



Analysis of the Relationship Between Junk Food Consumption Habits and Obesity With the Results of Glucose Testing in Elementary School Students in Bengkulu City

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Abstract

The increase in obesity in children and adolescents is parallel to that of adults. Obesity is caused by an imbalance between the amount of energy taken in and that needed by the body for various biological functions such as physical growth, development, activity, and health maintenance. If this situation continues (positive energy balance) for a long time, the impact is obesity. Objective: This study aims to determine whether there is a relationship between junk food consumption habits and obesity on the results of glucose level examination. Method: The sampling technique in this study using purposive sampling method, and the sample used was many as 72 samples. Result and Discussion: The results of the study from 72 samples showed that the number of students who consumed junk food was 53% and the number of obese students was 47%. There were 13% of elementary school students with junk food consumption habits and glucose positive and the rest 87% were glucose negative. There were 11.8% of students who were obese and glucose positive, then 88.2% were glucose negative. For the chi-square analysis results, the p value was 1.000, so $p > 0.05$ Conclusion: Based on the results of a study of 72 samples, there was no relationship between junk food consumption habits and obesity with the results of glucose level checks in elementary school students in Bengkulu City in 2024.

Keywords

junk food;
obesity;
glucose.

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Introduction

Childhood is a crucial stage in human development, particularly in shaping long-term health behaviors, including dietary patterns. As children begin formal schooling, their food choices are

increasingly influenced by external factors such as peers, school environment, and exposure to media and advertising. This transition often leads to changes in eating habits, including increased consumption of unhealthy foods, commonly known as junk food. Junk food is typically characterized by high levels of sugar, salt, and fat, with low nutritional value, which may negatively affect children's health.

The rapid development of the food industry and widespread marketing strategies have significantly increased children's access to and preference for junk food. Media exposure and promotional activities play an important role in influencing consumption behavior, particularly among children who are more vulnerable to persuasive messages. Studies have shown that consumer behavior is shaped by environmental stimuli, perceived value, and social influences (Abdullah et al., 2023; Tian et al., 2022). In the context of children, these influences may lead to unhealthy dietary patterns that persist into adulthood.

In Indonesia, lifestyle changes driven by urbanization and economic growth have contributed to shifts in dietary habits, particularly among school-aged children. Traditional diets are increasingly replaced by fast food and processed food consumption, leading to higher intake of energy-dense foods. This condition contributes to an imbalance between energy intake and expenditure, which is a major risk factor for obesity. The increasing prevalence of childhood obesity has become a serious public health issue, both globally and nationally.

Obesity is defined as excessive fat accumulation that poses a risk to health. It results from a long-term imbalance between caloric intake and energy expenditure. Children who are obese are more likely to experience various health problems, including metabolic disorders, cardiovascular diseases, and psychological issues. Furthermore, childhood obesity is often associated with an increased risk of developing non-communicable diseases later in life.

One of the major health risks associated with obesity is diabetes mellitus. Diabetes mellitus is a chronic metabolic disease characterized by elevated blood glucose levels due to impaired insulin production, insulin action, or both. In children, early signs of metabolic disorders may not always be clearly visible, making early detection essential. Glucose testing, including urine glucose examination, can be used as a screening method to identify potential abnormalities in glucose metabolism.

Dietary habits, particularly frequent consumption of junk food, are considered one of the contributing factors to obesity and glucose metabolism disorders. Junk food often contains high levels of simple carbohydrates and added sugars, which can lead to increased blood glucose levels. Over time, excessive consumption may contribute to insulin resistance and increase the risk of developing diabetes mellitus. However, the relationship between junk food consumption, obesity, and glucose levels is complex and influenced by various factors, including physical activity, metabolism, and genetic predisposition.

The stimulus-organism-response (SOR) framework explains how external factors such as food marketing and social environment influence individual behavior, including food consumption patterns (Tian et al., 2022). This framework highlights the role of environmental stimuli in shaping dietary habits, which may ultimately affect health outcomes. Children who are frequently exposed to unhealthy food advertisements are more likely to develop preferences for such foods, thereby increasing the risk of obesity and related metabolic disorders.

Despite the theoretical link between junk food consumption, obesity, and glucose abnormalities, empirical findings remain inconsistent. Some studies report a significant association between these variables, while others find no direct relationship. These inconsistencies may be influenced by differences in study design, sample size, and measurement methods. Additionally, some children may maintain normal glucose levels despite unhealthy eating habits due to compensatory factors such as high physical activity or efficient metabolic function.

In Bengkulu City, limited research has examined the relationship between junk food consumption, obesity, and glucose levels among elementary school students. Understanding this relationship is important to provide local evidence that can support the development of targeted health interventions. Early identification of risk factors is essential to prevent the progression of metabolic disorders and improve children's health outcomes.

Therefore, this study aims to analyze the relationship between junk food consumption habits and obesity with glucose test results among elementary school students in Bengkulu City. The results of this study are expected to provide valuable insights for schools, parents, and health professionals in developing effective strategies to promote healthy lifestyles and prevent metabolic diseases in children.

Materials and Methods

This study employed a quantitative analytical approach using a cross-sectional design to examine the relationship between junk food consumption habits, obesity status, and glucose test results among elementary school students. The cross-sectional design was chosen because it allows for the simultaneous measurement of exposure and outcome variables within a specific time frame, providing an overview of the relationships among variables.

The study was conducted in elementary schools located in Bengkulu City. The population consisted of all elementary school students who met the inclusion criteria determined by the researchers. A total of 72 respondents were selected using a purposive sampling technique, which allowed the researchers to select participants based on specific characteristics relevant to the study objectives. The inclusion criteria included students who were willing to participate, had parental consent, and were present at the time of data collection. Meanwhile, students with known chronic diseases or incomplete data were excluded from the study.

The variables in this study consisted of independent and dependent variables. The independent variables were junk food consumption habits and obesity status, while the dependent variable was glucose test results. Junk food consumption habits were measured using a structured questionnaire that assessed the frequency and types of junk food consumed by the respondents. The questionnaire was designed based on commonly consumed fast food items and validated through expert judgment.

Obesity status was determined using anthropometric measurements, specifically body weight and height, which were then used to calculate the Body Mass Index (BMI). The BMI values were interpreted according to age-specific standards to classify respondents into categories such as normal, overweight, or obese. Glucose levels were measured using urine glucose examination, which served as an initial screening method to detect the presence of glucose abnormalities.

Data collection was carried out through several stages. First, respondents were asked to complete the questionnaire under the supervision of the researchers. Second, anthropometric measurements were conducted using standardized instruments to ensure accuracy. Third, urine samples were collected and analyzed using appropriate laboratory procedures to determine glucose levels. All procedures were conducted in accordance with ethical standards, and informed consent was obtained from parents or guardians prior to data collection.

The collected data were processed and analyzed using statistical software. Data analysis consisted of univariate and bivariate analysis. Univariate analysis was used to describe the distribution of each variable in terms of frequency and percentage. Meanwhile, bivariate analysis was conducted using the Chi-Square test to determine the relationship between junk food consumption habits, obesity status, and glucose test results.

The level of statistical significance was set at $p < 0.05$. If the p-value obtained from the Chi-Square test was less than 0.05, it indicated a significant relationship between variables. Conversely,

if the p-value was greater than 0.05, it indicated that there was no statistically significant relationship.

To ensure the validity and reliability of the data, the researchers conducted preliminary testing of the questionnaire and used standardized measurement procedures. Ethical considerations were also prioritized, including maintaining the confidentiality of respondents' data and ensuring voluntary participation throughout the study.

Results and Discussions

From the results of the research conducted on 72 elementary school students in Bengkulu City, the results of the research were obtained as in the table below:

Table 1. Distribution of Junk Food Consumption Habits and Obesity in Elementary School Students in Bengkulu City in 2024

Variabel Research	Frequenc y (People)	Percent age (%)
Junk food consumption	38	53
Obesity	34	47
Total	72	100

From Table 1 above, it is known that the number of students who consume junk food is 38 people with a percentage of 53% and the number of students who are obese or overweight is 34 people with a percentage of 47%.

Table 2. Distribution of Frequency of Glucose Test Results in Elementary School Students Consuming Junk Food in Bengkulu City in 2024

Up to Glucosa urin	Frequenc y (People)	Percent age (%)
Positive	5	13
Negatives	33	87
Total	38	100

Table 2 There are 13% of elementary school students with the habit of consuming junk food who have positive glucose levels, namely 5 people and the remaining 87% of students who have negative glucose levels or as many as 33 people.

Table 3. Distribution of Frequency of Glucose Test Results for Obese Elementary School Students in Bengkulu City in 2024

Up to Glucosa urin	Frequency (People)	Percenta ge (%)
Positive	4	11,8
Negatives	30	88,2
Total	34	100

Table 3 There are 11.8% of obese or overweight elementary school students who have positive glucose levels, namely 4 people and the remaining 88.2% of students have negative glucose levels or as many as 30 people.

Table 4. The Relationship between Junk Food Consumption Habits and Obesity with Glucose Testing in Obese Elementary School Students in Bengkulu City in 2024

Research Variables	Respondent Distribution (N)	(%)	Normal Results (N)	(%)	Abnormal Results (N)	(%)	P-Value	α
Junk Food Consumption	38	52.8	33	45.8	5	6.9	1	0.05
Obesity	34	47.2	30	41.7	4	5.6		
Total	72	100	63	87.5	9			

Based on Table 4 above, the results of data analysis using chi-square indicate that the p. value = 1,000 so that the p> value is 0.05. Thus, it can be concluded that H0 is accepted, which means that there is no relationship between junk food consumption habits and obesity with the results of glucose level checks in elementary school students in the city of Bengkulu in 2024.

Discussion

Based on the results of data analysis, it was found that the p. value = 1,000 so that the p> value of 0.05 means that there is no relationship between junk food consumption habits and obesity with the results of glucose level checks in elementary school students in the city of Bengkulu in 2024

Relationship of junkfood consumption habits and obesity or overweight to glucose levels in the urine of respondents, there was no meaningful relationship between these variables. However, based on the results of univariate data analysis, there were respondents who showed positive glucose test results. Although there is no correlation, the presence of positive glucose receptors is enough to be a warning or warning that junk food consumption habits and the state of nutritional status assessed through BMI and the results of obesity or obesity are quite important notes in this study.

Problems like the above can occur because junk food is a food that is high in salt, contains soda, foods that contain additives (preservatives, colors, artificial sweeteners, and flavor enhancers, where excessive consumption of junk will increase sugar levels in the body which will cause diabetes mellitus (Hidajahturrokhmah et al., 2018)

After the second examination was carried out, namely a blood glucose examination when the respondents were positive for urine glucose in the blood glucose of the respondent was normal. This is in line with the opinion according to Tatsuhiko Urakami (2019) Subjects who show positive results for urine glucose in the first screening test and the second screening show normal blood glucose tolerance are considered to have renal glucosuria. They have no symptoms of diabetes, and some of them have a family history of renal glucosuria. Renal glucosuria is an isolated abnormality in proximal tubule glucose transport, characterized by abnormal urine excretion even though blood glucose levels are normal (Kitagawa et., al 2019).

In normal individuals, glucosuria can occur if blood sugar is higher than 160-180 mg/dL. But it is possible that intrinsic disorders in the kidneys can sometimes also induce glucosuria. This situation is called renal glucosuria, glucose is excreted with urine despite normal blood glucose levels. It occurs due to abnormalities in the renal tubules, so it is recommended to perform a fasting blood glucose analysis.

Positive glucose in the urine is an abnormal condition. Glucose or blood sugar will be absorbed by the kidneys to return to the blood vessels, instead of being excreted through urine. In

glucosuria, the kidneys are unable to absorb all the sugar back into the blood. As a result, sugar is wasted through the urine. Generally, glucosuria occurs because there is a hyperglycemia condition or a disease that is behind it (Nareza, 2020).

In this study, it was also found that 87% of respondents with junk food consumption habits and 88.2% of respondents with obesity had negative glucose test results, because respondents had gained knowledge from parents who had realized the importance of maintaining a daily diet and with the activities of students to play and study activities at school and the body's metabolism was still working well.

If glucosuria is caused by a state of hyperglycemia that is not too dangerous, for example due to the consumption of foods high in sugar or stress, treatment can be done by exercising regularly, monitoring blood sugar levels, consuming foods with balanced nutrients, and reducing sugar, fat, and caffeine consumption (Nareza, 2020).

This is in line with research conducted by Lindo (2014) Being overweight or obese with normal glucose levels in the blood, there will be no glucose secretion in urine or glucosuria. Glucosuria is a condition in which glucose is found in the urine. Glucose excretion in urine occurs when glucose in the blood increases so that it exceeds the reabsorption ability of the renal tubules. Glucosuria occurs when plasma glucose concentrations exceed the renal reabsorption threshold (usually around 180 mg/dl) (Lindo et al., 2015)

Conclusion

Based on the results of the research conducted, the results were obtained in the form that most of the respondents had junk food consumption habits (53%) and a small number of respondents were obese (47%). Almost all respondents who have a habit of consuming junk food have negative glucose levels (88.2%) and a small percentage of respondents are glucose positive (11.8%). Almost all respondents who were obese had negative glucose levels (87%) and a small percentage of glucose positive respondents (13%). So it can be concluded that there is no relationship between junk food consumption habits and obesity on the glucose levels of elementary school students in Bengkulu City in 2024

Recomendation

Schools should strengthen nutrition education programs and regulate the availability of unhealthy foods in the school environment. Parents are encouraged to monitor children's eating habits and provide balanced, nutritious meals at home. Health practitioners should conduct regular screening of nutritional status and glucose levels as part of early detection of metabolic disorders. In addition, collaboration between schools, families, and health institutions is essential to promote healthy lifestyles among children. Future research should involve larger sample sizes, include additional variables such as physical activity and socioeconomic status, and apply longitudinal designs to better understand causal relationships.

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