



Comparison Of Energy And Protein Intake Between Obese And Normal-Nutrition Children

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Abstract

Childhood obesity is a nutritional problem that can increase the risk of metabolic disorders and other health problems. Energy and protein intake are important components that influence nutritional status and growth. Differences in dietary intake between children with obesity and children with normal nutritional status need to be identified as a basis for appropriate nutritional intervention. This study aimed to compare energy and protein intake between obese children and children with normal nutritional status. This quantitative study used a comparative cross-sectional design. The sample consisted of 84 children, consisting of 42 obese children and 42 children with normal nutritional status. Dietary intake was assessed using a food recall questionnaire, while nutritional status was determined based on body mass index-for-age according to applicable growth standards. Data were analyzed using an independent *t*-test or Mann-Whitney test according to data distribution. The mean energy intake among obese children was 2,145.6 kcal/day, while children with normal nutritional status had a mean intake of 1,782.4 kcal/day. The mean protein intake was 78.5 g/day among obese children and 61.7 g/day among children with normal nutritional status. Statistical analysis showed significant differences in energy intake ($p=0.002$) and protein intake ($p=0.011$) between the two groups. Energy and protein intake was significantly higher among obese children than among children with normal nutritional status. Nutritional education and monitoring of dietary intake are important components of obesity prevention and management in children.

Keywords: Childhood Obesity, Energy Intake, Protein Intake, Nutritional Status, Children

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Publish: Association of Indonesian Teachers and Lecturers

International Journal of Health Sciences (IJHS)Journal Homepage: <https://jurnal.agdosi.com/index.php/IJHS/index>

Volume 4 | Number 3 | September 2026 |



1. Introduction

Childhood obesity is a nutritional issue that is receiving increasing attention because it can impact children's health in both the short and long term. Obese children are at greater risk of developing various metabolic disorders and are likely to maintain obesity into adulthood.

A child's nutritional status is influenced by various factors, including food intake, physical activity, health conditions, family environment, socioeconomic status, and lifestyle. Long-term energy intake that exceeds the body's needs can lead to energy storage in the form of fat tissue.

Energy is obtained from various nutrients, primarily carbohydrates, fats, and proteins. A child's energy needs should be adjusted according to their age, gender, physical activity level, and developmental stage. An imbalance between energy intake and energy expenditure can contribute to weight gain.

Protein is a macronutrient that plays a vital role in growth, tissue formation, cell maintenance, and various physiological functions. Although protein is essential for children's growth, excessive consumption in the context of a high total energy intake can contribute to an energy overload.

Children's consumption patterns also change with evolving social environments and lifestyles. Consuming energy-dense foods, fast food, snacks, and sugary drinks can increase daily energy intake.

Energy and protein intake assessments in obese children are necessary to identify consumption patterns that could potentially contribute to excess weight. Comparisons with children with normal nutritional status can provide insight into differences in macronutrient intake patterns.

Based on this description, this study was conducted to determine the comparison of energy and protein intake between obese children and children with normal nutrition.

2. Research Methods

This study used a comparative quantitative approach with a cross-sectional design to compare energy and protein intake between school-age children with obese and normal nutritional status. The study was conducted from June to August 2026 in the child health and education service setting in the research area.

The population consisted of school-age children, with a sample of 84 children comprising 42 obese children and 42 children with normal nutritional status, selected using purposive sampling based on predetermined inclusion and exclusion criteria. The inclusion criteria were school-age children who were willing to participate with parental/guardian consent, able to complete the interview process, not following a special diet, and not





experiencing chronic diseases that could directly affect eating patterns. Children with incomplete data collection or *food recall* data, as well as those who withdrew from the study, were excluded.

The main variables were energy intake, protein intake, and nutritional status. Energy and protein intake were assessed using a 24-hour *food recall* questionnaire, while nutritional status was determined based on body mass index-for-age using anthropometric measurements of body weight and height according to applicable growth standards. Data were collected through interviews with children and parents/guardians regarding food and beverage consumption during the previous 24 hours. Food consumption data were converted into energy and protein values using appropriate food composition tables. Univariate analysis was used to describe respondent characteristics and the distribution of energy and protein intake, while bivariate analysis was performed to compare energy and protein intake between the obese and normal nutritional status groups.

The independent *t*-test was used for normally distributed data, while the Mann–Whitney test was applied to non-normally distributed data, with a significance level of $\alpha = 0.05$. The study adhered to research ethics, including obtaining parental/guardian consent, maintaining the confidentiality and anonymity of participants' identities, and respecting participants' right to withdraw from the study.

3. Research Results And Discussion

a. Research result

Table 1. Respondent Characteristics

Characteristics	Obesity n (%)	Normal Nutrition n (%)
Man	24 (57.1)	21 (50.0)
Woman	18 (42.9)	21 (50.0)
Total	42 (100)	42 (100)

The table shows the distribution of respondents based on gender in the obesity and normal nutritional status groups. In the obesity group, the majority of respondents were male, with 24 children (57.1%), while 18 children (42.9%) were female. In contrast, the normal nutritional status group had an equal distribution between male and female respondents, with 21 children each (50.0%). Overall, each group consisted of 42 respondents, resulting in a total of 84 children.

Table 2. Comparison Of Energy Intake

Group	Average (kcal/day)	Elementary School	p-value
Obesity	2,145.6	386.4	0.002
Normal nutrition	1,782.4	342.7	





The average energy intake in the obese group was higher than in the normal nutrition group. The results of the analysis showed $p=0.002$, so there was a significant difference in energy intake between obese children and children with normal nutrition. High energy intake can be a contributing factor to excess weight if the amount of energy consumed consistently exceeds the body's needs.

Table 3. Comparison Of Protein Intake

Group	Average (g/day)	Elementary School	p-value
Obesity	78.5	18.6	0.011
Normal nutrition	61.7	15.4	

The average protein intake of obese children is 78.5 g/day, while that of children with normal nutritional status is 61.7 g/day. The results of the analysis showed $p=0.011$, so there was a significant difference in protein intake between the two groups. These findings indicate that obese children in this study had higher protein intakes than the normal-nutrition group. However, high protein intake cannot be directly attributed to obesity, as protein source, total energy, diet, physical activity, and other factors also play a role.

Table 4. Summary Of Comparison Of Nutrient Intake

Intake	Obesity	Normal Nutrition	p-value
Energy	2,145.6 kcal	1,782.4 kcal	0.002
Protein	78.5 g	61.7 g	0.011

Based on the study results, the two groups showed differences in energy and protein intake. The obese group had a higher average intake.

b. Discussion

The study results showed a significant difference in energy intake between obese children and children with normal nutritional status. Obese children had an average energy intake of 2,145.6 kcal/day, while the normal nutritional group had an average energy intake of 1,782.4 kcal/day.

This condition indicates a difference in energy consumption patterns between the two groups. Energy intake is one factor related to the body's energy balance. If energy intake consistently exceeds energy expenditure, the excess energy can be stored as body fat.

The incidence of obesity is not solely determined by energy intake. Physical activity, dietary quality, genetic factors, environment, family habits, sleep, and various social and behavioral factors can also influence a child's weight status.





Protein intake also showed significant differences. The obese group had a higher average protein intake than the normal-nutrition group. Protein is an essential nutrient for child growth because it plays a role in tissue formation and maintenance.

Differences in protein intake need to be viewed within the context of the overall diet. Protein from animal sources can be consumed alongside high levels of fat and energy. Therefore, evaluating a child's diet should not only consider the amount of protein, but also the types of protein sources and the total energy consumed.

Childhood obesity is a multifactorial condition. Excessive food intake can interact with low physical activity, increasing the risk of energy surplus. Therefore, obesity prevention requires a comprehensive approach.

Nutritional interventions for children should not focus on excessive dietary restriction. Children still need energy and protein for growth. Education should be more appropriately directed at balanced intake, food quality, portion sizes, fruit and vegetable consumption, limiting high-energy foods and drinks, and increasing physical activity.

The results of this study also demonstrate the importance of regularly monitoring food intake. Parents play a crucial role in providing healthy foods and establishing eating habits that support growth while preventing excess weight gain.

4. Conclusion And Suggestions

a. Conclusion

There are significant differences in energy and protein intake between obese children and children with normal nutrition. The average energy intake of obese children was higher than that of children with normal nutrition, namely 2,145.6 kcal/day compared to 1,782.4 kcal/day ($p=0.002$). The average protein intake of obese children was also higher, namely 78.5 g/day compared to 61.7 g/day ($p=0.011$).

These results demonstrate the importance of dietary management and monitoring nutrient intake in preventing and treating childhood obesity. However, assessing obesity requires consideration of various other factors, such as physical activity, sleep patterns, family environment, and genetics.

b. Suggestion

Parents are encouraged to provide balanced and nutritious food while monitoring children's energy and protein intake. Health workers and schools should strengthen nutrition education and physical activity programs to prevent childhood obesity. Further research is recommended to involve additional factors such as physical activity, sleep patterns, ultra-processed food consumption, socioeconomic status, and genetic





Publish: Association of Indonesian Teachers and Lecturers

International Journal of Health Sciences (IJHS)Journal Homepage: <https://jurnal.agdosi.com/index.php/IJHS/index>

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factors, as well as use a larger number of *food recall* days for more representative intake data.

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