

Differences in obesity between the groups consuming snacks and breakfast habits in Universitas Islam Negeri Sumatera Utara Medan

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ABSTRACT Overweight and obesity are increasing in Indonesia, and these conditions pose a growing threat to people with non-communicable diseases. This study aimed to show the difference in obesity among respondents who consume snacks compared to respondents who have the habit of eating breakfast with three choices to select from: always, sometimes, or never. This comparison was done to analyze the relationship between breakfast habits and snack consumption. This cross-sectional study collected data using a survey on 26 – 27 November 2021. The sample population included the entire academic community of the Universitas Islam Negeri Sumatera Utara, Medan. The sample was determined by an accidental sampling technique. Research instruments were used in the form of questionnaires, microtoise and weight scales to measure the anthropometrics of height and weight. Descriptive data analysis used normality tests and because the data were not normally distributed, the Kendall and Kruskal Wallis tests were done. The results of this study indicated that 38 respondents have overweight status (17.9%), 36 respondents (17.0%) obesity I, 18 respondents (8.5%) obesity II, and 26 respondents (12.3%) underweight. There was no significant difference in obesity among respondents who have the habit of eating breakfast always, sometimes, and never, with p-value of 0.793. There was a significant difference in obesity among respondents who have the habit of eating snacks never, sometimes, and always with a p-value of 0.014. Although snacking can sometimes lead to obesity, generally the fattening types of snacks consumed are cakes and fried foods. In conclusion, limiting snack foods such as cakes and fried foods can reduce obesity. It is recommended to replace the consumption of these snacks with fruits and vegetables.

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1. Introduction

Indonesia is not only facing the threat of infectious diseases, the threat of non-communicable diseases (NCDs) is also an alarming cause of death. One of the risk factors for the threat of NCDs is obesity. A survey of 1,000 residents in Mongolia found high prevalences of NCDs, including hypertension cases at 27.5%, obesity at 56.8%, alcohol use at 15.5%, and smoking at 24.8%.¹ Basic health research data in 2018 showed that the prevalence of NCDs in Indonesia were also

high, such as high blood pressure was 34.1%, obesity prevalence was 21.8% and smoking prevalence was 9.1%.²

Obesity occupies the largest cause of NCDs that result in death. The World Health Organization (WHO) stated that 71% of deaths in the world are caused by NCDs.³ The same concern was conveyed by Allen in 2018, indicating most of the global deaths in the world due to NCDs are experienced in low-income countries.⁴ Demographically, the NCDs are high in Bangladesh in low and middle socioeconomic status groups.^{5,6}

Control of NCDs is different for each country. For example, the State of Myanmar restricts smoking to control NCDs,⁷ while India emphasizes controlling

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hypertension.⁸ Limiting the consumption of foods high in sugar content is done to suppress the increase in NCDs-related obesity and diabetes mellitus.⁹ For another example, Mexico prioritizes physical activity and preventing obesity.¹⁰ Research has shown that obesity can reduce intelligence, activity, and creativity.¹¹

Changes in behavior, lifestyle, and diet are associated with the risk of NCDs.¹² Relevant to other studies, the quality of food and diet are associated with the increasing prevalence of NCDs.¹³ Obesity is related to the consumption of fast food and energy-dense snacks.⁵

In contrast to previous studies, this study analyzes the relationship between snack consumption and breakfast habits and found significant differences between respondents who eat snacks and obesity based on the frequency of always, sometimes, and never which has not been done by previous researchers.

The purpose of the study aimed to find any difference in obesity among respondents who have the habit of eating breakfast compared to the respondents who have the habit of eating snacks always, sometimes, and never. By analyzing the relationship between breakfast habits and snack consumption, this research is useful to provide information and show the importance of limiting the consumption of snacks to avoid obesity.

2. Method

2.1. Research type and design

This research is a type of field research using a survey. The survey method involves data collection that is done directly among respondents to obtain population characteristics.¹⁴ This cross-sectional study was conducted at the Universitas Islam Negeri Sumatera Utara in November 2021.

2.2. Population and sample

The research population involved lecturers, education staff, and students. Activities during work and study tend to be in a static position (sitting) for 6-8 hours, and it is assumed to increase the number of lecturers, education staff, and students experiencing

obesity. Therefore, it is necessary to conduct a study to prove this assumption. It is estimated that the total population in the study area is 400-450 respondents. Calculation of sample size based on population size used the Issac and Michel formula applied in research conducted by Hikmawati.¹⁵ The sample size at the 5% error level is 212 people: students, lecturers, and education staff. The tendency for the sample to be biased toward more students, is considering the ratio of the number of students, lecturers, and education staff which is: 20: 1.6: 1 The sample is determined by the incidental sampling technique.

2.3. Data collection and analysis

Data were collected using surveys at three research locations, namely Campus 1 IAIN Street No. 1 Medan, Campus 2 Willem Iskandar Street Pasar V Medan Estate, and Campus 4 Durian Jagak Street, Deli Serdang Regency. The research instrument used was a questionnaire to measure the variables of snack eating habits and obesity.

Anthropometric measurements used a microtoise, weight scales, and writing instruments. The classification of body mass index (BMI) refers to the Ministry of Health of the Republic of Indonesia,^{3,16} namely: 1). underweight (< 18.5). 2). normal weight (18.5 – 22.5). 3). Excess body weight (23 – 24.5). 4) obesity I (25 – 29.9). and 5) Obesity II (> 30).

Data analysis was done using the non-parametric Kendall test (to test the relationship between breakfast habits and snack consumption), and a different test for three groups. However, before conducting parametric analysis, the data normality test was conducted first. The results of the data analysis were not normally distributed, so Kruskal Wallis analysis was used (for the three groups testing). The data were then displayed in frequency distribution tables, diagrams, cross-tabulations, and NPar-Test tables.

3. Result

The data from the measurements in the field were then analyzed to produce the necessary information according to the research objectives. The characteristics of the respondents are displayed

Table 1. Characteristics age, gender, and employment status.

Characteristic	Frequency	Percentage
Age (year)		
< 26	180	84.9
26 – 37	13	6.1
38 – 49	13	6.1
50 – 61	6	2.8
Gender		
Man	57	26.9
Woman	155	73.1
Status		
Student	175	82.5
Lecturer and staff	37	17.5

Table 2. Breakfast habits, and snack food consumption.

Habit	Frequency	Percentage
Breakfast		
Always	112	52.8
Sometimes	94	44.3
Never	6	2.8
Snack consumption		
Always	4	1.9
Sometimes	135	63.7
Never	73	34.4

Table 3. Kruskal Wallis difference test results.

	Mean	Std. Deviation	N	p-value
Breakfast habits	1.50	0.555	212	0.953*
Obesity	2.65	1.152	212	
Snack	2.33	0.152	212	0.014*
Obesity	2.65	0.508	212	

*Sig p <0.05

based on the frequency distribution analysis in Table 1.

The majority of respondents in the age category < 26 years were 180 people (84.9%) and the minority in the 50 - 61 years age category were 6 people (2.8%). The majority of participants are women amounting to 155 people (73.1%). The majority of respondents are 175 students (82.5%) with the ratio of student: lecturer: education staff, equaling 20 : 1.6 : 1.

Table 2 shows that the majority of respondents have the habit of having breakfast in the yes category with 112 people (52.8%), sometimes 94 people (44.35%), and never 6 people (2.8%). The

consumption of snack foods in the category of occasional was as many as 135 people (63.7%). The results of the univariate analysis of the BMI variable are shown in Figure 1.

The figure 2 shows that the BMI of the majority of participants were in the normal category (18.5 – 22.9) amounting to 94 participants: 76 women and 18 men, with 20 women and 6 men underweight, 29 women and 9 men normoweight, 19 women and 17 men obesity I, and 11 women and 7 men obesity II. After conducting a univariate analysis using frequency distribution, the analysis continued with the relationship between snack consumption and breakfast habits to prove the hypothesis (Ha1). The results of the analysis with p-value of 0.793 means that Ha1 is rejected and accepts the null hypothesis. It is concluded that there is no significant relationship between snack consumption and breakfast habits. Next, a one-way ANOVA test was conducted to assess the differences in obesity of respondents who consumed snacks always, sometimes, and never. This test was conducted to prove the research hypothesis.

Based on the Kruskal – Wallis test (Table 3), it is known that the mean rank of respondents who never eat snacks is 174.0. Respondents who occasionally eat snacks have a mean rank of 99.97. Respondents who always eat snacks have a mean rank of 114.88. It was concluded that there was a significant difference in obesity among the groups of respondents who ate snacks always, sometimes, and never.

In addition, the mean value of breakfast habits is 1.50 and the mean obesity is 2.65. The p-value of 0.953 is greater than 0.05. It was concluded that there was no significant difference between obese respondents based on their breakfast habits.

The results of the Kruskal-Wallis test show that the mean value of obesity is 2.65 and the mean snack consumption is 2.33 (Table 3). The p-value of 0.014 is smaller than 0.05. It was concluded that there was a significant difference between obese respondents based on their habit of consuming snack foods.

4. Discussion

The majority age category <26 years is the majority group from the results of the study which is a young age. This result is reached by the status of the

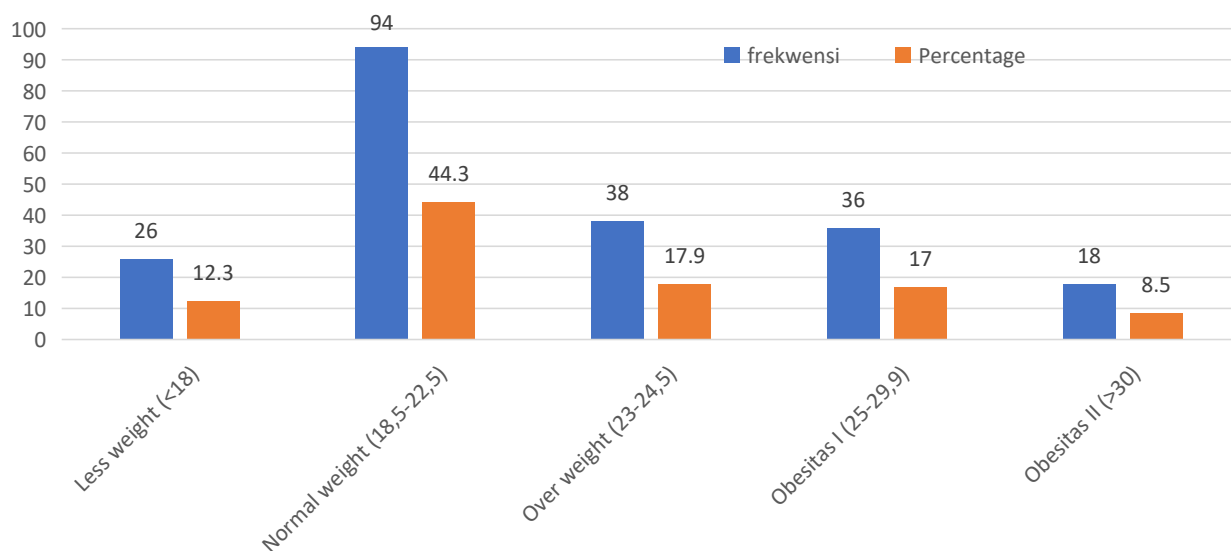


Figure 1. The comparison of body mass index based on the frequency and the percentage.

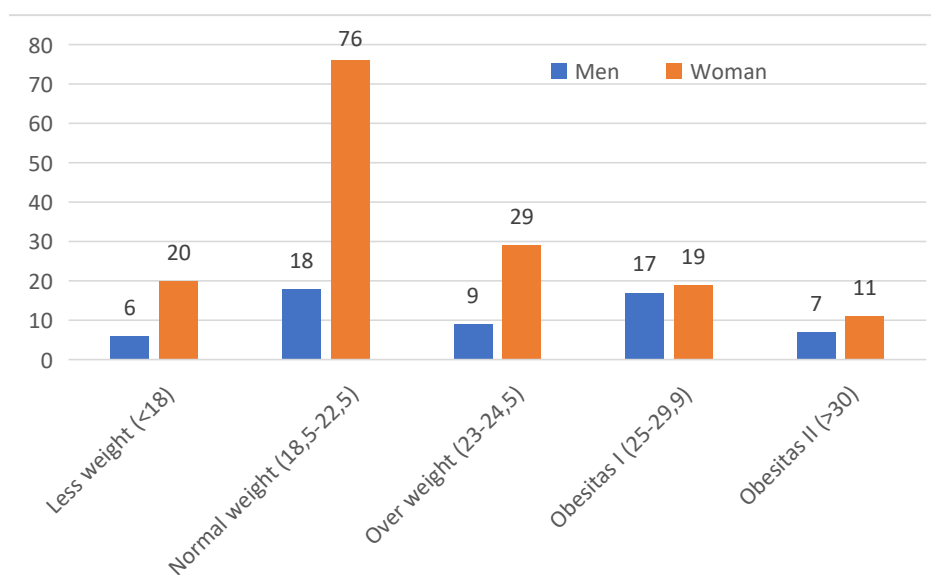


Figure 2. The average of body mass index of women and men.

majority of respondents are students with a total of 175 respondents (82.5%). Research respondents consist of students, lecturers, and education staff, with the ratio of the number of students, lecturers, and education staff of 20: 1,6: 1, so the majority of research respondents are students, creating a potential bias in the research results.

Dyussenbayev et al. (2017)¹⁷ divided the period

of human life into 10 periods of life. The period of youth aged 13-25 years physiologically and psychologically is a period of mental development and the formation of the emotional environment. It is considered the right period for respondents to study in college.¹⁷ The proportion of the female sex is greater than the proportion of men. International Labor Organization statistical data stated that the

global gender gap is higher for female workers than male workers as well as in the service sector, public services, and global companies which are more dominated by female workers than male workers.^{18,19}

It is known that the mean rank is 174 for respondents who never eat snacks, shown by the proportions with the 4 respondents who are all male, lecturer status and BMI category between 23.9 – 32.3 overweight category, obesity I, and obesity II so that it has the highest rating of the others. Because the average value of all respondents is obese, the mean rank is the highest compared to other groups. Women's consumption of snacks is higher than men's, especially when women have NCD problems, in contrast to men's. One study in Canada stated that the consumption of snacks occurs most often 2-3 times per day in adult women is higher than in adult men.²⁰ The weakness of the study was that several factors that influence obesity were not studied, such as family history, and smoking habits, whereas the researchers' considerations were the research objectives to prove snack consumption, breakfast habits, and obesity.

The survey results found that most of the respondents were overweight, obese I, and obesity II. This refers to the weight classification for Asian countries including Indonesia, according to the WHO classification based on a BMI of more than 23.21 Dobner (2018) described a person's weight-related risk factors for metabolic, endocrine, and immune disorders. Being overweight is a risk for NCDs, and being underweight is a risk for infectious diseases.^{22,23} Examining the analysis of the relationship between snack consumption and breakfast habits, there is no positive relationship and value. The majority of respondents have breakfast habits and the majority of respondents consume snacks sometimes, so even though they have breakfast, they also eat snacks. This finding is relevant to previous researchers explaining that respondents in the category of excess nutritional status have the habit of breakfast and have the habit of consuming snacks in the frequent category between the time after breakfast and lunch.²⁴

The world health survey results reported cases of NCDs from 48 countries including 25 middle-income countries and 23 other low-income countries. People

with higher education tend to be physically inactive, consume less fruits and vegetables, and have an active smoking habit every day.⁴ Low socioeconomic groups consume high alcohol and cigarettes, but have low consumption of vegetables and fruits compared to higher socioeconomic status.

Based on the survey results 212 respondents were underweight, overweight, obesity I, and obesity II. This phenomenon needs attention and control efforts to prevent the risk of NCDs through a healthy campus program. The Ministry of Health of the Republic of Indonesia collaborates with universities to implement healthy smoking habits and control obesity on campus to reduce the risk of NCDs due to obesity in academics.²⁵

The Myanmar government has implemented tobacco restrictions nationwide to control the problem of NCDs since five years ago. The prevalence of overweight and obesity after tobacco restriction decreased significantly, supported by increased physical activity and improved diet.⁷ A study of sociodemographic factors in Nepal found that the prevalence of NCDs in adolescents was 6 times higher in adolescents who smoked.²⁶ Other researchers stated that one of the factors that support obesity is smoking.^{27,28} Smoking habits have an impact on decreasing High-Density Lipoprotein (HDL) levels and low HDL levels are one of the criteria for metabolic syndrome.²⁹ Indirectly smoking is associated with metabolic disorders, decreased body sensitivity to insulin, which results in weight gain, obesity, diabetes mellitus, cardiovascular disorders, and other health problems.

It was found that there was a significant difference in obesity between the groups of respondents who ate snacks: always, sometimes, and never. Consumption of snacks increases the intake of protein, carbohydrates, or fat so that there is an accumulation of body fat mass. This study did not examine physical activity and types of snack foods, but the habit of eating snacks, breakfast habits, and obesity. The results showed that there was no relationship between snack consumption and breakfast habits. Consumption of fried snacks is associated with obesity.³⁰ This type of food is high in carbohydrates and fat. Even though the respondent

has breakfast, eating snacks remains an unhealthy habit so it increases the number of carbohydrates and fat in the body. Wrong eating habits and changes in physical activity contribute greatly to obesity.

Relevant to previous research, the frequency of snack consumption is high due to the habit of watching and using gadgets in their spare time. Snacks increase the number of calories and cholesterol intake every day. It was also found that the higher the education, the higher the risk of obesity.³⁰ Economic development and ease of access to food increase snack-eating behavior. Remarkably, identical adolescents experience changes in health due to eating behavior.^{31,32} Teenagers who eat snacks while studying, reading, and watching, eating disorders are associated with anxiety and adolescent mood.^{33,13}

This research provides benefits for institutions to control overweight and obesity in academics on campus. In the future, it is necessary to conduct periodic health checks such as checking blood pressure, blood sugar levels, cholesterol, and other efforts so that they are not only limited to anthropometric measurements and questionnaires. Education about dietary regulation can include limiting high-sugar diets, replacing snacks with fruit, and increasing physical activity. Obesity education in the community is oriented toward the application of a healthy diet, which is low in fat and sugar.^{11,34}

This program can be done in the form of seminars, training, or empowerment of the campus community. Healthy campus promotion programs aim to tackle NCDs on campus.³⁵ It is also necessary to identify the types of snacks consumed so that they can be replaced with healthy foods that are low in carbohydrates and fats. According to Fottrell (2018), NCDs prevention strategies in Bangladesh improve detection and treatment.³⁶

5. Conclusion

The majority of respondents have breakfast habits and the habit of eating snacks in the occasional category. There is no relationship between breakfast habits and snack consumption. The majority of respondents have breakfast habits and the majority of respondents consume snacks sometimes, which indicates even though they have breakfast, they

also eat snacks. Breakfast habits and snacking needs are different. Consumption of snacks is done simultaneously with activities such as working, watching movies, using gadgets, or doing additional work. This type of eating snacks such as cakes and fried foods increases the intake of calories, fat and stored in the body.

There is a significant difference in obesity among the groups of respondents who eat snacks always, sometimes, and never. Consumption of snacks increases the intake of protein, carbohydrates, or fat so that there is an accumulation of body fat mass. Obesity can lead to non-communicable diseases. Therefore, it is necessary to screen health examinations for all academic community members to prevent the increase in the prevalence of obesity and the risk of NCDs. On the other hand, snack consumption can be replaced with fruits and vegetables. Further studies need to be carried out related to physical activity so that early non-communicable diseases can be prevented in the academic community Universitas Islam Negeri Sumatera Utara, Medan.

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Conflict of interests

The author entirely declares that there is no conflict of interest between the authors.

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