

CHAPTER VI DISCUSSION

A. Interpretation and Discussion of Results

1. Overview of Frequency Distribution of Respondent Characteristics

a. Overview of Age Frequency Distribution

The results showed that most of the respondents were in the age group of 12–16 years, a small percentage of respondents were 17–25 years old. Adolescence is a period of growth and development characterized by biological, psychological, and social changes that affect health behaviors including food and beverage consumption patterns. In adolescence, individuals tend to consume foods high in sugar, fat, and salt more often due to the influence of peers, the school environment, and social media exposure (WHO, 2024)

Research by Marino et al. (2024) shows that adolescents have a high tendency to consume ultra-processed foods and sweetened beverages that contribute to an increased risk of metabolic disorders. Therefore, adolescence is a group that is vulnerable to the formation of eating habits that can affect health in adulthood.

b. Overview of Gender Frequency Distribution

The results showed that most of the respondents were female, almost half of whom were male.

Gender differences can affect food consumption patterns and health behaviors. Adolescent girls are generally more concerned about their health and diet than boys. However, both men and women are still at risk of experiencing metabolic disorders if they have an unhealthy diet and lack of physical activity (CDC, 2024).

c. Overview of BMI Frequency Distribution

The results showed that almost all respondents had a BMI norm, a small percentage of respondents were obese.

BMI is an indicator used to assess a person's nutritional status. Obesity is known to be closely related to increased insulin resistance due to the buildup of adipose tissue that produces various inflammatory mediators such as TNF- α and IL-6. This condition causes insulin sensitivity to decrease so that blood glucose levels increase (Moyce Gruber & Dolinsky, 2023).

Research by Zhang et al. (2022) also found that increased BMI was significantly associated with an increased risk of impaired glucose metabolism and type 2 DM in young age groups.

d. Overview of Smoking Distribution

The results showed that most of the respondents did not have a smoking habit, while a small percentage of others had a smoking habit. These results show that the majority of adolescents at SMA Negeri 1 Bengkulu City have not been actively exposed to the habit of smoking. These conditions can be influenced by various factors, such as parental supervision, school policies that prohibit smoking, knowledge about the dangers of smoking, and adolescents' awareness of the negative effects of smoking on health.

However, there are still some respondents who have a smoking habit. This habit needs to be considered because smoking is one of the risk factors that can increase the occurrence of metabolic disorders, including insulin resistance and increased blood glucose levels if accompanied by an unhealthy lifestyle, such as excessive consumption of artificially sweetened drinks and *junk food*.

2. Overview of the Frequency Distribution of Artificially Sweetened Beverage Consumption Habits (BEVQ)

The results showed that almost all respondents had a habit of consuming artificial sweetened drinks in the high category as many as 179 respondents (92.3%), while the low category was only 15 respondents (7.7%).

The high consumption of sweetened beverages in adolescents can be caused by ease of access, relatively affordable prices, peer influence, and wider exposure to advertisements through social media. Teenagers tend to choose drinks with a sweet taste because they are considered more attractive and in accordance with their preferences. This condition causes sweetened drinks to become one of the most commonly consumed types of drinks by the adolescent age group.

Sweetened drinks contain simple sugars that can be absorbed quickly by the body, potentially increasing blood glucose levels. Excessive and long-term consumption is known to be associated with weight gain, insulin resistance, and the risk of type 2 diabetes mellitus. The results of a systematic review conducted by Giovannucci et al. (2024) show that excessive consumption of sugar-sweetened beverages is associated with an increased risk of type 2 diabetes and metabolic disorders. In addition, Ambrosini et al. found that consumption of sweetened beverages in adolescents is associated with an increase in cardiometabolic risk factors that can affect blood glucose regulation.

3. Overview of Frequency Distribution of *Junk Food* Consumption Habits (FFQ)

The results showed that almost all respondents had a habit of consuming *junk food* in the rare category as many as 151 respondents (77.8%), while the frequent category was 43 respondents (22.2%).

Junk food is a food that generally contains high amounts of calories, sugar, saturated fat, and sodium, but is low in fiber and essential nutrients. Although most of the respondents were in the rare category, the existence of respondents who still often consumed *junk food* needs to be a concern because these diets can have an impact on adolescent metabolic health.

According to Monteiro et al. (2024), excessive consumption of ultra-processed *foods* is associated with an increased risk of obesity, type 2 diabetes, and various other metabolic disorders. Studies in adolescents have also shown that ultra-processed foods account for a large proportion of daily energy intake and may increase exposure to added sugars, saturated fats, and sodium. This condition can affect glucose metabolism and increase the risk of insulin resistance if it lasts for a long time.

4. The Relationship between Artificial Sweetened Beverage (BEVQ) Consumption Habits and the Risk of Hyperglycemia

The results showed that respondents with the consumption of artificially sweetened beverages in the high category were at risk of hyperglycemia as many as 105 respondents (58.7%), while in the low category as many as 8 respondents (53.3%). The results of the *Chi-Square* test showed a p-value of 0.688 ($p > 0.05$).

These results show that there is no significant relationship between the consumption of artificially sweetened beverages and the risk of hyperglycemia in SMA Negeri 1 Bengkulu students. Theoretically, sweetened drinks can increase blood glucose levels because they contain simple sugars that are easily absorbed by the body. However, blood glucose levels are not only influenced by the consumption of sweetened beverages, but also by physical activity, nutritional status, overall diet, genetic factors, and the body's ability to maintain a balance of glucose metabolism.

The OR value of 1.242 shows that respondents with the consumption of artificial sweetened drinks in the high category have a 1.242 times greater

chance of developing hyperglycemia than the low category. However, because the *p-value* is greater than 0.05, the relationship is not statistically significant. The results of this study show that although there is a tendency to increase the risk of hyperglycemia in the high-consumption group, the effect is not strong enough to show a significant relationship.

These findings are in line with several studies that state that the relationship between the consumption of sweetened beverages and blood glucose levels can be influenced by various confounding factors such as physical activity, body mass index, and other food consumption patterns. Therefore, consumption of sweetened beverages does not necessarily show a direct relationship with increased blood glucose in adolescents.

5. The Relationship between *Junk Food Consumption Habits* (FFQ) and the Risk of Hyperglycemia

The results showed that respondents with *junk food consumption habits* were often at risk of hyperglycemia as many as 36 respondents (83.7%), while the infrequent category was 77 respondents (51.0%). The results of the *Chi-Square* test showed a *p-value* of 0.000 ($p < 0.05$) with an OR value of 4.942.

These results show that there is a significant relationship between *junk food consumption habits* and the risk of hyperglycemia in SMA Negeri 1 Bengkulu students. *Junk food* generally contains sugar, saturated fat, and high energy so that if consumed in excess it can cause weight gain and insulin resistance. Insulin resistance causes glucose to not be used optimally by body cells so that blood glucose levels increase.

According to Monteiro et al. (2024), high consumption of ultra-processed foods is associated with an increased risk of metabolic diseases including type 2 DM. Various studies show that ultra-processed foods contain added sugars, saturated fats, and additives that can affect the regulation of glucose metabolism. In addition, an increased proportion of

ultra-processed food consumption is also associated with an increased risk of type 2 diabetes in the general population.

The OR value of 4.942 shows that respondents who often consume junk food have a risk of hyperglycemia about five times greater than respondents who rarely consume *junk food*. These findings show that junk food consumption habits are one of the factors that play a role in increasing the risk of hyperglycemia in adolescents. Therefore, nutrition education and healthy eating from school age need to be implemented to prevent future disruption of glucose metabolism.

B. Research Limitations

This research has been carried out in accordance with the established procedures, but it still has several limitations that need to be considered in interpreting the research results, including:

1. The collection of data on the consumption habits of artificially sweetened beverages and *junk food* using the *Beverage Intake Questionnaire* (BEVQ) and *Food Frequency Questionnaire* (FFQ) questionnaires depends on the respondents' ability to remember the frequency of consumption of food and beverages that have been consumed, thus allowing for recall *bias*.
2. Data on the consumption of artificially sweetened beverages and *junk food* was obtained based on the respondents' *self-reports*, so there is a possibility that respondents give answers that are not in accordance with the actual conditions due to misperceptions or the desire to give answers that are considered good (*social desirability bias*).