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Analysis of Physical Activity Levels and Anthropometric Measurements Among Elementary School Students in Panggang and Pramuka Islands

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Abstract

Physical activity during childhood is critical for healthy growth and development, contributing to both physical and mental well-being. This study aimed to assessment of physical activity levels and anthropometric measurements among elementary school children living on Panggang and Pramuka Islands, part of the Thousand Islands regency in Indonesia. The study sample includes 264 students from grades V and VI, consisting of 152 male and 112 female participants. Physical activity was evaluated using a modified version of the International Physical Activity Questionnaire (IPAQ) designed for children. Anthropometric measurements, including weight, height, and body mass index (BMI), were collected using a Xiaomi Mi 2 Pro scale for weight and BMI, and a stadiometer for height. Findings reveal that most students on these islands engage in moderate to high levels of physical activity, reflecting the outdoor, active lifestyle typical of the region. However, a minority of students exhibited low physical activity levels, highlighting the need for targeted interventions to increase engagement in physical activity. The unique geographic and cultural setting of Panggang and Pramuka Islands underscores the importance of developing localized strategies to enhance physical activity and ensure the long-term health of children, preventing potential risks like obesity, cardiovascular issues, and psychosocial challenges. This research provides a comprehensive understanding of children's physical activity and health status in the Thousand Islands, offering valuable insights for policymakers and educators in promoting healthier lifestyles in similar remote settings.

Keywords: *physical activity, IPAQ, children, Jakarta.*

INTRODUCTION

Physical activity is a fundamental component of maintaining health and promoting overall well-being (Fajrah Ilsya et al., 2024; Moore et al., 2020) . It plays a critical role in enhancing cardiovascular function, muscle strength, and metabolic

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balance (Bahri et al., 2021; Jakovljevic, 2017; Moore et al., 2020). Regular physical activity helps mitigate the risks of various non-communicable diseases, including cardiovascular diseases, diabetes, and obesity (Jakovljevic, 2017). For individuals of all ages, including children, physical activity is essential for supporting healthy physical and psychological development (Mahindru et al., 2023).

In the case of children, physical activity is not only vital for physical health but also for cognitive and social development (D'Anna et al., 2024). Physical activities contribute to the refinement of motor skills, improved cognitive functioning, and enhanced social interactions (Bukvić et al., 2021). Additionally, engagement in physical activity during childhood fosters lifelong habits of health-conscious behavior, contributing to overall well-being (Mahindru et al., 2023). Activities such as running, playing, and other forms of exercise are linked to better academic performance, greater self-confidence, and an increased ability to handle complex physical tasks (James et al., 2023).

The growing prevalence of childhood obesity and sedentary behavior is a significant concern in modern society (Zhang et al., 2024). Children who lack sufficient physical activity are at a heightened risk of developing obesity, which can lead to long-term health complications (van Sluijs et al., 2021). Sedentary behaviors, such as extended screen time, exacerbate these health risks, making it imperative for children to engage in regular physical activity (Anugrah et al., 2021; Hasan et al., 2020). Promoting physical activity is therefore essential in reducing obesity rates and encouraging healthy lifestyles among children, particularly in light of contemporary sedentary habits.

Contemporary challenges to maintaining sufficient physical activity levels in children are exacerbated by technological advancements and changing social patterns (Taylor & Owen, 2021). In many urban region, children are increasingly engaged in sedentary activities, such as video gaming and prolonged screen use, which contribute to a reduction in daily physical activity (Anugrah et al., 2021; Hasan et al., 2020). This trend directly contrasts with recommendations from global health organizations, which emphasize the importance of regular physical movement. As a result, insufficient physical activity has been linked to a variety of adverse health outcomes, including increased susceptibility to chronic diseases and

decreased quality of life in children (Zhang et al., 2024).

Urban environments present additional barriers to adequate physical activity among children (Hasan et al., 2020). In large cities, children often face limited access to open spaces for recreational activities, and their time is frequently consumed by academic obligations that restrict opportunities for movement (Sylejmani et al., 2019). The scarcity of green areas and sports facilities further compounds this issue, leading to lower levels of physical activity among urban children (Russo & Andreucci, 2023). These conditions increase their vulnerability to health issues stemming from insufficient exercise, including obesity and other metabolic disorders.

In contrast, children living in island regions such as Pulau Pramuka and Pulau Panggang may encounter unique challenges with regard to physical activity. While these regions offer more natural outdoor spaces, they often lack formal infrastructure and programs that promote organized physical activity. The traditional lifestyles in these areas, which may not involve structured physical exercise, can also limit the overall levels of daily activity. Consequently, children in island communities may exhibit lower physical activity levels, with potential negative effects on their health and development.

This research aims to evaluate the physical activity status and anthropometric profiles of children in Pulau Pramuka and Pulau Panggang. The primary objective is to assess the extent of children's engagement in physical activity and to determine their anthropometric health status in comparison to established health standards. By analyzing physical activity levels and anthropometric data, this study seeks to generate evidence-based recommendations for improving health outcomes in children from these island regions.

The findings will contribute to the development of targeted intervention strategies aimed at enhancing physical activity levels and promoting healthy growth and development among children in Pulau Pramuka and Pulau Panggang. These insights are expected to inform future public health policies and interventions designed to address the specific needs of children in island communities.

METHODS

The research employed a survey methodology, with the objective of

conducting an in-depth investigation into the current state of physical activity within a particular group. The findings are expected to offer a detailed and systematically organized overview, derived from the data gathered throughout the study. The population for this study comprised elementary school students in grades V and VI from Panggang Island and Pramuka Island, totaling 264 participants. This included 152 male students and 112 female students.

The instruments used in this study included a modified version of the International Physical Activity Questionnaire (IPAQ) tailored for children. The output from IPAQ was measured in Metabolic Equivalents (METs). The IPAQ categorizes physical activity into three levels: low, moderate, and high. Low physical activity is characterized by METs below 600, moderate activity ranges between 600 and 3000, while high activity exceeds 3000 METs. Body weight and Body Mass Index (BMI) were measured using the Xiaomi Mi 2 Pro, while participant height was measured using a stadiometer

RESULTS

Table 1 presents the anthropometric data of the participants involved in this study. The data includes various body measurements such as age, weight, height, and Body Mass Index (BMI), which are essential for obtaining a comprehensive understanding of the physical characteristics of the participants

Table 1. Anthropometric Data

Variables	**Male (n=152)**	**Female (n=112)**
Age (*years*)	11,12 ± 0,67	11,06 ± 0,75
Weight (kg)	33,27 ± 10,15	31,99 ± 6,80
Height (*cm*)	141,34 ± 11,41	136,17 ± 10,69
BMI (kg/m^2)	17,01 ± 1,82	17,25 ± 1,67

Table 2 displays the average duration of sitting, sleep hours, studying at home, and walking activities for participants on a daily basis. This data provides insight into the daily routines and lifestyle choices of the participants, highlighting patterns of physical activity and sedentary behavior. Understanding these durations is vital for assessing how they may impact the overall health and well-being of the individuals involved in the study. Furthermore, the information in this table can help identify areas for improvement in promoting a more active lifestyle among the

participants.

Table 2. Average Duration of Sitting, Sleep Hours, Studying at Home, and Walking Activities

Variables	**Male (n=152)**	**Female (n=112)**
Sitting (*hours*)	1,76 ± 0,33	1,67 ± 0,23
Sleep duration (*hours*)	7,78 ± 1,955	8,32 ± 2,05
Study at home (*hours*)	1,10 ± 0,31	0,92 ± 0,21
Walking (*hours*)	0,77 ± 0,36	0,67 ± 0,33

Table 3 presents data on the categories of physical activity, providing a comprehensive overview of the participants' engagement levels in various physical pursuits. This categorization not only reflects the overall activity patterns among the participants but also offers insights into their lifestyle choices related to physical health and well-being.

Table 3. Data on Categories of Physical Activity

Variables	**Male (n=152)**	**Female (n=112)**
Low	12,10 %	14,65 %
Moderate	51,89 %	52,17%
High	36,11%	34,28%

DISCUSSION

Our study aims to analyze the physical activity levels among children in Pulau Pramuka and Pulau Panggang. This research is believed to be one of the first comprehensive investigations into the physical activity patterns of children living in island environments. The distribution of physical activity levels among the children reveals notable differences, which likely reflect the distinct environmental, social, and infrastructural factors that shape their daily physical activities, as well as the unique challenges and opportunities associated with living in remote island communities.

The anthropometric data shown in Table 1 provide a comprehensive overview of the physical characteristics of children from Pulau Pramuka and Pulau Panggang. These findings are consistent with previous studies, indicating that children around that ages are typically undergoing a rapid growth phase (Li et al., 2020) . This period is characterized by increased variability in body composition, influenced by both

genetic predispositions and environmental factors, such as nutrition and physical activity, which play a crucial role in shaping their growth (Kininmonth et al., 2022; Smith et al., 2020).

In this study, it was observed that the average body weight of male participants exceeded that of their female counterparts. These findings are consistent with existing literature, which indicates that while the weight differential between genders at this developmental stage is generally modest, males tend to exhibit a higher average body weight than females (Lacroix et al., 2023). This disparity may be attributed to variations in physical activity patterns, as males are often more engaged in vigorous physical activities, leading to greater muscle mass and overall body weight (del-Cuerpo et al., 2023; Varì et al., 2016).

Height measurements further illustrate a notable distinction, with male participants averaging greater heights than their female counterparts. Prior research indicates that boys at this developmental stage typically exhibit increased height compared to girls, particularly due to the growth spurts commonly associated with early puberty (del-Cuerpo et al., 2023).. The data from this study corroborate these findings, highlighting a significant height differential between genders. Height serves as a critical indicator of growth in children and is frequently influenced by genetic factors as well as early nutritional intake (Kim et al., 2021).

The Body Mass Index (BMI) values for both boys and girls in this study demonstrated a relatively balanced distribution. These findings align with previous research indicating that the BMI of children around the age of 11 tends to be stable and reflects a generally adequate nutritional status (Ferrari et al., 2017; Mazidi et al., 2018). While there was a minor difference in BMI between boys and girls, the overall results suggest that children in this region maintain a healthy nutritional profile.

The average daily sitting duration reveals that boys spend a greater amount of time in sedentary activities compared to girls. This observation is consistent with prior studies indicating that elementary school-aged children typically engage in relatively short periods of sitting outside school hours, influenced by their physical activity levels and social environments (Greier et al., 2023). Although the difference between boys and girls is not statistically significant, the lesser sitting

time among girls may reflect variations in their daily activities.

Sleep duration reveals a difference between boys and girls, with boys averaging fewer hours of sleep per night compared to girls. Previous research has shown that girls at this age tend to have longer sleep durations than boys, which may be linked to differing physiological needs, as well as variations in daily routines and physical activity (Lewien et al., 2021; Yunus et al., 2021). Adequate sleep duration is essential for supporting children's growth and development, as well as maintaining their mental and physical health (Liu et al., 2024; Schlieber & Han, 2021).

The time spent on studying at home indicates that boys dedicate more hours to academic activities compared to girls, although both groups exhibit relatively low averages. This discrepancy reflects variations in study habits, with boys engaging in more structured learning practices at home.

Walking serves as a significant indicator of daily physical activity (Bai et al., 2022; Ungvari et al., 2023), and the findings of this study indicate that male participants engage in walking more frequently than their female counterparts. This discrepancy is likely attributed to gender roles within social environments and daily activities, where males typically participate more in physically active pursuits involving walking. Furthermore, walking plays a crucial role in cardiovascular health and constitutes an essential component of an active lifestyle that promotes the physical development of children (Powell et al., 2018).

The results of the study reveal a variation in physical activity categories among children in Pulau Panggang and Pulau Pramuka, where some of them engage in low levels of physical activity, while the majority participate in more adequate levels of activity. A significant portion of male and female participants falls within the moderate physical activity category among elementary school children in Pulau Panggang and Pulau Pramuka. This indicates that the majority of children in these regions engage in a sufficient level of physical activity. These findings are consistent with prior research that suggests elementary school-aged children are often categorized under moderate physical activity, particularly in school environments that promote physical engagement through sports and active play (Kovačević et al., 2020)

A notable proportion of male and female participants fall into the high physical activity category. This significant percentage indicates that nearly half of the participants engage in physical activities at a higher level, encompassing greater intensity or frequency. These findings align with previous studies that have identified a tendency for male children to be more physically active compared to their female counterparts (Kretschmer et al., 2023), although the differences in this data are not particularly pronounced. This reflect variations in activity preferences or the opportunities available within their environment (Hou et al., 2020), which could influence the overall engagement in higher intensity activities among elementary school children in Pulau Panggang and Pulau Pramuka.

The majority of children fall into the moderate and high physical activity categories, while those in the low category constitute less than twenty percent. This indicates that children in this region are generally engaged in adequate physical activities. This finding is significant, as low levels of physical activity during early childhood can contribute to various health issues later in life, such as obesity (Wyszyńska et al., 2020), cardiovascular diseases (Jakovljevic, 2017), and psychosocial problems (Yang et al., 2023). Consequently, the results of this research suggest that children in Pulau Pramuka and Pulau Panggang exhibit a generally healthy pattern of physical activity.

The limitations of this study encompass several aspects that should be considered to understand the context of the findings. First, the sample size used in this research is limited to children from Pulau Panggang and Pulau Pramuka, which may not represent the conditions of all children in the Thousand Islands. Therefore, the generalization of the results to a broader population should be approached with caution. Second, this study relies on self-reported measures of physical activity, which may be subject to subjective bias from the respondents. Children may not always provide accurate information regarding the duration and intensity of their physical activities.

CONCLUSSION

The findings of this study indicate that children in Pulau Panggang and Pulau Pramuka exhibit a generally healthy pattern of physical activity, with a significant

proportion engaging in moderate to high levels of activity. This is crucial, as adequate physical activity during childhood is essential for promoting overall health, preventing obesity, and reducing the risk of cardiovascular diseases in the future.

Moreover, the study highlights the importance of maintaining and enhancing opportunities for physical activity among children in these islands. Given the geographic and cultural context of Pulau Panggang and Pulau Pramuka, there are unique opportunities to further encourage active lifestyles through community initiatives and educational programs. Overall, the research underscores the need for continued focus on promoting physical activity in children, as it plays a critical role in their physical and mental well-being

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