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The Relationship between Diet and the Incidence of Gastroesophageal Reflux Disease in Boarding School Students

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Abstrak

*Gastroesophageal Reflux Disease (*GERD*)* merupakan gangguan sistem pencernaan yang umum terjadi, terutama pada kelompok usia produktif seperti mahasiswa. Mahasiswa kost cenderung memiliki pola makan yang tidak teratur akibat kebiasaan hidup mandiri, tekanan akademik, dan keterbatasan fasilitas makan, yang dapat meningkatkan risiko terjadinya GERD. Tujuan Penelitian ini bertujuan untuk menganalisis hubungan antara pola makan, termasuk keteraturan makan, waktu makan malam, dan konsumsi makanan pedas, dengan kejadian GERD pada mahasiswa kost yang tinggal di belakang Universitas Bengkulu. Metode Penelitian ini menggunakan desain kuantitatif analitik dengan pendekatan cross-sectional. Jumlah sampel sebanyak 35 mahasiswa kost yang dipilih menggunakan teknik purposive sampling. Data dikumpulkan melalui kuesioner dan dianalisis menggunakan uji chi-square dengan tingkat signifikansi $p < 0,05$. Hasil Terdapat hubungan signifikan antara pola makan tidak teratur dengan kejadian GERD ($p = 0,039$), makan malam setelah pukul 21.00 dengan kejadian GERD ($p = 0,046$), dan konsumsi makanan pedas dengan kejadian GERD ($p = 0,045$). Kesimpulan Pola makan yang tidak teratur, kebiasaan makan malam larut, dan konsumsi makanan pedas merupakan faktor-faktor yang berhubungan dengan kejadian GERD pada mahasiswa kost. Diperlukan edukasi mengenai pola makan sehat sebagai langkah promotif dan preventif terhadap gangguan saluran cerna

Keywords: Diet, GERD, mahasiswa asrama, makanan pedas, telat makan.

Abstract

Gastroesophageal Reflux Disease (GERD) is a common digestive system disorder, particularly affecting young adults, such as college students. Boarding school students tend to have irregular diets due to independent living habits, academic pressure, and limited eating facilities, which can increase the risk of GERD. This study aims to analyse the relationship between diet, including eating regularity, dinner time, and spicy food consumption, and the incidence of GERD in boarding school students living near the University of Bengkulu. This research method uses a quantitative analytical design with a cross-sectional approach. A sample of 35 boarding school students was selected using purposive sampling. Data were collected through questionnaires and analysed using the chi-square test with a significance level of $p < 0.05$. Results showed a significant association between an irregular diet and the incidence of GERD ($p = 0.039$), dinner after 21:00 and the incidence of GERD ($p = 0.046$), and consumption of spicy foods with the incidence *of* GERD ($p = 0.045$). Conclusion Irregular diet, late dinner habits, and consumption of spicy food are factors related to the incidence of GERD in boarding school students. Education about a healthy diet is necessary as a preventive measure against gastrointestinal disorders.

Keywords: Diet, GERD, boarding students, spicy food, late dinner

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INTRODUCTION

GERD is one of the gastrointestinal disorders that is increasingly reported among young people. This condition occurs when stomach contents, especially acid, rise back into the esophagus,

causing symptoms such as heartburn, chest burning, nausea, and sometimes shortness of breath (Bhaskar, 2018). In Indonesia, the incidence rate of GERD shows an increasing trend, not only in the adult and elderly groups, but also in adolescents and young adults. This suggests that risk factors come not only from the ageing of the digestive system, but also from an unhealthy lifestyle (Waluyo & Solikah, 2023)

Students are a group that is vulnerable to unhealthy lifestyles due to academic demands, psychological pressure, and limited time and resources. Students who live in boarding houses have more complex conditions because they live independently, often without parental supervision. Many people are unaware of the importance of balanced nutrition and often opt for fast food, instant food, or skip meals altogether. This combination of academic stress, staying up late, and an irregular diet is thought to be the main factor that increases the risk of the occurrence of GERD among students (Ajjah, Mamfaluti, & Putra, 2020; Ramya Sree, Kolli, Periyasamy, & Praveen, 2023).

Dietary habits and digestive system health, specifically the relationship between diet and the incidence of GERD among boarding school students, remain understudied. Most boarding school students develop non-ideal eating habits, such as skipping breakfast, having a late dinner, and consuming spicy and fatty foods frequently (Ardhan, Catarina Budyono, & Rifana Cholidah, 2022; Sharma, Sharma, & Puri, 2018). This habit can trigger irritation of the digestive tract and increase the likelihood of GERD occurring, which further worsens their quality of life (Jodi, 2024; Yuan et al., 2017)

The main problem that this study wants to answer is whether there is a significant relationship between diet and the incidence of GERD in students living in boarding houses. By understanding the consumption patterns and lifestyles of boarding school students, it is hoped that this study will provide more specific data on the causes of the increase in GERD cases among young individuals and inform prevention efforts that can be implemented early.

Various previous studies have shown a link between certain types of foods and an increase in symptoms of GERD. Research by Ndraha et al (2023), and previous researchers suggests that the consumption of spicy foods may increase the risk of suffering GERD up to 14,671 times compared to those who do not consume them. Other studies have shown that meal frequency and meal times have a significant effect on the symptoms of stomach acid reflux, as done by Suwindri et al. (2021), which revealed that students who did not eat breakfast and often ate instant food had a higher risk of indigestion. However, most of the research did not focus specifically on the context of boarding

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students. Boarding school students have different dynamics than students who live with their families, including economic limitations, limited access to healthy food, and limited time to prepare nutritious food.

The study also emphasises the aspect of diet as a complex construct, not only limited to the type of food consumed, but also includes the timing, frequency, and regularity of eating; thus, the approach used in this study is more holistic than previous approaches that only highlight one or two aspects of the diet (Agustriana, 2018). The results of this study are expected to provide new insights into the relationship between diet and the incidence of GERD, as well as being the basis for the development of health education programs for boarding school students, from a scientific side, this research is essential to expand the understanding of how poor diet contributes to gastrointestinal disorders such as GERD. The results of this study can serve as a reference for further research in clinical nutrition, public health, and the development of healthy lifestyle interventions for young age groups.

This research significantly increases student awareness of the importance of maintaining a healthy diet while living in a boarding house. The results are expected to serve as the basis for campuses, health institutions, and related agencies in developing nutrition education programs, promoting health, and implementing policies to provide healthy and affordable food in the surrounding environment. Thus, this research not only focuses on health aspects but also contributes to policies and programs that can improve the quality of life of boarding students.

METHODOLOGY

Research Type and Design

This research employs a quantitative approach, utilizing a descriptive and analytical design with a cross-sectional design. This approach assessed the relationship between diet and the incidence of Gastroesophageal Reflux Disease (GERD) in boarding school students over a one-year observation period. This design was chosen because it allowed simultaneous data collection regarding independent (diet) and dependent (GERD *occurrence*) variables from respondents.

Research Location and Time

The research was conducted in the student boarding area located behind the University of Bengkulu (UNIB), which has a high concentration of students living independently. The research

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implementation period begins in July and concludes in August 2025, encompassing the preparation stage, data collection, data analysis, and the preparation of research reports.

Population and Sample

This study consists of all students of the University of Bengkulu residing in the dormitory area behind UNIB. The sampling technique used is purposive sampling, which involves selecting samples based on specific criteria relevant to the research's purpose.

1. Criteria included:
   a. Active students of the University of Bengkulu
   b. Lived in a boarding house for at least the last 3 months. Willing to be a respondent and sign an informed consent
2. Exclusion criteria:
   a. College students who have a history of chronic gastrointestinal diseases other than GERD (such as chronic ulcers, stomach ulcers, or liver disorders)
   b. College students who are taking medications that affect the digestive system
   c. The study included 35 boarding school students, selected based on the above criteria and availability during the research period.

Data Collection Techniques

Data were collected by respondents filling out questionnaires directly, under the researcher's supervision to ensure the completeness and honesty of answers. Additionally, a brief, structured interview was conducted to enhance the respondents' understanding of the questions asked and prevent misinterpretations.

Data Analysis Techniques

The collected data will be analyzed using the latest version of the Statistical Package for the Social Sciences. The analysis techniques used include:

1. Univariate analysis to describe the characteristics of respondents and the distribution of each variable.
2. Bivariate analysis used the chi-square (χ^2) test to determine the relationship between diet and the incidence of GERD.
3. The significance level used was $p < 0.05$, with a confidence level of 95%.

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RESULTS AND DISCUSSION

RESULT

The characteristics of the respondents provide essential information for understanding the background of the research subject. In this study, the respondents consisted of 35 students living in boarding houses located in the back area of UNIB. The characteristics observed included gender, age, and length of stay in the boarding house. This information helps determine the demographic distribution of respondents and can influence their diet and the risk *of* GERD *events*. The following presents the frequency distribution of respondent characteristics:

Table 1. Characteristic Frequency Distribution

Characteristics	Category	*f*	(%)
Gender	Man	13	37,10%
	Woman	22	62,90%
Age (years)	18–20	14	40,00%
	21–23	17	48,60%
	>23	4	11,40%
Length of Stay in Boarding House	< 6 months	8	22,90%
	6–12 months	15	42,90%
	>12 months	12	34,20%

Based on Table 1, the majority of respondents in this study were women, comprising 22 people (62.9%), while men accounted for 13 people (37.1%). This indicates that the respondents are predominantly female students residing in the boarding house. In terms of age, the largest age group is in the range of 21-23 years, which is 17 people (48.6%), followed by 14 people (40.0%) aged 18-20 years, and the remaining four people (11.4%) are over 23 years old. Meanwhile, the length of stay in the boarding house was 6–12 months (42.9%), followed by >12 months (34.2%) and <6 months (22.9%). This suggests that most respondents have lived in boarding houses for a considerable time, implying that they may have developed independent lifestyle adaptations that could impact their diet.

Diet is one of the main factors that can affect the health of the digestive system, including the risk of GERD. In this study, diet was analysed based on the frequency of meals per day, regularity of meal times, breakfast habits, consumption of spicy foods, and dinner time. This data provides an overview of the eating behaviour tendencies of boarding school students. Here is the distribution of the frequency of respondents' diets:

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Table 2. Distribution of Dietary Frequency

Diet	Category	*f*	%
Frequency of Meals per Day	< 2 times	7	20,00%
	2–3 times	21	60,00%
	> 3 times	7	20,00%
Irregular Meal Timing	Ya	23	65,70%
	No	12	34,30%
Breakfast Habits	Routine	10	28,60%
	Not Routine	25	71,40%
Spicy Food Consumption	Often	13	37,10%
	Sometimes	15	42,90%
	Infrequently	7	20,00%
Dinner ≥ 21.00	Ya	19	54,30%
	No	16	45,70%

Table 2 shows that most respondents eat 2–3 meals a day (60.0%), while the rest have a frequency of eating less than two or more than three times a day. As many as 65.7% of respondents reported irregular eating times, and only 28.6% regularly eat breakfast. This indicates that most boarding house students do not have a healthy and consistent diet. In addition, 37.1% of respondents admitted to eating spicy foods frequently, which are known to trigger or worsen GERD symptoms. In comparison, 54.3% of respondents also eat dinner after 9:00 p.m., a habit that can aggravate acid reflux because the digestive system is still active before bedtime.

To find out the extent to which the incidence of GERD occurs among boarding school students, the general symptoms of GERD reported by respondents were identified. Symptoms studied in this study include heartburn, acid regurgitation, nausea, bloating, and pain. The following is the distribution of the incidence of GERD symptoms in boarding school students:

Table 3. Distribution of GERD Incidence Based on Perceived Symptoms

Symptoms of GERD	*f*	(%)
Heartburn (burning sensation in the chest)	15	42,90%
Acid regurgitation	11	31,40%
Nausea after eating	13	37,10%
Flatulence/tightness	16	45,70%
Heartburn	12	34,30%
Not experiencing symptoms *of* GERD	18	51,40%

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Based on Table 3, the most commonly reported symptoms *of* GERD are flatulence or tightness (45.7%), followed by heartburn (42.9%) and nausea after eating (37.1%). As many as 51.4% of respondents stated that they did not experience symptoms *of* GERD, while the rest experienced one or more symptoms that led to GERD. This data shows that almost half of boarding school students experience symptoms *of* GERD, which indicates potential digestive health problems due to their diet and lifestyle. To determine the extent to which GERD incidence occurs among boarding school students, common symptoms of GERD are identified, as reported by respondents. Symptoms studied in this study include heartburn, acid regurgitation, nausea, bloating, and pain. The following is the distribution of the incidence of GERD symptoms in boarding school students:

Table 4. The Relationship Between Irregular Diet and Incidence GERD in Boarding School Students

Irregular Diet	GERD				x2	p
	Ya		No			
	f	%	f	%		
Ya	14	60,9	9	39,1	4,23	0,039
No	3	25	9	75		

Based on Table 4, out of 23 students who had irregular diets, as many as 14 people (60.9%) experienced symptoms *of* GERD. Meanwhile, of the 12 students who had a regular diet, only three people (25.0%) experienced symptoms of GERD. This difference is quite striking and suggests a trend that irregular diets are associated with a higher incidence of GERD. The chi-square test results showed a statistically significant association between an irregular diet and the incidence of GERD, with a p-value of 0.039 (less than $\alpha = 0.05$). Thus, the null hypothesis is rejected, indicating a relationship between irregular diets and the incidence of GERD in boarding school students.

These results reinforce the notion that irregular eating behaviour can increase the risk of gastrointestinal disorders such as GERD. Irregular food consumption patterns are often observed in individuals who sleep late at night, after 21:00 WIB.

Table 5. The Relationship Between Dinner Habits ≥ 21.00 WIB with GERD Occurrence

Dinner ≥ 21.00	GERD				x2	p
	Ya		No			
	f	%	f	%		
Ya	12	63,2	7	36,8	3,97	0,046
No	5	31,3	11	68,7		

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Based on Table 5, it can be seen that of the 19 respondents who ate dinner after 21.00, 12 people (63.2%) experienced symptoms *of* GERD. In contrast, of the 16 respondents who ate dinner before 21.00, only five people (31.3%) experienced GERD symptoms. The chi-square test showed significant results (p = 0.046), indicating a substantial association between late dinner habits and the incidence *of* GERD. This supports the theory that dinner too close to bedtime increases the risk of acid reflux.

Table 6. The Relationship Between Spicy Food Consumption and GERD Incidence

Spicy Eating Consumption	GERD				x2	p
	Ya		No			
	f	%	f	%		
Often	10	76,9	3	23,1	6,21	0,045
Sometimes	5	33,3	10	66,7		
Infrequently	2	28,6	5	71,4		

Table 6 shows that out of 13 college students who often eat spicy foods, 10 people (76.9%) experience symptoms *of* GERD. Meanwhile, of the group that rarely eats spicy food, only two people (28.6%) experienced GERD. The chi-square test yielded a p-value of 0.045, indicating that the association between spicy food consumption and GERD incidence is statistically significant. These results suggest that frequent consumption of spicy foods can be a strong risk factor for the onset of GERD symptoms.

DISCUSSION

The results of data analysis on 35 boarding school student respondents living in the backyard area of the University of Bengkulu (UNIB) were obtained from the distribution of frequency and the relationship between several dietary factors and the incidence of GERD. Bivariate analysis using the chi-square test was conducted to assess the significance of the relationship between independent variables (irregular diet, late dinner habits, and spicy food consumption) and the dependent variable (GERD *occurrence*).

The analysis results showed that the three variables had a statistically significant relationship with the incidence of GERD. Therefore, the following discussion will elaborate in depth on the findings based on the data obtained, comparing them to previous research and relating them to relevant scientific theories and studies.

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This discussion is divided into three main parts: (1) the relationship between irregular eating and the incidence of GERD, (2) the relationship between late dinner habits and the incidence *of* GERD, and (3) the relationship between spicy food consumption and the incidence *of* GERD. These three sub-discussions aim to provide a comprehensive overview of how diet plays a role in the occurrence of digestive disorders in students, especially those who live far from family supervision and are prone to living an unhealthy lifestyle.

Irregular Diet and GERD Incidence

Irregular diet and incidence of Gastroesophageal Reflux Disease (GERD) are a special concern, especially among students. The results showed a significant relationship between irregular diets and the incidence of GERD in boarding school students, with a p-value of 0.039. The majority of respondents who experience symptoms of GERD have irregular eating habits. This suggests that dietary disorders can have a direct impact on stomach health, which is essential to understand in the context of public health (Husen & Tjandra, 2023).

An irregular diet can affect the process of stomach acid secretion, which is supposed to function rhythmically. When meal times are inconsistent, stomach acid production continues without food to neutralise the acid. As a result, this can irritate the gastric mucosa and trigger reflux. Previous research has shown that individuals with poor diets have a higher risk of developing gastric disorders, including GERD, which shows the importance of rhythm in diet (Yessi Angelica & Ernawaty Siagian, 2022). Students who live in boarding houses often have the freedom to manage their meal times without supervision. This creates opportunities for the formation of unhealthy eating habits. Research has also shown a link between students' lifestyles, such as diet and stress levels, and symptoms of dyspepsia, which is a condition similar to GERD. This association shows that a healthy lifestyle has a vital role in the prevention of gastrointestinal disorders among college students (Naziyah, 2022)

Prevention and education efforts regarding healthy eating habits are crucial, especially among students. It is recommended to raise awareness of the importance of maintaining a regular and nutritious diet to prevent GERD and other health problems. By understanding the impact of irregular diets, it is hoped that students can pay more attention to the health of their stomach and prevent the onset of symptoms that can interfere with their quality of life (Ramadhina et al, 2023).

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Late-Night Dinner Habits and GERD Occurrence

The habit of eating dinner after 21:00 is significantly related to the incidence of Gastroesophageal Reflux Disease (GERD), with a p-value of 0.046. College students who are accustomed to eating late at night are at a higher risk of experiencing symptoms of gastroesophageal reflux disease (GERD). The activity of the digestive system that remains ahead of bedtime contributes to this health problem, where the food consumed has not been fully digested when the body is in a horizontal position. This has the potential to increase pressure on the lower oesophageal sphincter, which can lead to stomach acid reflux into the oesophagus (Wahyuni, 2019)

Late dinners can affect the quality of student sleep. Research indicates that consuming large meals before bed can lead to discomfort that interferes with sleep quality, potentially affecting overall health. Prolonged sleep disturbances can worsen GERD symptoms, creating a harmful cycle that can negatively impact an individual's physical and mental well-being. Therefore, it is essential to pay attention not only to the time of meals, but also to the composition and type of food consumed at night, so as not to add to the load on the digestive system (Mokhtari et al, 2022).

Furthermore, late-night eating behaviours are often associated with unhealthy lifestyles that prevail among college students, such as academic stress and irregular sleep patterns. This habit can lead to the consumption of high-calorie, low-nutrient foods, such as fast food or high-fat snacks. Given that students often face high academic pressures, knowledge and awareness of the impact of unhealthy dinner habits must be increased. Adequate health education can help students make informed dietary choices, thereby reducing the risk of developing GERD and other digestive health issues (Rahman et al, 2023).

Spicy Food Consumption and GERD Incidence

A significant relationship was found between the frequency of spicy food consumption and the incidence of Gastroesophageal Reflux Disease (GERD), with a p-value of 0.045. Spicy foods, especially those containing capsaicin, can increase excess stomach acid production as well as slow down gastric emptying, ultimately triggering symptoms such as heartburn. These findings align with research by Sari et al. (2018), which showed that excessive consumption of spicy foods contributes to an increase in the incidence of GERD among college students. The high availability of spicy foods and taste preferences among college students increases the risk of this gastric disorder.

The negative impact of spicy food consumption on college students may also be influenced by the increased consumption of fast food and readily available spicy snacks. These unhealthy eating

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habits can be cumulative and have the potential to cause symptoms *of* GERD, which are more severe and more frequent. Research shows that spicy foods can be a trigger for digestive problems, where increased stomach acid can cause damage to the lining of the oesophagus if left unattended (Adhina Putri & Irawati, 2021). Therefore, college students need to be aware of the consequences of this habit and consider reducing the consumption of spicy foods in their diets.

The long-term effects of excessive consumption of spicy foods can lead to changes in more serious gastrointestinal conditions. This includes an increased risk of gastritis and other comorbid conditions associated with indigestion. Investigations show that college students who already have a history of digestive problems tend to be more sensitive to spicy foods, which can accelerate the occurrence of GERD symptoms. Research has recommended that nutrition counsellors be part of health education programs for students to provide correct knowledge about the impact of spicy food consumption.

Solutions to this problem include ongoing educational efforts about healthy eating. Avoiding spicy foods or consuming them in moderation can help improve the digestive health of college students. Health promotion programs, such as cooking classes and nutrition counselling, can be a practical step in improving diet and reducing the risk of adverse events, such as GERD. This is important to ensure students avoid poor health problems and adopt a sustainable, healthy lifestyle (Amuniti et al, 2024)

This study has several limitations that should be taken into account when interpreting the results. First, the limited number of samples, comprising only 35 students from one residential area (behind UNIB), limits the generalizability of the results to the broader student population. The relatively small number of respondents also limits the statistical analysis's ability to detect more complex relationships.

This research is expected to be the initial basis for further studies on digestive disorders in boarding school students. To strengthen the generalizability of the results, it is recommended that the study be conducted with a broader scope of respondents, including students from other faculties and universities, as well as different geographical regions.

It is also hoped that further research, conducted with a longitudinal approach or intervention, will examine the causal relationship between dietary changes and the improvement or worsening of GERD symptoms over time. Adding variables such as academic stress, staying up late, and consumption of caffeinated beverages is crucial to understanding the contributing risk factors.

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In addition, the results of this research can serve as a foundation for campuses or student health institutions in designing educational programs or healthy living campaigns, particularly in promoting regular eating habits, limiting spicy foods, and maintaining ideal meal times. Thus, it is expected to improve students' quality of life and gastrointestinal health in a sustainable manner.

CONCLUSION

Based on the study's results, it can be concluded that there is a significant relationship between an irregular diet and the incidence of GERD in boarding school students. In addition, eating dinner after 21.00 also shows a significant association with the incidence of GERD. Frequent consumption of spicy foods contributes to an increased risk of GERD. These findings show that boarding school students tend to have an unhealthy diet, which has the potential to increase the risk of gastrointestinal disorders, especially gastroesophageal reflux disease (GERD).

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