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Anxiety, Stress, and Depression in Recurrence of Gastritis Symptoms Among Inmates with a History of Drug Abuse in Bandung

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Abstract

Background : Drug abuse inmates in correctional institutions undergo rehabilitation programs and are supervised according to the determined sentence, thus losing their freedom. This condition causes psychosocial problems such as anxiety, stress, and depression, which may be associated with physical issues, including the recurrence of gastritis symptoms.
Aims : To identify the correlation between anxiety, stress, and depression with recurrence of gastritis symptoms in drug abuse inmates at the correctional institution.
Methods : The study used a cross-sectional design and involved 34 inmates with a history of gastritis due to drug abuse. Purposive sampling was employed to select the participants. The levels of anxiety, stress, and depression were measured with the Indonesian version of the Depression Anxiety Stress Scales (DASS-21). The Gastritis Recurrence Questionnaire evaluated the recurrence of gastritis symptoms in the inmates. The data was analyzed using descriptive statistics such as frequency distribution, and inferential analysis was conducted using the Kendal-tau test to identify correlations between the variables.
Results : The study findings indicate a correlation between anxiety, stress, and depression and the recurrence of gastritis symptoms in inmates in correctional institutions (*p-value* <0.05). Most inmates with a history of drug abuse experience psychosocial problems such as very high anxiety (29.4%) and severe stress (32.4%). At the same time, 73.5% do not experience depression.
Conclusion : Psychosocial issues like anxiety, stress, and depression have been found to contribute to the likelihood of recurrence of gastritis symptoms in inmates. The higher the levels of anxiety, stress, and depression, the greater the possibility of recurrence of gastritis symptoms. Correctional institution managers should be prepared to address these psychosocial issues to help inmates reduce the recurrence of gastritis symptoms.

Keywords : anxiety, depression, gastritis symptoms, inmate, stress

INTRODUCTION

The large number of drug abuse inmates in correctional institutions who experience psychosocial disorders causes high levels of physical health disorders. Inmates in correctional institutions are incarcerated, which causes isolation from the outside world, and they are required to follow the rules in the correctional institutions. This condition leads to psychosocial problems in inmates, such as anxiety, stress, and depression. Psychosocial issues in drug-abusing inmates can lead to physical problems, including headaches, sleep disorders, digestive issues, respiratory problems, and irregular heartbeats.[1–3]

The number of individuals abusing drugs in Indonesia has shown a concerning upward trend. According to the latest available national data from the Indonesian National Narcotics Agency, the prevalence of drug abuse among individuals aged 15–64 increased by 0.93% from 2019 to 2021, rising from 3,419,188 to 3,662,646 cases.[4] While data beyond 2021 have not been officially published as of this writing, these figures still offer relevant context to the ongoing burden of substance abuse. In the same year, 68,042 cases of drug addiction were reported in West Java Province, where this study was conducted.[4] Moreover, it was reported that approximately 96% of inmates in correctional facilities across Indonesia were incarcerated for drug-related offenses, comprising 145,413 individuals, 116,930 classified as drug dealers and 28,483 as drug users.[5] According to a preliminary study, there are a total of 1085 inmates at the Class IIA Narcotics Penitentiary in Bandung, Indonesia, with 503 prisoners of drug-related cases.

The Nurmagandi *et al*. study[1], it was found that 68.1% of inmates suffer from psychosocial problems related to anxiety disorders and stress during their sentences. Additionally, numerous studies have shown that inmates with drug-related offenses tend to experience moderate levels of anxiety, stress, and depression.[6–8] One study found that 60.5% of the 215 inmates in a correctional institution in Bandung City suffered from gastritis accompanied by psychosocial disorders.[2]

The psychosocial problems experienced by inmates who abuse drugs can lead to various physical issues such as headaches, sleep disorders, digestive problems, breathing difficulties, and irregular heartbeats.[9] These digestive problems may include symptoms of gastritis, which can reoccur due to psychosocial issues, leading to symptoms such as nausea, vomiting, and upper abdominal pain.[10] Recurrence of gastritis symptoms may be affected by diet, alcohol and smoking habits, coffee consumption, gender, age, use of nonsteroidal anti-inflammatory drugs (NSAIDs), drug use, anxiety, stress, and social environment issues.[11–15]

When inmates are sentenced to correctional institutions, they often feel isolated from the outside world, leading to loneliness, loss of self-confidence, disturbed self-concept, and decreased self-esteem.[16] Adapting to a new life and following the rules in these institutions can cause psychosocial problems. Additionally, inmates with a history of drug abuse require medical and social rehabilitation to prevent them from relapsing.[17,18] This can lead to fear of stopping drug consumption, skepticism about the effectiveness of treatment, and negative public attitudes toward drug users, resulting in increased psychosocial problems like anxiety, stress, and depression.[19,20]

Anxiety, stress, and depression are factors that cannot be controlled from outside of the person, so it's essential to identify these psychosocial factors as they can affect the recurrence of gastritis. Additionally, stress conditions are suspected to be related to the of recurrence of gastritis symptoms in both drug-abuse and non-drug-abuse individuals.[2,21] The current research on the relationship between anxiety and depression and the recurrence of gastritis in inmates, particularly those with a history of drug abuse, is limited. Therefore, this study aimed to examine the correlation between anxiety, stress, and depression and the recurrence of gastritis in drug abuse inmates at a narcotics correctional institution in Bandung.

METHODS

The study was designed as a cross-sectional study and conducted at the Class IIA Narcotics Correctional Institution in Bandung, West Java, Indonesia, from June to August 2024. The study focused on inmates with a history of drug abuse. The inclusion criteria for the study required the participants to suffer from gastritis suffer from based on a screening for symptoms of recurrence of gastritis symptoms. These symptoms included epigastric pain, nausea, vomiting, hematemesis, melena, discomfort in the upper abdomen, and a minimum imprisonment period of 3 months. The exclusion criteria were inmates under special supervision by prison officers at risk of causing disturbances.

The sampling technique employed was purposive sampling, which involved recruiting participants based on their health reports from the correctional institution clinic. Participants displaying gastritis symptoms were recruited within one week of being screened by medical personnel at the clinic. The sample size was determined using the Cochran Formula with a 90% confidence level ($z = 1.64$), an expected proportion of 15% (0.15), and an error rate of 10%, resulting in 34 people. The choice of a 90% confidence level was made due to the limited accessibility and tightly controlled setting of the correctional institution, which constrained the recruitment of eligible participants within the available

timeframe.

The study examined personal characteristics, anxiety, stress, and depression in inmates with a history of drug abuse. Personal characteristic variables included participant demographics such as age, marital status, religion, education, employment before imprisonment, length of sentence, dietary patterns during imprisonment, food triggers for gastritis, use of Non-steroidal anti-inflammatory drugs (NSAIDs), cigarette consumption, coffee drinking habits, family visits, and perceptions of adaptation to prison life. These personal characteristic variables were assessed using a demographic questionnaire developed by the researcher.

This study defines the anxiety variable as the body's response to a difficult-to-describe danger, characterized by fear that can cause physical problems such as recurrent gastritis. The stress variable refers to the body's natural reaction to changes that threaten the self and can also cause physical problems such as recurrent gastritis. In addition, the depression variable is interpreted as a prolonged dejected condition resulting from the inability to adapt to changes that can cause physical problems such as recurrent gastritis.

Anxiety, stress, and depression were measured using the Indonesian version of the Depression Anxiety Stress Scales (DASS-21), a validated 21-item instrument with three subscales (7 items each) rated on a 4-point Likert scale (0 = never, 1 = sometimes, 2 = often, 3 = very often). Higher scores indicate greater symptom severity. The DASS-21 has demonstrated strong psychometric properties, with validity coefficients ranging from 0.70 to 0.94 across subscales and a Cronbach's alpha of 0.96, indicating high reliability in the Indonesian context.[22–24]

In this study, the last variable measured was the recurrence of gastritis symptoms, which is defined as the re-emergence of gastritis symptoms caused by psychosocial problems such as anxiety, stress, and depression. The instrument used to measure the recurrence of gastritis symptoms is the gastritis symptom questionnaire created by Rodliya, which consists of 14 question items with a 4-point Likert scale. The questionnaire addresses three dimensions: general symptoms of gastritis, symptoms triggered by certain foods, and symptoms related to meal times.[25] The gastritis symptom recurrence questionnaire has demonstrated acceptable validity (r = 0.536–0.835) and high reliability (Cronbach's alpha = 0.928), ensuring its suitability for use in this population.[25]

Study questionnaires were distributed directly to participants with the assistance of prison officers. The questionnaires included a demographic survey, DASS-21, and a questionnaire about gastritis symptom recurrence. Before participants expressed their willingness to take part, they were provided with a detailed explanation of the study's purpose and their understanding was checked. Once we obtained informed consent from each participant, they filled out the written questionnaire directly. This process took between 30 to 45 minutes.

The data was analyzed descriptively, and participant characteristics were reported using frequencies and percentages. The correlation between anxiety, stress, and depression with the recurrence of gastritis symptoms in inmates was analyzed using the Kendall Tau-C test, with p <0.05 indicating statistical significance. Descriptive statistics were used in data analysis, and statistical analysis was performed using SPSS version 26 (IBM Corp., Armonk, NY, USA). Before participants completed the study questionnaire, the assessment began with a general explanation of the project's purpose and a request for written consent to indicate their willingness to participate. This study was approved by the Research Ethics Committee from Universitas 'Aisyiyah Bandung at Universitas 'Aisyiyah Bandung, Indonesia (Number 948/KEP.01/UNISA-Bandung/VI/2024).

RESULTS

Table 1 displays the characteristics of the participants in this study. Nearly half of the inmates involved were between 17 and 25 (44.1%) and single (50%). Most inmates were Muslim (97.1%) and had completed high school (55.9%). A few had worked as laborers before their imprisonment (26.5%), and most inmates had received 2–4 years (26.5%) sentence. Over 65% had knowledge of gastritis, were able to adjust to the correctional environment, were regularly visited by family, and had a consistent diet. Furthermore, over 55% had the habit of consuming spicy foods, NSAID drugs, cigarettes, and coffee.

Table 2 shows the level of anxiety, stress, depression, and relapse problems experienced by drug abuse inmates. Inmates who experience very severe anxiety reach 29.4%, and those with moderate to high stress reach 64.8%. More than 70% of inmates do not experience depression. Meanwhile, most inmates experience a relapse of gastritis symptoms while in prison.

Table 3 displays the cross-tabulation results and correlation analysis between anxiety, stress, and depression with the recurrence of gastritis symptoms in drug abuse inmates. The results show statistically significant correlations between these psychosocial variables and recurrence of gastritis symptoms. Specifically, anxiety was found to have a strong positive correlation with the recurrence of gastritis symptoms, with a Kendall Tau-c coefficient of 0.647 and a p-value of 0.000. This indicates a statistically significant relationship at the 0.01 level, meaning higher anxiety levels are strongly associated with increased recurrence of gastritis symptoms.

TABLE 1
Personal characteristics of inmates with a history of drug abuse (n=34)

Characteristics	Frequency (f)	Percentage (%)
Age		
17–25 years	14	41.2
26–35 years	15	44.1
36–45 years	3	8.8
46–55 years	1	2.9
56–65 years	1	2.9
Marital status		
Married	13	38.2
Single	17	50
Divorce	4	11.8
Religion		
Muslim	33	97.1
Christian	1	2.9
Education level		
Elementary School	7	20.6
Junior High School	7	20.6
High School	19	55.9
Bachelor	1	2.9
Occupation Before Entering Prison		
Laborer	9	26.5
Entrepreneur	8	23.5
Driver	3	8.8
Private	3	8.8
Other	8	23.5
Unemployed	3	8.8
Maximum Prison Sentence		
Less than two years	4	11.8
Two to three years	9	26.5
Four to five years	4	11.8
Six to seven years	6	17.6
Eight to ten years	7	20.6
More than 10 years	4	11.8
Exposure to gastritis information		
Yes	23	67.6
No	11	32.4

TABLE 1. *Continued*

Characteristics	Frequency (f)	Percentage (%)
Habit of consuming spicy food		
Yes	27	79.4
No	7	20.6
Diet pattern		
Regular	29	85.3
Irregular	5	14.7
Habit of using NSAID drugs		
Yes	19	55.9
No	15	44.1
Habit of consuming cigarettes		
Yes	32	94.1
No	2	5.9
Habit of consuming coffee		
Yes	29	85.3
No	5	14.7
Habit of being visited by family		
Yes	23	67.6
No	11	32.4
Ability to adapt in prison		
Yes	33	97.1
No	1	2.9

Similarly, stress showed a significant positive correlation with recurrence of gastritis symptoms (correlation coefficient = 0.522, p-value = 0.000), demonstrating that inmates experiencing higher stress levels were more likely to experience recurrent gastritis symptoms. In contrast, depression had a weaker but still statistically significant correlation with recurrence of gastritis symptoms (correlation coefficient = 0.280, p-value = 0.002), suggesting that while depression contributes to gastritis symptom recurrence, its association is less pronounced compared to anxiety and stress. The inclusion of p-values supports the conclusion that all three psychosocial variables, anxiety, stress, and depression, are significantly correlated with the physical manifestation of gastritis among the inmate population. These findings emphasize the importance of addressing psychosocial well-being as a preventive measure for physical health deterioration.

DISCUSSION

The study findings prove that psychosocial disorders, including anxiety, stress, and depression, are related to the recurrence of gastritis symptoms in drug abuse inmates. Anxiety, stress, and depression are psychosocial problems that are interconnected with each other.[26] Anxiety and stress are psychosocial conditions that can cause depression, which can ultimately have an impact on physical health, such as the emergence of gastritis symptoms.[27] Drug abuse inmates in correctional institutions are in a period of rehabilitation from drugs and prison sentences. In the early stages of drug rehabilitation, inmates not only stop using drugs gradually, but they also face environmental changes that make them feel bound and less free in their daily activities.

Different types of drugs affect different neurotransmitter pathways in various ways. However, most drugs affect the dopamine system.[28] Dopamine

TABLE 2
Distribution of anxiety, stress, depression, and recurrence of gastritis symptoms in inmates with a history of drug abuse (n=34)

Variable	Frequency (f)	Percentage (%)
Anxiety		
Normal	6	17.6
Low	3	8.8
Moderate	7	20.6
Severe	8	23.5
Very severe	10	29.4
Stress		
Normal	2	5.9
Low	8	23.5
Moderate	11	32.4
Severe	11	32.4
Very severe	2	5.9
Depression		
Normal	25	73.5
Mild	7	20.6
Moderate	2	5.9
Recurrence of Gastritis		
Yes	25	73.5
No	9	26.5

controls emotions, motivation, and feelings of pleasure. This is the brain's reward system. Our brains are hardwired to make sure we repeat pleasurable activities. When we do something enjoyable, we get a little dopamine, which reminds us to do it again through the brain.[29] When drug abusers stop using drugs, large amounts of dopamine are released, and the brain has difficulty keeping up with its production, and it can temporarily run out of dopamine. This causes the inmate to experience depression, increased alertness or suspiciousness, even auditory and visual hallucinations, inappropriate behavior, and psychosocial problems such as anxiety, stress, and depression.[28,30]

When experiencing psychosocial issues such as anxiety, stress, and depression, the hypothalamus may become activated, leading to the stimulation of two neuroendocrine systems: the sympathetic system and the adrenal cortex system.[31] The sympathetic nervous system responds to nerve impulses and the hypothalamus. ACTH hormone is carried through the bloodstream to the adrenal cortex, which stimulates the release of cortisol. Increased cortisol levels result in heightened gastric secretion activity (HCL).[32] Prolonged gastric secretion can lead to bodily reactions, including improved breathing, pulse rate, and blood pressure.[33] Additionally, digestive problems may arise, such as decreased appetite, bloating, a sensation of fullness in the stomach, stomach pain, nausea, and vomiting. These reactions are among the symptoms of recurrence of gastritis symptoms.[2,34] The higher the levels of anxiety, stress, and depression, the greater the likelihood of gastritis recurrence. This is supported by our findings, where 73.5% of the inmates reported experiencing recurrence of gastritis symptoms.

The high prevalence of gastritis symptoms in this study aligns with previous findings that suggest digestive disorders, especially gastritis, are common among inmates with psychosocial burdens. According to Elliya and Haryanti (2020), over 60% of inmates in a correctional facility in Sukadana, Lampung, experienced gastritis symptoms related to psychological stress.[2] Another study by Tania *et al*. (2023) reported a recurrence of gastritis symptoms rate of 68.4% among adolescents

TABLE 3
Correlation of anxiety, stress, and depression with recurrence of gastritis symptoms (n=34)

Variables	Recurrence of Gastritis		Coefficient correlation	*p*-value
	Yes - f (%)	No - f (%)		
Anxiety			0.647	0.000
Normal	2 (5.9)	4 (11.8)		
Low	0 (0.0)	3 (8.8)		
Moderate	5 (14.7)	2 (2.9)		
Severe	8 (23.5)	0 (0.0)		
Very severe	10 (29.4)	0 (0.0)		
Stress			0.522	0.000
Normal	1 (2.9)	1 (2.9)		
Low	3 (8.8)	5 (14.7)		
Moderate	8 (23.5)	3 (8.8)		
Severe	11 (32.4)	0 (0.0)		
Very severe	2 (5.9)	0 (0.0)		
Depression			0.280	0.002
Normal	16 (47.1)	9 (26.5)		
Mild	7 (20.6)	0 (0.0)		
Moderate	2 (5.9)	0 (0.0)		

Note: Statistical analysis was conducted using the Kendall Tau-C correlation test; significance was set at $p < 0.05$

facing academic and social pressure.[10] In our study, the 73.5% recurrence rate highlights how psychosocial distress in a highly restrictive correctional environment may exacerbate physiological symptoms even more than in general community populations. To help mitigate negative psychosocial and physical health consequences, including the recurrence of gastritis symptoms, it is essential to implement physical, emotional, and spiritual support strategies.

In contrast, depression showed a weaker but still statistically significant correlation with gastritis recurrence (correlation coefficient = 0.280, $p = 0.002$). This indicates that while depression contributes to gastritis symptoms, its predictive strength appears less pronounced compared to anxiety and stress. From a clinical perspective, this implies that while addressing depression remains important, interventions in correctional settings may yield greater impact by prioritizing the management of anxiety and stress. Nonetheless, comprehensive psychosocial care should include all three components to address overlapping symptomatology and underlying vulnerabilities.

Factors that can influence the recurrence of gastritis, aside from anxiety, stress, and depression, include diet, smoking habits, coffee consumption, age, use of nonsteroidal anti-inflammatory drugs (NSAIDs), and psychosocial environment issues.[11–15] In this study, 44.1% of participants were aged 26–35 years. Recurrence often occurs during productive age ranges such as 26–35 years, which aligns with our study finding that 44.1% of participants fell into this age group. At this age, individuals are typically engaged in high levels of activity and responsibility, which may increase their susceptibility to stress-related health issues such as gastritis recurrence.[12]

A majority of inmates, over 55%, have the habit of consuming spicy foods, taking NSAIDs, smoking, and drinking coffee. Diet can be a factor in the recurrence of gastritis. Foods high in saturated fat, coconut milk, spicy, processed, instant, and carbonated drinks, as well as irregular eating habits such as skipping breakfast, delaying meals, and consuming excessive or unhealthy food, can increase the production of stomach acid. This can irritate the stomach wall and cause symptoms of recurrence of gastritis symptoms. The use of NSAIDs can also affect recurrence of gastritis symptoms, as long-term use can lead to an excess of stomach acid. In our study, 85.3% of inmates reported coffee consumption, and 94.1%

smoked cigarettes, both of which are significant risk factors for gastric irritation and recurrence. Coffee can increase stomach acid due to its caffeine content, and smoking introduces nicotine, which disrupts the bicarbonate-acid balance in the stomach, further increasing acidity and the risk of mucosal damage.[35,36]

This study has several limitations. It did not explore the relationship or mediating influence between anxiety, stress, and depression. Several theories propose reciprocal effects among these variables, warranting further exploration. Another limitation lies in the relatively small sample size (n = 34), which may introduce selection bias and limit the generalizability of findings beyond the specific population of inmates with a history of drug abuse at a single correctional facility. Broader studies across diverse institutional contexts are recommended to validate and expand upon these results.

CONCLUSION

The study showed a significant relationship between anxiety, stress, and depression and the recurrence of gastritis in drug abuse inmates. The higher the levels of anxiety, stress, and depression, the more likely it was for the inmates to experience recurrence of gastritis symptoms. These psychosocial issues need to be addressed as they can lead to increased cortisol hormone levels, which in turn can cause gastric secretion (HCL) and subsequently lead to recurrence of gastritis symptoms. Therefore, interventions such as consolidating physical, emotional, and spiritual activities are necessary to address these psychosocial problems and reduce the factors contributing to recurrence of gastritis symptoms.

Based on these findings, comprehensive psychosocial and health-related interventions are highly recommended within correctional settings. First, structured mental health screening programs should be implemented routinely to detect early signs of anxiety, stress, and depression among inmates. Second, cognitive-behavioral therapy (CBT) and group counseling can be introduced as part of rehabilitation programs to help inmates develop emotional coping mechanisms. Third, stress-reduction strategies such as mindfulness-based interventions, spiritual or faith-based programs, and guided relaxation exercises can be integrated into daily correctional routines.

From a physical health perspective, dietary education and modification are essential. Correctional health services should collaborate with nutritionists to provide inmates with meals that reduce gastric irritation, such as limiting spicy food, caffeine, and NSAIDs when not clinically required. Educational workshops can also raise inmates' awareness about the relationship between psychosocial stress and gastrointestinal health. Lastly, a multidisciplinary approach involving psychologists, nurses, correctional officers, and primary care providers should be strengthened to ensure continuity of care and promote a holistic rehabilitation model. These integrative interventions are not only aimed to reduce recurrence of gastritis symptoms but also to improve the overall quality of life and mental resilience of inmates.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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