in non-communicable diseases such as diabetes, high blood pressure, heart disease, stroke, and cancer (Al-Nakeeb et al., 2014, 2015). Lifestyle in adolescence is very important and can determine the development of a person's adult health level, physical activity carried out at moderate intensity for 30 minutes/ day and carried out 3 times a week will have a significant positive impact on health (Riebe, Ehrman, Liguori, & Magal, 2018). According to (Liwanag & Wyss, 2020),

Correspondence author: Sendy Mohamad Anugrah, Universitas Sultan Ageng Tirtayasa, Indonesia.
Email: Sendymohamadanugrah@untirta.ac.id

lack of physical exercise is in the top four causes of death after hypertension, diabetes, and smoking. Besides that, almost half of the total population in Indonesia with the age group above 10 years, 42% are classified as having less behavior in physical activity (*sedentary*). (Riskesdas, 2018). Low levels of cardiovascular fitness are also an independent factor of mortality in individuals, whether they are normal weight or overweight (Penduduk et al., 2016).

Several studies on physical activity have been done before. In a study conducted in 2017 with 3477 TPB student research subjects (joint preparation stage) of the 2016-2017 academic year, it was concluded that 66.79% of students had good health status, 22.88% of students had diseases with a moderate risk level, and 10.33% had a disease with a high-risk level (Sunadi & Permana, 2017). Other studies in 2019 concluded that TPB ITB students for the 2018-2019 academic year had high activity levels above 70% (Gunawan et al., 2019). The factors that caused physical activity in the good category for the research subjects in both studies were due to the implementation of sports courses at ITB during the TPB period, so the level of physical activity was in the good category. Another study with research subjects of high school students has been conducted in Semarang, hence with 128 students as research subjects. In that study, the average physical activity level for males was 1506.61 *MET (min/week),* while female students were 1015.85 *MET (min/week).* In general, male students were more active than female students. These findings indicated that in general the physical activity of students was still low, so there must be efforts to improve health and an active lifestyle among students (Widiyatmoko & Hadi, 2018). Another study conducted in Brazil concluded that adolescents who did physical activity regularly would have a normal body mass index (BMI) and were not overweight and they had a higher posture than adolescents who did not do physical activity regularly (Santos-Silva, Pedrinelli, & Greve, 2017; Tannehill, MacPhail, Walsh, & Woods, 2015)

From several journals regarding the level or status of physical activity, no one has examined the condition of high school student activity levels in Cilegon and the average sample in other studies was less than 200 people. Thus, the purpose of this study was to measure the physical activity status of high schools in Cilegon, Banten Province with a total *sampling of* approximately 3000 students. Where the data were taken could describe the level of physical activity of adolescents in the City of Cilegon. So that the data could be used as a mapping of the level of physical activity of adolescents in Indonesia.

METHOD

The method used in this research is a survey study. This research design aims to study intensively the background of a current situation, especially regarding the lifestyle and environmental interactions in a social unit, be it individuals, groups, or communities. The results of this study are a complete and organized picture based on the data obtained.

The population of this study was all-state high school students in Cilegon City. The research subjects were all high school students from class X to class XII for the 2020-2021 school year in 5 state high schools in Cilegon City with a total of 3185 consisting of 985 male students and 2200 female students. Researchers used the *purposive sampling technique* in recruiting participants, where the criteria for inclusion were high school students.

The procedures in this study included, the participants took physical activity measurements by filling out a paper-based online questionnaire, namely the *Short Form International Physical Activity Questionnaire* validated (IPAQ, 2005). Furthermore, for anthropometric measurements (height, weight) also used the online questionnaire, and for the measurement of Body Mass Index (BMI) was calculated using the formula weight in kilograms divided by height in meters square (kg / m^2) (Hales, Fryar, Carroll, Freedman, & Ogden, 2018).

Data presentation will be displayed in the form of mean and standard deviation. Significant per-group analysis used the *One Way ANOVA* or *one way– test*. All statistical analyzes used the SPSS application version 22 with a significance level (p <0.01 or p <0.05).

RESULTS

The total of subjects in this study were 3185 students, consisting of 985 males or 30.9%, and 2200 females or 69.1%. All samples were students of State High Schools in Cilegon (Table 1).

Table 1. Anthropometric data for male and female students

Variable	male (n= 985)			female (n= 2200)			
	Score min	Score max	Average	Score min	Score max	Average	*P* Value
Age (years)	14.00	20.00	16.0±0.9	14.00	48.00	15.9±1.2	0.347
Height (cm)	115.00	200.00	167.9±7.2	105.00	185.00	157.2± 8.5	0.001*
Body weight (kg)	7.00	115.00	58.2±13.6	30.00	96.00	49.8±9.3	0.001*
BMI	2.29	49.5	20.6±4.6	12.02	58.92	20.2±3.2	0.004*

Figure 1 showed the BMI category was *underweight, normal, overweight,* and *obese* for males were 361 people (37.5%), 359 people (37.3%), 94 people (9.8%), and 148 people (15.4%), respectively. Whereas for females respectively were 786 people (35.7%), 1020 people (46.4%), 204 people (9.3%), and 190 people (8.6%). However, overall, the average BMI of males and females was in the normal or healthy weight category. Where the normal range of BMI according to WHO, quoted by Nuttal et al, was at 18.5 - 24.9, while for *overweight* it was at 25.0 - 29.9, and while for the *obese* category was at 30.0 and above (Nuttall, 2015).

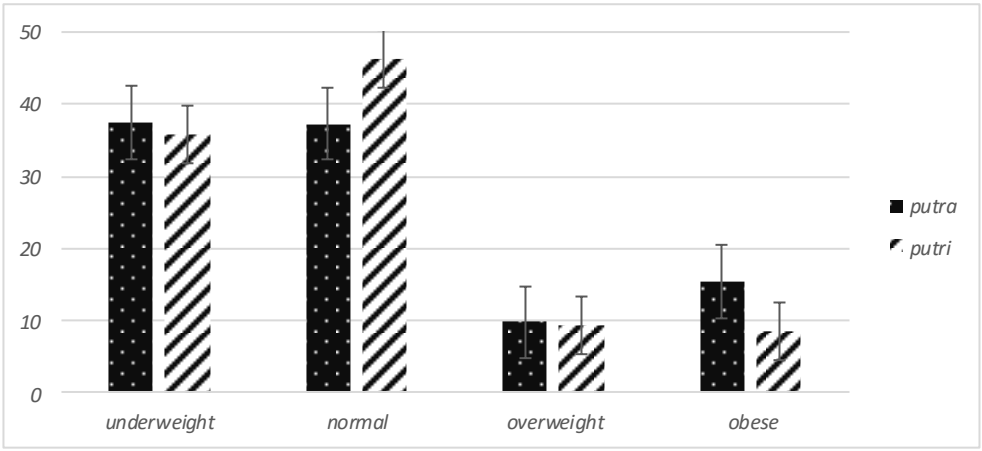

Figure 1. BMI categories of all samples

Table 2 showed that the level of physical activity performed by the male group had an average of 1480.6 MET minutes/week. Meanwhile, the female group had an average activity level of 898.3 MET minutes/week.

Table 2. Physical Activity Data

Variables	Male	Female	*P* Value
Total of Physical Activity METs Minutes / Week	1480.6 ± 939	893.3 ± 386	0.001**

Figure 2 showed the sports participation performed by males and females. In the males, 85.5% were active in sports, while 15.5% did not exercise. 59.7% of the females were active in sports, while the remaining 40.3% did not do sports.

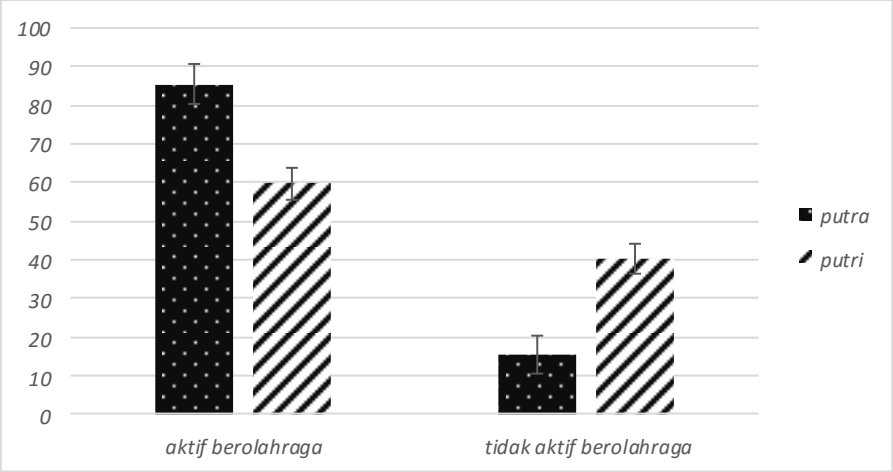

Figure 2. Physical activity of all samples

Figure 3 showed the level of physical activity with the category of *low, moderate,* and *high* that was carried out by males, respectively 38.7%, 33.8%, and 27.5%. Meanwhile, the level of physical activities performed by the females were 66.5%, 24.1%, and 9.4%, respectively.

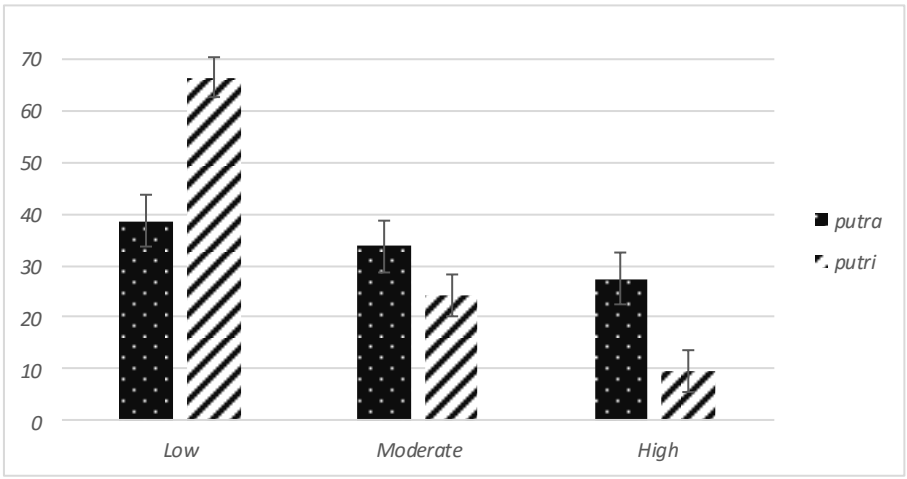

Figure 3. Sports participation

Figure 4 showed the selection of sports carried out by students who were active in sports. The participation for males were 2% martial arts, 13.2% running, 24.9% cycling, 2.4% swimming, 3.2% gymnastics, 12.9%, *gym,* and 41.4% soccer. Meanwhile, female participations were 4.2%

martial arts, 30.0% running, 28.0% cycling, 7.7% swimming, 24.3% fitness, 3.3%, *gym,* and 6.7% soccer.

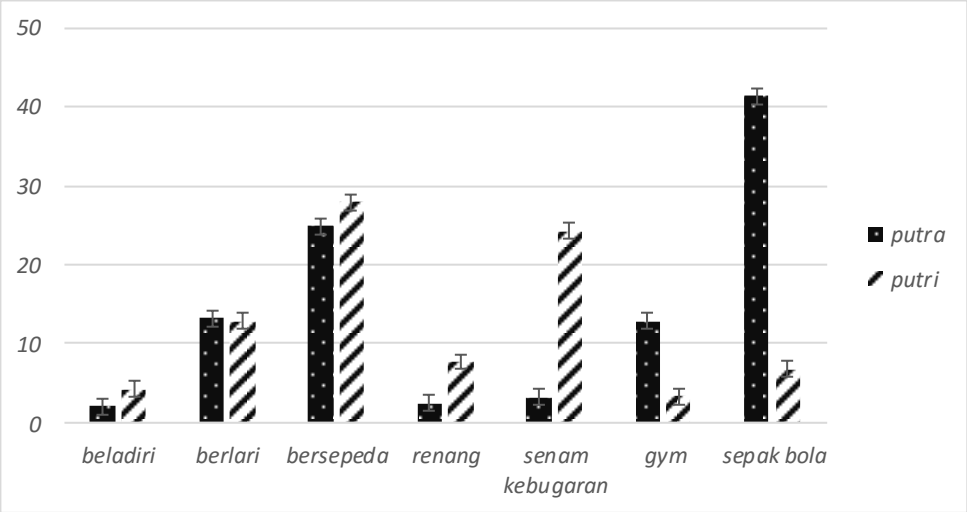

Figure 4. Sports selection.

DISCUSSION

The main focus of this study was to determine anthropometry, BMI categories, physical activity, and sports participation of state high school students in Cilegon. Table 1 showed that high school students in Cilegon had an average age of 16 years, which at that age was included in the adolescent category (Riskesdas, 2018). The average Body Mass Index (BMI) of high school students ranged from 20.62, so that in this value both groups were in the *healthy weight* or normal category because they were still in the range of 18.5 - 24.9 (WHO, 2011). In the height data, the male group had an average height of 167 cm, while the female group had an average height of 157 cm (Muljati, Triwinarto, Utami, & Hermina, 2017). The average height of male and female was above the average height of Indonesian adolescents, a recent study stated that the height of 16-18 years old for male was 163 cm, while for female it was 153 cm (Muljati et al., 2017). Figure 1 showed the distribution of BMI categories between male and female. We found that as many as 15.4% of the males and 8.6% of the females were *obese*. Our findings differed from previous studies conducted in Turkey and Canada, where the rate of obesity in adolescents

16-18 years was below 4% (Eker et al., 2018). This should be of particular concern to relevant agencies regarding the number of research subjects who were *obese* to provide a sustainable program so that the rate of *obesity* among high school students could decrease. *Obese* that occurred in adolescents would result in adolescents becoming less confident. This happened because many people thought that adolescents were *obese* tended to be slow and lazy. Another tendency if *obese* in adolescence was left unchecked, it would have an impact when the adolescent got older, where someone who was *obese* in adulthood was more prone to disease than someone who has an ideal weight (Riskesdas, 2018).

In this study, we found that the total amount of physical activity performed by the male group was 61% in the activity categories of *Moderate* and *High*. Meanwhile, only 33% of the female did activities of *Moderate* and *High*. In the category of physical activity, *there* were males who reached 39% and females 67%. The findings in this study were in line with what was done by the Ministry of Health in 2013 which stated that 42% of the population over the age of 10 had behavior *sedentary* (lack of physical activity) (Soediono, 2014). The results of our research were the same as research conducted by ITB in 2017 which concluded that the low level of physical activity in high school students was due to the lifestyle that occurred during the 12th grade which tended to focus more on national exams and entrance examinations for state universities and activities carried out by students were spending more on taking additional lessons and tutoring outside of school, thus the opportunity to move was very limited (Gunawan et al., 2019; Sunadi & Permana, 2017). The high percentage of the activity category was feared that the subjects of this study would affect their health condition in the future. The World Health Organization (WHO) warned that lack of physical activity would increase health risks and it was in the top four causes of death after hypertension, diabetes, and smoking (Al-Nakeeb et al., 2014, 2015; Duggan, 2010).

Figure 3 showed the sports participation carried out by male/ female of high school in Cilegon. The percentage of male was greater than

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female. In this study, it illustrated that the male group had a very high enthusiasm for sports compared to the female group. Our results did not differ greatly from the conclusions of several previous studies which stated that young men tended to participate in sports compared to young women (Maillane-Vanegas, Codogno, Turi, Christofaro, & Fernandes, 2018). The high sports participation in this study, especially for male, must be maintained, while for female, it must be increased. The importance of increasing sports participation for adolescents of their age was because several previous studies had stated that young men and women who actively participated in sports tended to continue exercising when they entered adulthood. In the study, it was explained that they continued to participate in sports as adults because they were accustomed to doing sports at adolescence, in addition to having fun and maintaining health (Santos-Silva et al., 2017; Tannehill et al., 2015).

Figure 4 showed several types of sports selected from the data for male / female of high school in Cilegon who participated in sports. In this study, we found that soccer was the popular choice for the male group with a percentage of 41% followed by cycling with 2%, while for female running was the popular choice with 30% followed by cycling 28%, and fitness gymnastics 24%. The high participation of male in football in this study was similar to research that had been conducted where adolescents aged 16-18 years tended to choose football as their favorite sport (Hulteen et al., 2017; Maillane-Vanegas et al., 2018). Male participation in several sports, such as football, in this case made it easier for parties or related agencies to find potential teenagers who could be developed towards professional athletes. It is inversely proportional to the condition of female who only 6% chose football, making it difficult to find potential young women.

In this study, we found that few chose swimming both for male and female. In fact, according to several studies that had been conducted, it was concluded that adolescents who actively did swimming have a higher position than those who did not do sports even with several other sports

such as football and futsal (Santos-Silva et al., 2017). The lack of participation in swimming sports, especially by female groups, was due to the inadequate existence of a public swimming pool in Cilegon to accommodate the needs of female in swimming because they were still mingling or not separated from male, causing female to be less interested in swimming sports.

CONCLUSION

The findings in this study provide evidence that the BMI of high school students in Cilegon is in the normal or healthy *weight* category. However, in the BMI category there are still many research subjects who are in the *obese* category. This is because the physical activities carried out by students are in the *low* category. The high percentage of the activity category is feared that the subjects of this study will affect their health condition in the future. So that the results of this study can be used as a *database* for the Banten provincial government and the Education Office to create a program to increase the physical activity of their students.

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