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Original Article

Unhealthy Mind, Unhealthy Gut: The Impact of Stress and Eating Patterns on Gastritis in Early Adolescents in Depok, Indonesia

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Abstract

Introduction: Gastritis is a prevalent digestive disorder among adolescents, frequently associated with stress and poor eating patterns. Due to academic pressures and irregular dietary habits, adolescents are increasingly vulnerable to unhealthy lifestyles that elevate their risk of developing gastritis. In Indonesia, such risk factors are particularly relevant given the rising incidence of gastritis among early adolescents. **Methods:** This study employed a cross-sectional design to analyse the relationship between stress levels, eating patterns, and the incidence of gastritis among early adolescents in Depok, Indonesia. A total of 150 adolescents were selected using a stratified random sampling technique. Data collection was conducted using a structured questionnaire that assessed participants' stress levels, dietary habits, and gastritis symptoms. The data were analysed using logistic regression tests to evaluate the influence of stress and eating patterns on the likelihood of gastritis. **Results:** The findings revealed a statistically significant relationship between stress levels and gastritis incidence (p-value < 0.05; OR = 6.833). Similarly, poor eating patterns demonstrated a significant association with the occurrence of gastritis (p-value < 0.05; OR = 155.032). Among the two factors, poor eating patterns exhibited a stronger influence on gastritis development. **Conclusion:** The study concludes that both high stress levels and poor eating patterns are significant risk factors for gastritis among early adolescents, with dietary behaviour exerting a more pronounced impact. These results underscore the importance of promoting healthy eating habits and implementing stress management interventions. Collaborative efforts among schools, parents, and healthcare providers are essential in providing nutritional education and mental health support to enhance the well-being of adolescents.

Keywords: *Adolescents; Eating Patterns; Gastritis; Stress Levels*

Introduction

Adolescents often engage in numerous activities and exhibit poor eating habits, leading to an unhealthy lifestyle characterised by the consumption of junk food, fast food, spicy food, smoking, and frequent exposure to stress (Miranda *et al.*, 2021). In the current era of globalisation, modernisation, and urbanisation, lifestyle significantly influences daily life, especially among the millennial generation, commonly referred to as adolescents. Excessive busyness and unhealthy eating patterns, as described above, can lead to health issues if left unchecked. Adolescents are particularly prone to experiencing health problems such as gastritis (Baceviciene, Jankauskiene & Trinkuniene, 2022).

Gastritis, also known as indigestion, is an inflammation of the stomach lining caused by irritation or infection. When exposure to irritating substances or conditions occurs repeatedly, it may result in stomach injuries. These injuries can lead to abrasions and wounds, causing inflammation referred to

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as gastritis (Bayti *et al*., 2021). Gastritis is common among adolescents due to their preference for fast food and sugary beverages, which often replace home-cooked meals and water. If this dietary behavior continues over time, it can result in stomach pain and other digestive complications (Rahman *et al*., 2022; Silwal *et al*., 2021). Gastritis can affect individuals of all ages; however, research indicates that adolescents are particularly susceptible (Shalahuddin, 2018). Gastritis is most commonly observed among teenagers aged 15 to 24 years, with early adolescents also being vulnerable due to their developing physiological and psychological conditions.

According to data from the World Health Organization (Slpponen *et al*., 1985), gastritis is one of the most prevalent diseases globally, affecting 69% of the population in Africa, 78% in South America, and 51% in Asia. Each year, gastritis impacts approximately 1.8 to 2.1 million people worldwide, with Southeast Asia contributing around 586,635 cases. In Indonesia, the WHO reported that 40.8% of the population, equivalent to 274,396 individuals, suffered from gastritis in 2019, affecting a total of 238,452,952 people across various regions. This represents an incidence rate of 40.8% (Tiu, Tosepu & Effendy, 2022). Data from the Ministry of Health of the Republic of Indonesia in 2019 indicated that gastritis was among the top ten diseases in the country, particularly among patients seeking treatment in hospitals and clinics. Specifically, in Depok City, the Health Profile of Depok City (2019) reported that gastritis was one of the most prevalent diseases. There were 753 cases (2.10%) in 2017, 368 cases (2.67%) in 2018, and a significant increase to 21,590 cases (5.16%) in 2019. This increase in gastritis cases aligns with the growing urbanisation and changing lifestyle patterns in Depok, particularly among early adolescents aged 10 to 14 years, who are increasingly exposed to unhealthy dietary habits and academic stress.

Preliminary research conducted by Putri, Hadiyanto and Tarwati, (2023) on the relationship between eating patterns, stress levels, and the prevalence of gastric diseases among students at SMPN 14 Sukabumi revealed that 47.1% of students exhibited poor eating patterns. Additionally, stress levels among students were distributed as follows: 21.6% experienced mild stress, and 33.3% experienced moderate stress. These findings indicate that poor eating habits and moderate to high stress levels remain common among adolescents (Putri, Hadiyanto & Tarwati, 2023). Stress, particularly academic and social stress experienced by early adolescents, can exacerbate gastric issues by increasing gastric acid production and weakening the stomach lining. Dietary habits also influence the gastric microbiome, which can be further disrupted by *H. pylori* infection (Rueda-Robles *et al*., 2021).

Gastric accommodation, a crucial process in the stomach's adaptation to food intake, can be impaired by dietary factors, resulting in increased intragastric pressure and symptoms associated with functional dyspepsia and gastroesophageal reflux disease (Li & Page, 2022). However, certain dietary components like chitin can trigger adaptive responses in the stomach, including the production of digestive enzymes by chief cells, which may have metabolic benefits (Kim *et al*., 2023).

Adolescents often neglect their dietary habits and lifestyle due to their engagement in various activities during this productive stage of life. Adolescents with poor dietary habits frequently consume instant noodles, coffee, soft drinks, and alcohol. They also tend to stay up late, snack excessively, and prefer fast food over balanced meals. These behaviours are often accompanied by dining in unclean environments. Concerns also arise regarding the nutritional value of such foods. If gastritis is left untreated, it can lead to severe complications such as upper gastrointestinal bleeding (hematemesis), skin cancer, haemorrhagic shock, ulceration, and even death (Wauters *et al*., 2021).

Many teenagers strive to achieve an ideal body shape by dieting and altering their eating patterns, often leading to skipped meals or irregular eating habits. This behaviour is largely influenced by societal pressures that emphasise physical appearance, particularly through social media and cultural beauty standards. As a result, adolescents may develop unhealthy dietary patterns that not only affect their nutritional intake but also increase the risk of digestive issues such as gastritis. The pursuit of an unrealistic body image can lead to extreme dieting behaviours, which, when prolonged, may have detrimental effects on both physical and mental health.

In severe cases, gastritis can co-occur with mental health issues such as depression, which can further exacerbate gastrointestinal problems. Research suggests that stress plays a crucial role in the development and recurrence of gastritis, as it can lead to increased stomach acid production and inflammation. The relationship between stress and gastritis is mediated through the HPA-axis pathway, which regulates the body's response to stress (Sugiharta *et al*., 2022). Prolonged exposure to high levels of stress can weaken the stomach lining, making it more susceptible to damage and increasing the likelihood of developing erosive gastritis. This highlights the importance of addressing both psychological and physiological factors in managing gastrointestinal health. Prolonged stress also can trigger excessive gastric acid production and inflammation, weaken the stomach lining and make it more susceptible to damage. Moreover, stress-related hormonal imbalances, particularly those involving the hypothalamic-pituitary-adrenal (HPA) axis, may contribute to the progression of gastritis into more severe gastrointestinal conditions, including peptic ulcers and even gastric cancer (Vahid *et al*., 2023).

Furthermore, studies have shown that severe stress levels are associated with a poorer quality of life among gastritis patients (Sandi *et al*., 2021). Chronic stress can contribute to frequent gastritis flare-ups, making it difficult for individuals to maintain a balanced and healthy lifestyle. These findings suggest that stress management strategies, such as mindfulness practices, relaxation techniques, and psychological counselling, may be effective in preventing and managing gastritis symptoms. However, it is also important to consider other contributing factors, such as dietary compliance and knowledge levels, which can significantly influence gastritis outcomes (Sandi *et al*., 2021). A holistic approach that includes proper nutrition, stress reduction, and health education is essential for promoting long-term digestive health in adolescents.

The interplay between poor dietary habits and high-stress levels, especially in early adolescents, underscores the need for further research in urban settings like Depok, Indonesia, to better understand the impact of stress and eating patterns on gastritis.

Methodology

The study was conducted at SMP Terpadu Informatika Perjuangan to examine the influence of eating patterns and stress levels on the prevalence of gastritis among early adolescents. This research employed a cross-sectional design, involving data collection at a single point in time without follow-up, to identify the effects of the independent variables on the dependent variable. The population consisted of all students at SMP Terpadu Informatika Perjuangan, totalling 240 individuals. A random sampling technique was used to select a sample of 150 respondents, determined using Slovin's formula with a 5% margin of error.

Data were collected through structured questionnaires assessing stress levels, eating patterns, and gastritis prevalence. The stress level questionnaire evaluated students' stress conditions, the eating pattern questionnaire examined their dietary habits, and gastritis was assessed through self-reported symptoms. The data were analyses using multiple logistic regression to determine the influence of eating patterns and stress levels on gastritis prevalence.

Results

Table 1: Respondent Characteristics

Respondent Characteristics	Frequency (f)	Percentage (%)
Age		
12	43	28.7
13	74	49.3
14	33	22
Gender		
Female	86	57.3
Male	64	42.7
Total	150	100

The characteristics of the respondents in this study are described based on Table 1. Out of a total of 150 respondents, the majority were 13 years old, comprising 74 students (49.3%). This was followed by respondents aged 12 years, totalling 43 students (28.7%), and those aged 14 years, with 33 students (22%). In terms of gender, the respondents were predominantly female, accounting for 86 students (57.3%), while the remaining 64 students (42.7%) were male. This demographic distribution reflects a fairly balanced representation of both genders, with a slight predominance of female students, and the majority of respondents were in the 13-year age group.

Table 2: Relationship Between Stress Levels, Eating Patterns and Gastritis

	Incidence of Gastritis						
Variable	**Gastritis**		**No Gastritis**		**Total**		***p*-value**
	n	**%**	**n**	**%**	**n**	**%**	
Stress Level							
Normal	10	47.6	11	52.4	21	100	
Moderate	61	63.5	35	36.5	96	100	0.002
Severe	30	90.9	3	9.1	33	100	
Eating Patterns							
Good	19	28.8	47	71.2	66	100	
Poor	82	97.6	2	2.4	84	100	0.000

Table 2 shows that stress levels and eating patterns have a significant relationship with the incidence of gastritis among adolescents. Respondents with higher stress levels tend to have a higher incidence of gastritis. Likewise, poor eating patterns are significantly associated with an increase in the incidence of gastritis. Both variables have a *p*-value < 0.05, indicating that they can be included in a logistic regression analysis.

Table 3: Results of Logistic Regression Analysis

		B	**S.E.**	**Wald**	***df***	**Sig.**	**Exp(B)**	**95% C.I. for EXP(B)**	
								Lower	**Upper**
Step 1[a]	Stress Level	1.922	0.571	11.318	1	0.001	6.833	2.230	20.936
	Eating Pattern	5.044	0.859	34.469	1	0.000	155.032	28.786	834.950
	Constant	-10.018	1.839	29.683	1	0.000	0.000		
a. Variable(s) entered on step 1: Stress Level, Eating Pattern.									

Table 3 shows that stress levels and eating patterns have a *p*-value < 0.05, which means that stress levels and eating patterns significantly influence gastritis. The stress level variable has an Exp(B) = 6.833 > 1, indicating that it is a risk factor, with a 95% CI value greater than 1 (2.230–20.936), making the OR significant. Exp(B) represents the odds ratio, indicating how much more likely the outcome (gastritis) is to occur for each unit increase in the predictor variable, with values greater than 1 showing increased risk. This can be interpreted as adolescents with higher stress levels having a 6.833 times higher risk of developing gastritis. Meanwhile, the eating patterns variable has an Exp(B) = 155.032 > 1, also indicating a risk factor, with a 95% CI value greater than 1 (28.786–834.950), making the OR significant. This means that adolescents with poor eating patterns have a 155.032 times higher risk of developing gastritis. The results indicate that eating patterns have a greater influence on the incidence of gastritis compared to stress levels.

Discussion

The findings of this study highlight the significant impact of stress levels and eating patterns on the incidence of gastritis among early adolescents. The statistical analysis demonstrates that both variables had a strong correlation with gastritis occurrence, as indicated by their *p*-values being less than 0.05. This suggests that stress and dietary habits play crucial roles in the development of gastritis, reinforcing the need to address these factors in adolescent health interventions. Given that adolescence is a period of rapid physical and psychological development, the influence of stress and eating patterns on digestive health should not be underestimated. Stress has been identified as a significant contributor to higher gastritis status, with studies indicating that individuals experiencing chronic stress have an increased likelihood of developing gastritis symptoms (Feyisa & Woldeamanuel, 2021).

The significant relationship between stress levels and gastritis found in this study is consistent with previous research that highlights the physiological impact of stress on the digestive system. Stress stimulates the production of stomach acid and impairs gastric mucosal defence, which increases the likelihood of developing gastritis. Adolescents experiencing moderate to severe stress may also adopt unhealthy coping mechanisms, such as skipping meals, consuming fast food, or relying on caffeinated beverages, further exacerbating their susceptibility to gastritis. The findings align with the research by Putri, Hadiyanto and Tarwati, (2023), Amin *et al*. (2023), and Firdausy *et al*. (2022) similarly reported the link between stress and gastritis.

The odds ratio (OR) for stress levels was found to be 6.833, meaning that adolescents experiencing higher stress levels had a significantly increased risk—nearly seven times greater—of developing gastritis compared to those with normal stress levels. This aligns with previous research indicating that stress triggers an overproduction of stomach acid, which can irritate the gastric lining and lead to inflammation. Additionally, chronic stress can weaken the immune system, making the stomach more vulnerable to infections such as *Helicobacter pylori*, a common cause of gastritis. These findings emphasise the importance of stress management strategies in reducing the risk of gastritis among adolescents.

Adolescence is a period when gastritis is more likely to occur. This is because teenagers often have busy lifestyles and are less concerned about their health and stress levels, which increases the likelihood of developing gastric problems (Шкляев, 2023). Stress commonly arises from a person's inability to manage tasks that exceed their capacity. When the body responds to stress, it undergoes psychological changes that can affect the function of internal organs, causing stomach cells to produce excess gastric acid. If this condition persists for a prolonged period, it can lead to gastritis (Kim *et al*., 2023). Beyond stress and diet, *Helicobacter pylori* (H. pylori) infection remains a major factor in the development of chronic gastritis and an established risk factor for gastric cancer. However, its effects are influenced by additional biological and environmental factors. Studies have shown that gut microbiota composition, the presence of intestinal helminths, and host genetic factors can modulate the severity and progression of *H. pylori*-induced gastritis (Kumar, Patel & Ghoshal, 2021). A well-balanced gut microbiome may counteract some of the harmful effects of *H. pylori*, while genetic predisposition can determine an individual's susceptibility to severe gastric inflammation and cancer progression. This highlights the need for a multifaceted approach in gastritis prevention that not only focuses on stress and diet but also considers microbial and genetic influences.

In contrast, poor eating patterns posed an even greater risk factor for gastritis, as indicated by the remarkably high odds ratio of 155.032. This suggests that adolescents with unhealthy eating habits are over 155 times more likely to develop gastritis than those with balanced and structured eating patterns. Irregular eating habits, such as skipping meals, consuming excessive fast food, and eating at inconsistent times, may disrupt the stomach’s ability to regulate acid production, leading to gastric irritation. These behaviours are common among teenagers due to busy school schedules, peer influence, and exposure to unhealthy food choices, further increasing their susceptibility to gastritis. This is supported by research from Feyisa and Woldeamanuel (2021) that poor eating patterns significantly contribute to gastritis risk, emphasising the need for better dietary habits to maintain gastric health (Feyisa & Woldeamanuel, 2021). Irregular meal schedules, such as skipping breakfast or eating at inconsistent times, disrupt the stomach's natural acid regulation, leading to increased irritation of the gastric mucosa.

The strikingly high odds ratio for poor eating patterns suggests that dietary habits play a more substantial role in gastritis occurrence compared to stress levels. While stress can exacerbate stomach acid production, an unhealthy diet directly impacts the gastric environment by introducing irritants, unhealthy fats, and excessive sugar, all of which contribute to gastric inflammation. In addition to gastritis, poor dietary and lifestyle habits are closely linked to related conditions such as gastroesophageal reflux disease (GERD) (Farooq & Hassan, 2025). Obesity, smoking, and alcohol consumption have been identified as major risk factors for both gastritis and GERD (Khan *et al*., 2024; Dutta *et al*., 2024). Furthermore, consuming large meal volumes, eating close to bedtime, and regularly

ingesting certain trigger foods—such as citrus juices, tomatoes, and carbonated beverages—are associated with GERD symptoms (Mukhtar *et al*., 2022). These behaviors lead to increased intra-abdominal pressure, weakening the lower esophageal sphincter and allowing stomach acid to reflux into the esophagus.

Given these findings, interventions aimed at reducing gastritis incidence should prioritise both stress management and dietary improvements. Schools, families, and healthcare providers should work together to implement educational programs that raise awareness about the impact of stress and poor eating habits on digestive health. Encouraging adolescents to adopt relaxation techniques, engage in physical activities, and maintain a well-balanced diet can significantly lower their risk of developing gastritis (Al-Beltagi *et al*., 2025). Moreover, school meal programs should be designed to provide healthier food choices and educate students about the importance of regular and nutritious meals.

This study underscores the need for a holistic approach to preventing gastritis among adolescents by addressing both psychological and dietary factors. Stress reduction techniques, such as mindfulness and time management, can help mitigate the effects of high stress levels on digestive health. Simultaneously, promoting healthy eating habits through nutritional education and structured meal routines can significantly lower the risk of gastritis.

Conclusion

Based on the results of this study, it can be concluded that stress levels and eating patterns have a significant influence on the incidence of gastritis among early adolescents. Adolescents with high stress levels tend to be at greater risk of developing gastritis, particularly because stress can trigger an increase in stomach acid production and affect digestive system function. In addition, poor eating patterns, such as irregular eating habits, frequent consumption of spicy, acidic, and fast food, as well as skipping breakfast, have been shown to be a more dominant factor in increasing the risk of gastritis. These findings indicate that unhealthy eating patterns contribute more significantly to the occurrence of gastritis compared to stress. Therefore, preventive efforts are needed through education on the importance of maintaining a balanced diet and effective stress management. Collaboration between schools, parents, and healthcare providers is crucial to raise adolescents' awareness about the dangers of poor eating patterns and the impact of stress on digestive health, thereby preventing gastritis and improving their quality of life. Future research should explore additional lifestyle factors, such as physical activity and sleep patterns, to further understand the multifaceted nature of gastritis prevention. By implementing comprehensive health strategies, the incidence of gastritis among adolescents can be significantly reduced, improving their overall well-being.

Conflict of Interest

The authors affirm that there are no conflicting objectives.

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