

# Relationship of Social Determinants and Physical Activity among Adolescents with Risk of Obesity in Rural Areas of Indonesia

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## ABSTRACT

Physical inactivity in adolescents can increase the risk of obesity which has the potential of negative impacts on the physical and psychological health of adolescents. It can also increase the incidence of non-communicable diseases in adulthood. This study aimed to identify the relationship between social determinants and physical activity among adolescents with the risk of obesity in rural Indonesia. A cross-sectional study was conducted at two senior high schools in rural areas of Indonesia on 134 respondents that were selected by using a simple random sampling technique. Data were collected using a demographic data questionnaire and Physical Activity Questionnaire-Adolescents (PAQ-A). The results of analysis by using the Chi-square test showed a significant relationship between parental education and physical activity among adolescents with the risk of obesity ( $P = 0.002$ ). Meanwhile, gender ( $P = 1.000$ ), parental occupation ( $P = 0.474$ ), and parental income ( $P = 0.317$ ) showed that there was no significant relationship with physical activity among adolescents with the risk of obesity, respectively. It is suggested that the relevant senior high schools collaborate with public health centers to provide health education for parents of adolescents, especially those with low formal education, about the importance of physical activity for adolescents' health.

**Keywords:** Adolescents, Physical Activity, Risk of Obesity, Social Determinants

## INTRODUCTION

Adolescence is a transition period in which attitudes and behaviors from childhood will be carried over to adulthood, including lifestyle aspects.<sup>1</sup> Nowadays, one health problem in adolescents is overweight or obese.<sup>2</sup> World Health Organization (WHO) (2021) reported that more than 340 million children and adolescents aged 5-19 years have been overweight and obese since 2016.<sup>3</sup> It could happen because more than 80% of the

world's youth population has less physical activity. Globally, lack of physical activity is the fourth leading risk factor of death, which is 32.1 million premature deaths at young age per year.<sup>4</sup>

Indonesian Center for Health Data and Information reported that the prevalence of obesity with a Body Mass Index (BMI) of 25-27 and BMI of 27 in the population aged 15 years is 35.4%. This prevalence is higher in females (29.3%) than in males (14.5%).<sup>5</sup>

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One of the leading causes of the high prevalence of obesity in adolescents is lack of physical activity<sup>6</sup>. The recommended physical activity for adolescents is at least 60 minutes per day with moderate to severe intensity<sup>7</sup>. But, millions of adolescents in this modern era are less aware of the importance of physical activity and already have a *sedentary lifestyle*.<sup>8</sup> The highly sedentary lifestyle is worrying because it harms adolescents' health and even continues into adulthood.<sup>2</sup>

Adolescents with physically inactive lifestyles have the potential to experience cardiovascular disease and metabolic syndrome, such as diabetes, at a young age, thereby increasing the morbidity and mortality rates among adolescents. A sedentary lifestyle also causes negative psychological impacts, namely the risk of experiencing mental health disorders such as depression and anxiety.<sup>9</sup> It could occur because adolescents with a chance of obesity often experience social discrimination due to changes in body shape, become victims of bullying, impaired body image, and can experience low self-esteem.<sup>10</sup>

To prevent risk conditions of obesity in adolescents, nurses as health professionals need to be aware of the physical activity habits of adolescents, especially at school. Schools are the main target for increasing the prevention of obesity risk due to lack of physical activity in adolescents.<sup>11,12</sup>

Health Promotion Model developed by Pender in 1996 was applied as a conceptual framework in this study. One of the essential components to determine the behavior of physical activity among adolescents in the Pender Health Promotion Model is a personal factor, such as social factor<sup>13</sup>. The previous study found that the socio-demographics of adolescents, such as gender, parental education, parental occupation, and parental income, are related to the adolescents' physical activity, generally.<sup>14-16</sup>

Based on this description, the researchers want to determine the relationship between social determinants and physical

activity among adolescents with the risk of obesity in rural areas of Indonesia.

## METHODS

### Study Design and Samples

A cross-sectional study was conducted on August 6<sup>th</sup>-24<sup>th</sup>, 2022. The nutritional status screening was carried out on July 2022, so we found 138 adolescents at two senior high schools in rural areas of Indonesia confirmed having risks of obesity.

The sample size was determined using Cohen's; then, we used a simple random sampling technique to determine the total number of respondents, so we must get one hundred and thirty-five respondents. Adolescents' risk of obesity with endocrine disease, musculoskeletal disease, neurologist disease, disability, and lack of parental permission were excluded from the study. Based on this criteria, one sample didn't have permission from the parent to participate in this study, so there were 134 adolescents' with the risk of obesity recruited in this study.

### Data Collection

Informed consent sheets were distributed to all respondents before the researcher collected the data in the study fields. All respondents with parents' permission to participate in the study would get questionnaire forms.

Questionnaire forms include a socio-demographic questionnaire (respondent code, class, age, gender, and parental data such as parental education level, parental occupation, and parental income per month) and Physical Activity Questionnaire-Adolescents (PAQ-A) to collect the physical activity data of respondents. PAQ-A is a standard questionnaire tested for validity and reliability, with the Cronbach alpha coefficient between 0.79 - 0.89.<sup>17-19</sup>

### Statistical Analysis

The data has been collected using univariate and bivariate computerized analysis. Socio-

demographic data and physical activity levels of adolescents with the risks of obesity were descriptively analyzed. The Chi-square test was used to determine the relationship between social determinants (gender, parental education, parental occupation, and parental income) and physical activity among adolescents' risk of obesity in rural areas of Indonesia.

### Ethical Clearance

The Ethical Clearance was obtained from the Research Ethics Committee of the Faculty of Nursing, Syiah Kuala University, with research code 112015270622.

### RESULT

The results of the data analysis in this study can be seen in the tables 1:

Table 1 shows that most participants were in early adolescence (82.8%) and were female (53.0%). Then, most of their parents have a low education level (91.8%), work as farmers (53.0%), had monthly income less than the public minimum salary (85.8%).

Table 2 shows that most adolescents with risks of obesity have a low physical activity level (94.0%).

**Table 1: Demographic Characteristics of Respondents**

<i>Characteristics of Respondents</i>	<i>Frequency (f)</i>	<i>Percentage (%)</i>
<i>Age</i>		
Early adolescence	111	82.8
Late adolescence	23	17.2
<i>Gender</i>		
Female	71	53.0
Male	63	47.0
<i>Parental Education</i>		
Low education level	123	91.8
High education level	11	8.2
<i>Parental Occupation</i>		
Agraris	71	53.0
Non agraris	63	47.0
<i>Parental Income/ Month</i>		
Less than the public minimum salary	115	85.8
More than the public minimum salary	19	14.2

**Table 2: Physical Activity Level Among Adolescents with Risks of Obesity**

<i>Physical Activity</i>	<i>f</i>	<i>%</i>
Low	126	94.0
High	8	6.0
Total	134	100

**Table 3: Relationship of Social Determinants and Physical Activity Among Adolescents with the Risks of Obesity**

<i>Social Determinants</i>	<i>Physical activity</i>						<i>p-value</i>
	<i>Low</i>		<i>High</i>		<i>Total</i>		
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>	
<i>Gender</i>							
Male	59	93.7	4	6.3	63	100	1.000
Female	67	94.4	4	6.3	71	100	
<i>Parental Education</i>							
Low education level	119	96.7	4	3.3	123	100	0.002
High education level	7	63.6	4	36.4	11	100	
<i>Parental Occupation</i>							
Agraris	68	95.8	3	4.2	71	100	0.474
Non Agraris	58	92.1	5	7.9	63	100	
<i>Parental Income</i>							
Less than the public minimum salary	109	94.8	6	5.2	115	100	0.317
More than the public minimum salary	17	89.5	2	10.5	19	100	

Table 3 shows a significant relationship between parental education and physical activity among adolescents with the risks of obesity ( $P = 0.002$ ). Meanwhile, no significant associations were found between gender ( $P = 1.000$ ), parental occupation ( $P = 0.474$ ), and parental income ( $P = 0.317$ ) with physical activity among adolescents with the risk of obesity, respectively.

## DISCUSSION

This study found a significant relationship between parental education and physical activity among adolescents with the risks of obesity. The educational level of parents can affect the biological activity behavior of adolescents. This is because the education level reflects the parents' knowledge, including the importance of a healthy lifestyle, such as implementing the regular physical activity. Adolescents who have parents with low education levels will have low physical activity levels. Meanwhile, adolescents with parents with high education levels will have a high physical activity level of.<sup>20</sup>

The findings of this study are also supported by a previous study, which also found a significant relationship between parental education level and physical activity among adolescents,<sup>21,22</sup> especially in adolescents with obesity.<sup>23</sup> Falese et al. (2021) explained that high physical activity levels among adolescents who have parents with high education levels because parents with high education are more likely to support youth involvement in physical activity, like choosing schools that can promote physical activity for their adolescents.<sup>21</sup>

Galiano et al. (2020) explained that highly educated parents have better knowledge about the benefits of physical activity for health, so they will spend time doing physical activity with their adolescents. Then, even though highly educated parents provide opportunities for their teenagers to do screen time activities such as watching television and playing with gadgets, they can balance it, so adolescents' free time is also filled with

physical activities. However, the balance between these two things is not found in parents with low education, who cannot take control in balancing between adolescents' screen time activity with regular physical activity. Parents with low education levels allow their adolescents to spend more time watching television and playing with gadgets without regular physical activity.<sup>22</sup>

Then, according to Ruedl et al. (2021), 60.4% of obese adolescents were found that they have at least one parent has formal education at the senior high school level or above, while 38.3% of obese adolescents were seen by both parents who have formal education at least at the Junior High School level or lower. They found that even though parents with high education levels have more busy lives, they still provide free time to accompany adolescents to do physical activities together and even teach their adolescents about specific sports. It might occur because they have excellent knowledge about the importance of physical activity in improving the physical fitness of adolescents in a growth transition. This interaction allows parents with higher education to establish regular physical activity habits in adolescents.<sup>23</sup>

Based on this study result, adolescents who have highly educated parents will also have high physical activity. Then, compared to adolescents with parents with low education, they will also have low physical activity. This is because parents with higher education have more excellent knowledge and awareness to control their adolescent's physical activity schedule. In contrast, parents with low education let their adolescents do high screen time activities without balancing physical activity support. This can be seen in the research findings that the researchers obtained that most adolescents with a risk of obesity had a low physical activity category (94.0%). It could happen because most of their parents have low education levels (91.8%). However, parental education is a social determinant that significantly correlates physical activity among adolescents with the risks of obesity.

Meanwhile, other social determinants, including gender, parental occupation, and parental income, showed no significant relationship with physical activity among adolescents with the risk of obesity ( $P > 0.05$ ). The previous study also supports these findings. Mayo et al. (2020) also showed no significant relationship between gender and physical activity among adolescents. It can happen because both boys and girls have the same responsibility based on age; they are both required to spend half their daily time studying at school, doing school homework, and fulfilling other roles that are less active.<sup>24</sup>

The previous study also explained that physical activity behavior among adolescents is not only determined by gender but also by family socio-economic factors, where both genders are equally unable to have facilities for some sports because they come from a family with financial deficiencies. This evidence supports the findings of this study, where there was as many as 85.8% of adolescents with risk of obesity from both genders who participated have a parental monthly income less than the general minimum salary category, which indicates that weak finances have an impact on low physical activity level both boys and or girls, so that gender as biological factors which is not correlated with physical activity behavior.<sup>24</sup>

But, Sanchez et al. (2022) showed a different result from our study. They found a significant relationship between gender and adolescents' physical activity. According to that study, it could occur because all adolescents have prioritized their body image views, where the two sexes have the same perceptions and perspectives about physical activity. When they have a goal to achieve a proportional body, both will be physically active. Conversely, if they don't mind their body image, both will allow less physical activity behavior. So, it could be one of the reasons why gender is related to physical activity among adolescents in this previous study.<sup>25</sup>

Then, Sleskova and Orosova's (2015) study also found a different result, which

shows a significant relationship between parental occupation and physical activity in obese adolescents. This is because parents who work non-permanently have moderate or high financial pressure, so adolescents do not have more intensive closeness, support, monitoring, and communication with their parents. At the same time, parents who work regularly have a fixed income to monitor adolescents' lifestyles and support adolescents to improve healthy behavior, including carrying out physical activities together.<sup>26</sup>

According to this study's findings, there was no significant relationship between parents' occupation and physical activity among adolescents' risk of obesity because both adolescents with parents as agrarian and non-agrarian alike did not provide more social support for increased physical activity in adolescents' risk of obesity. Then, most respondents' parents worked as agrarians (53.0%) with incomes almost less than the minimum public salary, so they could not provide personal sporting equipment facilities for their adolescents. But, non-agrarian parents with regular jobs, such as civil servants, also do not seem to provide free time to remind their adolescents of physical activity, provide facilities for adolescents to have high screen time, and allow adolescents to engage in highly sedentary behavior while at home.

The previous study by Heradstveit et al. (2020) found results that were inverse to this study's findings that there was a significant relationship between parental income and adolescent physical activity. This previous study showed that teenage boys from low-income families tend to be more physically inactive than boys from high-income families.<sup>27</sup>

The other study also explained that the physical activity of adolescents who have parents with income in the high category (>20 euros/week) (67.3%) is better than adolescents who have parents with incomes in the moderate category (6-20 euros/ week) (59.9%) and low category (0-5 euros/week) (53.6%). This could be because families

with insufficient financial resources find it challenging to access sports infrastructure, pay for sports membership fees, or need help to afford sports equipment which costs a lot of money. In addition, parents with low incomes tend to experience more significant stress and anxiety related to life necessities, which in turn neglects financial support to involve adolescents in various physical activities outside the home or in the school environment.<sup>21</sup>

According to this study, the researcher assumed that adolescents with a lower socioeconomic status than their parents would feel marginalized because their parents cannot provide private sports facilities, and their self-esteem decreases. So, they are reluctant to do physical activity or join and invite friends to do it together. Consequently, this leads to a sedentary lifestyle.

## CONCLUSION

The study findings showed that parental education is a social determinant that has a significant relationship with physical activity among adolescents with the risks of obesity. However, other social determinants, such as gender, parental occupation, and parental income, were not significantly related to physical activity.

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**Limitations:** This study used subjective tools to measure physical activity level, a self-report questionnaire. So, it is suggested for further research to use objective tools like an accelerometer so that the results will be more accurate.

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**Conflict of interest:** The authors declare no conflict of interest.

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