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Young Adults' Mental Health Status: Investigating GERD's Relationship with Anxiety and Depression

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ABSTRACT

Background Gastroesophageal Reflux Disease (Gerd) Is A Chronic Digestive Disorder That Occurs When Stomach Acid Or, Occasionally, Stomach Contents Flow Back (Reflux) Into The Esophagus. This Backwash (Acid Reflux) Can Irritate The Lining Of The Esophagus, Causing Uncomfortable Symptoms And Potential Complications. Studies Suggest That Smoking, Obesity, Anxiety/Depression, And Older Age Are Some Of The Contributing Factors to Gerd Development. Young Adults In Jakarta Showed 14.5% Gerd Prevalence Rate During 2017. This Research Explores The Potential Correlation Between Anxiety And Depression With Gerd Development In Young Adult Populations. **Methods** This Study Utilized A Cross-Sectional Method To Assess The Symptoms Of Anxiety, Depression, And Gerd (Gastroesophageal Reflux Disease) Using The Hospital Anxiety And Depression Scale (HADS) Questionnaire And Gerd Questionnaire (GERDQ). The Research Involved 115 Participants Aged 18-40 From Pondokkaso Urban Village. The Study Analyzed Gender, Anxiety, Depression, And Gerd Using Fisher Exact Tests (P<0.05). **Results** Analysis Of 115 Respondents Revealed Gerd Prevalence In 26 Subjects (22.6%), Anxiety In 5 Subjects (4.3%), And Depression In 6 Subjects (5.2%). Statistical Analysis Demonstrated No Significant Correlation Between Anxiety And Gerd Incidence (P=1.000), Depression And Gerd Incidence (P=0.128), Or Gender And Gerd Incidence (P=0.756) Among Young Adult Subjects. **Conclusions** Statistical Analysis Revealed No Significant Correlation Between Gerd Incidence And The Variables Of Anxiety, Depression, And Gender Among Young Adults In Pondokkaso Urban Village.

1. Introduction

Gastroesophageal reflux disorder (GERD) is a condition in which the contents of the stomach rise back into the esophagus, causing the patient to experience discomfort or digestive complications. (1) The etiology of GERD is due to a dysfunction of the lower esophageal sphincter where there is frequent and/or prolonged relaxation leading to regurgitation of stomach acid. Over time, stomach acid will cause damage and dysplasia of the gastroesophageal mucosa. (2)

GERD is one of the most common diseases of the upper gastrointestinal tract and a common gastrointestinal disease worldwide. (3,4) In 2017, the prevalence of endoscopically diagnosed GERD in Jakarta was 7.5%. (5) GERD has a severe impact on health-related quality of life, affecting patient's social activities, and physical and emotional well-being. GERD can also interfere with sleep and work. GERD symptoms can be a burden to patients in terms of physical, emotional, and social health. (6) The risk factors for GERD are mental disorders such as anxiety/depression, smoking, high body mass index (BMI), older age, and lack of physical activity. (7)

Anxiety and depression are the two most prevalent mental disorders worldwide. (8) Psychological factors such as anxiety and depression can increase esophageal stimulation and influence the severity of gastrointestinal disorders by affecting pain perception through activity in the gut-brain

axis. These mechanisms are also present in patients with GERD. [9,10] There are several studies on the relationship between anxiety and depression and the incidence of GERD, Research conducted by Mohammad S, et al[10] and Choi JM, et al[11] showed that mental factors (anxiety and depression) play an important role in the development of GERD. In contrast to the results of previous research conducted by Aro P, et al[12] Anxiety does not affect the risk of GERD. The results of research conducted by Kessing BF, et al[13] showed that there was no association between depression and GERD.

Previous research investigating the correlation between GERD and psychological factors, specifically anxiety and depression, has yielded heterogeneous findings. While several studies demonstrate a significant association between GERD and anxiety disorders, other investigations indicate no substantial correlation between acid reflux symptomatology and anxiety levels. These inconsistent findings underscore the necessity for additional empirical investigations to elucidate the potential relationship between GERD and psychological parameters. This study investigates the relationship between psychological disorders and GERD among young patients to improve clinical management strategies and mitigate the impact of psychological factors on disease symptoms, treatment efficacy, and patient quality of life.

2. Methods

A cross-sectional study was conducted in Pondokkaso Urban Village, Sukabumi, from September to November 2023. The study included 115 young adults (18-40 years) selected through stratified random sampling. Participants were screened to exclude those who were pregnant, used substances (alcohol/coffee/tobacco), had psychiatric disorders, or took specific medications. Data was collected using the Hospital Anxiety and depression scale (HADS) and GERD Questionnaire (GERDQ) to examine the relationship between anxiety, depression, and GERD in young adults.

Hospital Anxiety and Depression Scale (HADS) was a 14-item screening tool that measures anxiety (7 items) and depression (7 items). Each item is scored from 0-3, with total scores ranging from 0-21 for each subscale. Higher scores indicate greater symptom severity.

GERD Questionnaire (GERDQ) was a 6-item diagnostic tool that assesses the frequency of GERD symptoms over the past week. It evaluates positive predictors (heartburn, regurgitation, sleep disturbance) and negative predictors (epigastric pain, nausea, use of over-the-counter medication). Total scores range from 0-18, with scores ≥8 indicating a high probability of GERD.

3. Results

The characteristics of study subjects are presented according to gender, anxiety incidence, depression incidence, and incidence of GERD, as illustrated in Table 1. The study population (n=115) consisted of subjects aged 18-40 years, with females representing 86.1% (n=99) and males 13.9% (n=16) of the sample. Among the participants, 4.3% (n=5) reported anxiety symptoms, 5.2% (n=6) exhibited depression, and 22.6% (n=26) were diagnosed with GERD.

Table 1. Distribution of study subject characteristics

Variable	Frequency (n)	Percentage (%)
Gender		
Male	16	13,9
Female	99	86,1
Anxiety		
Yes	5	4,3
No	110	95,7
Depression		
Yes	6	5,2

No	109	94,8
GERD		
Yes	26	22,7
No	89	77,4

Analysis of GERD distribution by gender, as presented in Table 2, revealed that among the 26 GERD cases, 25% (n=4) were male and 22.2% (n=22) were female. Statistical analysis using Fisher's Exact test demonstrated no significant association between gender and GERD incidence (p = 0.756, p>0.05) in young adults residing in Pondokkaso Urban Village.

Table 2. Association between Gender and GERD in Young Adults

Variable	GERD		Total	p value
	Yes (n,%)	No (n,%)		
Gender				
Male	4 (15.4)	12 (13.4)	16	0,756*
Female	22 (84.6)	77 (86.5)	99	

**Fisher Exact test*

In this study, among 5 participants experiencing anxiety, 1 individual (20%) presented with GERD, while 4 individuals (80%) did not manifest GERD symptoms. Among 110 subjects without anxiety, 25 individuals (22.7%) were diagnosed with GERD, and 85 individuals (77.3%) were GERD-negative. Statistical analysis revealed no significant association between anxiety and GERD (p = 1.000) (table 3).

Table 3. Correlation between anxiety and depression with the incidence of Gastroesophageal reflux disease (GERD) in young adults

Variable	GERD		Total	p value
	Yes (n,%)	No (n,%)		
Anxiety				
Yes	1 (20)	4 (80)	5	1.000*
No	25 (22,7)	85 (77,3)	110	
Depression				
Yes	3 (50)	3 (50)	6	0,128*
No	23 (21,1)	86 (78,9)	109	

**Fisher Exact test*

Furthermore, among 6 participants with depression, an equal distribution was observed with 3 individuals (50%) presenting with GERD and 3 individuals (50%) without GERD. Of the 109 subjects without depression, 23 individuals (21.1%) were diagnosed with GERD, while 86 individuals (78.9%) did not exhibit GERD symptoms. Statistical analysis examining the relationship between depression and GERD incidence also demonstrated no significant association (p = 0.128) (table 3).

4. Discussion

1. Gender and Gastroesophageal Reflux Disease (GERD) Occurrence in Young Adults

Analysis of the data demonstrated no statistically significant correlation between gender and GERD occurrence among young adults in Pondokkaso Urban Village. Research literature

indicates that while GERD prevalence may exhibit gender-based variations, these differences are not universally consistent across populations. Although females may experience heightened GERD symptoms during specific physiological states, particularly pregnancy due to hormonal fluctuations, these gender disparities often become statistically insignificant when controlling for confounding variables such as BMI and lifestyle factors. Krigel A, et all concluded that men and women experience different GERD symptoms and manifestations. Physicians do not include gender factors in estimating the probability of GERD or in decisions about its treatment. (14) Another Study identified primary GERD risk factors including tobacco use, consumption of spicy and high-fat foods, carbonated beverages, obesity, irregular eating patterns, and coffee consumption, while gender remained statistically non-significant as a risk factor. (15)

Behavioral and lifestyle variables, including smoking habits, alcohol consumption, dietary patterns, and physical activity levels, substantially influence GERD development and manifest differently across genders. For instance, while males typically exhibit higher rates of smoking and alcohol consumption - established GERD risk factors - females often demonstrate distinct dietary behaviors and healthcare-seeking patterns, potentially affecting perceived prevalence rates. Research controlling for these lifestyle variations typically reveals no substantial gender-specific patterns in GERD occurrence. (16)

Gender-based differences in symptom reporting patterns warrant consideration. Evidence suggests that females demonstrate higher rates of GERD symptom reporting and medical consultation compared to males. However, this observation may reflect disparities in healthcare-seeking behavior rather than true differences in disease incidence. This reporting pattern could introduce bias, potentially inflating female GERD prevalence rates. Some studies' absence of gender-based differences may indicate more equitable healthcare-seeking behaviors across genders in certain geographical regions or healthcare environments.

2. The Association of Anxiety and Depression with Gastroesophageal Reflux Disease (GERD) Occurrence in Young Adult Population

The findings of this study indicate there is no meaningful correlation between anxiety, depression, and the incidence of GERD. Several factors may help explain these results. GERD is a multifactorial condition, meaning that it is influenced by various factors such as diet, obesity, genetics, and lifestyle choices. While anxiety and depression can impact the body, their effect on GERD may not be strong enough to override the influence of these other more prominent risk factors. (12)

These findings are in line with earlier studies by Aro et al., who demonstrated that the primary risk factors for GERD development are lifestyle-related, specifically alcohol consumption, smoking habits, and obesity, rather than psychological factors such as anxiety. These results contribute to the growing evidence suggesting that physiological and behavioral factors may play a more substantial role in GERD development than psychological conditions. (12) The variability in how individuals experience anxiety and depression could contribute to the lack of significant findings. Not everyone with anxiety or depression will experience the same physiological responses, and these conditions may not manifest in ways that directly lead to GERD. This suggests that psychological factors may not consistently result in the physical changes needed to trigger or worsen GERD.(12)

Additionally, the methods used to assess anxiety, depression, and GERD in this study might not have been sensitive enough to detect a potential connection. Variations in assessment tools, such as self-reported questionnaires or diagnostic criteria, could lead to discrepancies in identifying individuals who might have a more subtle or indirect relationship with GERD. The lack of a significant relationship between anxiety, depression, and GERD in this study may be partly attributed to limitations in the questionnaires used to assess these variables, namely the Hospital Anxiety and Depression Scale (HADS) and the GERD Questionnaire (GERDQ). The HADS

is designed to assess symptoms of anxiety and depression in a general medical setting, but it does not account for the full spectrum of psychological disorders that may contribute to GERD. The scale focuses on anxiety and depression symptoms rather than exploring the potential impact of other psychological factors, such as stress or specific mental health conditions that might play a more direct role in GERD development. As a result, the HADS may not have captured the nuances of psychological distress that could be influencing GERD in the study population. Similarly, the GERDQ, which is commonly used to diagnose GERD, may not have provided a sufficiently detailed or accurate assessment of the condition. This questionnaire relies on self-reported symptoms, which can be influenced by a person's perception of their condition, memory biases, or even their psychological state at the time of the survey. People with anxiety or depression may be more prone to overreporting or misinterpreting symptoms, which could skew the results and contribute to the lack of a significant correlation between anxiety, depression, and GERD.

Moreover, lifestyle factors like diet, alcohol consumption, and smoking habits may mediate the effect of anxiety and depression on GERD, and without accounting for these variables, the potential association between mental health and GERD might not be evident. These confounding factors may dilute the observed relationship.

Another research conducted by Bakry S, et al., did not support the findings of the current research, which showed a marked relationship between anxiety and the incidence of GERD. Anxiety is known to trigger a stress response by stimulating the release of corticotropin-releasing hormone in the hypothalamus. This, in turn, activates the immune system through a shift from the T Helper 1 lymphocyte response to the T Helper 2 lymphocyte response. Such changes can lead to alterations in digestive tract function and neuromuscular dysfunction, potentially resulting in esophageal motility disorders.[12,17,18]

Research conducted by Channa SM, et al., also reversed the results of the researcher's study where there was a significant relationship between anxiety and the incidence of GERD with statistical test results ($p < 0.05$), Channa SM, et al. explained that one of the factors that contribute to the development of GERD is psychological factors. Psychological factors, namely anxiety, can contribute to the development of GERD where anxiety or emotional tension can affect the function of the digestive tract. The severity of gastrointestinal disorders can also be influenced by anxiety, where anxiety can induce pain perception through gut-brain axis activity. Anxiety can also directly precede the onset of GERD manifestations by stimulating gastric acid reflux by increasing gastric acid secretion, altering esophageal motility, and decreasing lower esophageal sphincter muscle pressure. In addition, anxiety is known to complicate GERD treatment by causing poor treatment outcomes. This is evidenced by GERD patients who experience anxiety and have been treated with proton pump inhibitors (PPIs) showing poor treatment results compared to GERD patients who do not experience anxiety. [10,11] A study by Yang XJ, et al., reported a significant relationship between depression and GERD, with a p-value of < 0.05. Depression is known to impact gastrointestinal function, causing changes in motility, gastric mucosa vascularization, pain sensitivity, and gastric acid secretion. [19,20]

The study by Kessing BF, et al. found no substantial correlation between depression and the incidence of GERD. This study used the same tool as the one employed in our research, the Hospital Anxiety and Depression Scale (HADS). Kessing's research involved esophageal reflux monitoring (esophageal pH monitoring) in patients, and the results showed that depression did not increase the risk of developing GERD, as the esophageal pH levels were within normal limits. Additionally, the study found that patients with depression did not experience typical GERD symptoms, such as retrosternal burning or regurgitation. [13] Meanwhile, based on research conducted by Syam AF, et al., explained that factors that can influence the development of GERD are age >50 years, body mass index >30 kg/m2, and smoking habits. [21]

Although there is still debate over whether anxiety and depression can directly cause GERD, we can conclude that the absence of a significant relationship between anxiety, depression, and

GERD in this study can be attributed to the multifaceted nature of GERD, the variability in individual experiences, potential confounding factors, and limitations in assessment methods. Further research is necessary to gain a deeper understanding of the potential connections between these conditions.

5. Conclusion

This study completed in Pondokkaso Urban Village, Sukabumi, West Java found that among young adults. The prevalence of GERD was 22.6%, anxiety was 4.3%, and depression was 5.2%. Furthermore, based on the relationship between variables, The study demonstrated no statistically significant correlation between GERD incidence in young adults and any of the examined factors: gender, anxiety, or depression.

6. Author Contribution

Muhammad Fikri Annabih carried out the experiment, fabricated the data, and wrote the manuscript with support from Mustika Anggiane Putri. Mustika Anggiane Putri helped supervise the project and Assisted in drafting and refining the manuscript.

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Young Adults' Mental Health Status: Investigating GERD's Relationship with Anxiety and Depression

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ABSTRACT

Introduction. Gastroesophageal Reflux Disease (GERD) is a chronic digestive disorder that occurs when stomach acid or, occasionally, stomach contents flow back (reflux) into the esophagus. This backwash (acid reflux) can irritate the lining of the esophagus, causing uncomfortable symptoms and potential complications. studies suggest that smoking, obesity, anxiety/depression, and older age are some of the contributing factors to GERD development. Young adults in Jakarta showed a 7.5% GERD prevalence rate during 2017. This research explores the potential correlation between anxiety and depression with GERD development in young adult populations. **Methods.** This study utilized a cross-sectional method to assess the symptoms of anxiety, depression, and GERD using the Hospital Anxiety and Depression Scale (HADS) questionnaire and GERD Questionnaire (GERDQ). The research involved 115 participants aged 18-40 from Pondokkaso Urban Village. The study analyzed gender, anxiety, depression, and Gerd using Fisher Exact tests ($p<0.05$). **Results.** Analysis of 115 respondents revealed GERD prevalence in 26 subjects (22.6%), anxiety in 5 subjects (4.3%), and depression in 6 subjects (5.2%). Statistical analysis demonstrated no significant correlation between anxiety ($p=1.000$), depression ($P=0.128$), or gender and GERD incidence ($P=0.756$) among young adult subjects. **Conclusions.** Statistical analysis revealed no significant correlation between GERD incidence and the variables of anxiety, depression, and gender among young adults in Pondokkaso Urban Village.

1. Introduction

Gastroesophageal reflux disorder (GERD) is a condition in which the stomach contents rise back into the esophagus, causing the patient to experience discomfort or digestive complications.[1] The etiology of GERD is due to a dysfunction of the lower esophageal sphincter, where there is frequent and/or prolonged relaxation leading to regurgitation of stomach acid. Over time, stomach acid will cause damage and dysplasia of the gastroesophageal mucosa.[2]

GERD is one of the most common diseases of the upper gastrointestinal tract and a common gastrointestinal disease worldwide.[3,4] According to the National Consensus on Gastroesophageal Reflux Disease Management in Indonesia (2022), the prevalence of GERD in Indonesia varies around 9.35% in the general population when using the GERD questionnaire (GERDQ). Furthermore, the consensus also states that studies among dyspepsia patients who underwent upper gastrointestinal endoscopy showed a GERD prevalence of 53.8%.[5] GERD severely impacts health-related quality of life, affecting patient's social activities, and physical and emotional well-being. GERD can also interfere with sleep and work. GERD symptoms can be a burden to patients in terms of physical, emotional, and social health.[6] The risk factors for GERD are mental disorders such as anxiety/depression, smoking, high body mass index (BMI), older age, and lack of physical activity.[7]

Anxiety and depression are the two most prevalent mental disorders worldwide.[8] Psychological factors such as anxiety and depression can increase esophageal stimulation and influence the severity of gastrointestinal disorders by affecting pain perception through activity in the gut-brain axis. These mechanisms are also present in patients with GERD.[9,10] There are several studies on the relationship between anxiety and depression and the incidence of GERD Research conducted by Mohammad S, et al and Choi JM, et al showed that

mental factors (anxiety and depression) play an important role in the development of GERD.[10,11] In contrast to the results of previous research conducted by Aro P et al., anxiety does not affect the risk of GERD.[12] The results of research conducted by Kessing BF, et al showed that there was no association between depression and GERD.[13]

Previous research investigating the correlation between GERD and psychological factors, specifically anxiety and depression, has yielded heterogeneous findings. While several studies demonstrate a significant association between GERD and anxiety disorders, other investigations indicate no substantial correlation between acid reflux symptomatology and anxiety levels. These inconsistent findings underscore the necessity for additional empirical investigations to elucidate the potential relationship between GERD and psychological parameters. This study investigates the relationship between psychological disorders and GERD among young patients to improve clinical management strategies and mitigate the impact of psychological factors on disease symptoms, treatment efficacy, and patient quality of life.

2. Methods

A cross-sectional study was conducted in Pondokkaso Urban Village, Sukabumi, from September to November 2023. This study included 115 young adults aged 18-40 years who were able to communicate effectively and provided written informed consent. Screening involved physical examinations to identify and exclude individuals with a BMI (body mass index) ≥30 and pregnant women. Comprehensive medical history assessment excluded subjects who consumed alcohol, coffee, or tobacco within the previous seven days, and eliminated participants with previously diagnosed psychotic disorders based on medical records. To minimize pharmacological bias, medication history forms excluded users of anticholinergics, theophylline, nitrates, calcium channel blockers, benzodiazepines, tricyclic antidepressants, analgesics, and NSAIDs within the previous week. Data was collected using the Hospital Anxiety and depression scale (HADS) and GERD Questionnaire (GERDQ) to examine the relationship between anxiety, depression, and GERD in young adults.

In our study, we used the Hospital Anxiety and Depression Scale (HADS). The Hospital Anxiety and Depression Scale is a screening tool consisting of 14 items that measure anxiety through 7 items and depression through 7 items. Each item is scored from 0-3, with total scores ranging from 0-21 for each subscale. For the anxiety and depression subscales, we followed established cutoff points where scores of 0-7 indicate individuals who do not suffer from anxiety or depression, considered within the normal range, while scores of 8-21 signify individuals suffering from anxiety or depression. A score of 8 or higher is considered to indicate a clinically significant level of anxiety or depression symptoms, which aligns with standard interpretations of the HADS in clinical practice and research.[10]

The GERD Questionnaire (GERDQ) is a 6-item diagnostic tool that assesses the frequency of GERD symptoms during the past week. This tool evaluates positive predictors including heartburn, regurgitation, and sleep disturbance as well as negative predictors such as epigastric pain, nausea, and use of over-the-counter medication. Scores ranging from 0 to 7 indicate the absence of GERD while scores between 8 and 18 signify the presence of GERD.[14]

This research has obtained ethical approval from the Ethics Committee of the Faculty of Medicine, Universitas Trisakti, no. 150/KER-FK/VII/2023.

3. Results

The characteristics of study subjects are presented according to gender, anxiety incidence, depression incidence, and incidence of GERD, as illustrated in Table 1. The study population (n=115) consisted of subjects aged 18-40 years, with females representing 86.1% (n=99) and males 13.9% (n=16) of the sample. Among the participants, 4.3% (n=5) reported anxiety symptoms, 5.2% (n=6) exhibited depression, and 22.6% (n=26) were diagnosed with GERD.

Analysis of GERD distribution by gender, as presented in Table 2, revealed that among the 26 GERD cases, 25% (n=4) were male and 22.2% (n=22) were female. Statistical analysis using Fisher's Exact test demonstrated no significant association between gender and GERD incidence ($p = 0.756$, $p>0.05$) in young adults residing in Pondokkaso Urban Village.

In this study, among 5 participants experiencing anxiety, 1 individual (20%) presented with GERD, while 4 individuals (80%) did not manifest GERD symptoms. Among 110 subjects without anxiety, 25 individuals (22.7%) were diagnosed with GERD, and 85 individuals (77.3%) were GERD-negative. Statistical analysis revealed no significant association between anxiety and GERD ($p = 1.000$). Furthermore, among 6 participants with depression, an equal distribution was observed with 3 individuals (50%) presenting with GERD and 3 individuals (50%) without GERD. Of the 109 subjects without depression, 23 individuals (21.1%) were diagnosed with GERD, while 86 individuals (78.9%) did not exhibit GERD symptoms. Statistical analysis examining the relationship between depression and GERD incidence also demonstrated no significant association ($p = 0.128$) (Table 3).

Table 1. Distribution of study subject characteristics

Variable	Frequency (n)	Percentage (%)
Gender		
Male	16	13,9
Female	99	86,1
Anxiety		
Yes	5	4,3
No	110	95,7
Depression		
Yes	6	5,2
No	109	94,8
Probable GERD		
Yes	26	22,7
No	89	77,4

Table 2. Association between Gender and GERD in young adults

Variable	GERD		Total	p value
	Yes (n,%)	No (n,%)		
Gender				
Male	4 (15.4)	12 (13.4)	16	0,756*
Female	22 (84.6)	77 (86.5)	99	

*Fisher Exact test

Table 3. Correlation between anxiety and depression with the incidence of GERD in young adults

Variable	GERD		Total	p value
	Yes (n,%)	No (n,%)		
Anxiety				
Yes	1 (20)	4 (80)	5	1.000*
No	25 (22,7)	85 (77,3)	110	
Depression				
Yes	3 (50)	3 (50)	6	0,128*
No	23 (21,1)	86 (78,9)	109	

*Fisher Exact test

4. Discussion

a. Gender and GERD Occurrence in Young Adults

Analysis of the data demonstrated no statistically significant correlation between gender and GERD occurrence among young adults in Pondokkaso Urban Village. Research literature indicates that while GERD prevalence may exhibit gender-based variations, these differences are not universally consistent across populations. Although females may experience heightened GERD symptoms during specific physiological states, particularly pregnancy due to hormonal fluctuations, these gender disparities often become statistically insignificant when controlling for confounding variables such as BMI and lifestyle factors. Krigel A, et al. concluded that men and women experience different GERD symptoms and manifestations. Physicians do not include gender factors in estimating the probability of GERD or in decisions about its treatment.[15] Another study identified primary GERD risk factors, including tobacco use, consumption of spicy and high-fat foods, carbonated beverages, obesity, irregular eating patterns, and coffee consumption, while gender remained statistically non-significant as a risk factor.[16]

Behavioral and lifestyle variables, including smoking habits, alcohol consumption, dietary patterns, and physical activity levels, substantially influence GERD development and manifest differently across genders. For instance, while males typically exhibit higher rates of smoking and alcohol consumption - established GERD risk factors - females often demonstrate distinct dietary behaviors and healthcare-seeking patterns, potentially affecting perceived prevalence rates. Research controlling for these lifestyle variations typically reveals no substantial gender-specific patterns in GERD occurrence [17]

Gender-based differences in symptom reporting patterns warrant consideration. Evidence suggests that females demonstrate higher rates of GERD symptom reporting and medical consultation

compared to males. However, this observation may reflect disparities in healthcare-seeking behavior rather than true differences in disease incidence. This reporting pattern could introduce bias, potentially inflating female GERD prevalence rates. Some studies absence of gender-based differences may indicate more equitable healthcare-seeking behaviors across genders in certain geographical regions or healthcare environments.

b. The Association of Anxiety and Depression with Gastroesophageal Reflux Disease (GERD) Occurrence in Young Adult Population

The findings of this study indicate there is no meaningful correlation between anxiety, depression, and the incidence of GERD. Several factors may help explain these results. GERD is a multifactorial condition, meaning that it is influenced by various factors such as diet, obesity, genetics, and lifestyle choices. While anxiety and depression can impact the body, their effect on GERD may not be strong enough to override the influence of these other, more prominent risk factors.[12]

These findings are in line with earlier studies by Aro et al., who demonstrated that the primary risk factors for GERD development are lifestyle-related, specifically alcohol consumption, smoking habits, and obesity, rather than psychological factors such as anxiety. These results contribute to the growing evidence suggesting that physiological and behavioral factors may play a more substantial role in GERD development than psychological conditions.[12] The variability in how individuals experience anxiety and depression could contribute to the lack of significant findings. Not everyone with anxiety or depression will experience the same physiological responses, and these conditions may not manifest in ways that directly lead to GERD. This suggests that psychological factors may not consistently result in the physical changes needed to trigger or worsen GERD.[12]

Additionally, the methods used to assess anxiety, depression, and GERD in this study might not have been sensitive enough to detect a potential connection. Variations in assessment tools, such as self-reported questionnaires or diagnostic criteria, could lead to discrepancies in identifying individuals who might have a more subtle or indirect relationship with GERD. The lack of a significant relationship between anxiety, depression, and GERD in this study may be partly attributed to limitations in the questionnaires used to assess these variables, namely the Hospital Anxiety and Depression Scale (HADS) and the GERD Questionnaire (GERDQ). The HADS is designed to assess symptoms of anxiety and depression in a general medical setting, but it does not account for the full spectrum of psychological disorders that may contribute to GERD. The scale focuses on anxiety and depression symptoms rather than exploring the potential impact of other psychological factors, such as stress or specific mental health conditions that might play a more direct role in GERD development. As a result, the HADS may not have captured the nuances of psychological distress that could be influencing GERD in the study population. Similarly, the GERDQ, which is commonly used to diagnose GERD, may not have provided a sufficiently detailed or accurate assessment of the condition. This questionnaire relies on self-reported symptoms, which can be influenced by a person's perception of their condition, memory biases, or even their psychological state at the time of the survey. People with anxiety or depression may be more prone to overreporting or misinterpreting symptoms, which could skew the results and contribute to the lack of a significant correlation between anxiety, depression, and GERD.[10,14]

Moreover, lifestyle factors like diet, alcohol consumption, and smoking habits may mediate the effect of anxiety and depression on GERD, and without accounting for these variables, the potential association between mental health and GERD might not be evident. These confounding factors may dilute the observed relationship.[12]

Another research conducted by Bakry S, et al., did not support the findings of the current research, which showed a marked relationship between anxiety and the incidence of GERD. Anxiety is known to trigger a stress response by stimulating the release of corticotropin-releasing hormone in the hypothalamus. This, in turn, activates the immune system through a shift from the T Helper 1 lymphocyte response to the T Helper 2 lymphocyte response. Such changes can lead to alterations in digestive tract function and neuromuscular dysfunction, potentially resulting in esophageal motility disorders.[12,18,19]

Research conducted by Channa SM, et al., also reversed the results of the researcher's study where there was a significant relationship between anxiety and the incidence of GERD with statistical test results ($p < 0.05$), explaining that one of the factors that contribute to the development of GERD is psychological factors. Psychological factors, namely anxiety, can contribute to the development of GERD where anxiety or emotional tension can affect the function of the digestive tract. The severity of gastrointestinal disorders can also be influenced by anxiety, where anxiety can induce pain perception through gut-brain axis activity. Anxiety can also directly precede the onset of GERD manifestations by stimulating gastric acid reflux by increasing gastric acid secretion, altering esophageal motility, and decreasing lower esophageal sphincter muscle pressure. In addition, anxiety is known to complicate GERD treatment by causing poor treatment outcomes. This is evidenced by GERD patients who experience anxiety and have been treated with proton pump inhibitors (PPIs) showing poor treatment results compared to GERD patients who do not

experience anxiety.[10,11] A study by Yang XJ, et al., reported a significant relationship between depression and GERD, with a p-value of < 0.05. Depression is known to impact gastrointestinal function, causing changes in motility, gastric mucosa vascularization, pain sensitivity, and gastric acid secretion.[20,21]

The study by Kessing BF, et al. found no substantial correlation between depression and the incidence of GERD. This study used the same tool as the one employed in our research, the Hospital Anxiety and Depression Scale (HADS). Kessing's research involved esophageal reflux monitoring (esophageal pH monitoring) in patients, and the results showed that depression did not increase the risk of developing GERD, as the esophageal pH levels were within normal limits. Additionally, the study found that patients with depression did not experience typical GERD symptoms, such as retrosternal burning or regurgitation.[13] Meanwhile, based on research conducted by Syam AF, et al., it was explained that factors that can influence the development of GERD are age >50 years, body mass index >30 kg/m2, and smoking habits.[14]

The study employed a cross-sectional research design in which interviews and questionnaire administration for measuring both independent and dependent variables were conducted simultaneously, while acknowledging that temporal factors and respondent conditions influence anxiety and depression manifestations.

Several additional factors potentially influencing the development of GERD remained unexplored, including consumption of spicy foods, high-fat dietary intake, chocolate consumption, Helicobacter pylori infection, insufficient physical activity, and various other unexplored variables.[22] Subsequent research endeavors would benefit from incorporating these additional variables into their investigative framework. Data collection methodology involved direct interview-based questionnaire administration with research participants, a process inherently limited by participants' ability to accurately recall symptomatic experiences from the preceding week.

Although there is still debate on whether anxiety and depression can directly cause GERD, we can conclude that the absence of a significant relationship between anxiety, depression, and GERD in this study can be attributed to the multifaceted nature of GERD, the variability in individual experiences, potential confounding factors, and limitations in assessment methods. Further research is necessary to gain a deeper understanding of the potential connections between these conditions. Future large-scale epidemiological studies are warranted for reliable investigating GERD's relationship with Anxiety and depression in young populations.

5. Conclusion

This study in Pondokkaso Urban Village, Sukabumi, West Java found that among young adults. The prevalence of GERD was 22.6%, anxiety was 4.3%, and depression was 5.2%. Furthermore, based on the relationship between variables, the study demonstrated no statistically significant correlation between GERD incidence in young adults and any of the examined factors: gender, anxiety, or depression.

6. Author Contribution

Muhammad Fikri Annabih conducted the experimental work. The project supervision was supported by Mustika Anggiane Putri, who provided oversight throughout the research process.

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