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Research article

Risk Factors for Overweight Among Students at SDN 104219 Tanjung Anom

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ABSTRACT

Background: The increase in cases of malnutrition among elementary school children is caused by high-energy, low-fiber diets, inactive lifestyles, environments that encourage fast food consumption, and a lack of nutrition education. This study aims to analyze risk factors for overweight among elementary school students.
Methods: This study used a cross-sectional design conducted on April 20-21, 2025, at SDN 104219 Tanjung Anom. The research subjects were all grades IV and V students, totaling 52 people, who were selected using the total sampling technique. The independent variables consisted of fast food, sweet food, snack food, fruit and vegetable consumption, and physical activity. The dependent variable was overweight. Food consumption data were collected using the 2×24-Hour Recall method (school days and weekends) to obtain a more accurate picture of average intake. Physical activity was measured with the Physical Activity Questionnaire for Children (PAQ-C). Data analysis using the Chi-square test and logistic regression.
Results: Fast food consumption ($p < 0.001$; OR = 10.8; 95% CI = 2.512-46.423), consumption of sweets ($p < 0.001$; OR = 23.8; 95% CI = 4.383-126.670), snack consumption ($p < 0.001$; OR = 15.4; 95% CI = 2.898-25.959) has a significant association with overweight of school children. Fruit and vegetable consumption ($p = 0.509$; OR = 0.66; 95% CI = 0.187-2.302), physical activity ($p = 0.238$; OR = 0.47; 95% CI = 0.135-1.657) showed no significant association with overweight of school children.
Conclusion: Eating fast food, sweet foods, and snacks more than three times a week is a risk factor for overweight in elementary school children.

I. Introduction

Overnutrition has become a global issue affecting the entire world and is the most significant health problem in the world (Dwi Kusuma Putri & Citra Palupi, 2020). The increase in overweight and obesity rates in several countries has become a significant problem in various nations, both developed and developing (Syifa & Djuwita, 2023). Obesity is the excessive or abnormal accumulation of fat or adipose tissue in the body that can impair health (Jin et al., 2023). The nutritional status of elementary school children needs attention because during this period, children experience an increase in weight and height. Having good nutritional status is crucial because it affects intelligence, health, immunity, productivity, and helps prevent the risk of chronic diseases and premature death (Zuhriyah, 2021).
Based on data from the 2018 RISKESDAS, the problem of child malnutrition in Indonesia among school-aged children aged 5-12 years, according to body mass index/age, is 9.3% thin, which is divided into 2.4% skinny and 6.8% thin. The prevalence of overweight is 20.6%, with 11.1% being overweight and 9.5% being obese. The prevalence of stunting is 23.6%, with 6.7% being severely stunted and 16.9% being stunted (Riskesdas, 2018). Meanwhile, the results of the 2018 RISKESDAS data on the prevalence of children's nutritional status according to Body Mass Index/Age for children aged 5-12 years in North

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Sumatra Province are as follows: skinny category 2.1%, thin 5.6%, overweight 10.6%, and obese 9.1% (Riskesdas, 2018).

The impact of being overweight in childhood can increase the likelihood of becoming overweight or obese in adulthood. Childhood is a period of growth and development, so being overweight at this age increases muscle and bone mass. Meanwhile, being overweight in adults only leads to an enlargement of body cells, making it easier to lose weight to a normal level. Excessive nutrition can increase the likelihood of developing various diseases. Children who are overweight or obese are at high risk of developing non-communicable diseases, such as insulin-related diabetes, hypertension, heart disease, cardiovascular disease, and potentially experiencing depression due to social stigma in adulthood. To address the problem of overnutrition, which carries the risk of causing obesity in children, various efforts are being made to reduce the high rate of nutritional problems in children (Made Tantra Wirakesuma et al., 2022).

Diet plays a vital role in the occurrence of obesity, primarily by consuming food portions that exceed daily needs (Faridi et al., 2022). Unhealthy eating habits, as well as lifestyle changes, have occurred as traditional lifestyles transitioned into modern lifestyles with minimal physical activity (Amrynia & Prameswari, 2022). As a result of consuming large portions of food, foods high in energy, fat, simple carbohydrates, and low in fiber, such as fast food, packaged foods, and soft drinks (Sineke et al., 2019). The family's economic situation is also related to the occurrence of obesity. In general, the better a person's financial condition, the higher their purchasing power for the food they consume (Syifa & Djuwita, 2023). This study aims to determine the risk factors for overweight in elementary school children (frequency of fast food consumption, consumption of sugary drinks, snack consumption, fruit and vegetable consumption, and physical activity) among 4th and 5th-grade students at SDN 104219 Tanjung Anom.

The implications of childhood obesity extend far beyond immediate health concerns. Research indicates that children who are overweight are at a significantly heightened risk of remaining overweight or obese into adulthood. This is particularly concerning during childhood, a critical period for growth and development, where an increase in body mass can lead to an increase in both muscle and bone mass. In contrast, when adults gain weight, it primarily results in an enlargement of body cells, making it more challenging to revert to a healthy weight. The consequences of overnutrition are dire, as it elevates the risk of developing non-communicable diseases such as type 2 diabetes, hypertension, cardiovascular diseases, and even mental health issues stemming from social stigma and discrimination. The societal implications of these health challenges cannot be overstated, as they contribute to a cycle of poverty and health inequity that affects future generations (Made Tantra Wirakesuma et al., 2022).

Dietary habits play a crucial role in the development of obesity, particularly in terms of portion sizes that exceed daily caloric needs (Faridi et al., 2022). The shift from traditional dietary practices to modern lifestyles has led to unhealthy eating habits characterised by increased consumption of energy-dense foods that are high in fats and simple carbohydrates, while being low in essential nutrients and dietary fibre. Fast food, packaged snacks, and sugary beverages have become staples in many children's diets, exacerbating the problem of overnutrition (Sineke et al., 2019).

The economic status of families is intricately linked to obesity rates. Generally, individuals with better financial resources possess a higher purchasing power, allowing them access to a wider variety of food options, including those that are often unhealthy. This correlation highlights the need for targeted interventions that consider the socio-economic context of families, as well as the dietary choices available to them (Syifa & Djuwita, 2023).

This study aimed to explore the risk factors contributing to overweight status among elementary school children, specifically focusing on factors such as the frequency of fast food consumption, sugary drink intake, snack choices, and the consumption of fruits and vegetables, as well as levels of physical activity among 4th and 5th-grade students at SDN 104219 Tanjung Anom.

The issue of overnutrition and its implications for childhood obesity is a complex interplay of dietary habits, socio-economic factors, and lifestyle choices. Addressing this multifaceted problem requires a holistic approach that not only promotes healthier eating habits and physical activity but also considers the broader socio-economic context in which families operate. By fostering environments that support healthy choices and providing education on nutrition, we can work towards reducing the prevalence of

obesity and its associated health risks among children. The stakes are high, and the time for action is now; the health of future generations depends on our efforts today.

II. METHODS

This study used a cross-sectional design conducted on April 20-21, 2025, at SDN 104219 Tanjung Anom. The research subjects were all grades IV and V students, totaling 52 people, who were selected using the total sampling technique. Inclusion criteria included students registered at SDN 104219 Tanjung Anom and present in class during the study. Exclusion criteria included students who were unwilling to complete the questionnaire and could not participate due to illness or absence.

The independent variables consisted of fast food consumption, sweet food consumption, snack food consumption, fruit and vegetable consumption, and physical activity. The dependent variable was overweight. Food consumption data were collected using the 2×24-Hour Recall method (school days and weekends) to obtain a more accurate picture of average intake. Physical activity was measured with the Physical Activity Questionnaire for Children (PAQ-C). Data processing began with coding each variable, followed by descriptive analysis to obtain the frequency distribution. Bivariate analysis was performed using the Chi-square test, while multivariate analysis used logistic regression. This study has received approval from the Prima Indonesia University Health Research Ethics Committee with number 004/KEPK/UNPRI/IV/2025.

III. RESULTS

Respondent Characteristics

This research uses a quantitative approach and employs height, weight, and questionnaire completion measurements for data collection. Fifty-two respondents will complete the questionnaire. The characteristics of this study include age, gender, class, and nutritional status in children. Table 1 shows that 61.5% of respondents were over 10 years old. In terms of gender, most respondents were female, amounting to 51.9%. Based on grade level, respondents from grades 4 and 5 amounted to 50%.

Table 1. Respondent Characteristics

Characteristics	n	%
Age		
≤10 years	20	38.5
>10 years	32	61.5
Gender		
Male	25	48.1
Female	27	51.9
Class		
4th Grade	26	50.0
5th Grade	26	50.0

Frequency Distribution of Factors Causing Overweight in Students

Table 2 shows that 42.3% of respondents consume fast food more than three times a week. Based on the consumption of sweets, 40.4% of respondents consumed sweets with the same frequency. Regarding snack consumption, 46.4% of respondents recorded consuming snacks more than three times per week. Meanwhile, 40.4% of respondents consumed fruits and vegetables with a frequency of more than three times a week. Based on the level of physical activity, 46.2% of respondents were classified as having low physical activity. 28.8% of respondents were overweight, while 71.2% not overweight.

Table 2. Frequency Distribution of Factors Causing Overweight in Primary School Children

Variable	n	%
Fast Food Consumption		
More than 3 times a week	22	42.3
1-2 times a week	30	57.7
Sweet Consumption		
More than 3 times a week	21	40.4
1-2 times a week	31	59.6
Snack Consumption		
More than 3 times a week	24	46.2
1-2 times a week	28	53.8
Fruit and Vegetable Consumption		
More than 3 times a week	21	40.4
1-2 times a week	31	59.6
Physical Activity		
Low (physical activity < median value 76,5)	24	46.2
Tinggi (physical activity > median value 76,5)	28	53.8
Overweight		
Overweight	15	28.8
Not overweight	37	71.2

Chi-Square Test

Table 3 shows that fast food consumption has a significant association with overweight of school children ($p < 0.001$; OR = 10.8; 95% CI = 2.512-46.423). Children who consumed fast food more than three times a week had a 10.8 times greater risk of being overweight than those who consumed one to two times a week. Consumption of sweets also showed a significant association with overweight of school children ($p < 0.001$; OR = 23.8; 95% CI = 4.383-126.670). Children who consumed sweets more than three times a week were 23.8 times more likely to be overweight than those who consumed one to two times a week. Similarly, snack consumption had a significant association with overweight of school children ($p < 0.001$; OR = 15.4; 95% CI = 2.898-25.959). Children who consumed snacks more than three times a week had a 15.4 times greater risk of being overweight than those who consumed one to two times a week. In contrast, fruit and vegetable consumption showed no significant association with overweight of school children ($p = 0.509$; OR = 0.66; 95% CI = 0.187-2.302). Similarly, physical activity was not significantly associated with overweight ($p = 0.238$; OR = 0.47; 95% CI = 0.135-1.657). These findings suggest that high fruit and vegetable consumption and physical activity will likely protect against overweight in school children. However, the association was not statistically significant.

Table 3. Chi-Square Test

Variable	Overweight				Total		p	OR; 95% CI
	Overweight		Not overweigl					
	n	%	n	%	n	%		
Fast Food Consumption								
More than 3 times a week	12	23.1	10	19.2	22	42.3	<0.001	10,8; 2,512-46,432
1-2 times a week	3	5.8	27	51.9	30	57.7		
Sweet Consumption								
More than 3 times a week	13	25.0	8	15.4	21	40.4		23,6; 4,383-126,670
1-2 times a week	2	3.8	29	55.8	31	59.6	<0.001	
Snack Consumption								
More than 3 times a week	13	25.0	11	21.2	24	46.2	<0.001	15,4; 2,898-2,959
1-2 times a week	2	3.8	26	50.0	28	53.8		
Fruit and Vegetable Consumption	5	9,6	16	30,8	21	40,0	0,509	0,66;

Variable	Overweight				Total		p	OR; 95% CI
	Overweight		Not overweigl					
	n	%	n	%	n	%		
More than 3 times a week	10	19,2	21	40,4	31	59.6		0,187-2,302
1-2 times a week								
Physical Activity								
Low (<median 76.5)	5	9,6	19	36,5	24	46.2	0,238	0,47;
High (>median 76.5)	10	19,2	18	34,6	28	53.8		0,135-1,657

Table 4 shows that snack consumption is the most dominant variable associated with schoolchildren's overweight (p = 0.002; AOR = 30.520; 95% CI = 3.514-264.079). Consuming snacks more than 3 times a week had a 32.5 times higher risk of being overweight than 1-2 times a week.

Table 4. Logistic Regression Model

Variable	AOR (95% CI)	P-value
Fast Food Consumption		
More than 3 times a week	5.215 (0.699-38.941)	
1-2 times a week	Ref	0,107
Sweet Consumption		
More than 3 times a week	30.520 (3.514-264.079)	0,002
1-2 times a week	Ref	
Snack Consumption		
More than 3 times a week	14.768 (1.661-131.317)	0,016
1-2 times a week	Ref	

IV. DISCUSSION

The relationship of fast food consumption to the overweight of school children

Based on the analysis results, fast food consumption has a significant association with overweight of school children (p < 0.001; OR = 10.8; 95% CI = 2.512-46.423). Children who consumed fast food more than three times a week had a 10.8 times greater risk of being overweight than those who drank it one to two times a week. Based on the results of the study, overweight students were found to consume fast food three or more times a week. Factors that generally encourage the high consumption of fast food among respondents are its good taste and practical presentation. This fast food is available both in the school canteen and in the neighborhood around the school, where a lot of this food is sold.

Another contributing factor is the habit of most children not eating breakfast at home, either because they wake up late or because their parents don't have time to prepare food. This condition causes children to receive more pocket money, which is used to buy fast food at school. This finding is in line with previous research, which showed that out of 30 overweight respondents, all reported an association between fast food consumption and an increased risk of childhood obesity (p = 0.0031) (Sriwahyuni et al., 2021). However, another study stated that no significant relationship was found between the habit of consuming fast food and overweight in elementary school children at SDIT Annuriyah Jakarta, with the result (p-value = 1.000) (Rizqiya et al., 2025).

The relationship of sweet consumption to the overweight of school children

This study indicates that consumption of sweets also showed a significant association with overweight of school children (p < 0.001; OR = 23.8; 95% CI = 4.383-126.670). Children who consumed sweets more than three times a week were 23.8 times more likely to be overweight than those who consumed one to two times a week. Of the 52 respondents studied, 15 were overweight, and 13 consumed sugary drinks more than three times a week. Respondents generally consumed high amounts of sugary foods and drinks because children prefer sugary drinks over water, which is considered less appealing. Sugary drinks are their top choice because of their favorable taste. In addition, the relatively affordable price of sugary drinks also encourages the frequency of their purchase among children. Another influencing factor is exposure to social media and television advertisements, which creates curiosity and encourages them to buy the drinks when they are available.

These results are in line with research conducted by (Rahmad & Rasmawati, 2024) at SD Negeri 52 Pilipi, which found that out of 73 respondents, as many as 18 children who were overweight showed a significant relationship between consumption of sugary drinks and risk factors for overweight (p = 0.014). The study also indicated that the higher the frequency of consumption of sugary drinks, the greater the effect on increasing the risk of being overweight. In contrast, another study by (Rizqiya et al., 2025) Showed different results. The study, conducted at SDIT Annuriyah Jakarta, found no significant association between sugary drink consumption and the incidence of overweight in elementary school children (p = 1.000).

The relationship of snack consumption to the overweight of school children

Snack consumption had a significant association with overweight of school children (p < 0.001; OR = 15.4; 95% CI = 2.898-25.959). Children who consumed snacks more than three times a week had a 15.4 times greater risk of being overweight than those who drank one to two times a week. The results of this study show that most overweight students consume snacks three or more times a week. Some factors that influence the high frequency of snack consumption include the habit of children who are given excessive freedom to consume snacks, especially at school, without parental supervision. In addition, the availability of various types of snacks or street food in the school environment and the habit of children imitating their peers' behavior in buying and consuming snacks also contribute to this behavior.

These results align with research conducted by (Angrainy et al., 2019) at SDN 42 Pekanbaru, which found that out of 82 respondents, 52 children consumed snacks (p = 0.042), indicating a significant relationship between snack consumption and nutritional status. In contrast, research conducted by (Ratih et al., 2024) showed different results. The study stated that there was no significant relationship between snacking habits and the incidence of overweight in elementary school students at SD Negeri X, with 32 respondents (p = 0.085). The conclusion of this study shows that the habit of snacks or snack consumption is not significantly associated with overweight status in students.

The relationship of fruit and vegetable consumption to the overweight of school children

Fruit and vegetable consumption showed no significant association with overweight of school children (p = 0.509; OR = 0.66; 95% CI = 0.187-2.302). These findings suggest high fruit and vegetable consumption will likely protect against overnutrition in schoolchildren. However, the association was not statistically significant. This finding shows that among students who are overweight, many still consume fruits and vegetables. This condition is influenced by the positive habits and attitudes of families who consistently provide fruits and vegetables at home, so children are accustomed to consuming them regularly. In addition, children tend to like the sweet taste of fruit and are still willing to consume vegetables, although they are limited to certain types.

These results are in line with research conducted by (Milanti et al., 2022) in RW 00 Elementary School, Sunter Agung Village, North Jakarta, researchers found that out of 80 respondents, there was no significant relationship between fruit and vegetable consumption and risk factors for obesity in children (p = 0.603). The study also showed that children who were overweight tended to consume fruits and vegetables more often. In contrast, another study by (Farida et al., 2022) showed different results. Research conducted at SD Teknologi Pekanbaru City found a significant relationship between fruit and vegetable consumption and the incidence of obesity in school-age children (p = 0.000). The results showed that a lower frequency of fruit and vegetable consumption was associated with a lower risk of obesity than a higher frequency of consumption.

The relationship of physical activity to the overweight of school children.

Physical activity was not significantly associated with overweight (p = 0.238; OR = 0.47; 95% CI = 0.135-1.657). These findings suggest that high physical activity will likely protect against overweight in school children. Students who are overweight tend to be more active in their daily activities, both at school and at home, compared to those who are not overweight. This phenomenon is particularly evident during recess, when overweight students are more often involved in physical activities such as running with their peers, playing jump rope, and playing soccer on the school field. Meanwhile, children who are not overweight tend to be calmer and spend more rest time sitting or being still.

These results are in line with research conducted by (Rahmani & Dewi, 2021) at MIN 2 Johar Baru, which found that out of 42 respondents, 24 students had good physical activity levels (p-value = 0.903). These findings indicate no significant relationship between physical activity and overweight status. However, different results were found in a study by (Rahma & Wirjatmadi, 2020), which showed a significant relationship between physical activity and overweight status among elementary school students at SD Negeri Ploso I-172, Tambaksari, Surabaya. The study involved 210 respondents and yielded a p-value of 0.016. This finding indicates that low physical activity levels are associated with overweight status in elementary school children. Therefore, increasing physical activity and reducing sedentary behavior in children is recommended to prevent overweight.

V. CONCLUSION

Eating fast food, sweet foods, and snacks more than three times a week is a risk factor for overweight in elementary school children. Fruit and vegetable consumption and physical activity showed no significant association with overweight in school children. Further research is recommended to examine in greater depth the variety and frequency of fast food and snack consumption that significantly impacts weight gain in children. This study could also involve analysis of the energy content, sugar levels, and fat content in the foods consumed.

VI. ACKNOWLEDGMENTS

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VII. CONFLICTS OF INTEREST

The authors declare that this study is free from any conflicts of interest.

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