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RESEARCH MEETS INNOVATION

The Relationship between snacking preferences and Diet and the Nutritional Status of SMK Negeri 3 Pematangsiantar Students

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ABSTRACT

Background: *The result of General Health Research of 2018 shows the prevalence of nutritional status in the age group of 16-18 years old in Pematangsaintar. 11.67% of this age group in underweight category and 13.67% are in overweight category. Pematangsiantar is the city with second-most number of underweight category in North Sumatera Province. Malnutrition can be caused by snacking preferences and diet.*
Purpose: *The aim of this study is to determine the relationship between snacking preferences and diet, and the nutritional status of students of SMK Negeri 3 Pematangsiantar.*
Methods: *This is an observational research with cross-sectional research design. The study was conducted in SMK Negeri 3 Pematangsiantar, North Sumatra in September-October 2022 with a sample of 60 students. The sampling method used is total sampling technique.* Data was obtained directly using anthropometric measurements and questionnaire. *Bivariate analysis was conducted using Spearman rank test, while multivariate analysis was conducted with multiple linear regression analysis.*
Results: *The results show that snacking preferences of most students is in the inadequate category (51.70%). Students' diet is in inadequate category (51.70%). Nutritional status of the students is inadequate (43.30%) Spearman's rank test shows that there is a significant relationship between snacking preferences and diet, and the nutritional status. It also shows that there is a significant relationship between diet and nutritional status (p=0.000, 0.000). Multiple linear regression test shows that there is a significant relationship between snacking preferences and diet, and the nutritional status of the students with Y = -3.312 + 0.007 +0.045 (p=0.000)*
Conclusions: *It can be concluded that there is a relationship between snacking preferences and diet, and the nutritional status of SMK Negeri 3 Pematangsiantar students. Diet is also the most dominant factor affecting nutritional status.*

Keywords: *snacking preferences; diet; nutritional status*

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INTRODUCTION

Nutritional status is the state of the body due to food consumption and use of nutrition. The imbalance between nutritional intake and metabolic rate affects the body's nutritional status (1). The prevalence of nutritional status in Pematangsiantar in the 16-18 age group is underweight (11.67%) and overweight (13.67%). The data shows that in North Sumatera, Pematangsiantar is the city/regency with the highest prevalence of underweight, following Tebing Tinggi (2).

Diseases related to nutritional status are affected by bad diet, due to the imbalance between consumption and nutritional needs of the body. A good diet is a diet with balanced nutritional intake (3).

The result of National Economic-Social Survey (Susenas) shows that in Pematangsiantar, the highest spending for food in 2021 is in fast food category (28.73%). On the other hand, spending for fruits is the lowest (6.14%). In the last ten years (2011-2021), there has been a shift in the diet of general population. The consumption of grains and fish in meals decreases by 4.38% and 2.55% respectively (4).

Diet and meal consumption are closely interconnected. Having only meals sometimes is not enough to satisfy hunger, so consuming snacks are picked as an alternative. Snacking can have either positive or negative effects, depending on the choice of snack. Most of the snacks nowadays have high calorie and fat content. The consumption pattern also negatively impacts nutritional status (5).

The trend shows that snacking preferences is on the rise with 27% of daily caloric intake is obtained from snacks. The results of BPOM (Indonesian Food and Drug Administration) survey in 2014 shows that children's snack that meets the standard is only 76.18%, still below the goal of 90%. This unavailability of healthy snacks also affects the snacking preferences (6).

Snacking preferences are closely related with the quality of the snacks and nutritional status. Yani & Reynaldi (6) shows that there is a relationship between the attitude and actions towards snacks and nutritional status. Self awareness towards snack consumption becomes necessary as it is very easy to access unhealthy snacks, causing people to have snacking tendencies (7). High snacking tendencies cause people to satisfy their hunger improperly, and not have full meals with balanced nutritions. Therefore, it is important to be aware of the qualities and quantities of snack consumption (8).

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Observation in SMK Negeri 3 Pematangsiantar shows that 60% of students prefer to buy snacks from hawkers outside of school perimeter, and 40% likes to buy snacks from the school canteen. It was also observed that some students in SMK Negeri 3 Pematangsiantar are either underweight or overweight, indicating malnutrition. Based on the explanation above, this study aims to determine the relationship between snacking preferences and diet, and the nutritional status of students in SMK Negeri 3 Pematangsiantar.

MATERIALS AND METHODS

The research was conducted in SMK Negeri 3 Pematangsiantar, located on Tambun Nabolon street, Kecamatan Siantar Martoba, Kota Pematangsiantar. It was conducted in September-December 2022. The population of the study is all students of grade 10 in the Culinary Arts program, totaling 60 students. From the population, total sampling was carried out, meaning that all of the population became the sample. This study used cross sectional research design.

The instrument used in this design was a questionnaire. Primary and secondary data were collected in this research. The primary data consists of the questionnaires answers: respondents characteristics, snacking preferences, diet. Secondary data consists of the student number and school situation. Snacking preferences data was collected using a 53-question questionnaires. Diet data collection was done using a 25-question questionnaires. Nutritional status data was collected using anthropometric measurements (IMT/U).

Snacking preferences are categorized into two, good snacking preferences (score > 60) and bad snacking preferences (score < 59). Similarly, the diet is categorized as good diet (score > 51) and bad diet (score < 50) Scores are based on overall scores of the research variables using the percentage score (P), percentage mean (Mx), and interval range (Mi) The nutritional status is obtained from IMT/U and categorized as obesity (>+2 SD), overnourished (>+1 SD - >+2 SD), well-nourished (-2 SD - +1 SD), under-nourished, and malnourished (<-2 SD) (Permenkes, 2020). <-2 Sd), dan gizi buruk (<-2 Sd) (Permenkes, 2020).

The data processing included editing, coding, scoring, and data entry using Microsoft Excel and SPSS. Bivariate analysis was conducted using Spearman’s rank test while multivariate analysis was conducted using multiple linear regression test. Spearman's rank test was conducted to determine the relationship between snacking

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preferences and nutritional status, and also between diet and nutritional status. Multiple linear regression test was conducted to determine the relationship between snacking preferences and diet, and the nutritional status.

RESULTS AND DISCUSSIONS

Respondents' characteristics

Table 1. Frequency Distribution of Respondents' Characteristics

Respondents' characteristics	Number of respondents (n)	Percentage (%)
Sex		
Male	13	21.70
Female	47	78.30
Total	60	100.00
Daily Allowance		
Low (Rp. 5,000 - 9,000)	18	30.00
Medium (Rp. 10,000 - 20,000)	42	70.00
Total	60	100.00
Min - Max	6,000 - 14,000	
Average±SD	Rp.11,866.67±2,837.2	

In this research, the characteristics consists of sex and the daily allowance of the students. Table 1 shows that the sample consists of more female students (78.30%) than male students (21.70%) The average allowance of the student is Rp.11.866,67±2837,2 with the highest distribution in the medium category (Rp. 10,000 - 20,000) at 70% and the rest in low category (Rp. 5,000 - 9,000) at 30%.

Snacking preferences

Table 2. Frequency distribution of Snacking preferences

Snacking preferences	Number of respondents (n)	Percentage (%)
Good	29	48.30
Bad	31	51.70
Total	60	100.00
Min - Max	34 - 100	
Average ± SD	70.3 ± 20,64	

Snacking preferences is a behavior that can change between choosing safe, healthy, and nutritious snacks, or the opposite. As can be seen in Table 2, 51.70% of the students have bad snacking preferences with the average snacking preferences score of 70.30 ± 18.82. This result is in line with Zulaichah (8) who found that 71.90% of SMA

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Assalam Surakarta also have bad snacking preferences. Bad snacking preferences can be caused by environmental factors, especially the peers. When the peers are very influential, the respondents listen to and follow their actions, so respondents and their peers often show similar behavior (9).

This result is also in line with Sulistyadewi & Wasita (9) who found that 53.50% of students of SMK Kesehatan Bali Khresna Medika have bad snacking preferences. Bad snacking preferences can also be caused by other factors, including daily allowance. This is due to the fact that daily allowance affects healthy snack choice.

Diet

Table 3. Frequency Distribution of Diet

Diet	Number of respondents (n)	Percentage (%)
Good	29	48.30
Bad	31	51.70
Total	60	100
Min - Max	20 - 100	
Average±SD	57.67±24.98	

Diet is the composition and amount of food consumed by an individual or a group in a certain period of time. It is closely related to the kinds, amount, and ingredients of daily food consumption. As can be seen in Table 3, 51.70% of students have bad diet. The average diet score is 57.67±24.98. This result is supported by Kumara & Putra (10) who found that 61.48% of the students in SMA Negeri 1 Singaraja Kabupaten Buleleng have bad diet. Bad diet can be caused by the lack of food variety. In this case, food variety refers not only to the kinds of food consumed, but also the portion of food i.e. balanced in sufficient portion, not overeating, and eating regularly. Students need to pay attention to their diet according to the balanced nutrition guide. One of the moral messages of balanced nutrition is to thank and enjoy the variety of foods on Earth (11).

This result is also in line with Nuryastuti et al. (11) who found that 77% of students of SMA Negeri 11 Tidore Kepulauan have bad diet. Bad diet is usually caused by skipping breakfast and meals, so their mealtime is not regular. Another factor is the households' financial status. Lower financial status might not be enough to afford sufficient and balanced nutritional intake.

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Nutritional status

Table 4. Frequency Distribution of Nutritional Status

Nutritional Status	Number of respondents (n)	Percentage (%)
Obesity	4	6.70
Over-nourished	3	5.00
Well-nourished	23	38.30
Under-nourished	26	43.30
Malnourished	4	6.70
Total	60	100
Min - Max	-3.21 - 2.6	
Average±SD	-1.20±1.64	

Nutritional status is the level or status related to an individual or a group. In Table 4, it can be seen that the students are categorized in different levels: 6.70% are categorized as obesity, 5.00% over-nourished, 38.00% well-nourished, 43.30% under-nourished, and 6.70% malnourished. The average nutritional status is found to be -1.20±1.64. Overall, the number of students with nutritional level below well-nourished is found to be 50%. This is in line with Sari (12) who found that students with under-nourished nutritional status is 50.50% of SMA Negeri 2 Tembilahan students. Under-nourished is caused by bad diet, bad eating habit, and heavily disliking certain foods. Teenagers also often covet having slim bodies, making it a factor of nutrition deficiency. Teenagers sometimes incorrectly limit their food intake to stay slim (13).

This is in line with Tumaloto & Ruslan (13) who found under-nourished students to be 88.30% of students in SMA Negeri 4 Gorontalo. Under-nourishment can be caused by bad eating habit and bad diet, in which students prefer snacks such as fritters, chocolate, candies, and popsicles/ice creams. This caused them not to eat various kinds of healthy food (14).

Relationship between Snacking Preferences and Nutritional Status

Based on Spearman's rank correlation test result, there is a positive and very significant relationship between snacking preferences and nutritional status with a correlation coefficient of 0.501 and p-value of 0.000 at significance 0.05. This means that the better the student's snacking preferences is, the better their nutritional status is. This is similar to Yani & Reynaldi (6) who found p-value of 0.000 for similar case. As such, it

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can be concluded that there is a relationship between snacking preferences and nutritional status. Knowledge is very crucial for a child to decide, choose, and buy the kinds of snacks to consume. Attitude and actions related to snacking is formed from knowledge and behavior of an individual. Attitude and actions affects the nutritional status as good actions lead to good nutritional status.

Anggiruling et al. also shows that snacking preferences at school relates to nutritional status with a p-value of 0.000 There are five main determinants of choosing a snack: familiarity with the snack, characteristic of snack, environment and social factors, nutritional value, and variety. Research shows that snacking preferences play an important role to snacking habit and contribute to nutritional status (15).

Relationship between Diet and Nutritional status

Based on Spearman's rank correlation test result, there is a positive and very significant relationship between diet and nutritional status with a correlation coefficient of 0.692 and p-value of 0.000 at significance 0.05. This means that the better the student's snacking preferences is, the better their nutritional status is. This is in line with Nurholilah et al whose Chi-square test show p-value of 0.023. So, it can be concluded that there is a relationship between diet and nutritional status. Daily diet is an individual's daily eating pattern and habit. Unhealthy diet affects the body negatively. One of the factors causing under-nourished and over-nourished nutritional statuses in young age groups is diet with high fat, sugar, and salt but low fiber, especially from fruits and vegetables. A balanced diet leads to a good nutritional status (16).

This result is also in line with Rahayu & Fitriana (16) who states that there is a relationship between diet and nutritional status in students with p-value of 0.000 Nutritional intake determines the nutritional status. A good and balanced diet heavily affects teenagers' growth and development. One of the dominant factors causing undernourishment is choosing and providing food improperly. Normal nutritional status shows that the quality and quantity of food intake meet the daily needs of the body. It is advised for parents and students to choose healthy and nutritious food to meet their daily needs (17).

Relationship between Snacking preferences and Diet, and the Nutritional status

The multiple linear regression analysis result shows that there is a negative and significant effect between snacking preferences and diet with nutritional status with a p-value of 0.000 and formula $Y = -3.312 + 0.007X_1 + 0.045X_2$. The negative constant value

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(a), -3.312 means that if the snacking preferences and diet are equal to 0, nutritional status decreases. The regression coefficient of snacking preferences variable (X_1) of 0.007 shows that the snacking preferences are positively correlated to nutritional status. Similarly, the regression coefficient of diet (X_2) (0.045) means that diet is positively correlated to nutritional status.

This shows that there is a positive relationship between snacking preferences and diet, and the nutritional status. Diet is the most dominant variable affecting nutritional status, shown by higher regression coefficient of 0.045 compared to snacking preferences at 0.007. This is in line with Yani & Reynaldi (16) and Anggiruling *et al.* (15) who found that snacking preferences have a significant correlation with nutritional status.

The results show that in SMK Negeri 3 Pematangsiantar, students have bad snacking preferences so they have bad nutritional status. The bad snacking preferences are due to some parents not teaching the students the importance of nutritional value in food and the dangers of unhealthy snacks. To improve students' snacking preferences, parents and teachers need to support the students in choosing nutritious, healthy, clean, and safe snacks. This can be done by monitoring the school canteen and encouraging students to bring lunch or snack from home. This allows the sugar level to be maintained well, so students can concentrate on the lessons and other school activities.

Other factors affecting students' nutritional status are energy and protein intake, and sociocultural factors. The more active an individual is, the more energy is needed. This is the reason recess or break time is provided at school. Students use this time to buy snacks from the school canteen and they are free to choose what they want. During recesses, students also interact, play, and exchange opinions. Both positive and negative effects might be caused by this interaction and form their habits.

Researches show that diet significantly relates to nutritional status. This research supports the findings of Nurholilah et al (15) and Rahayu & Fitriana (16) who show that diet is significantly related to nutritional status. This means that the students of SMK Negeri 3 Pematangsiantar need to improve their nutritional status. Regular nutritional status check up should be performed by the school's health unit, cooperating with the principal and local health board. Investigation and intervention programs should be carried out if nutritional problems are found. Socializations of healthy and good diet also needs to be conducted.

CONCLUSIONS AND RECOMMENDATIONS

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Conclusions

1. Most of the respondents are female (70.30%) and the allowance are in medium category (70.00%)
2. 51.70% of the students have bad snacking preferences.
3. 51.70% of the students have bad diet.
4. 43.30% of the students are undernourished.
5. The Spearman's rank correlation test analysis shows that there is a positive and significant relationship between snacking preferences and nutritional status with a correlation coefficient of 0.501 and p-value of 0.000 at 0.05 significance. This means the better the snacking preferences are, the better the nutritional status is.
6. The Spearman's rank correlation test analysis shows that there is a positive and significant relationship between diet and nutritional status with a correlation coefficient of 0.692 and p-value of 0.000 at 0.05 significance. This means the better the diet is, the better the nutritional status is.
7. Multiple linear regression analysis shows that there is a negative and significant relationship between snacking preferences and diet, and the nutritional status with p-value=0.000 and $Y = -3.312 + 0.007X_1 + 0.045X_2$. The constant (a) is negative (-3.312), which means if the snacking preferences and diet are equal to zero (0), nutritional status decreases. The regression coefficient of snacking preferences variable (X_1) of 0.007 shows that the snacking preferences are positively correlated to nutritional status. Similarly, the regression coefficient of diet (X_2) (0.045) means that diet is positively correlated to nutritional status. This shows that there is a positive relationship between snacking preferences and diet, and the nutritional status. Diet is the most dominant variable affecting nutritional status, shown by higher regression coefficient of 0.045 compared to snacking preferences at 0.007.

Recommendations

1. Further studies should use different variables, such as snack consumption pattern, food combination, healthy snack consumption behavior, etc.
2. The Health Board of Pematangsiantar should monitor nutritional status at schools regularly.
3. The Health Board of Pematangsiantar should conduct socializations and educate students on good diet and choosing healthy snacks at schools.

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