

# The Relationship Between Screen Time and Nutritional Status of Children at SDN 060838 Medan in 2024

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## Abstract

Excess weight in children and adolescents was a global health problem that resulted in various serious complications. One of the main factors that triggered obesity was a lack of physical activity, which was largely influenced by the duration of screen device usage. Screen use exceeding two hours per day was linked to increased sedentary behavior, decreased physical activity, disrupted sleep patterns, and unhealthy eating habits, all of which contributed significantly to the risk of obesity. This study aimed to assess the relationship between screen time duration and nutritional status among students at SDN 060838 in Medan City. Using a cross-sectional analytical research design, a sample of 50 students was selected from a population of 198. Data analysis through the Mann-Whitney test revealed a statistically significant relationship between screen time duration and nutritional status ( $p < 0.001$ ). The findings highlighted the critical need for interventions to manage screen time as part of obesity prevention strategies in children. Suggested actions included implementing school-based education programs to raise awareness about the risks of excessive screen time, encouraging physical activities through structured extracurricular programs, and promoting balanced dietary habits. Policymakers were urged to develop and enforce guidelines for screen usage tailored to children's developmental needs. Furthermore, parental involvement in setting limits on screen time and fostering active lifestyles was crucial in ensuring the long-term health and well-being of children amidst the growing reliance on screen devices for both social interaction and education.

**Keywords:** Adolescents; Children; Nutritional Status; Obesity; Screen Time

## Introduction

Obesity in children and adolescents has become one of the main public health challenges globally, with its incidence steadily increasing over the past few years. Several studies indicate that the prevalence of obesity in boys has risen from 0.9% to 7.8%, while in girls, it has increased from 0.7% to 5.6% worldwide (Liu et al., 2023). Obesity at an early age often leads to various serious health problems, such as metabolic disorders, heart disease, and mental health issues (Bartosiewicz et al., 2020). In addition, chronic inflammation is also commonly observed in children suffering from obesity (Jebeile et al., 2022).

In Indonesia, the prevalence of childhood obesity has been increasing in recent years, reflecting the global trend. According to the National Basic Health Research (Riskesdas, 2018), the prevalence of overweight and obesity among children aged 5-12 years in Indonesia was 18.8%, with a higher prevalence observed in urban areas compared to rural

ones. In the island of Sumatra, where this study was conducted, obesity prevalence among children is similarly high, driven by rapid urbanization, dietary transitions, and increased screen device usage. Medan, a major city on the island of Sumatra, has witnessed significant lifestyle changes among families and children, contributing to higher sedentary behavior and unhealthy eating habits (Ministry of Health Indonesia, 2018).

Preventing obesity is crucial to reduce health risks both in the short and long term. In the short term, obesity can trigger various conditions such as asthma, sleep apnea, high blood pressure, and musculoskeletal disorders. Meanwhile, in the long term, the risks include adult obesity, type 2 diabetes, and cardiovascular disease (Wen et al., 2022). However, scientific evidence on the effectiveness of obesity prevention measures in children remains relatively limited (Goncalves et al., 2019). One of the main factors contributing to the rise in childhood obesity is a sedentary lifestyle, often exacerbated by prolonged use of electronic devices (Liu et al., 2023).

In recent years, screen devices have become an integral part of daily life, both among families and children (Byrne et al., 2021). While screen-based technology has many advantages, various studies have shown a significant correlation between increased use of these devices and the rising rates of childhood obesity (Garcia-Conde et al., 2020; Wu et al., 2022). In Indonesia, data suggest that children increasingly spend their time on electronic devices, often exceeding recommended screen time limits. The American Academy of Pediatrics (AAP) recommends limiting screen time for children according to their age group, with a maximum of 1.5 hours per day for children aged 6-10 years and a maximum of 2 hours per day for those aged 11-13 years (Byrne et al., 2021). However, some studies reveal that children aged 10-12 spend an average of almost 8 hours per day in front of screens (Wu et al., 2022).

Excessive screen use, especially more than two hours per day, has been proven to have significant health impacts, particularly in relation to obesity risk (Mohd et al., 2022). When a person spends extended time in front of a screen, it is often accompanied by excessive sitting or a sedentary lifestyle. The lack of physical activity due to too much sitting can reduce the calorie burn needed to maintain a healthy weight. As a result, the body does not efficiently burn energy, which can lead to fat accumulation and eventually contribute to weight gain and obesity (Nagata et al., 2021).

The relationship between obesity and screen time can also be seen in the disruption of sleep patterns caused by excessive screen use, especially at night, which adds to the obesity risk (Mohd et al., 2021). Blue light from screen devices can interfere with the production of melatonin, a hormone that regulates the sleep cycle. Poor-quality sleep affects the regulation of hormones that control appetite, such as leptin and ghrelin. Leptin, which signals satiety to the brain, decreases, while ghrelin, a hormone that increases hunger, rises. This condition leads to increased hunger, especially for high-calorie, fatty, and sugary foods (Bartosiewicz et al., 2020).

Other research findings suggest that exposure to unhealthy food advertisements on television and digital media also plays a key role in promoting unhealthy eating habits, particularly among children. Ads that frequently showcase fast food products, sugary drinks, or foods high in saturated fats, sugars, and sodium can influence food preferences and encourage children to consume such products. Children exposed to these ads tend to request unhealthy food from their parents or buy it themselves, thus worsening their daily eating habits and increasing the risk of obesity (Alfinnia et al., 2021).

This study examines three key aspects to identify and understand the phenomenon of screen time and its impact on the nutritional status of children at SDN 060838 in Medan. The first aspect focused on the intensity of screen time, analyzing how long children used electronic devices such as TVs, computers, or phones in their daily lives. The study aimed to assess whether screen time fell within reasonable limits or was excessive and how it influenced their lifestyle.

The second and third aspects explored children's nutritional status and the relationship between screen time intensity and their nutrition. Nutritional status was measured using health indicators like Body Mass Index (BMI). The study sought to determine whether children with higher screen time tended to have poorer nutritional status, such as being overweight or obese, compared to those with lower screen time. The analysis aimed to provide insights into the potential health impacts of screen time, offering useful information for future prevention and intervention efforts.

## Methods

This study utilizes a quantitative approach with a cross-sectional analytic design, conducted on students of SDN 060838 in Medan to identify the relationship between screen time intensity and children's nutritional status. The research took place in March 2024 at SDN 060838, following approval from the Health Research Ethics Committee (KEPK) of Universitas Prima Indonesia under the number 010/KEPK/UNPRI/III/2024. The study population consisted of all students from grades I to VI who were willing to participate, and the sample size was determined using the Lemeshow formula. From a total population of 198 students, a sample of 47 was calculated, but rounded up to 50 to improve the validity and representativeness of the study.

## Sampling Method

The sampling technique used was stratified random sampling. The student population was divided into strata based on grade levels, and five students from each class were randomly selected to be included as the sample. Data was collected through questionnaires filled out by students of SDN 060838 Medan. Screen time was measured based on daily activities involving the use of gadgets, such as smartphones, computers, or televisions. Meanwhile, nutritional status was assessed using anthropometric methods, specifically by calculating the Body Mass Index (BMI) using the weight-for-height (BB/TB) formula, according to the CDC growth charts

## Operational Definitions

This study involves two variables: screen time as the independent variable and nutritional status as the dependent variable. Screen time was measured using a questionnaire, while nutritional status was assessed through anthropometric methods using tools such as a microtoise for height and a weight scale.

Table 1. Operational definitions in this research

Variable	Definition	Research Tool	Measurement	Scale
Screen time	The daily amount of time a child spends looking at a screen	Questionnaire	Calculation of average duration per day	Ordinal: 1 = Moderate (<2 Hour), 2 = High (>2 Hours)
Nutritional status	The condition of the body is the result of a balance between the food consumed and the use of nutrients in the body	Microtoises, scales, CDC curves	Measurement of child's height and weight	Ordinals: 1 = Malnutrition 2 = Underweight 3 = Normal nutrition 4 = Overweight 5 = Obesity

(Author, 2024)

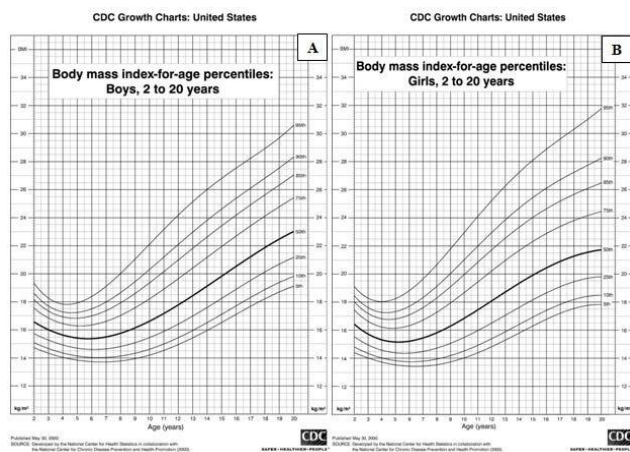


Figure 1. CDC Growth Index (CDC, 2000)

### Research Procedure

The study began with an explanation to the respondents about the purpose and objectives of the research. After agreeing to the informed consent, students filled out a questionnaire and underwent measurements of height and weight. The collected data were then analyzed using statistical software.

### Results

Based on the univariate analysis, the distribution of respondent characteristics is presented in Table 2. Based on the univariate analysis, of the 50 participants, 26 (52%) were male and 24 (48%) were female, showing a nearly equal gender distribution. Regarding age, 21 (42%) were children aged 5-9 years, while 29 (58%) were adolescents aged 10-18 years, with adolescents being the majority. The dominance of adolescents may impact behavior, activity patterns, and gadget use, providing key insights into these characteristics within this age group.



**Table 2.** Frequency Distribution of Respondent Characteristics by Gender and Age

Based on Gender		
Respondent Characteristic	Summary	Percentage (%)
Male	26	52
Female	24	48
<b>Total</b>	<b>50</b>	<b>100</b>

Based on Age		
Respondent Characteristic	Summary	Percentage (%)
Children (5-9 Y.O.)	21	42
Adolescents (10-18 Y.O.)	29	58
<b>Total</b>	<b>50</b>	<b>100</b>

(Author, 2024)

**Table 3.** Respondent's Screen time Frequency Distribution

Screen Time Duration	Summary	Percentage (%)
Moderate ( $\leq 2$ hours)	31	62
High ( $> 2$ hours)	19	38
<b>Total</b>	<b>50</b>	<b>100</b>

(Author, 2024)

Based on Table 3, 31 individuals, or 62% of the total respondents, reported that they use screen devices such as mobile phones, computers, or televisions for a duration considered moderate, which is less than 2 hours per day. This duration is in line with health guidelines that recommend limited screen use to maintain a balance between digital and physical activities. This time limit is considered safe, especially for children and adolescents, to minimize the negative impacts that can arise from excessive technology use.

Moderate screen use has various benefits, primarily in reducing the risk of a sedentary lifestyle, which is often linked to health problems such as obesity, metabolic disorders, and decreased physical fitness. By limiting screen time, respondents tend to have more time to move or engage in healthier physical activities (Martin et al., 2022). This is especially important for children and adolescents who are still growing, as adequate physical activity is essential for supporting their physical and mental development.

Limiting screen time can also contribute to maintaining good quality sleep and reducing eye problems and postural issues that are often associated with excessive digital device use. Excessive screen exposure, especially at night, is often linked to sleep disturbances due to exposure to blue light, which can decrease the production of melatonin, the hormone that helps regulate sleep cycles. Additionally, using screens in non-ergonomic positions can increase the risk of postural problems such as neck and back pain. With limited screen time, these risks can be minimized, making respondents more likely to have better overall health (Hashemi et al., 2024).

Meanwhile, 19 individuals, or 38% of the respondents, reported using screens for more than 2 hours per day. A duration exceeding 2 hours per day is often considered risky for health, especially when not balanced with sufficient physical activity. Excessive screen use can increase the likelihood of a sedentary lifestyle, which is associated with various health problems such as obesity, metabolic disorders, and decreased mental health, including stress or anxiety.

Although the majority of respondents are still within the safe category in terms of screen time duration, the fact that nearly 40% of respondents use screens for more than 2 hours per day is a concern. Prolonged screen use, especially outside of work or school hours, can affect sleep patterns, the quality of social interaction, and increase the risk of long-term health problems. Therefore, even though the majority of respondents are within safe limits, it is important to provide further education on the impacts of excessive screen use and encourage more balanced practices, such as scheduling breaks from screens and increasing physical activity.

**Table 4.** Respondent's Nutritional Status Percentage Distribution

Nutrition Status	Summary	Percentage (%)
Malnutrition	0	0
Underweight	7	14
Normal Nutrition	23	46
Overweight	9	18
Obesity	11	22
<b>Total</b>	<b>50</b>	<b>100</b>

(Author, 2024)

Based on the data in Table 4, the distribution of nutritional status among respondents indicates that the majority, specifically 46% of the total respondents, fall within the normal nutritional status category. This suggests that nearly half of the studied population has a nutritional condition that aligns with recommended health standards, meaning they neither experience underweight nor overweight.

The research findings revealed the presence of a group of respondents facing nutritional issues. A total of 7 individuals, or 14% of the total respondents, were categorized as having underweight, indicating that they may be experiencing insufficient nutrient intake for their body's needs. This undernourished status can signify various problems, such as inadequate consumption of nutritious foods or other factors such as underlying health conditions that affect nutrient absorption.

Furthermore, 9 individuals, or 18% of respondents, were classified as overweight, suggesting that they have a caloric intake exceeding their body's requirements but have not yet reached the level of obesity. This group is at risk of developing various health problems in the future if their dietary patterns and lifestyle are not improved, such as the risk of heart disease and diabetes.

The research data in Table 4 also indicates that 11 individuals, or 22% of respondents, fall into the obese category, meaning that nearly a quarter of the study population faces more serious health risks. Obesity is often linked to various chronic diseases such as hypertension, type 2 diabetes, cardiovascular disease, and other metabolic disorders.

This proportion demonstrates that although a majority of respondents have a normal nutritional status, there is still a significant percentage experiencing obesity or overweight, which requires special attention in terms of health interventions and nutrition education.

**Table 5.** The Correlation between Screen Time and Nutritional Status

Screen time	Nutr. Stat. (%)		Asymp. Sig (2-tailed)
	Mean	Std. Deviation	
Cukup	103,59	16,07	<,001
Lebih	115,48	12,03	

(Author, 2024)

In Table 5, the relationship between screen time duration and nutritional status was analyzed using the non-parametric Mann-Whitney U test. This test was chosen because the data did not follow a normal distribution. The test aimed to compare the distribution of two different groups based on screen time duration, namely the group with high screen time and the group with low or moderate screen time.

The results of the analysis showed a statistically significant difference between screen time duration and nutritional status, with a p-value <0.001. This very small p-value indicates that the relationship between these two variables is not coincidental, but rather has strong statistical significance. In other words, the more time a person spends in front of a screen, whether it be watching television, using a computer, or other digital devices, the greater the likelihood they will experience a decline in nutritional status and related health problems.

Specifically, individuals with longer screen time durations tend to have poorer nutritional status compared to those with more moderate or controlled screen time durations. This can be attributed to several factors, such as a more sedentary lifestyle, lack of physical activity, and the possibility of an imbalanced diet during screen time, such as consuming high-calorie, low-nutrient snacks. These findings are important as they highlight the need for greater attention to screen time duration, especially in certain age groups, to maintain optimal nutritional status and prevent long-term health risks.

## Discussion

This study found a significant relationship between screen time (time spent in front of screens, such as televisions, computers, smartphones, or tablets) and nutritional status, particularly in terms of body weight and body mass index (BMI). Nutritional status is an indicator of whether a person's weight is appropriate for their height, and in this context, it is often associated with the risk of obesity or malnutrition (Quinteros-Reyes et al., 2024).

This relationship can be explained by several mechanisms, where increased screen time often leads to reduced physical activity. Children and adolescents who spend more time in front of screens tend to move less, which reduces their daily calorie expenditure. Additionally, high screen time can also contribute to unhealthy eating habits. For example, watching television or playing games is often accompanied by the consumption of high-calorie, low-nutrient snacks, such as fast food, sugary drinks, or unhealthy snacks. The combination of a sedentary lifestyle and poor eating habits can increase the risk of weight gain and obesity.

This study found a significant relationship between screen time and nutritional status. These findings are consistent with previous research conducted by Pratiwi and Mardiyati (2018), where they found that increased screen time was associated with weight gain in children. These findings are also consistent with the research of Wu et al. (2022), which identified a relationship between screen time duration and increased BMI in adolescents. Adolescents with higher screen time durations tend to have a higher body mass index, indicating a higher risk of obesity.

Furthermore, these findings underscore the importance of monitoring screen time duration for children and adolescents, as recommended by the American Academy of Pediatrics (Nagata et al., 2021). Strict guidelines on screen time use can help families prevent excessive weight gain caused by uncontrolled screen use.

However, Rizqiyantul's research (2022) showed that there was no significant relationship between screen time and nutritional status in children and adolescents, which differs from some other studies that found a link between the two. This confirms that nutritional status is not only influenced by screen time duration but also by various other factors such as genetic factors, physical activity, and dietary patterns. Genetic factors influence metabolism and an individual's predisposition to certain nutritional conditions, while physical activity plays an important role in the body's energy balance. A healthy and balanced diet can also mitigate the negative impacts of excessive screen time, such as the tendency to snack while watching television. Additionally, differences in research findings can occur due to variations in methodology, particularly in how screen time is measured, where some studies use self-reporting which is prone to errors or respondent bias. Therefore, to comprehensively understand the impact of screen time on nutritional status, further research with more rigorous methodologies is needed, considering other relevant factors, and the impact of screen time on nutritional status should be viewed with caution and considering various influencing factors.

## Conclusion

Based on the analysis, a positive correlation was found between screen time duration and nutritional status, meaning the more time spent in front of a screen, the higher the likelihood of an individual having a suboptimal nutritional status. In this study, the majority of respondents were male, and they were divided into two age groups: children and adolescents, with varying nutritional status in each group. These differences provide important insights into how screen time duration can affect nutritional status at different ages.

The results also showed that most respondents, especially in the children age group, had screen time durations that were still considered reasonably safe, i.e., less than or equal to 2 hours per day. However, some respondents used screens for more than 2 hours per day. This group was more susceptible to nutritional problems, with a higher tendency to fall into the overweight or obese category. This suggests that prolonged screen use may contribute to an increased risk of poor nutritional status, primarily due to a sedentary lifestyle and imbalanced eating patterns during screen time. These findings emphasize the importance of regulating screen time and promoting physical activity to prevent more serious nutritional disorders among children and adolescents.

The findings of this study indicate a strong correlation between excessive screen time and childhood obesity. To mitigate this issue, a multi-faceted approach is recommended. Strategies such as limiting screen time, promoting physical activity, and establishing balanced media use schedules should be implemented. Parents, schools, governments, and individuals should collaborate to create an environment that supports healthy lifestyle behaviors and reduces the risk of obesity.



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