

Correlation Between Spicy Food Consumption, Academic Stress, and Boarding School Environment and the Risk of GERD Among Students at Darul Falah Islamic Boarding School

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Abstract: This study explores the relationship between spicy food consumption, academic stress, and the pesantren environment with the risk of Gastroesophageal Reflux Disease (GERD) among students at Pondok Pesantren Darul Falah. GERD is a chronic digestive disorder caused by acid reflux and is prevalent among adolescents with specific lifestyle factors in an Islamic boarding school setting. A cross-sectional quantitative design was employed with 194 participants aged 15-18 years, using validated questionnaires to assess dietary habits, stress levels, environmental perceptions, and GERD symptoms. Spearman's rank correlation analysis showed significant correlations between spicy food consumption ($r = 0.338$, $p < 0.001$), academic stress ($r = 0.146$, $p < 0.042$), and unfavorable perceptions of the pesantren environment ($r = -0.170$, $p = 0.018$) with GERD risk. These results indicate that dietary, psychological, and environmental factors collectively contribute to the prevalence of GERD in this population. The study concludes that preventive strategies in pesantren should integrate nutrition education, stress management, and environmental improvements to effectively reduce GERD incidence and promote student health.

Keywords: Spicy Food, Academic Stress, Boarding School Environment, GERD

1. Introduction

Gastroesophageal Reflux Disease (GERD) is a chronic gastrointestinal disorder characterized by the reflux of stomach acid into the esophagus, causing symptoms such as heartburn and regurgitation that interfere with the quality of life of sufferers (Mardalena, 2021). The prevalence of GERD continues to increase globally and in Indonesia, especially among adolescents, with a rate of approximately 10–12% globally and 9.35% in West Java based on the latest GERD-Q questionnaire (Dinas Kesehatan Jawa Barat, 2020). GERD risk factors are multifactorial, encompassing biological, psychological, and social aspects that interact and exacerbate clinical conditions (National Consensus on GERD Management, 2022). Spicy food consumption has been proven to be a major biological risk factor that increases the risk by up to 14.7 times through stimulation of gastric acid production and damage to the esophageal mucosa

(Ndraha et al., 2023). Additionally, academic stress also plays a significant role in worsening GERD symptoms through stress mechanisms that increase gastric acid production and disrupt lower esophageal sphincter function (Turab et al., 2025). The boarding school environment, with its busy schedule and limited eating patterns, can exacerbate these risks through psychological pressure, irregular meal schedules, and habits of consuming foods that trigger stomach acid (Romadonika et al., 2022).

Research on the interaction between spicy food consumption, academic stress, and boarding school environmental characteristics as risk factors for GERD in students is still limited, as most studies only highlight one risk factor separately (Puspitasari et al., 2024). Several studies confirm the role of spicy food consumption and academic stress in increasing the incidence of GERD, but they are not sufficient to explain the complex mechanisms that occur in the context of students' lives in Islamic boarding schools, which have distinctive patterns of activity, diet, and academic pressure (Doligalska et al., 2025). Therefore, there is an urgent need for research that comprehensively examines these three factors in the context of santri to provide a scientific basis for more effective prevention and treatment interventions (Rahim, 2023).

The main objective of this study is to analyze the relationship between spicy food consumption, academic stress, and the pesantren environment with the risk of GERD in santri at the Darul Falah Islamic Boarding School. This study is expected to provide a representative picture that can be used as a basis for designing promotional and preventive programs tailored to the specific needs of the pesantren population, particularly in prevention efforts.

2. Materials and Methods

The methods for this study comprised a quantitative cross-sectional design conducted at Pondok Pesantren Darul Falah, West Bandung, in October 2025 during the study period as specified in the research plan. The target population included active santri residing in the pesantren's dormitories, specifically students from grades X, XI, and XII of SMA Darul Falah, totaling 375 individuals. The sample size was determined using the Slovin formula with a 5% margin of error, resulting in 194 respondents selected through stratified random sampling, ensuring proportional representation from each grade level and meeting set inclusion criteria (active dormitory resident, aged 15–18 years). Exclusion criteria included chronic gastric disease or current use of antacid/acid-reducing medication.

The primary variables assessed were spicy food consumption, academic stress, perception of the pesantren environment, and risk of GERD. Spicy food consumption was measured using a validated Food Frequency Questionnaire (FFQ), academic stress with the Perceived Academic Stress Scale (PASS), and environment perception using a pesantren environment questionnaire, all of which showed good reliability with Cronbach's Alpha 0.789. The Health Research Ethics Commission (KEPK) of Binawan University has given approval for this study No. 578/KEPK-UBN/IX/2025.

Data collection was carried out through self-administered questionnaires under researcher supervision. Univariate analysis was used to describe the distribution of demographic and key study variables. Bivariate analysis employed the Spearman rho test to examine correlations between each independent variable and GERD risk due to the ordinal scale and non-normal data distribution. Prior to analysis, all data underwent editing, coding, and cleaning to ensure accuracy (Hernawati, 2017).

3. Results and Discussion

3.1. Respondent Characteristics

Table 1. Respondent Characteristics

Class	Frequency	Percentage (%)
X	61	31.4
XI	65	33.5
XII	68	35.1
Age		
15	39	20.1
16	85	43.8
17	56	28.9
18	14	7.2
Gender		
Males	71	36.6
Females	123	63.4
Variable	Frequency	Percentage (%)
Spicy Food Consumption		
Rarely	95	49
Sometimes	99	51
Often	0	0
Academic Stress		
Low	0	0
Moderate	154	79.4
High	40	20.6
Boarding School Environment		
Good	36	18.6
Fairly Good	156	80.4
Less Good	2	1
Risk of GERD		
Low Risk	116	59.8
High Risk	78	40.2
Total	194	100

The respondent characteristics indicate that the participants consist of 68 students from class XII, 65 from class XI, and 61 from class X. The largest age group is 16 years old with 85 respondents, followed by 17 years old with 56 respondents, 15 years old with 39 respondents, and 14 respondents are 18 years old. There are 123 female respondents and 71 male respondents in the study. Regarding

spicy food consumption, 99 students reported consuming spicy food sometimes, 95 rarely, and none often. Academic stress was moderate in 154 respondents and high in 40, with none experiencing low stress. Concerning the boarding school environment, 156 respondents perceived it as fairly good, 36 as good, and 2 as less good. The risk of GERD was low in 116 respondents while 78 were classified as high risk. These data portray a study population mainly composed of female students in upper classes with moderate academic stress, occasional spicy food consumption, positive perceptions of their boarding environment, and a mix of low to high GERD risk.

3.2. Bivariate Analysis

Table 2. Bivariate Analysis

	Spicy Food towards Risk of GERD	Academic Stress towards Risk of GERD	Boarding School Environment towards Risk of GERD
<i>r</i>	0.338	0.146	-0.170
<i>p</i>	<0.001	0.042	0.018
		N=194	

Bivariate analysis using Spearman’s correlation reveals that spicy food consumption has a statistically significant positive association with the risk of GERD, with a correlation coefficient (*r*) of 0.338 and a *p*-value of less than 0.001. This indicates that increased frequency of spicy food intake is associated with higher GERD risk among the respondents. These findings are consistent with the research by Alatawi et al. (2025), which also found a dose-response relationship between the frequency of spicy food consumption and GERD symptoms. Alatawi's research shows that participants who frequently consumed spicy foods had a higher risk of GERD compared to those who rarely consumed them, thus reinforcing the results of this study that an increase in the frequency of spicy food consumption is significantly associated with an increased risk of GERD.

Academic stress also shows a significant correlation with GERD risk, with an *r* value of 0.146 and a *p*-value of 0.042, meaning that higher academic stress corresponds to an elevated GERD risk. This finding is reinforced by research conducted by Munir et al. (2020), which shows that academic stress among Indonesian students is mainly triggered by heavy workloads, exam pressure, conflicts with peers, and personal factors. This stress can have an impact on study habits, eating patterns, and gastrointestinal health. Other studies have shown that higher stress levels are significantly associated with a greater risk of GERD in medical students; individuals with high stress levels are approximately 2.3 times more likely to experience GERD than those without stress.

Meanwhile, the perception of the boarding school environment is negatively correlated with GERD risk (*r* = -0.170, *p* = 0.018), suggesting that better perceived environments are linked to lower GERD risk. Pakpahan et al. (2025) found that a positive social and school environment in pesantren marked by strong peer and teacher support, helps reduce adolescent stress and supports healthy adjustment, which contributes to better overall mental and physical health. This supports the finding that a better perceived boarding school environment is linked to lower GERD risk. In line with this, Febria et al. (2024) demonstrated that improvements in the physical environment and sanitation of pesantren significantly enhanced students’ awareness and health outcomes, further supporting that a healthy and well-maintained boarding school environment mitigates health risks among santri.

Overall, these findings confirm that dietary habits, psychological stress, and environmental factors all play significant roles in the risk for GERD in this study population.

4. Conclusions

This study hypothesized that spicy food consumption, academic stress, and the boarding school environment are significantly associated with the risk of GERD among santri at Darul Falah

Islamic Boarding School. The findings support the hypothesis: increased spicy food consumption and higher academic stress were positively correlated with GERD risk, while a better boarding school environment was linked to a lower risk of GERD. These results reinforce the multifactorial nature of GERD and contribute new evidence specific to the pesantren adolescent population, where psychological, dietary, and environmental factors interact. The study demonstrates the need for integrated promotive and preventive strategies, such as nutrition education and stress management tailored to the pesantren setting, to address this health issue. Limitations include reliance on self-reported data and the cross-sectional design, which precludes causality; future research should include longitudinal studies, broaden the range of risk factors assessed, and evaluate intervention models to reduce GERD incidence and improve student well-being. These findings emphasize the critical role of vocational nurses in Islamic boarding schools to implement integrated health programs, focusing on nutritional screening and stress management to mitigate gastrointestinal issues among students.

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