Knowledge and Preventive Behavior Toward Gastroesophageal Reflux Disease Among Undergraduate Students at Universitas Gadjah Mada

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Abstract

Background: Gastroesophageal Reflux Disease (GERD) is a chronic condition characterized by the regurgitation or backflow of stomach contents into the esophagus, which can potentially lead to various complications. This study aims to evaluate the relationship between the level of knowledge and the level of preventive behavior regarding GERD among students at Universitas Gadjah Mada.

Materials and methods: A cross-sectional study was conducted using a convenience sampling method, involving 113 students aged 18-25 years, with data collected through a questionnaire. Knowledge about GERD was measured using the Guttman scale, while preventive behavior was assessed using the Likert scale.

Results: The results revealed a significant relationship between knowledge and preventive behavior (Pearson Chi-Square value: 8.817, p=0.03). Among the 49 students with poor knowledge, 59.2% exhibited poor preventive behaviors, while 68.8% of the 64 students with good knowledge demonstrated good preventive behaviors.

Conclusion: Overall, students with better knowledge of GERD tend to have better preventive behaviors. The study also found a relationship between the academic cluster with levels of knowledge and preventive behaviors. However, other characteristics such as age, sex, semester, history of GERD, living situation (alone or with parents), and monthly allowance were not significantly associated.

Keywords: Gastroesophageal Reflux Disease (GERD), Knowledge, Preventive Behavior, Students, Universitas Gadjah Mada

1. INTRODUCTION

Gastroesophageal Reflux Disease or commonly known as GERD is a chronic condition characterized by the backflow of stomach contents, including food and acidic liquid, into the esophagus. This condition often leads to symptoms such as a burning sensation in the chest (heartburn), which tends to worsen when lying down or bending over. Less common symptoms of GERD include difficulty swallowing, chest pain, excessive saliva production, burping, hiccups, nausea, and vomiting (1).

According to Fass et al. (2021), the pathophysiology of GERD involves multiple factors, including gastric acid gland positioning, delayed stomach emptying, and dysfunction of the anti-reflux barrier and Crural Diaphragm (CD) (2). The characteristics of the refluxed material and the esophageal clearing mechanism impact the level of mucosal damage. Additionally, GERD symptoms are significantly influenced by mucosal integrity and a combination of peripheral, central, and psychological processes. Several lifestyle-related factors, such as obesity, coffee consumption, spicy foods, alcohol intake, the use of Non-Steroidal Anti-Inflammatory Drugs

(NSAIDs), and psychological stress, also contribute to the risk of GERD (3).

Based on research done by Zhang, Liu, Li, and Wang (2022), the global prevalence of GERD increased by 77.53% (4). In 1990, there were approximately 441.57 million cases, which rose to 783.95 million cases by 2019. Similarly, a study by El-Serag et al. (2014) reported a continuous increase in GERD prevalence across regions: 18.1-27.8% in North America, 23.0% in South America, 8.8-25.9% in Europe, 11.6% in Australia, and 8.7-33.1% in the Middle East (5). East Asia showed the lowest prevalence, ranging from 2.5% to 7.8%. However, studies indicate a steady increase in the region, from 2.5-4.8% in 2005 to 5.2-8.5% by 2010. In contrast, the prevalence in Southeast Asia and West Asia was found to be higher, ranging from 6.3% to 18.3% after 2005 (6). In Indonesia, GERD prevalence was reported to be 57.6% according to a survey conducted between 2013 and 2015 (7).

Despite the increasing prevalence of GERD, research focusing on Indonesian higher education students remain limited. According to the Data and Information Technology Center of the Ministry of Education, Culture, Research, and Technology of Indonesia, there were 9.3 million students enrolled in higher education across various institutions during the 2022-2023 academic year.

College students are particularly vulnerable to GERD due to factors such as irregular sleep patterns, high stress levels, skipping meals, and eating hastily (8). A study by Otayf et al. (2022) in Saudi Arabia found that GERD prevalence among students was 23.1% out of 953 participants, while a study conducted in India found that 25% of 600 medical students experienced GERD (9,10).
The demands of academic life often lead students to neglect early GERD symptoms or to self-medicate without proper medical guidance. This behavior can exacerbate the condition and lead to serious complications. Thus, there is an urgent need for further research to increase awareness and provide effective management strategies for GERD among this population (8).

Over-the-counter and prescription medications can help treat GERD, but lifestyle changes also play a crucial role in managing and preventing symptoms. A recent study identified five key lifestyle factors that may help prevent GERD, including maintaining a healthy diet, achieving a healthy body weight, avoiding smoking, engaging in regular moderate to vigorous exercise, and limiting coffee, tea, or soda intake to no more than two cups per day (11). These strategies not only help prevent GERD but also minimize symptoms in individuals already diagnosed with GERD (11). Given the multifactorial causes and potential complications of GERD, prevention is essential in reducing its impact on health and quality of life. If left unmanaged, chronic acid reflux can lead to more severe complications such as esophagitis, esophageal strictures, and Barrett's esophagus (8). Therefore, adopting these preventive lifestyle measures is crucial in mitigating the long-term risks associated with GERD.

Awareness of GERD and its prevention strategies remains limited among college students, potentially leading to poor health outcomes. As highlighted by Gyawali et al. (2015), improving general knowledge and ensuring easier access to medical information can support responsible self-medication practices, including preventive measures (12). Therefore, this study aims to evaluate the relationship between students' knowledge levels of GERD and the preventive behaviors they adopt.

2. MATERIALS AND METHODS
a. Research Design

This study employs a non-experimental survey with a cross-sectional design. Data were collected over one week using questionnaires distributed to students at Universitas Gadjah Mada. The collected data were then analyzed descriptively using the Chi-square test.

b. Research Sample

The study sample consisted of 113 undergraduate students from various faculties at Universitas Gadjah Mada. The sample selection was conducted using a convenience sampling technique based on the Slovin formula. Participants were required to meet the inclusion criteria of being 18–25 years old and providing informed consent to participate in the study. The exclusion criteria included postgraduate and doctoral students, as well as respondents with

incomplete questionnaire responses.

c.   Research Instrument

The knowledge level was measured using the Guttman scale, while preventive behavior was assessed with the Likert scale. The questionnaire consisted of 20 items related to knowledge and 16 items assessing preventive behavior.

The validity of questionnaire items was tested using the Pearson correlation test, with a validity coefficient (r) > 0.320 considered acceptable. Reliability was assessed using Cronbach's Alpha, yielding a reliability coefficient of 0.821 for the knowledge items and 0.792 for the preventive behavior items, indicating a reliable measurement tool.

d.   Data Collection and Analysis

The questionnaire was distributed online via Google Forms for one week. After data collection, responses were converted into numerical scores. Scores equal to or above the mean were classified as good, while scores below the mean were classified as poor.

The study was conducted through univariate and bivariate analysis using IBM SPSS Statistics 27. The Chi-square method was used to determine associations between these variables, as it is suitable for categorical data analysis.

3.   RESULTS

a.   Respondents' Sociodemographic Characteristics

A total of 113 university students participated in this study, with the majority being 22 years old (45.1%). Most respondents were female (76.1%). The study was conducted during the even semester, with eighth-semester students comprising the largest group (45.1%). Participants were from various faculties at Universitas Gadjah Mada, categorized into medical and non-medical academic clusters. Although non-medical students dominated (66.4%), the Faculty of Pharmacy contributed the highest number of respondents (24.8%). Although the number of respondents from each faculty does not fully represent the total student population due to study limitations, all faculties have been included and represented in this study. Most of the respondents live by themselves both in their own house or dormitory (66.4%), and most

respondents have monthly allowance ranging from Rp1.000.000 – Rp2.000.000 (54.9%).

The majority of respondents have no history of GERD. However, approximately one-third of the total respondents have a history of GERD, indicating a relatively high prevalence among students. Proton Pump Inhibitors (PPIs) were the most frequently used GERD medication (38.89%), with omeprazole being the most commonly consumed (27.78%). Additionally, 25% of respondents reported using a combination. Notably, 8.33% of respondents did not take any medication despite having GERD, which may be attributed to effective lifestyle management or either limited access to medical facilities, warranting further investigation.

b.   Level of Knowledge

Assessing students' knowledge about GERD is essential to understanding their awareness of the condition. The questionnaire included 20 items covering GERD definition, causes, symptoms, risk factors, prevention, and treatment.

Most students had a solid understanding of GERD, with over 90% correctly identifying its definition and common symptoms, such as heartburn (90.3%) and regurgitation (92.9%). Around 80.5% recognized that GERD is preventable through lifestyle changes like weight management, avoiding trigger foods, and quitting smoking (13). However, misconceptions existed regarding risk factors: only 31.0% understood the link between family history and GERD, and 46.9% recognized obesity as a contributing factor (14). Knowledge of GERD management varied, with 69.9% aware of the benefits of elevating the head during sleep, and 61.9% knowing that PPIs are the first-line treatment.

Students were categorized as having a good knowledge if their total score was above or equal to the mean and poor knowledge if below. The mean score of GERD knowledge score was 15.25 (SD = 3.063). The mean was used to divide the level of knowledge as the data were normally distributed. A majority (56.64%) demonstrated good knowledge of GERD, suggesting that most students possess sufficient awareness of the disease. These results indicate that while the majority of students have adequate knowledge of

GERD, a significant portion still shows gaps in understanding, underscoring the need for targeted educational interventions to improve awareness amongst these students.

c. Preventive Behavior Level

GERD prevention behaviors were assessed using 16 Likert-scale items (score 0–3), with higher scores indicating better practices. The average scores (in parentheses) indicate the mean values for each behavior. Regular eating habits had a mean score of (1.73), but breakfast routines were a bit inconsistent (1.48). Irregular eating patterns increase the risk of GERD by 2.33 times compared to regular eating patterns (15). Adherence to small, frequent meals was low (1.26), while awareness regarding the avoidance of overeating and the maintenance of an ideal body weight was moderate. Despite the well-established association between late-night eating and an increased risk of GERD, this behavior remained common (1.09). It is essential that dinner be avoided within three hours of bedtime, as this behavior increases the risk of GERD symptoms by 7.45 times (14).

Students occasionally consume spicy, acidic, and high-fat foods, which can irritate the esophagus and increase GERD risk (16). In contrast, the consumption of carbonated beverages (2.69), smoking (2.77), and alcohol (2.88) was infrequent, which is favorable, as these behaviors are associated with reduced LES pressure and exacerbated GERD symptoms (14).

Students were categorized as having good preventive behavior if their total score was above or equal to the mean and poor behavior if below. The mean score was 29.73 (SD = 4.27). Most students (56.64%) demonstrated good preventive behaviors, while 43.36% exhibited poor practices, highlighting the need for targeted interventions to enhance GERD prevention.

d. The Relationship between Sociodemographic Characteristic and Knowledge

Table I. Relationship between Sociodemographic Characteristic and Knowledge

Characteristic	Level of Knowledge %		P value
	Good	**Poor**	
Age (years)			
< 21	59.1	40.9	0.796
≥ 21	56.0	44.0	
Sex			
Male	40.7	59.3	0.056
Female	61.6	38.4	
Semester			
< 8th Semester	57.8	42.2	0.842
≥ 8th Semester	55.9	44.1	
Academic Cluster			
Medical	92.1	7.9	<0.001
Non-medical	38.7	61.3	

GERD History			
No	51.9	48.1	0.141
Yes	66.7	33.3	
Residence			
Living alone	54.7	45.3	0.553
Living with parents	60.5	39.5	
Monthly Allowance			
< Rp1.000.000	57.1	42.9	
Rp1.000.000 – Rp2.000.000	53.2	46.8	0.534
>Rp2.000.000	68.5	31.2	

The analysis of various sociodemographic characteristics in relation to students' knowledge levels revealed that academic cluster was the only characteristic with a significant association. Students in the medical cluster demonstrated a higher level of knowledge about GERD, likely due to their academic background, which fosters greater awareness of GERD symptoms and risk factors (17). Conversely, other factors such as age, sex, semester, GERD history, residence, and monthly allowance did not show a significant relationship with knowledge levels. Although sex had a p-value of 0.056, which is close to the significance threshold, the statistical evidence was insufficient to conclude a definitive relationship. Future studies with a larger sample size may be necessary to confirm this potential association.

e. **The Relationship between Sociodemographic Characteristic and Preventive Behavior**

Table II. Relationship between Sociodemographic Characteristic and Preventive Behavior

Characteristic	Level of Behavior %		P value
	Good	Poor	
Age (years)			
< 21	59.1	40.9	0.796
≥ 21	56.0	44.0	
Sex			
Male	44.4	55.6	0.143
Female	60.5	39.5	
Semester			
< 8th Semester	60.0	40.0	0.557
≥ 8th Semester	54.4	45.6	
Academic Cluster			
Medical	81.6	18.4	<0.001
Non-medical	44.0	56.0	
GERD History			
No	55.8	44.2	0.804
Yes	58.3	41.7	
Residence			
Living alone	50.7	45.3	0.072

Living with parents	68.4	31.6	
Monthly Allowance			
< Rp1.000.000	57.1	42.9	
Rp1.000.000 – Rp2.000.000	56.5	43.5	0.997
>Rp2.000.000	56.3	33.8	

The analysis of sociodemographic characteristics in relation to GERD preventive behavior also found that academic cluster was the only factor significantly associated with preventive behavior. In contrast, characteristics such as sex, semester, GERD history, residence, and monthly allowance did not demonstrate a significant relationship.

Relationship Between Knowledge and Preventive Behavior

Table III. Relationship between Knowledge and Preventive Behavior

	Preventive Behavior		
	Poor	**Good**	*P value*
Knowledge			
Poor	59.2%	40.8%	0.03
Good	31.2%	68.8%	

Based on the table III, among students with poor GERD knowledge, 59.2% exhibited poor preventive behavior, indicating that a lack of knowledge may contribute to inadequate preventive actions. In contrast, among students with good GERD knowledge, 68.8% demonstrated good preventive behavior, while only 31.2% showed poor preventive behavior. This finding indicates that students with a better understanding of GERD are more likely to engage in effective preventive behavior.

The study results indicate a positive relationship between GERD knowledge and preventive behavior. The chi-square test yielded a p-value of 0.03, which is below the significance threshold of 0.05, confirming that GERD knowledge level is significantly associated with preventive behavior. In other words, students with a higher level of GERD knowledge are more likely to adopt preventive behavior. This finding aligns with the study by Ariyani et al. (2024), which reported that among 119 respondents, 61.7% had good knowledge, 53.4% exhibited positive behavior, and 59.6% actively practiced GERD prevention (18).

4. DISCUSSION

The findings of this study highlight the critical role of GERD knowledge in shaping preventive behaviors among undergraduate students at Universitas Gadjah Mada. Students with a strong understanding of GERD are more likely to recognize risk factors, symptoms, and effective prevention strategies, leading them to adopt healthier habits. Conversely, insufficient knowledge about GERD can result in low awareness and a failure to implement preventive measures, ultimately increasing susceptibility to the condition. Many students with limited knowledge may not fully grasp the connection between their daily habits and GERD development, making them more prone to experiencing its adverse effects.

The results further indicate a significant association between GERD knowledge and preventive behavior, reinforcing the notion that education plays a vital role in influencing health-related actions. This finding aligns with previous research, which suggests that individuals with adequate knowledge about GERD are more likely to adopt preventive strategies (18). The significant relationship between academic cluster and GERD knowledge, as well as preventive behavior, suggests that students from medical faculties are better informed about GERD-related risks and prevention, likely due to their academic exposure to health sciences (17). In contrast, non-medical students exhibited lower levels of knowledge and preventive behavior, emphasizing the need for broader educational interventions across all academic disciplines. Interestingly, other sociodemographic factors such as age, sex,

semester, GERD history, residence, and monthly allowance did not exhibit significant associations with GERD knowledge or preventive behavior. This suggests that while individual lifestyle habits may vary, academic background exerts a more substantial influence on GERD awareness and prevention.

Given that university students often experience lifestyle changes such as irregular eating patterns, increased consumption of fast food, high stress levels, and insufficient physical activity, GERD knowledge becomes even more crucial in this population. Without proper awareness, students may unknowingly engage in behaviors that elevate their GERD risk. Educational institutions must play an active role in disseminating GERD-related information and promoting preventive measures. Universities can implement targeted health education programs through workshops, seminars, and digital campaigns to enhance students' understanding of GERD and encourage healthier habits.

Overall, these findings underscore the necessity of strengthening GERD awareness among university students to adopt preventive behaviors and mitigate GERD-related risks. By addressing existing knowledge gaps and implementing structured educational interventions, universities and health organizations can contribute to reducing GERD prevalence and improving students' long-term digestive health.

5. CONCLUSIONS

The findings indicate that both GERD knowledge levels and preventive behaviors among Universitas Gadjah Mada students fall into the good category. Additionally, a significant relationship was found between academic cluster with GERD knowledge level and GERD preventive behavior, whereas other sociodemographic factors such as age, sex, semester, GERD history, residence, and monthly allowance did not exhibit significant associations. Furthermore, the study confirms a strong relationship between GERD knowledge and preventive behavior, with students possessing higher knowledge levels demonstrating better preventive practices.

REFERENCES

1. Baklola, M., Terra, M., Badr, A., Fahmy, F. M., Elshabrawy, E., Hawas, Y., Abdel-Hady, D., & El-Gilany, A. H. (2023). Prevalence of gastro-oesophageal reflux disease, and its associated risk factors among medical students: a nation-based cross-sectional study. BMC Gastroenterology, 23(1). https://doi.org/10.1186/s12876-023-02899-w

2. Fass, R., Boeckxstaens, G. E., El-Serag, H., Rosen, R., Sifrim, D., & Vaezi, M. F. (2021). Gastro-oesophageal reflux disease. In Nature Reviews Disease Primers (Vol. 7, Issue 1). Nature Research. https://doi.org/10.1038/s41572-021-00287-w

3. Taraszewska, A. (2021). RISK FACTORS FOR GASTROESOPHAGEAL REFLUX DISEASE SYMPTOMS RELATED TO LIFESTYLE AND DIET. In Roczniki Panstwowego Zakladu Higieny / Annals of the National Institute of Hygiene (Vol. 72, Issue 1, pp. 21–28). National Institute of Public Health NIH – National Research Institute. https://doi.org/10.32394/rpzh.2021.0145

4. Zhang, D., Liu, S., Li, Z., & Wang, R. (2022). Global, regional and national burden of gastroesophageal reflux disease, 1990–2019: update from the GBD 2019 study. Annals of Medicine, 54(1), 1372–1384. https://doi.org/10.1080/07853890.2022.2074535

5. El-Serag, H. B., Sweet, S., Winchester, C. C., & Dent, J. (2014). Update on the epidemiology of gastro-oesophageal reflux disease: A systematic review. In Gut (Vol. 63, Issue 6, pp. 871–880). BMJ Publishing Group. https://doi.org/10.1136/gutjnl-2012-304269

6. Jung, H. K. (2011). Epidemiology of gastroesophageal reflux disease in asia: A systematic review. In Journal of Neurogastroenterology and Motility (Vol. 17, Issue 1, pp. 14–27). https://doi.org/10.5056/jnm.2011.17.1.14

7. Syam, A. F., Sobur, C. S., Hapsari, F. C. P., Abdullah, M., & Makmun, D. (2017). Prevalence and risk factors of GERD in Indonesian population—an internet-based study. Advanced Science Letters, 23(7),

6734-6738.
https://doi.org/10.1166/asl.2017.9384

8. Alrashed, A., Aljammaz, K., Pathan, A., Mandili, A., Almatrafi, S., Almotire, M., & Bahkali, S. (2019). Prevalence and risk factors of gastroesophageal reflux disease among Shaqra University students, Saudi Arabia. Journal of Family Medicine and Primary Care, 8(2), 462. https://doi.org/10.4103/jfmpc.jfmpc_443_18

9. Otayf, B., Dallak, F., Alomaish, A., Qadri, A., Moafa, R., Gosadi, I., & Alhazmi, A. H. (2022). Prevalence and Risk Factors of Gastroesophageal Reflux Among Jazan University Students, Saudi Arabia: A Cross-Sectional Study. Cureus. https://doi.org/10.7759/cureus.22500

10. Sharma, A., Sharma, P. K., & Puri, P. (2018). Prevalence and the risk factors of gastro-esophageal reflux disease in medical students. Medical Journal Armed Forces India, 74(3), 250–254. https://doi.org/10.1016/j.mjafi.2017.08.005

11. Mehta, R. S., Nguyen, L. H., Ma, W., Staller, K., Song, M., & Chan, A. T. (2021). Association of diet and lifestyle with the risk of gastroesophageal reflux disease symptoms in US women. JAMA Internal Medicine, 181(4), 552-554.

12. Gyawali, S., Ravi Shankar, P., Poudel, P. P., & Saha, A. (2015). Knowledge, attitude and practice of self-medication among basic science undergraduate medical students in a medical school in Western Nepal. Journal of Clinical and Diagnostic Research, 9(12), FC17–FC22.https://doi.org/10.7860/JCDR/2015/16553.6988

13. Katz, P. O., Dunbar, K. B., Schnoll-Sussman, F. H., Greer, K. B., Yadlapati, R., & Spechler, S. J. (2022). ACG Clinical Guideline for the Diagnosis and Management of Gastroesophageal Reflux Disease. American Journal of Gastroenterology, 117(1), 27–56. https://doi.org/10.14309/ajg.0000000000001538

14. Makmun, D., Fauzi, A., Maulahela, H., & Pribadi, R. R. (2022). Konsensus Nasional Penatalaksanaan Penyakit Refluks Gastroesofageal (gastroesophageal reflux disease/GERD) di Indonesia (revisi 2022). Perkumpulan Gastroenterologi Indonesia (PGI).

15. Hyun Song, J., Chung, S. J., Lee, J. H., et al. (2011). Relationship between gastroesophageal reflux symptoms and dietary factors in Korea. Journal of Neurogastroenterology and Motility, 17(1), 54-60.

16. Ness-Jensen, E., Hveem, K., El-Serag, H., & Lagergren, J. (2016). Lifestyle Intervention in Gastroesophageal Reflux Disease. Clinical Gastroenterology and Hepatology, 14(2), 175-182.e3.
https://doi.org/10.1016/j.cgh.2015.04.176

17. Awadalla, N. J. (2019). Personal, academic and stress correlates of gastroesophageal reflux disease among college students in southwestern Saudi Arabia: A cross-section study. Annals of Medicine and Surgery, 47, 61-65.
https://doi.org/10.1016/j.amsu.2019.10.021

18. Ariyani, F., Martini, M., Hestiningsih, R., & Fauzi, M. (2024). Gambaran perilaku (pengetahuan, sikap, dan perilaku) pencegahan gastroesophageal reflux disease (GERD) pada mahasiswa. Jurnal Kesehatan Masyarakat, 12(1), 115-119. https://doi.org/10.14710/jkm.v12i1.39705