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Original Research Article

Association between gastroesophageal reflux disease-questionnaire factors and gastroesophageal reflux disease incidence at Kardinah general hospital inpatient wards

Darren Gosal[1]*, Rachman Edi Santoso[2], Yohanes Firmansyah[3]

[1]Internship Medical Doctor, Kardinah General Hospital, Tegal, Central Java, Indonesia
[2]Department of Internal Medicine, Kardinah General Hospital, Tegal, Central Java, Indonesia
[3]Department of Medicine, Tarumanagara University, Jakarta, Indonesia

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***Correspondence:**
Dr. Darren Gosal,
E-mail: darren_gosal@hotmail.com

ABSTRACT

Background: Gastroesophageal reflux disease (GERD) is a condition where an acid reflux into the esophagus with can resulted some symptoms. GERD is one of the most common disease in around the world. The most common symptom is heartburn, with its various risk factors. Diagnosing GERD based on the clinical examination or more advanced examination. One simple tool to help diagnosing is GERD questionnaire (GERD-Q). This study aims to find out the association of GERD-Q factors to GERD incidence at Kardinah inpatient wards.
Methods: This study is cross sectional design, with the subjects are all patients in the inpatient wards, and asked with the Indonesian version of GERD-Q plus other questions. All data will be assessed with chi Square test.
Results: Total of 84 respondents are in this study, where the relationship of each factors with GERD incidence are: gender (p value: 0.191), surgery (p value: 0.428), spicy foods consumption (p value: 0.920), fatty foods consumption (p value: 0.916), sour foods consumption (p value: 0.557), and irregular eating habit (p value: 0.023).
Conclusions: Irregular eating habit is significantly associated with GERD incidence.

Keywords: GERD, Risk factor, GERD-Q

INTRODUCTION

Gastroesophageal reflux disease (GERD) is defined as a condition of an acid reflux or related to the retrograde flow of gastric contents into the esophagus, which leads to troublesome symptoms with or without complications.[1,2] A recent study stated that the prevalence of GERD is 18,1–27.8% in North America, 8,8–25,9% in Europe, 2,5–7,8% in East Asia, 8,7–33,1% in middle east, 11.6% in Australia, and 23% in South America, on the other hand according to a study in Indonesia, about 3% in Asia, increased from 5.7% to 25.18% from 1997 to 2002, and another study showed 27.4% of GERD prevalence was among Indonesian physician.[3-5]

The most common symptom of GERD is heartburn, a burning sensation in the chest, radiating to mouth with sour taste in the back of mouth, another symptoms such as: throat clearing, hoarseness, even can lead to "like" cardiac chest pain, cough, dyspnea, and wheezing.6 GERD is diagnoses based on the physician's assessment, starting from clinical history, GERD questionnaires, proton pump inhibitor trial, endoscopy- biopsy, ambulatory reflux monitoring, pH impedance monitoring, and esophageal high resolution manometry.[7]

The pathophysiology of GERD is not fully clear yet, so far, the causes are: esophageal junction pressure, hiatal hernia, acid pocket positive pressure gradient, gastric motility, esophageal clearance, peripheral sensitization, central sensitization and psycho-neuro-immune interactions, and last esophageal injury.[8] There are a lot of risk factor that can increase GERD incidence, such as: obesity, age (>40 years old), male, Caucasian race, sedentary lifestyle,

pregnancy, smoking, alcohol consumption, family history of GERD, higher socioeconomic status, history of vagotomy, comorbid diseases like diabetes mellitus, asthma, scleroderma, neuropathy, and some drugs, supplementation, and spicy, sour, and fatty foods can caused a direct esophageal mucosal irritation also reduction in lower esophageal sphincter (LES) tone and gastric motility.[9,10] Eating habits, such as quick, irregular, big meals, eating before sleeping also associated with acid hypersensitivity and psychological stress.[11] Patients who were scheduled for a surgery, should undergo a GERD assessment because it is associated with increased postoperative complication rate.[12]

Spicy foods as told above, can increase the incidence of GERD by direct irritation of the lower esophageal mucosa, with red pepper which contains the neurotoxin capsaicin also inhibited the gastric emptying, resulting in heartburn and reflux.[11] Another study said that fat consumption induced reflux events, increased the LES pressure and esophageal acid exposure 3 hour after eating compared with a low fat meal individuals, but there is also another study that stated fat content of the meal did not affect the rate of reflux, esophageal acid exposure and LES pressure.[13]

GERD Questionnaire (GERD-Q) is a simple tool for diagnosing in clinical setting, which already validated with 49% sensitivity and 91% specificity, consisting of GERD symptoms: heartburn, regurgitation, abdominal pain, nausea, sleeping trouble, taking over the counter (OTC) drugs with points each one of the questions, total maximum of 18 points. Total score of 0 to 2 points=0% likelihood of GERD, 3 to 7 points=50% likelihood, 8 to 10 points=79% likelihood, 11 to 18 points=89% likelihood.[14,15] The purpose of this study was to find out the association between GERD-Q factors to GERD incidence at the Kardinah General Hospital inpatients wards.

METHODS

The design of this study is cross-sectional, conducted at the Kardinah General Hospital in the period June 2020 to July 2020 to see what potential factors cause the incidence of GERD at inpatient wards who stay overnight or are treated. The population in this study were all patients who were hospitalized, while the sample in this study were part of the affordable population who met the inclusion criteria. The inclusion criteria in this study were patients who were competent to answer all questions in the questionnaire, were at least 17 years old, and willing to participate in the study. Exclusion criteria in this study included patients with previous major gastrointestinal abnormalities such as a history of gastric bleeding, or a history of malignancies in the gastrointestinal area, experiencing hepatobiliary diseases such as hepatitis cirrhosis, bile duct infection, as well as a history of previous operations on the area along the gastrointestinal tract (excluding surgery performed at the time of this). The minimum sample size required in this study was 70 people. The sampling technique was non-random consecutive sampling. The independent variables in this study included current surgery, a history of consuming spicy foods, a history of eating oily or fatty foods, a history of consuming acidic foods, and the frequency of eating irregularities. The dependent variable in this study is the probability of GERD occurring based on the GERD-Q questionnaire. The operational definition of having surgery while inpatient is that a patient has recently undergone a history of surgery under general anesthesia in less than 48 hours. The definition of fondness for eating spicy, oily, and sour foods is based on patient answers. The definition of the frequency of irregular eating is the frequency of eating that is not always the same in 7 consecutive days with the time of eating that often changes over a distance of more than 1 hour on the same measurement time on different days. The definition of GERD based on the Indonesian version of GERD-Q questionnaire is when the score or value obtained by the respondent is more than 7 points.

Reliability and validity tests on the GERD-Q questionnaire have been carried out in previous studies with a Cronbach Alpha value of 0.83 and an r-correlation value>0.3 for all items. All data will be assessed categorically by analytic test in the form of Chi Square with Yates Correction and Fisher Exact alternative test. The results are said to be significant or the Null Hypothesis is rejected when the p-value<0.05 at type 1 error is 5% and the confidence range index is 95%.

RESULTS

The study was conducted for 1 month and included 84 respondents who met the inclusion criteria. The mean age of the respondents was 50 (17-89) years and was dominated by male as many as 52 (61.9%) respondents. All of the demographic characteristics of respondents and research variables are presented in Table 1.

Table 1: Base characteristics of patients at Kardinah general hospital inpatient wards from June to July 2020.

Variable	N (%)	Mean (SD)	Med (Min – Max)
Age		50.06 (15.68)	50 (17 – 89)
Gender			
Male	52 (61.9)		
Female	32 (38.1)		

Continued.

Variable	N (%)	Mean (SD)	Med (Min – Max)
Occupation			
Government employee	1 (1.2)		
Private employee	17 (20.2)		
Driver	2 (2.4)		
Retirement	3 (3.6)		
Housewife	19 (22.6)		
Labor	10 (11.9)		
Unemployed	11 (13.1)		
Farmer	6 (7.1)		
Entrepreneur	13 (15.5)		
Student	2 (2.4)		
Education			
No Education	2 (2.4)		
Elementary school	39 (46.4)		
Junior high school	21 (25)		
Senior high school	16 (19.0)		
Diploma	2 (2.4)		
Bachelor or above	4 (4.8)		
Comorbid diseases			
Diabetes mellitus	7 (8.3)		
Hypertension	17 (20.2)		
Coronary heart disease	4 (4.8)		
Kidney disease	1 (1.2)		
Surgery < 48 hours			
No	49 (58.3)		
Yes	35 (41.7)		
Consumption of spicy foods			
Like	52 (61.9)		
Dislike	32 (38.1)		
Consumption of fatty foods			
Like	58 (69)		
Dislike	26 (31)		
Consumption of sour foods			
Like	45 (53.6)		
Dislike	39 (46.4)		
Irregular eating habit			
Yes	16 (19)		
No	68 (81)		
Heartburn			
0 point	66 (78.6)		
1 point	9 (10.7)		
2 points	5 (6.0)		
3 points	4 (4.8)		
Reflux sensation			
0 point	57 (67.9)		
1 point	13 (15.5)		
2 points	12 (14.3)		
3 points	2 (2.4)		
Epigastric pain			
0 point	10 (11.9)		
1 point	22 (26.2)		
2 points	16 (19.0)		
3 points	36 (42.9)		

Continued.

Variable	N (%)	Mean (SD)	Med (Min – Max)
Nausea			
0 point	9 (10.7)		
1 point	26 (31.0)		
2 points	25 (29.8)		
3 points	24 (28.6)		
Sleeping trouble			
0 point	44 (52.4)		
1 point	20 (23.8)		
2 points	17 (20.2)		
3 points	3 (3.6)		
Consumption of over the counter drugs			
0 point	72 (85.7)		
1 point	6 (7.1)		
2 points	5 (6.0)		
3 points	1 (1.2)		
GERD-Q total score		5.56 (2.36)	6 (0 – 12)
Classification of GERD-Q score			
GERD	14 (16.7)		
Not GERD	70 (83.3)		

Table 2: Relationship of various risk factors for GERD incidence in the Kardinah general hospital inpatient wards from June 2020 to July 2020.

Parameter		GERD		Not GERD		PR	CI 95%		P value
		N	%	N	%		Min	Max	
Gender	Male	6	11.5	46	88.5	0.462	0.176	1.208	0.191
	Female	8	25.0	24	75				
Surgery	No	10	20.4	39	79.6	1.786	0.609	5.234	0.428
	Yes	4	11.4	31	88.6				
Spicy Foods	Like		15.4	44	84.6	0.821	0.313	2.148	0.920
	Dislike	6	18.8	26	81.3				
Fatty Foods	Like	9	15.5	49	84.5	0.807	0.300	2.173	0.916
	Dislike	5	19.2	21	80.8				
Sour Foods	Like	6	13.3	29	86.7	0.650	0.247	1.711	0.557
	Dislike	8	20.5	31	79.5				
Irregular eating habit	Yes	6	37.5	10	62.5	3.188	1.286	7.900	0.023*
	No	8	11.8	60	88.2				

DISCUSSION

First, gender is one of the risk factors which can increase the incidence of GERD, a study stated that reflux symptoms and non-erosive reflux disease (NERD) affect female more than male, on the other hand, pathologic changes are more frequent in male.16 In female, estrogen can increase the esophageal mucosal resistance by up regulating the expression of esophageal tight junction, then the prevalence of pathological changes in postmenopausal female were increased, similar to the male.[16] Another study stated that Reflux esophagitis (RE) is more common in male (p value<0.001), but GERD and NERD were more prevalent in females and increased with the age (more than 50 years old), including pregnant women because of the progesterone and estrogen hormones that reduce the LES pressure (p-value <0,001).[17,18]

Compared to our study, there is no statistically significant difference in gender to GERD incidence, but the amount of GERD in female are more than male. Next, according to our study, most patients in the surgery group, which require fasting, did not have GERD. Although there was no statistically significant difference, other studies showed that patients who fast during Ramadhan experienced less severe GERD symptoms, compared to the non- fasting group (p-value <0,001).[19] However, another study stated that there was no significant differences between the fasting and non- fasting groups from before to after Ramadhan (p-value >0,005).[20] While on our study finding out about the surgery effect to GERD incidence, so far

there are no studies that correlate between surgery and GERD. In our study also, the result differences can be caused by small group of sample and lack of other GERD diagnostic testing.

Foods are also the risk factors to GERD incidence, study showed that spicy foods consumption increased the heartburn frequency compared to who never consumed spicy foods, but there were no significant associations between consumption of spicy foods and heartburn.[21] Also in our study showed that no significant differences, while most of the patients who like to consumed spicy foods did not have GERD. Next, high fat diets were associated with severe GERD symptoms (OR=1.77) and twice as likely to consume fried foods (OR=2.10) because high fat meals can decrease the LES pressure compared to high protein meals with the same number of calories.[22,23] There is no significant difference in our study, that can be caused from the difference meaning about like and dislike in term of consumption each patient and small number of samples.

Sour foods due to its low pH can stimulate the mechanoreceptor in esophagus which can cause GERD symptoms especially if there are inflammatory lesions at the mucous membrane, but in the previous study showed there was no difference between sour foods and GERD incidence (p- value=0.813).[24] Our study showed the same result where there was no significant difference (p-value>0.005) and more GERD occurred in subjects who dislike sour foods. Irregular eating habit is correlated with the GERD incidence according to one study in Korea, where irregular eating habit is one of the risk factors for GERD (p-value=0.026; OR=2.33).[25] One study in Indonesia, also found there was a correlation between eating habit and GERD incidence (p value <0.001), which it come from the irregular eating habit and increase the production of gastric acid and histamine to affect the oxyntic glands, furthermore irritating the stomach mucosa.[26] There is a significant difference (p value<0,005) in our study for the irregular eating habit with the GERD incidence, same with the other previous studies.

CONCLUSION

Irregular eating habit is significantly associated with the GERD incidence (p value=0.023) while others are not, which can be cause by small numbers of sample group and lack of more advanced examinations. We suggest larger sample group and advanced examinations to diagnose are needed for the next study.

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