Association between Anxiety and Dyspepsia among Outpatients at Atma Jaya Hospital

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ABSTRACT

Background: *Anxiety is a psychological condition characterized by excessive fear and worry that is dificult to control. Anxiety plays a significant role in causing dyspepsia through the Brain-Gut Axis mechanism. There is still a lack of research on the relationship between anxiety and dyspepsia in Indonesia. Therefore, this study aimed to determine the relationship between anxiety and dyspepsia.*

Method: *This cross-sectional study was conducted on outpatients at Atma Jaya Hospital. The patient characteristic data, including gender, age, highest level of education, and habits, such as eating spicy food, drinking coffee, alcohol consumption, smoking, and NSAID used were collected. The GAD-7 and SF-LDQ questionnaires, which have been validated in Indonesian, were used in this study. Spearman correlation test was used to analyze the data to find the relationship between anxiety and dyspepsia.*

Results: *This study obtained 158 participants. The age range of participants who experienced dyspepsia the most is 19-44 years(77.53%). The majority of those who experienced dyspepsia are female (79.12%). The highest education level of the participants who experienced dyspepsia is a Master's degree (100%). Participants who consumed spicy food accounted for 61.39% while 54.43% consumed coffee, 6.96% consumed alcohol, 12.66% smoked, and 1.90% used NSAIDs. Additionally, 105 participants (66.46%) experienced both anxiety and dyspepsia. The Spearman correlation test results showed a significant relationship between anxiety and dyspepsia (p-value = 0.000) and a moderate correlation (rs = 0.450).*

Conclusion: *There is a moderate correlation between anxiety and dyspepsia.*

Keywords: *Anxiety, Dyspepsia, GAD-7, Heartburn, SF-LDQ.*

ABSTRAK

Latar belakang: *Cemas adalah kondisi psikologis yang ditandai dengan rasa takut dan khawatir berlebih yang sulit untuk dikendalikan. Cemas memainkan peran penting dalam menyebabkan dispepsia melalui mekanisme Brain-Gut Axis. Penelitian mengenai hubungan antara cemas dengan dispepsia di Indonesia masih kurang. Maka dari itu, artikel ini bertujuan untuk mengetahui hubungan antara cemas dengan dispepsia.*

Metode: *Penelitian secara potong lintang dilakukan pada pasien rawat jalan di Rumah Sakit Atma Jaya. Data karakteristik pasien, meliputi jenis kelamin, usia, dan tingkat pendidikan terakhir, serta kebiasaan makan makanan pedas, minum kopi, mengonsumsi alkohol, merokok, dan penggunaan NSAID diambil. Kuesioner yang digunakan dalam penelitian ini adalah GAD-7 dan SF-LDQ yang telah divalidasi ke dalam Bahasa Indonesia. Analisis data menggunakan uji korelasi Spearman untuk mencari hubungan antara cemas dengan dispepsia.*

Hasil: *Penelitian ini mendapatkan 158 partisipan. Rentang usia partisipan yang paling banyak mengalami dispepsia ada di usia 19-44 tahun (77,53%). Jenis kelamin terbanyak yang mengalami dispepsia adalah perempuan (79,12%). Tingkat pendidikan terakhir partisipan yang mengalami dispepsia terbanyak adalah S2 (100%). Partisipan yang makan makanan pedas terdapat sebanyak 61,39%, minum kopi sebanyak 54,43%, mengonsumsi alkohol sebanyak 6,96%, merokok sebanyak 12,66%, dan menggunakan NSAID terdapat 1,90%. Selain itu, partisipan yang sama-sama memiliki cemas dan dispepsia ada sebanyak 105(66,46%) partisipan. Hasil uji korelasi Spearman menunjukkan hubungan yang bermakna antara cemas dengan dispepsia (p-value = 0,000) dan korelasi yang moderat (r_s = 0,450).*

Simpulan: *Terdapat korelasi yang moderat antara cemas dengan dispepsia.*

Kata kunci: *Cemas, Dispepsia, GAD-7, Heartburn, SF-LDQ.*

INTRODUCTION

Dyspepsia is a term that describes heterogeneous symptoms,[1,2] such as pain or discomfort in the upper abdomen,[3] burning sensation in the upper abdomen,[4] feeling full or bloated, nausea, vomiting, and belching.[3] In general, the prevalence of functional dyspepsia is approximately 10-30% worldwide, including Indonesia.[5] A prevalence study of functional dyspepsia in Europe, the United States, and the United Kingdom were 14.7%, 15%, and 23.8% respectively.[6] Another study from 14 clinics in nine Asian countries, including Indonesia, found that 43% of the patients had functional dyspepsia.[7] Although there is no exact data on the number of dyspepsia cases in Indonesia, according to the 2007 Health Profile of Indonesia, dyspepsia is ranked 10th among the most common diseases and is estimated to affect around 30% of the general practice and 60% in specialist practice population.[8] The data indicated the high number of cases in Indonesia, which should be properly addressed.

Some potential triggering factors for dyspepsia were known, including psychological factors, namely anxiety.[9] Anxiety is considered a psychological condition characterized by a sense of tension and excessive worry that occurs continuously and is difficult to control, thereby affecting daily life.[10] Anxiety is believed to be related to dyspepsia through the Brain-Gut Axis mechanism. Anxiety disorder illicits cortisol release that activates the autonomic nervous system. It stimulates gastric acid, reduces prostaglandin production,[9] causes an imbalance of the gut microbiota system, and finally results in dyspepsia symptoms.[11]

From various studies conducted, it has been reported that anxiety can affect gastrointestinal function and exacerbate dyspepsia symptoms.[12] Aro et al. reported a higher degree of anxiety would result in more severe dyspepsia symptoms.[13]

In 2019, the World Health Organization stated that there were approximately 301 million people living with anxiety disorders, and of those 301 million, 243 million were adults.[14] A survey conducted in the United States in 2019 also reported that 44% of the US population experienced anxiety symptoms.[15] In addition, the 2007 Basic National Research data from Indonesia stated that Indonesia has a high prevalence of anxiety disorders, which is 11.6% of the adult population, meaning that out of the total adult population of around 150,000,000 people in Indonesia, 1,740,000 of them experience anxiety disorders.[16] Moreover, in the second year of the COVID-19 pandemic, out of the 356 participants in a study conducted on the Indonesian urban population, 18.5% of the participants presented clinically significant anxiety.[17]

Data showed a high number of anxiety and dyspepsia. This raised a concern to learn the possible association between them, especially in adult subjects in Atma Jaya Hospital as a secondary hospital. Therefore, this research aimed to determine the association between anxiety and dyspepsia among outpatients at the Atma Jaya Hospital.

METHOD

This was a cross-sectional study that was conducted on outpatients at Atma Jaya Hospital between January–November 2023. All patients aged 19-59 years in specialist practice are included, while patients who were unwilling to fill out and sign informed consent, those who could not speak Indonesian, and those who were pregnant are excluded from this study.

The participants were recruited based on a proportional sampling method to meet the minimum sample size. The estimated minimum sample size is calculated based on the cross-sectional formula with a deviation of 0.08^2 and a 10% sample dropout, resulting in a minimum sample of 158 samples. The sample collection technique is based on the number of inpatients per department registered divided by the total number of registered patients from all departments and multiplied by the estimated sample size. This study has followed the process and rules of the medical ethics review board at Atma Jaya Hospital (NO: 21/08/KEP-FKIKUAJ/2023).

The Generalized Anxiety Disorder-7 (GAD-7) and Short-Form Leeds Dyspepsia Questionnaire (SF-LDQ) were used as the measurement. The GAD-7 and SF-LDQ was translated and validated into Bahasa Indonesia.[18,19] The GAD-7 was used to measure the degree of anxiety[20] and SF-LDQ was used to measure the severity of dyspepsia.[21]

Demographic characteristic data, including gender, age, the highest level of education, and habits, such as eating spicy food, drinking coffee, alcohol consumption, smoking, and history of Non-steroidal Anti-inflammatory Drugs (NSAID) used were also collected.

Spearman correlation test was used to find the relationship between anxiety and dyspepsia. All data were processed using statistical program for social sciences (SPSS) version 25. Univariate data is used to describe each variable in the form of a frequency distribution table, while bivariate data is used to determine whether there is a relationship between anxiety and dyspepsia. If the bivariate data analysis results in a p-value below 0.05, the results are considered significant.

RESULTS

A total of 158 participants were included in this study. Out of 158 participants, 84.18% of participants experienced anxiety and 74.68% of participants experienced dyspepsia. Therefore, there were 66.46% participants that met the anxiety and dyspepsia criteria. The most prevalent age group that experienced dyspepsia was 19-44 years (77.53%). The majority of those who experienced dyspepsia are female (79.12%). The highest education level of the participants who experienced dyspepsia is a Master's degree (100%).

Table 1. Patient Characteristics (n=158)

Patient Characteristics		Number of outpatients at Atma Jaya Hospital	
Variable	**Category**	**Frequency**	**Percentage (%)**
Gender	Male	67	42.41
	Female	91	57.59
Age (year)	19-44	89	56.33
	45-59	69	43.67
Last education level	Primary	12	7.6
	Secondary	25	15.82
	Senior High	73	46.2
	Bachelor	46	29.11
	Master	2	1.27

The Spearman correlation test results showed a significant relationship between anxiety and dyspepsia (p-value $\leq$ 0.001) and a moderate correlation (rs = 0.450).

DISCUSSION

The characteristics of participants in this study indicate that women experience dyspepsia more than men, which was similar to a previous study conducted by Tshabalala et al. They reported that out of 201 participants, two-thirds were women, with 195 (97%) participants experiencing dyspepsia.[22] Theoretically, hormonal changes during the reproductive cycle, such as premenstrual syndrome (PMS), pregnancy, postpartum anxiety, and perimenopausal mood changes, make women more frequent and vulnerable to anxiety disorders.[23] The process was mediated by estrogen, progesterone, and testosterone which play a role in regulating anxiety.[23] Estradiol (E2) and progesterone hormones can also slow down gastric emptying, resulting in dyspepsia.[24]

Age was known as a potential factor to induce dyspepsia. The majority of participants in the age group of 19 to 44 years reported dyspepsia (77.53%). This age group also had a higher proportion for mild dyspepsia and a slightly higher proportion for moderate and severe dyspepsia compared to the 45-59 years group. The 45-59 years age group reported lower dyspepsia (71.01%). This age group had more participants with very mild dyspepsia or even no dyspepsia. This can happened because it is believed that the productive age group causes more severe dyspepsia due to the fact that the productive age is the working age. Based on research from South Korea, job stress is a risk factor for psychological changes, such as anxiety, which are related to gastrointestinal diseases and symptoms, including functional dyspepsia.[25] Therefore, 19-44-year-olds are more prone to dyspepsia due to anxiety from their work.

In addition, participants with the highest level of education who experienced dyspepsia were those with a Master's degree, with 100%. This can happen because according to a study conducted in Japan, people in Asia with high socioeconomic status, including high education, have more anxiety disorders.[26] Studies in China also reported that higher education makes people more ambitious to achieve something, so if they fail, they are more likely to cause anxiety.[27] However, both studies are contradictory to the other research conducted in Germany and China. In Germany, lower education causes more anxiety disorders, while in China, higher education causes fewer people to experience anxiety because they tend to be happier when achieving something big, such as higher education.[28,29]

In the study, the result show a relationship between anxiety and dyspepsia, with a p-value of 0.000 and an r_s of 0.450. This finding is consistent with a study conducted by Aro, et al in the Swedish population. The Swedish study reported that out of 2122 participants who completed a questionnaire, and 1001 were invited to undergo esophagogastroduodenoscopy. Of these, 202 participants were found to have uninvestigated dyspepsia and 157 participants had functional dyspepsia. Subsequently, the participants completed a questionnaire about anxiety, and the results showed a significant relationship. Therefore, it was concluded that there is a relationship between anxiety and dyspepsia, both uninvestigated and functional dyspepsia.[13] Additionally, a study by Tshabalala, et al in a hospital in South Africa found that out of 201 participants, 149 had dyspepsia and anxiety.[22] Consequently, it was concluded that there is a relationship between anxiety and dyspepsia.

The text also discusses the prevalence of dyspepsia and the correlation of factors, such as alcohol consumption, smoking, and NSAID use with the occurrence of dyspepsia. The study suggests that although the data on dyspepsia cases in Indonesia is not definitive and research on the relationship between anxiety and dyspepsia in Indonesia, especially in Jakarta, is lacking, there are still many cases of undiagnosed anxiety and dyspepsia in clinics. Furthermore, based on the risk factor data and the analysis, it is observed that alcohol consumption, smoking, and NSAID use among participants with dyspepsia, while not significant, are correlated with the occurrence of dyspepsia, as these factors are more likely to cause dyspepsia.

This study lacks a discussion on genetic risk factors in causing dyspepsia and the absence of discussion on the relationship between stress and depression, which can inadvertently contribute to causing anxiety, with dyspepsia. Therefore, future research should inquire about the history of anxiety or dyspepsia, especially in their family history. This is necessary to eliminate genetic factors that may cause dyspepsia. Future research should also investigate and discuss the relationship between stress, anxiety, and depression with dyspepsia, as well as compare which factors most commonly cause dyspepsia.

CONCLUSION

There was a significant relationship was found between anxiety and dyspepsia (p-value $\leq$ 0.001) and a moderate correlation (rs = 0.450) in outpatient patients at Atma Jaya Hospital, Jakarta. From this research, it was found that from 158 participants, the most prevalent age group that experienced dyspepsia was 19-44 years (77.53%). The majority of those who experienced dyspepsia are female (79.12%). The highest education level of the participants who experienced dyspepsia is a Master's degree (100%).

Future researchers should inquire with participants about their history of anxiety or dyspepsia, especially in their family history. This is necessary to eliminate genetic factors that may cause dyspepsia. Additionally, researchers should investigate and discuss the relationship between stress, anxiety, and depression with dyspepsia, as well as compare the most common factors that cause dyspepsia.

Table 2. Characteristics of Patient with Dyspepsia (n=158)

Characteristics of Patient with Dyspepsia	Dyspepsia Severity(%)				
	No dyspepsia	Very mild	Mild	Moderate	Severe
Gender:					
Male	21(31.34)	30(44.79)	9(13.42)	4(5.97)	3(4.48)
Female	19(20.88)	32(35.16)	27(29.67)	10(10.99)	3(3.3)
Age:					
19-44 years old	20(22.47)	32(35.96)	25(28.09)	8(8.99)	4(4.49)
45-59 years old	20(28.99)	30(43.48)	11(15.94)	6(8.7)	2(2.89)
Last education level:					
Primary school	3(25)	3(25)	2(16.67)	3(25)	1(8.33)
Secondary school	4(16)	16(64)	2(8)	2(8)	1(4)
Junior high school	17(23.29)	22(30.13)	24(32.88)	6(8.22)	4(5.48)
Bachelor's degree	16(34.78)	19(41.30)	8(17.39)	3(6.52)	
Master's degree					
Eating spicy food	24(24.74)	40(41.25)	25(25.77)	5(5.15)	3(3.09)
Not eating spicy food	16(26.23)	22(36.07)	11(18.03)	9(14.75)	3(4.92)
Drinking coffee	25(29.07)	33(38.37)	18(20.93)	7(8.14)	3(3.48)
Not drinking coffee	15(20.83)	29(40.28)	18(25)	7(9.72)	3(4.17)
Consuming alcohol	2(18.18)	4(36.36)	3(27.27)	2(18.18)	
Not consuming alcohol	38(25.85)	58(39.46)	33(22.45)	12(8.16)	6(4.08)
Smoking	7(35)	6(30)	5(25)	1(5)	1(5)
Not smoking	33(23.91)	56(40.59)	31(22.46)	13(9.42)	5(3.62)
Using NSAIDs		2(66.67)	1(33.33)		
Not using NSAIDS	40(25.81)	60(38.71)	35(22.58)	14(9.03)	6(3.87)

Table 3. The Relationship between Anxiety and Dyspepsia (n=158)

		Dyspepsia Severity (%)						
		No dyspepsia	Very mild	Mild	Moderate	Severe	P-value	r_s
Degree of Anxiety	No anxiety	12(48)	10(40)	2(8)	1(4)		0.000	0.450
	Mild	26(26.5)	46(46.9)	21(21.4)	3(3.1)	2(2)		
	Moderate	1(4)	6(24)	10(40)	6(24)	2(8)		
	Severe	1(10)	2(20)	1(10)	4(40)	2(20)		

Table 4. The Relationship between Anxiety and Dyspepsia, Excluding Factors other than Anxiety that Can Cause Dyspepsia (n=37)

		Dyspepsia Severity (%)						
		No dyspepsia	Very mild	Mild	Moderate	Severe	P-value	rs
Degree of Anxiety	No anxiety	2(50)	1(25)	1(25)			0.001	0.520
	Mild	4(21,06)	10(52,63)	3(15,79)	1(5,26)	1(5,26)		
	Moderate		2(22,23)	3(33,33)	3(33,33)	1(11,11)		
	Severe	1(20)			3(60)	1(20)		

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