ISSN: 2714-7045

Macronutrient Intake and Overweight

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Abstract

Obesity among adolescents is increasingly on the rise. Obesity is linked to various health issues, including cardiometabolic conditions, mental health challenges, and an increased risk of early mortality in adults one of the cause of obesity and overweight is macronutrinet intake over nutritional requirement figures. The aim of this study was to describe the consumption of macronutrients in the form of carbohydrate and fat as well as the number of overweight students. The sample for this study was late adolescents studying at Teuku Umar University, Faculty of Public Health, who were taking nutritional surveillance classes. This research used kuantitative and cross sectional design. The variables measured were body weight, height and daily consumption of macronutrient about carbohydrate and fat. Data was collected using questionnaires and anthropometric measuring instruments and analyzed using a nutritional survey. Research shows that 12% of students are obese, consuming 37% too much protein and 25% less, consuming 50% too much fat, 25% consuming excess calories while 65% lacking calories. In conclusion, students at the research location still have nutritional status problems which are suspected to be caused by consumption factors which are still not normal from the analysis of consumption needs. Further research needs to be done on other risk factors in order to obtain the right solution to solve the problem of overweight in the late adolescent group by manage the macronutrient intake and ensure their metabolism.

Keywords: Carbohydrate; Fat; Macronutrient; Overweight

Introduction

Eating patterns and lifestyle can influence the occurrence of obesity. Overweight and obesity continue to rise. (Caroline, M 2016). Obesity among adolescents is increasingly on the rise. (Sommer & Twig, 2018).Prior to the COVID-19 pandemic, the rates of obesity in children and adolescents had stabilized in many high-income nations, even though cases of severe obesity were on the rise. In contrast, low- and middle-income countries saw an increase in obesity rates. During the pandemic, many regions experienced a rise in weight gain among young people. Obesity is linked to various health issues, including cardiometabolic conditions, mental health challenges, and an increased risk of early mortality in adults (Jebeile et al., 2022).

The alarming rise of overweight and obesity among children and teenagers has become a significant public health concern. Childhood and adolescent obesity are linked to an increased risk of cardiometabolic factors. Moreover, obesity during adolescence is a strong predictor of obesity and higher mortality rates in

adulthood. Due to the severe consequences of obesity in teenagers, effective treatment is urgently needed. Lifestyle interventions are recommended as a therapy. However, real-world data shows that most teenagers fail to achieve long-term weight loss and are reluctant to participate in lifestyle interventions.(Nicolucci & Maffeis, 2022).

On the other hand, a systematic review that tested sugar-sweetened meals and macronutrient content, showed a high-dairy diet was found to reduce body fat percentage. A high-dairy diet was also shown to increase lean body mass. Replacing sugary drinks with non-caloric drinks or flavored milk reduced body fat percentage (Jakobsen et al., 2023)

The research gap compared to previous studies is that the variables studied prove that sugar consumption affects weight gain (Siregar, 2024), this study looks at fat and carbohydrate consumption and a description of adolescents who are overweight..

Methods

This study used a crosssectional design with a sample size of 40 respondents with the characteristics of students who were classified into final year adolescents who were taking part in a study on nutritional status assessment. Data were collected by measuring body weight, height and daily consumption which were analyzed using the nutria survey application. The variables measured were body mass index to assess whether or not they were overnourished and food consumption of carbohydrate, fat, and nutrient requirements, whether deficient, normal or excessive. Data were analyzed univariately to see the distribution of respondents' nutritional status and daily food consumption of the measured nutrients.

Results

The results of the nutritional status assessment in the form of body mass index of 40 respondents and the results of food recal analysis in the form of carbohydrate, fat, and fiber nutrient variables can be seen in the table below.

Table 1. Distribution of body mass index measurements and food consumption

Variabel	Category	F	Percent
BMI	Underweight	5	12,5
	Normal weight	25	62,5
	Overweight	10	25
Carbohydrate	Lack	10	25
	Normal	10	25
	More	20	50
Fat	Lack	10	25
	Normal	10	25
	More	20	50

(data primer, 2024)

Table 1 above shows that the rate of overweight in the study sample was 25%, and the risk of excessive carbohydrate and fat consumption was 50% each. This study shows that the rate of overweight is already quite

high even in small community groups and needs to be a concern. Likewise, for the macronutrient consumption patterns surveyed, the majority of respondents tended to exceed daily requirements**.**

Discussion

The principles of dietary education emphasize adopting eating habits that align with local dietary guidelines. This includes increasing the consumption of fruits and vegetables, reducing energy-dense and nutrient-poor foods as well as sugary drinks, and enhancing dietary behaviors by promoting regular mealtime routines and family meals(Jebeile et al., 2022).

People who don't eat many fruits and vegetables, but consume a lot of fatty foods, sugary snacks, and fried foods, and also have a sedentary lifestyle with less than 1 hour of physical activity per day and more than 2 hours of screen time per day, getting less than 10 hours of sleep per day is linked to a higher risk of being overweight or obese(Liberali et al., 2021). "As socioeconomic status increases, the likelihood of being overweight or obese also rises significantly. Furthermore, obese children are 1.5 to 2 times more likely to experience gas bloating and vomiting compared to children who are not obese (Al-Hussaini et al., 2019).

Obesity is a significant issue in modern industrialized society. The rising rates of obesity are mainly linked to lifestyle choices, including poor dietary habits such as the consumption of easily accessible junk food and fast food, combined with a growing tendency towards sedentary behaviors (Hajivandi et al., 2020)

The impact of carbohydrate intake on health remains a topic of ongoing debate. Both high and low percentages of energy from carbohydrates have been linked to increased mortality, with the lowest risk observed when 50–55% of calories come from carbohydrate intake. In the PURE Study, researchers found that consuming more than 60% of energy from carbohydrates was associated with an increased risk of total mortality, while no such association was identified for total fat or different types of fat. Additionally, emerging evidence regarding dietary fats, particularly saturated fats, and their relationship to health and mortality remains inconclusive(Santiago et al., 2021).

The other study found that energy intake and carbohydrate levels in the diet were significant predictors of BMI z-score after accounting for age and sex, whereas protein and fat intake were only predictors in the unadjusted analysis. This indicates that diets high in energy and low in carbohydrates are a key risk factor for obesity in adolescents. Managing obesity in adolescents requires a multifaceted approach, combining lifestyle changes, behavioral interventions, and nutritional support. Our findings support current guidelines for nutritional interventions, which recommend reducing calorie intake, cutting down on sugars and saturated fats, increasing unsaturated fats (like those in vegetable oils), and consuming more fruits and vegetables daily (Vizzuso et al., 2020)

There was a significant correlation between total energy intake and BMI, as well as between BMI and the energy distribution across different meals. This finding may have important implications for developing nutrition education programs aimed at preventing overweight and obesity in school-aged adolescents

(Khoshfetrat et al., 2024). The consumption of simple sugars and certain saturated fatty acids negatively impacts body fat, whereas protein and fiber intake appear to positively influence satiety and processes related to energy metabolism (San-Cristobal et al., 2020)(Cao et al., 2020)

Other studies have also shown that energy intake increases significantly during the consumption of ultra-processed foods, which are high in carbohydrates and fat rather than protein. Whereas during the consumption of unprocessed food, energy input did not change significantly (Hall et al., 2019).

In the othe hand, There is a study was carried out to examine the eating habits of overweight and obese adolescent girls with PCOS. The findings revealed that adolescent girls with PCOS tend to consume a significant amount of unhealthy foods, including fast food, soft drinks, sweets, and junk food. Emerging global data suggest that women with PCOS have different baseline dietary energy intakes compared to those without PCOS (Hajivandi et al., 2020)

In contrast, a more comprehensive understanding of the relationship between BMI and macronutrient intake across the full BMI spectrum compared to analyses based solely on mean values. The findings from the study, using quantile regression, suggest that the link between BMI and macronutrients varies throughout the BMI range and even within the same BMI category (Moon et al., 2021)

For obese adolescents, a dietary intervention focused on reducing calorie intake while increasing the consumption of high-quality carbohydrates (with limited sugars) may help reduce excess weight. Additionally, lowering fat intake could improve glucose tolerance, lower the risk of developing diabetes, and consequently reduce cardiometabolic risk later in life. Specifically, dietary patterns that limit saturated fat intake are important for these outcomes (Vizzuso et al., 2020)

Conclusion

From the results of the research conducted, it can be concluded that the average respondent has a high calorie intake sourced from fat and carbohydrates above the daily needs according to the age of late adolescence. Obesity was also found in respondents with carbohydrate and fat intake that exceeded their daily needs. Therefore, adolescents should control the intake of carbohydrates and fat as a type of macronutrient and consume a balanced nutrition menu and carry out public health movements to manage body weight.

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