2024, Retos, 61, 1-7

Parents' income has influence on levels of physical activity and sedentary behaviour of junior high school student

El ingreso de los padres influye en los niveles de actividad física y el comportamiento sedentario de los estudiantes de secundaria

*Afif Rusdiawan, *Muhammad Dzul Fikri, *Mochamad Purnomo, **Azmawaty Mohamad Nor, *Yuni Fitriyah Ningsih, *Moh. Fathur Rohman, *Lucy Widya Fathir, ***Ahmad Lani

*Universitas Negeri Surabaya (Indonesia), ** University of Malaya (Malaysia), ***Universitas Insan Budi Utomo (Indonesia)

Abstract. This study aims to determine physical activity (PA level) and sedentary behavior (SB level) in students with various parents' income levels. This study used a cross-sectional design. The subjects used in this study were 900 students from 10 schools and ten cities in East Java, Indonesia. Data on students' parents' income were grouped into five categories based on their income level (very low: n = 360; low: n = 231; medium: n = 123; high: n = 79; very high: n = 107). The research instruments used were the Children's Physical Activity Questionnaire (CPAQ) to measure the level of physical activity (PA level) and the Adolescent Sedentary Activity Questionnaire (ASAQ) to measure the level of sedentary behavior (SB level). The results of the Mann-Whitney statistical test showed significant differences in PA level and SB level between the very low-income group of parents and the low, medium, high, and very high-income groups ($p<0.05$). In conclusion, the higher the level of parental income, the better the students' physical activity, and the lower their sedentary behaviour.

Keywords: Family monthly income, physical activity, sedentary behavior, junior high school student

Resumen. Este estudio tiene como objetivo determinar la actividad física (nivel de AF) y el comportamiento sedentario (nivel de SB) en estudiantes con diferentes niveles de ingresos de los padres. Este estudio utilizó un diseño transversal. Los sujetos utilizados en este estudio fueron 900 estudiantes de 10 escuelas y diez ciudades en Java oriental, Indonesia. Los datos sobre los ingresos de los padres de los estudiantes se agruparon en cinco categorías según su nivel de ingresos (muy bajo: n = 360; bajo: n = 231; medio: n = 123; alto: n = 79; muy alto: n = 107). Los instrumentos de investigación utilizados fueron el Cuestionario de Actividad Física Infantil (CPAQ) para medir el nivel de actividad física (nivel de AF) y el Cuestionario de Actividad Sedentaria en Adolescentes (ASAQ) para medir el nivel de comportamiento sedentario (nivel de SB). Los resultados de la prueba estadística de Mann-Whitney mostraron diferencias significativas en el nivel de actividad física y el nivel de SB entre el grupo de padres de ingresos muy bajos y los grupos de ingresos bajos, medios, altos y muy altos ($p<0,05$). En conclusión, cuanto mayor es el nivel de ingresos de los padres, mejor es la actividad física de los estudiantes y menor es su comportamiento sedentario.

Palabras clave: Ingresos mensuales familiares, actividad física, comportamiento sedentario, estudiante de secundaria

Fecha recepción: 30-07-24. Fecha de aceptación: 16-08-24

Afif Rusdiawan

afifrusdiawan@unesa.ac.id

Introduction

Physical activity is known as an internal factor that supports overall health conditions. Doctors and health authorities worldwide recommend that actively participating in sufficient and regular physical activity is essential for supporting health in all aspects. Various benefits can be felt for someone actively participating in physical activity (Hallal *et al.*, 2012; Warburton and Bredin, 2017). There is evidence that sufficient physical activity can reduce mortality by up to 31% compared to less physically active people (Arem *et al.*, 2015; Huang, Ng and Ha, 2022). Therefore, adolescents need to engage in physical activity and manage a sedentary lifestyle to prevent cardiovascular disease and reduce the risk of obesity (Kumar, Robinson and Till, 2015; Lear *et al.*, 2017).

Social or interpersonal factors have been shown to influence the level of physical activity and have a role as the most vital determinant (Gustafson and Rhodes, 2006). Parents have a crucial role in forming healthy living habits in children (Taylor, Baranowski and Sallis, 1994). Children's activity-related behavior can vary depending on their parents' encouragement of an active lifestyle and their level of physical activity (Tandon et al., 2014; Trost & Loprinzi, 2011; Yao & Rhodes, 2015). Family and friends' support significantly influences young people's moderate-to-vigorous physical activity, predicting 12.7% of nearby adolescents' physical activity and 29.7% in remote areas (Sanz-Martín *et al.*, 2024).

There is evidence that poverty has an impact on children's health outcomes and lifestyle choices (Cottrell *et al.*, 2015). Several studies have found that children living in poverty tend to have lower physical activity levels than their peers (Singh, Siahpush and Kogan, 2010; Milteer *et al.*, 2012). In addition, several studies reveal the relationship between family income and physical activity in children. The results of these studies find that children from families with low incomes usually have limited access to resources and places to play, affecting their physical activity level (Romero *et al.*, 2001; Tandon *et al.*, 2012). Not only that, other studies find that children who come from families with low income tend to have a higher risk of obesity and lower physical fitness status when compared to children who come from families with higher incomes (Jin and Jones-Smith, 2019). Parents play a crucial role in shaping the physical activity and sedentary behaviours of their children (Ihmels *et al.*, 2009). Families with higher incomes may have greater access to resources that encourage physical activity, such as organised sports, recreational facilities, and safe neighbourhoods (Powell *et al.*, 2006).

Conversely, children from lower-income households may have fewer opportunities for physical activity due to a lack of access to these resources (Powell *et al.*, 2006; Carver, Timperio and Crawford, 2008). Research has shown that the socioeconomic status of a family, as measured by income, can have a significant impact on the physical activity levels and sedentary habits of their children, particularly during the crucial developmental stage of junior high school (Powell *et al.*, 2006; Carver, Timperio and Crawford, 2008; Ihmels *et al.*, 2009)

Furthermore, parental modelling of physical activity and sedentary behaviours can also influence their children's habits (Zecevic *et al.*, 2010). Parents who are physically active and limit sedentary time are more likely to have children who exhibit similar healthy behaviours (Ihmels *et al.*, 2009). The interplay between socioeconomic status, parental influence, and the physical activity and sedentary behaviours of junior high school students is a complex and multifaceted issue. Continued research is needed to further understand the mechanisms by which parental income can shape the physical activity and sedentary habits of this population, as well as to develop effective interventions to promote healthier lifestyles for all children, regardless of their family's socioeconomic background.

Methods

Study Design

A cross-sectional research design was used in this study. Filling out a questionnaire to collect information about students' physical activity level (PA level) was carried out by completing the Children Physical Activity Questionnaire (CPAQ) expressed in metabolic equivalent of task units (METs) (Ahmad et al., 2016; Hariyanto et al., 2023).

Subjects

This study involving 900 junior high school students as subjects in 10 cities and districts in East Java, Indonesia, consisting of 391 male students and 509 female students. The choice of the city as the location for data collection is based on its location in the north, south, east, and west. The northern city consists of Tuban, Lamongan, and Bangkalan. The southern city consists of Malang, Blitar, and Tulungagung. The eastern city consists of Situbondo and Jember, while the western city consists of the cities of Madiun and Ponorogo. Each city is represented by one junior high school whose data is collected.

Instrument and Data collection

The Children Physical Activity Questionnaire (CPAQ) instrument was used in this study because the instrument is suitable for children aged 8-14 (Kowalski, Crocker and Donen, 2004; Paxton, Estabrooks and Dzewaltowski, 2004). The CPAQ measurement assessed the mode, duration, and frequency of physical activity and sedentary habits over the past seven days (Corder et al., 2009). Meanwhile, the level of sedentary behavior (SB level) was measured using the Adolescent Sedentary Activity Questionnaire (ASAQ) instrument (Hardy, Booth and Okely, 2007). The ASAQ instrument calculates the average time students spend in sedentary conditions daily. A sedentary lifestyle is considered high if students spend ≥ 5 hours per day in a sedentary state and low if < 5 hours per day (Guo et al. 2012; Wiriawan et al. 2023). Data on the income of parents of students is divided into five categories, namely the very low category for income less than IDR 1,500,000, the low category for income between IDR 1,500,000 – IDR 2,500,000, the medium category for income between IDR 2,500,000 – IDR 3,500,000, high category for income between IDR 3,500,000 – IDR 4,500,000, and very high category for income of more than IDR 4,500,000.Indicate methods and the purpose of their use; research procedures and an algorithm for conducting a pedagogical experiment.

Statistical analysis

In this study, the collected data were analyzed descriptively by using the mean value and standard deviation for each research variable used to determine the characteristics of the research subjects. Furthermore, the Kruskall-Wallis test was used to test whether there were significant differences in the level of students' physical activity (PA level) and the level of sedentary behavior (SB level) based on the income levels of the parents of different students. After knowing the significant results of the Kruskall-Wallis test, the Mann-Whitney test was carried out as a post hoc test.Describe methods of mathematical statistics and the purpose of their use.

Results

This study used research subjects with 900 students from ten cities and junior high schools in East Java province. Below, a table containing data on the characteristics of the research subjects is presented.

The characteristics of the research subjects presented in Table 1 show that the research subjects consisted of 391 male students and 509 female students. The average age of 13.27 years categorizes the research subjects as teenagers (MacKay and Duran, 2008; Backes and Bonnie, 2019; Diananda, 2019). The average BMI of the research subjects was 19.06 kg/m^2, which could mean that the average research subject had a normal BMI (Harahap, Widodo and Mulyati, 2014). Then, to see the distribution of the types of work parents do for students, see Figures 1 and 2.

Table 1.
Characteristics of research subjects

Respondent's characteristics	Frequency	Percent (%)
Gender		
Boys	391	43.4%
Girls	509	56.6%
Grade (Junior High School)		
7	391	43.44%
8	244	27.11%

Table 1.
Characteristics of research subjects

Respondent's characteristics	Frequency	Percent (%)
9	265	29.44%
Age (year)		
12	219	24.33%
13	320	35.56%
14	269	29.89%
15	82	9.11%
16	10	1.11%
Body Height (cm)		
30-49	658	73.11%
50-69	213	23.67%
70-89	29	3.22%
Body Weight (kg)		
111-130	22	2.44%
131-150	326	36.22%
151-170	521	57.89%
171-190	31	3.44%

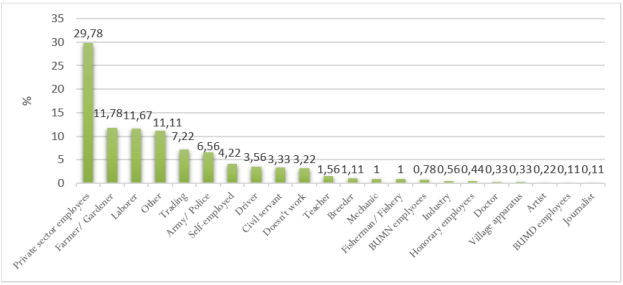

Figure 1. Percentage of father's type of work.

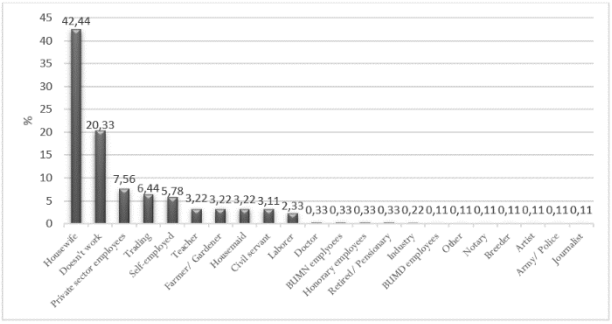

Figure 2. Percentage of mother's type of work.

Figures 1 and 2 reveal that the majority of fathers are private employees. In contrast, most mothers work as housewives and do not work. Table 2 below presents a description of physical activity data and sedentary behavior.

Table 2.
Description of PA and SB data

Variable	Mean±SD		
	Boys	Girls	Total
CPAQ Scores	2.51±0.60	2.33±0.52	2.41±0.56
ASAQ Scores weekdays	96.66±103.05	125.82±298.74	113.15±235.04
ASAQ Scores weekend	231.05±254.13	267.87±227.64	251.87±240.07

Based on Table 2, the results show that boys have a better CPAQ score than girls. In terms of ASAQ scores, girls score higher on both weekdays and weekends, with weekend ASAQ scores being higher than weekday ASAQ scores. Then, for data analysis, use the Kruskal-Wallis test because the data distribution is not normally distributed ($p<0.005$). Table 3 below displays the results of the Kruskal-Wallis test.

Table 3.
Kruskal-Wallis test results for each variable studied according to the income level of parents

Variables	Category										p-value
	Very Low		Low		Medium		High		Very High		
	Mean±SD	f	Mean±SD	f	Mean±SD	f	Mean±SD	f	Mean±SD	f	
PA level	2.31±0.52	360	2.48±0.56	231	2.43±0.56	123	2.52±0.61	79	2.51±0.60	107	0.000*
SB level weekday	86.67±81.29		115.08±134.83		155.06±573.91		124.57±98.68		141.44±123.02		0.000*
SB level weekend	207.15±191.89		246.52±177.57		297.48±394.06		294.62±209.87		329.90±206.31		0.000*

*significantly different ($p<0.05$) using the Kruskall Wallis test; very low category for income less than IDR 1,500,000; Low category for income between IDR 1,500,000 – IDR 2,500,000; Medium category for income between IDR 2,500,000 – IDR 3,500,000; High category for income between IDR 3,500,000 – IDR 4,500,000; Very high category for income of more than IDR 4,500,000

The Indonesia Central Statistics Agency has revealed that the minimum wage in East Java Province in 2018 was IDR 1,508,895, while in 2019 it was IDR 1,630,059, and in 2020 it was IDR 1,768,777 (BPS, 2020). Based on the table above, it can be seen that 360 parents of students have incomes in the very low category or below Rp. 1,500,000.-. This shows that most people in East Java Province still live inadequately because their income is lower than the provincial minimum wage. The results of the Kruskall-Wallis test showed significant differences in all variables based on parents' income level ($p<0.05$).

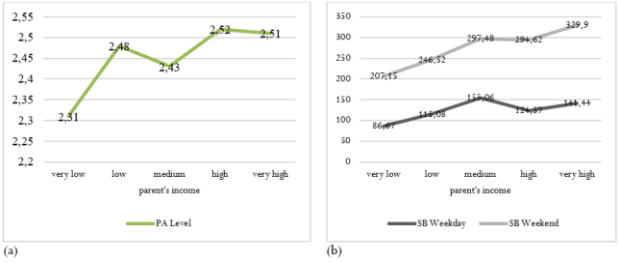

Figure 3. (a) PA level value based on parent's income; (b) SB level based on parent's income.

Figure 3 shows that the higher the parents' income, the higher the level of physical activity and sedentary behaviour tends to be. In order to find out the influence of parents' income level on the PA and SB levels, a post hoc test was carried out using the Mann-Whitney test. The results of the Mann-Whitney test are presented in Table 4.

Table 4.
The influence of parents' income level on PA level and SB level

Variable		p (sig)		
		PA Level	SB Weekday	SB Weekend
Very low income	Low income	0.000*	0.000*	0.000*
	Medium income	0.034*	0.001*	0.000*
	High income	0.005*	0.000*	0.000*
	Very high income	0.000*	0.000*	0.000*
Low income	Medium income	0.481	0.902	0.448
	High income	0.864	0.061	0.052
	Very high income	0.462	0.025*	0.012*
Medium income	High income	0.352	0.100	0.270
	Very high income	0.320	0.055	0.114
High income	Very high income	0.865	0.734	0.668

*significantly different ($p<0.05$) using the Mann-Whitney test

The results of the Mann-Whitney test presented in the table above show that between parents whose income is very low or below IDR 1,500,000, there is a significant difference in PA level compared to parents whose income is in the low, medium, high, and very high categories ($p<0.05$). In general, the income of other parent categories (low, medium, high, and very high) is not significantly different ($p > 0.05$). On weekdays or weekends, the SB level also shows results that are almost identical to the PA level. The SB level differs significantly between parents with very low income, or below IDR 1,500,000, and parents with low, medium, high, and very high income categories. However, parents with other income categories (low, medium, high, and very high) tend not to differ significantly.

Discussion

This study found that adolescents from families with very low parental income (<Rp. 1,500,000 per month) were less physically active than those with higher incomes. This study's results also suggest a positive relationship between adolescents' physical activity levels and family income levels (Lethbridge-Çejku, Schiller and Bernadel, 2004; Mo *et al.*, 2005; Kari *et al.*, 2015). People with a high income tend to have 26% higher exercise energy expenditure and 3% higher exercise intensity when compared to people with the lowest income (Meltzer and Jena, 2010). According to (Kantomaa *et al.*, 2007), there is a relationship between a teenager's socioeconomic status and their participation in sports organizations after school hours. In their research, (Wolch *et al.*, 2011) also found a correlation between children's low level of physical activity and the poverty rate in urban and suburban areas. Parents with high incomes may be less directly involved in their children's physical activities but can provide opportunities for their children to participate in physically active environments (Best, 2010; Kempermann *et al.*, 2010). The relationship between income and physically active participation can be more complex than expected. It is based on a simple assumption of utility maximization. Someone tends to allocate their time to maximise certain utility functions involving commodity consumption and leisure (Kari *et al.*, 2015). This statement demonstrates that while a higher income can lead to more opportunities for physical activity (the income effect), it can also impact the availability of leisure time, potentially reducing an individual's involvement in physical activity. This is exemplified by the findings of Cottrell et al. (2015), who found in their rural research that children from low-income families engage in more physical activity than their counterparts from other income levels. When low-income families encourage their children to be active and play outside, parents' support for children's physical activity increases (Cottrell *et al.*, 2015). In middle- and high-income countries, there has been a decline in fitness levels among children and adolescents (Uddin, Mandic and Khan, 2019). This decline could be due to a variety of factors, including less walking or cycling to school, less participation in outdoor play activities, and increased interest in games, social media, and other entertainment (Tomkinson, Lang and Tremblay, 2019). This condition is vital to pay attention to, even for families with high incomes. Presenting the study results in tables and describing them logically is crucial.

This study also found that adolescents from high-income families tend to have bad sedentary behaviour (SB). We found that adolescents with middle- to upper-income parents were sedentary on weekdays for an average of more than 2 hours, and this increased to more than 5 hours on weekends. This finding is in line with the research by Muthuri et al. (2014), which revealed that school-age children in Africa with a high social status tend to have a high rate of sedentary lifestyles (Muthuri *et al.*, 2014). Wiriawan et al. (2024) also stated that in Indonesia, high school students' physical activity and sedentary lifestyles differ based on parental income and occupation. Higher-income families tend to have better schedules and access to resources, leading to a more active lifestyle. However, they spend less time on sedentary activities. Aside from that, countries with middle- to upper-income people tend to have higher screen time rates (Mielke *et al.*, 2017). In this section, critically analyse and interpret the results presented in the previous section. Begin by addressing each key finding individually, explaining its significance, and comparing it to existing literature, particularly the literature analyzed in the introduction.

Discuss any unexpected or contradictory results, and propose possible explanations or hypotheses. Relate your findings back to your research objectives or hypothesis stated in the introduction. Highlight the practical implications of your results, as well as their relevance to the broader field. Acknowledge the limitations of your study and suggest areas for future research.

Conclusion

The higher a person's income, the higher the level of physical activity. This is because higher-income parents can create structured time for their children to engage in a balance of physical activity. However, they avoid sedentary time during both weekdays and weekends. Parents with higher incomes spend less time sedentary than parents with lower incomes. Better facilities for parents with higher incomes lead to them spending a significant amount of time in these facilities.

Acknowledgements

I would like to express my gratitude to the students and teachers who have granted permission for the data collection for this project. I would like to express my gratitude to Universitas Negeri Surabaya for providing financial support for this research.

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Datos de los/as autores/as y traductor/a:

Afif Rusdiawan	afifrusdiawan@unesa.ac.id	Autor/a
Muhammad Dzul Fikri	muhammadfikri@unesa.ac.id	Autor/a
Mochamad Purnomo	mochamadpurnomo@unesa.ac.id	Autor/a
Azmawaty Mohamad Nor	azy_mn@um.edu.my	Autor/a
Yuni Fitriyah Ningsih	yuniningsih@unesa.ac.id	Autor/a
Moch. Fathur Rohman	mohrohman@unesa.ac.id	Autor/a
Lucy Widya Fathir	lucyfathir@unesa.ac.id	Autor/a
Ahmad Lani	lani_asgar@yahoo.co.id	Autor/a
Mhs proofreading	mhsproofreading@gmail.com	Traductor/a