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Relationship between Gastroesophageal Reflux Disease (Gerd) with Quality of Sleep

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ABSTRACT

Background. GERD is a commonly prevalent gastrointestinal disorder in medical students. Based on data from the 2006 US National Health and Wellness survey observing respondents who experienced heartburn at least twice a month, 89% of respondents experienced night-time GERD symptoms, which showed that the presence of nighttime GERD was associated with decreased quality of sleep. This study aimed to analyze the relationship between GERD and quality of sleep, and severity of GERD and insomnia in Faculty of Medicine USU 2020-2022.

Method. This study was conducted at the Faculty of Medicine USU from February 2023 to October 2023. The subject of the study was students in the Faculty of Medicine USU 2020-2022. This study was an analytic study with a cross-sectional design. This study used a total sampling method. Data collection was carried out using an online questionnaire in the form of a Google form. The questionnaires used were the GERD Questionnaire (GERD-Q), Frequency Scale for the symptoms of GERD (FSSG), Pittsburgh Sleep Quality Index (PSQI), and Insomnia Severity Index (ISI). Data processing uses the Statistical Package for the Social Sciences (SPSS) program. The analysis used was univariate and bivariate analysis with Chi-square.

Results. This study involved 378 respondents, 114 people (30.2%) with GERD, 67 people (58.8%) with severe GERD, 286 people (75.7%) had a bad quality of sleep, and 43 people (15%) with moderate and severe of insomnia. The results of statistical analysis showed an association between GERD and quality of sleep ($p = 0.011$).

Conclusion. There was a correlation between GERD and quality of sleep, severity of GERD, and insomnia of USU Faculty of Medicine students' class 2020-2022.

Keywords: GERD, quality of sleep, insomnia

ABSTRAK

Latar belakang. Gangguan pencernaan seperti GERD adalah gejala umum yang mengganggu pada mahasiswa kedokteran.Berdasarkan data dari US National Health and Wellness Survey 2006, yang mengamati responden yang mengalami GERD setidaknya dua kali sebulan, sebanyak 89% responden mengalami gejala GERD pada malam hari, hal ini menunjukkan bahwa kejadian GERD yang sering muncul di malam hari bisa membuat kualitas tidur jadi menurun. Penelitian ini bertujuan untuk menganalisis hubungan antara GERD dengan kualitas tidur pada mahasiswa FK USU angkatan 2020-2022.

Metode. Penelitian ini dilakukan di Fakultas Kedokteran USU pada bulan Februari 2023 hingga Oktober 2023. Subjek penelitian adalah mahasiswa Fakultas Kedokteran USU angkatan 2020-2022. Penelitian ini merupakan

penelitian analitik dengan desain potong lintang. Penelitian ini menggunakan metode total sampling. Pengumpulan data dilakukan dengan menggunakan kuesioner online dalam bentuk google form. Kuesioner yang digunakan adalah GERD Questionnaire (GERD-Q), Frequency scale for the symptoms of GERD (FSSG), Pittsburgh Sleep Quality Index (PSQI), dan Insomnia Severity Index (ISI). Pengolahan data menggunakan program Statistical Package for the Social Sciences (SPSS). Analisis yang digunakan adalah analisis univariat dan bivariat dengan Chi-square.

Hasil. Penelitian ini melibatkan 378 responden, terdapat 114 orang (30.2%) yang menderita GERD, 67 orang (58.8%) dengan derajat GERD berat, 286 orang (75.7%) memiliki kualitas tidur buruk, dan 43 orang (15%) dengan derajat insomnia sedang dan berat. Hasil analisis statistik menunjukkan adanya hubungan antara GERD dengan kualitas tidur.

Kesimpulan. Terdapat hubungan antara GERD dengan kualitas tidur pada mahasiswa Fakultas Kedokteran Universitas Sumatera Utara Angkatan 2020 - 2022.

Kata kunci: GERD, kualitas tidur, insomnia

1. Introduction

Gastroesophageal Reflux Disease (GERD) is a common gastrointestinal disorder caused by the reflux of stomach contents into the esophagus, as a result, it causes various symptoms or complications [1]. GERD affects approximately 13% of the population worldwide and 20% of the adult population in Western countries. According to reports, the prevalence of GERD was highest in North America, ranging from 18.1% to 27.8%, followed by 8.8% to 25.9% in Europe, and the lowest from 2.5% to 7.8% in Asia [2]. Based on research at CiptoMangunkusumo Hospital in Jakarta, 22.8% of patients who were endoscope had esophagitis. The prevalence of GERD in Indonesia has reached 27.4% and will continue to increase along with lifestyle changes such as obesity and smoking [3], [4]. Based on data from the 2006 US National Health and Wellness Survey, respondents experienced heartburn at least twice a month, 89% experienced nighttime GERD symptoms, 68% had sleep difficulties, 49% had difficulty initiating sleep, and 58% had difficulty maintaining sleep. They showed the presence of GERD was associated with more than twice the likelihood of experiencing sleep difficulties [5].

One of the most important needs for humans is sleep. How long an individual sleeps at night does not determine whether the sleep is of good quality. Sleep is good quality when a person can wake up without showing feelings of fatigue and drowsiness and has a sense of satisfaction with his sleep [6],[7]. It is important to have good sleep quality. Good sleep quality can increase productivity and can improve quality of life. However, poor sleep quality has effects on health such as difficulty concentrating, fatigue, headaches, and mood swings. It can also lead to long-term effects such as increased risk of cancer, heart disease, and obesity. Therefore, everyone should fulfill their sleep to be able to carry out activities well [8].

Medical students are students with very high levels of stress, emotional exhaustion, and work-related fatigue. Gastrointestinal disorders such as GERD are common symptoms in medical students [9], [10]. The frequent occurrence of GERD at night can reduce sleep quality, even though sleep quality is important for medical students to be able to concentrate and be productive in their activities as students [11]. Based on the above background, this prompted researchers to analyze the relationship between GERD and quality of sleep the and severity of GERD and insomnia in the Faculty of Medicine USU 2020-2022.

2. Method

The sampling technique used in this study was total sampling. In total sampling, all members of the population are used as samples. Data were obtained through questionnaires distributed online to USU FK students who met the inclusion and exclusion criteria. Exclusion criteria are students who do not fill out the questionnaire completely. The questionnaires used were the GERD Questionnaire (GERD-Q), Frequency Scale for the symptoms of GERD (FSSG), Pittsburgh Sleep Quality Index (PSQI), and Insomnia Severity Index (ISI).

Interviews were conducted using a questionnaire related to demographic characteristics, such as gender, age, ethnicity, family history of GERD (presence of family members with GERD either first-degree relatives such as biological parents, siblings; second-degree relatives such as uncles, aunts, grandparents; third-degree relatives such as great-grandparents, great-grandmothers and cousins). The questionnaire also included weight and height questions to determine body mass index. Overweight was considered if BMI > 23 kg/m2, normal BMI 18.5-22.9 kg/m2, and underweight BMI < 18.5 kg/m2. GERD-Q instrument to

diagnose GERD in the subject. FSSG instrument to evaluate the severity of GERD. PSQI instrument to evaluate sleep quality. ISI instrument to evaluate the degree of insomnia. This study was approved by the Health Research Ethics Committee Faculty of Medicine USU

Statistical Analysis

The data that has been obtained will be processed using the SPSS application. Moreover, to measure the relationship between variables using the chi-square test. The value of $p<0.05$ was considered the research hypothesis was accepted.

3. Results

The total number of FK USU students from 2020 - 2022 is 752 students. Of the 752 students, 374 students were not willing to fill out the questionnaire. 378 samples met the inclusion and exclusion criteria set by the researcher. Based on Table 1, the characteristics of respondents based on class, 200 respondents from the class of 2020 (52.9%), 92 respondents from the class of 2021 (24.3%), and 86 respondents from the class of 2022 (22.8%). Based on gender, this study included 253 (66.9%) women and 125 (33.1%) men, where the majority of this study was female. For nutritional status, some subjects had normal BMI, namely 164 respondents (43.4%), followed by 76 respondents (20.1%) who were obese 1,54 respondents (14.3%) who were overweight, 52 respondents (13.8%) who were underweight, and 32 respondents (8.5%) who were obese 2. The majority of respondents did not have comorbidities (82.5%) and did not family history of GERD (58.5%)

There were 114 respondents (30.2%) experiencing GERD, 286 respondents (75.7%) had bad quality of sleep, and 43 respondents (11.4%) had moderate and severe insomnia.

Table 1. Characteristics of Respondents

Characteristics	Frequency	Percentage (%)
Class		
2020	200	52.9
2021	92	24.3
2022	86	22.8
Age (years)		
18	29	7.7
19	84	22.2
20	125	33.1
21	116	30.7
22	20	5.3
23	4	1.1
Gender		
Man	125	33.1
Woman	253	66.9
BMI		
Underweight	52	13.8
Normal	164	43.4
Overweight	54	14.3
Obese 1	76	20.1
Obese 2	32	8.5
Comorbidities		
Yes	66	17.5
No	312	82.5
Family History With GERD		
Yes	157	41.5
No	221	58.5
GERD		
Yes	114	30.2
No	264	69.8
Quality of Sleep		
Good	92	24.3
Bad	286	75.7
Insomnia		
No and Mild	335	88.6
Moderate and Severe	43	11.4

Table 2 shows the characteristics of respondents with GERD. Of the 114 respondents with GERD, 87 (76.3%) were female and 27 (23.7%) were male. Based on age, it was found that 41 respondents were 21 years old (36%), 40 respondents were 20 years old (35.1%), 20 respondents were 19 years old (17.5%), 8 respondents were 18 years old (7%), and 5 respondents were 22 years old (4.4%). Based on BMI, 52 respondents had normal BMI (45.6%), 19 respondents were obese 1 (16.7%), 17 respondents were overweight (14.9%), 16 respondents were underweight (14%), and 10 respondents were obese 2 (8.8%). Based on comorbidities, 91 respondents (79.8%) did not have comorbidities and 23 respondents (20.2%) had comorbidities. Based on family history with GERD, it was found that 60 respondents (52.6%) had a family history of GERD and 54 respondents (47.4%) had no family history of GERD. There were 114 respondents with GERD, 67 respondents had severe GERD (58.,8%), and 47 respondents with mild GERD (41.2%).

Table 2. Characteristics of Respondents With GERD

Characteristics	**Frequency**	**Percentage (%)**
Gender		
Man	27	23.7
Woman	87	76.3
Age (years)		
18	8	7
19	20	17.5
20	40	35.1
21	41	36
22	5	4.4
BMI		
Underweight	16	14
Normal	52	45.6
Overweight	17	14.9
Obese 1	19	16.7
Obese 2	10	8.8
Comorbidities		
Yes	23	20.2
No	91	79.8
Family History With GERD		
Yes	60	52.6
No	54	47.4
GERD Severity		
Mild	47	41.2
Severe	67	58.8

According to Table 3, there is a relationship between GERD and quality of sleep (p-0.011) and there is a relationship between degree of severity of GERD and quality of sleep (p-0.017).

Table 3. Characteristics of Respondents

Characteristics	**Quality of Sleep**				**Total**		**p-value**
	Bad		**Good**				
		%			**n**	**%**	
GERD							
Yes	96	84.2	18	15.8	114	100	0.011*
No	190	72	74	28	264	100	
GERD Severity							
Severe	61	91	6	9	67	100	0.017*
Mild	35	74.5	12	25.5	47	100	

*Chi-square test

In Table 4, there was a relationship between GERD and insomnia (p-0.005) and there was a relationship between the degree of severity of GERD and insomnia (p-0.005).

Table 4. Relationship between GERD, Degree of Severity of GERD, and Insomnia

Characteristics	Insomnia				Total		p-value
	Moderate and Severe		No and Mild				
	n	%	n	%	n	%	
GERD							0.005*
Yes	21	18.4	93	81.6	114	100	
No	22	8.3	242	91.7	264	100	
GERD Severity							0.005*
Severe	15	22.4	52	77.6	67	100	
Mild	6	12.8	41	87.2	47	100	
No	22	8.3	242	91.7	264	100	

*Chi-square test

4. Discussion

Gastroesophageal Reflux Disease (GERD) is a disorder of the gastrointestinal system, resulting from the repeated reflux of stomach contents into the esophagus, which will cause disturbing symptoms and/or complications [4], [12]. Gastroesophageal reflux disease pathophysiology is multifactorial, including the influence of the tone of the lower esophageal sphincter, the presence of a hiatal hernia, esophageal mucosal defense against the refluxate and esophageal motility [13], [14]. Increased body mass index (BMI) is associated with an increased risk of GERD. Lifestyle and food such as a high-fat diet, carbonated drinks, caffeine consumption, and alcohol consumption are also contributing factors [15]. Other risk factors for GERD include smoking and stress, emotional stress also affects the occurrence of GERD due to the production of gastric acid (HCL) increase [16].

There is an association between nocturnal gastroesophageal reflux and more severe forms of GERD, especially with atypical/extraesophageal manifestations and mucosal damage complications, such as esophagitis, esophageal stricture, Barrett's esophagus, and esophageal adenocarcinoma [17]. Heartburn and sleep disturbances are common symptoms of nocturnal gastroesophageal reflux [18]. The cause of nocturnal gastroesophageal reflux is known to be associated with reduced saliva production during sleep and a reduced swallowing response during sleep, resulting in reduced esophageal peristalsis. This process is critical as it is the esophagus' primary defense against exposure to stomach acid [19].

GERD symptoms that occur more frequently at night are known to be associated with nocturnal gastroesophageal reflux. GERD symptoms that occur more often at night will wake up everyone who experiences it from sleep, this will be associated with bad sleep quality [20].

There is debate over the relationship between medical students' demographics and sleep quality. For example, other research supports our findings about the separation of sex-related sleep disturbances from sleep disorders [21], while Akhlaghi and co-workers represented worse conditions in girls in Iran [22] that was consistent with the results of another study in Pakistan [23], a fact that probably may have occurred because of the boys better ability to adapt to hard studying and stressful medical conditions. The impact of study quality on sleep quality is another popular topic that many authors evaluate. The results of the subsequent research supported the conclusions of our report, which insisted that there was no relationship at all between the students' study grades and the quality of their sleep. However, the majority of research indicated that clinical students' poor sleep quality was caused by burnout, demanding work schedules, and prolonged nighttime awareness [23]. The purpose of the study was to determine how GERD affected objectively measured sleep quality using a variety of sleep parameters acquired through in-laboratory polysomnography. The results showed a significant correlation between GERD and a reduction in REM sleep duration, total sleep time, and sleep efficiency. Moreover, a longer N3 sleep duration, REM latency, and an increase in wake time following the commencement of sleep were all linked to GERD. When adjusting for age, sex, and BMI, GERD was similarly linked to an increase in sleep start latency; however, in the fully adjusted model, this association vanished when adjusting for other medical comorbidities [24].

5. Conclusion

In this study, there was a correlation between GERD and quality of sleep, the severity of GERD, and insomnia. There is debate over the relationship between medical students' demographics and sleep quality, a fact that probably may have occurred because of the boy's better ability to adapt to hard studying and stressful medical conditions.

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