Prevalence of Gastroesophageal Reflux Disease (GERD) in Dyspepsia Patients in Primary Referral Hospital

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ABSTRACT

Background: *Gastroesophageal reflux disease (GERD) is caused by reflux of stomach contents into the esophagus and give the typical symptoms as heartburn. The prevalence of GERD was vary around the world. Prevalence of GERD by endoscopy in Jakarta was 22.8%. Limited data exist to determine the prevalence and related factors of gastroesophageal reflux disease (GERD) in the population without alarm symptoms. Validated GERDq questionnaire can be used easily to diagnose GERD in primary health care. This study aims to know the prevalence of GERD and related factors.*

Method: *This cross-sectional study was conducted in adult dyspepsia patients at General Hospital District of Cilincing from January to March 2016. A validated GERDq questionnaire and a single proportion sample size calculation were used.*

Results: *The prevalence of GERD was 49%, in elderly participants the prevalence was 44%. Of the 104 consecutive participants, 33.7% were male and 66.3% were female. The mean age was 47.6 ± 15.4 years old. The rate of GERD was higher in females than in males (53 vs. 40%, p = 0.189), increased as the age of the participants increased (p = 0.059) and also increased as the body mass index (BMI) of the participants increased (p > 0.05). GERD was present in 50% of active or former smokers (p > 0.05), 33.3% of daily coffee drinkers (p > 0.05), 56.2% of active or former alcohol consumers (p > 0.05), and 57.4% of daily tea drinkers (p = 0.049).*

Conclusion: *The prevalence of GERD in dyspeptic patient was still high. There is a relation between GERD and tea consumption.*

Keywords: *gastroesophageal reflux disease* **(***GERD), dyspepsia, GERDq questionnaire*

ABSTRAK

Latar belakang: *Penyakit refluks gastroesofagus disebabkan oleh refluks isi gaster ke dalam esofagus yang menyebabkan timbulnya gejala khas berupa heartburn. Prevalensi penyakit refluks gastroesofagus di seluruh dunia bervariasi. Prevalensi penyakit refluks gastroesofagus yang terdiagnosis dengan endoskopi di Jakarta sebesar 22,8%. Prevalensi dan faktor yang mempengaruhi penyakit refluks gastroesofagus pada populasi dispepsia di komunitas masih terbatas. Kuesioner GERDq yang telah divalidasi dapat digunakan dengan mudah untuk mendiagnosa penyakit refluks gastroesofagus pada pelayanan kesehatan primer. Tujuan penelitian ini adalah mengetahui prevalensi penyakit refluks gastroesofagus pada pasien dispepsia di komunitas dan faktor yang mempengaruhinya.*

Metode: *Studi potong lintang pada pasien dewasa dispepsia di Rumah Sakit Umum Kecamatan Cilincing dari Januari ke Maret 2016. Penelitian menggunakan kuesioner GERDq Bahasa Indonesia yang telah divalidasi dan penghitungan sampel menggunakan proporsi tunggal.*

Hasil: *Prevalensi GERD yang didapatkan pada penelitian ini sebesar 49%. Dari 104 pasien ditemukan 33.7% laki-laki dan 66.3% perempuan. Usia rata-rata 47.6 ± 15.4 tahun. Prevalensi GERD ditemukan lebih tinggi pada wanita dibanding pada laki-laki (53 vs. 40%, p = 0.189), prevalensi GERD meningkat sesuai dengan usia (p = 0,059) dan juga meningkat sesuai BMI (p > 0,05). GERD ditemukan pada 50% mantan atau perokok aktif (p > 0,05), 33,3% pada peminum kopi rutin (p > 0,05), 56.2% pada mantan atau peminum alkohol (p > 0,05) dan 57.4% pada peminum teh rutin (p = 0.049).*

Simpulan: *Prevalensi GERD dispepsia pasien tanpa itu masih tinggi. GERD lebih banyak ditemukan pada pasien yang mengkonsumsi teh.*

Kata kunci: *gastroesophageal reflux disease (GERD), dispepsia, kuesioner GERDq*

INTRODUCTION

Gastroesophageal reflux disease (GERD) is a pathological condition caused by the disturbance in the reflux of gastric content to the oesophagus which results in the symptoms in oesophagus to pharynx, larynx, or even respiratory tract.[1] The pathophysiology of GERD is that it is caused by spontaneous regurgitation during the relaxation of lower esophageal sphincter (LES), a retrograde flow which occurs before normal LES tone after swallowing and the increase of intraabdominal pressure. Epidemiologically, in America, it is reported that 20% of adults at least have experienced heartburn symptoms and or regurgitation once a week. In patients who have experienced symptoms with alarming signs and underwent endoscopy, the prevalence of oesophagitis may reach 7%.[1]

The prevalence of GERD in several Asian Countries varies, while in Indonesia no large-scale study has been performed to identify the prevalence of GERD, particularly in the population of dyspepsia patients. A study conducted in Saudi Arabia utilised GERD questionnaire and obtain a GERD prevalence of 45.4%.[2] From a hospital-based study performed in Cipto Mangunkusomo Hospital, it was reported that the prevalence of oesophagitis in patients who underwent endoscopy was 22%.[1] Based on a survey in Jakarta in 2006 in 1639 individuals diagnosed with GERD, heartburn complaint was found in 7.3% individuals, while regurgitation symptoms were more commonly found, which was 18.4%.[3] In daily life, GERD can be difficult to differentiate from complaints of dyspepsia; many patients who suffer from GERD was not diagnosed accurately and did not receive adequate treatment. Therefore, proper history taking, physical examination, and supporting examinations are needed to aid in establishing the diagnosis.

GERD can be diagnosed through history taking or endoscopic examination, including pH metry examination. In daily clinical practice, GERD can be diagnosed using GERDq questionnaire which has been validated in Indonesian language (Bahasa Indonesia).[4] With this questionnaire, health practitioners can easily diagnose GERD and prescribed empirical therapy as required. Based on the diagnostic study which has been performed, GERD q with the cut-off score of 8 has specificity and sensitivity of 71.4 and 64.6%, respectively.[3] This study was performed in a primary referral hospital, to identify the magnitude of the problem and prevalence of GERD in patients referred with complaints of dyspepsia from primary health care centre. Additionally, we also would like to find out several habits in the community which play role in the development of GERD.

METHOD

The study used a cross-sectional design. Patients who were referred to the Cilincing District General Hospital with the complaint of dyspepsia in January – March 2016 and whose ages were ≥ 18 years were interviewed using GERDq questionnaire in the Indonesian language which has been validated.

Patients who had GERDq score ≥ 8 were included into the GERD group. The sample size was calculated using a single proportion with d 0.1, and α 0.05. Clinical and demographical characteristics are presented in the prevalence table. Associated factors were analysed using bivariate analysis. Data were analysed using SPSS version 16.

RESULTS

From 104 patients who fulfilled the inclusion criteria, it was obtained that the prevalence of GERD was 49%, while in geriatric patients the prevalence was 44%. From these 104 patients, 33.7% were males and the rest were females. The average age of participants was 47.6 ± 15.4 years. The prevalence of GERD was higher in females compared to males (53 vs. 40%, p = 0.199), with the highest prevalence was found among Javanese participants, with increasing prevalence along with the increasing of age (p = 0.059). When participants were grouped according to their age, the highest prevalence of GERD were found in two age groups, the 30-39 year-old group and the 50-59 year-old group. The prevalence also increased as the participants' BMI increased (p > 0.05) whereby obese patients had higher proportion of GERD compared to normal and overweight patients. GERD was found in 50% active or former smokers (p > 0.05), in 33.3% routine coffee drinkers (p > 0.05), in 56,2% active or former alcohol drinkerss (p > 0.05) and in 57.4% tea drinker (p = 0.049).

Table 1. Baseline characteristics

	Average	SD
Age	47.67	15.43

Table 2. Baseline characteristics

Variable	n (%)
GERD	51/104 (49)
Sex	
Male	35 (33.7)
Female	69 (66.3)
Ethnicity	
Javanese	46 (44.2)
Sundanese	18 (17.3)
Betawinese	14 (13.5)
Bataknese	8 (7.7)
Padangnese	8 (7.7)
Others	10 (9.6)
Smoking history	
Non-smoker	74 (71.2)
Former smoker	12 (11.5)
Active smoker	18 (17.3)
Alcohol history	
Non-alcohol drinker	88 (84.6)
Former alcohol drinker	1 (1)
Active alcohol drinker	15 (14.4)
Coffee (last 1 month)	
Never	70 (67.3)
Seldom	22 (31.2)
Daily	12 (11.5)
Tea (last 1 month)	
Never	20 (19.2)
Seldom	37 (35.6)
Daily	47 (45.2)
Body mass index (BMI)	
Underweight	12 (11.5)
Normal	32 (30.8)
Overweight	16 (15.4)
Obese 1	31 (29.8)
Obese 2	13 (12.5)

Table 3. Bivariate analysis

Age	Mean	SD
Non-GERD	47.24	16.21
GERD	48.11	14.73

Table 4. Association between age and gastroesophageal reflux disease (GERD)

Age group (years)	GERD n (%)	Non-GERD n (%)	Total
18-29	4 (7.8)	12 (22.6)	16 (15.4)
30-39	13 (25.5)	4 (7.5)	17 (16.3)
40-49	8 (15.7)	8 (15.1)	16 (15.4)
50-59	15 (29.4)	15 (28.3)	30 (28.8)
≥ 60	11 (21.6)	14 (26.4)	25 (24)
Total	51 (100)	53 (100)	104 (100)

Table 5. Bivariate analysis of association gastroesophageal reflux disease (GERD) and its factor

Variables	GERD n (%)	Non-GERD n (%)	p
Sex			0.189
Male	14 (40)	21 (60)	
Female	37 (53.6)	32 (46.4)	
Smoking history			
Non-smoker	36 (48.7)	38 (51.3)	0.992
Former smoker	6 (50)	6 (50)	
Active smoker	9 (50)	9 (50)	
Alcohol history			
Non-alcohol drinker	42 (47.8)	46 (52.2)	0.418
former drinker	0	1 (100)	
Active drinker	9 (60)	6 (40)	
Coffee (last month)			
Never	35 (50)	35 (50)	0.478
Seldom	12 (54.5)	10 (45.5)	
Daily	4 (33.3)	8 (66.7)	
Tea (last month)			
Never	5 (25)	15 (75)	0.049
Seldom	19 (51.3)	18 (48.7)	
Daily	27 (57.4)	20 (42.6)	
Body mass index			
Underweight	3 (25)	9 (75)	0.504
Normal	16 (50)	16 (50)	
Overweight	8 (50)	8 (50)	
Obese 1	17 (54.8)	14 (45.2)	
Obese 2	7 (53.8)	6 (46.2)	

DISCUSSION

In this study, we obtained a high prevalence of GERD in patients complaining of dyspepsia which was 44%. This prevalence was higher than that of previous study which has been performed in Tanjung Priok, which was 13.3%.[5] The higher prevalence in this study was caused by the different study population, as the author obtained the study sample among patients complaining of dyspepsia, while the study performed in Tanjung Priok obtained general population, both in symptomatic and asymptomatic patients. A similar study performed online using GERDq questionnaire in the Indonesian language in symptomatic and asymptomatic medical doctors, observed a lower prevalence of GERD which was 27.4%, where only 21% of the participants reported that GERD did not disturb their daily activities and 6.4% patients stated that GERD had a great impact in their lives.[6] The application of GERDq questionnaire gained significant

popularity mainly because it can be used immediately and properly to help in diagnosing GERD. A study in Saudi Arabia using GERDq revealed a similar prevalence of GERD with that of this study, which was 45.4%.[2] Meanwhile, a study in India using a sample from the general population obtained a prevalence of 22%.[7] From the above data, the prevalence of GERD in general population varied in the range of 13.3-27.4% and might not disturb the daily activities. However, the prevalence will increase if patients complained of discomfort in the upper abdominal area. In patients with discomfort in the upper abdominal area, screening using GERDq can be performed, so that accurate and adequate therapy can be given.

Several studies have reported that GERD is associated with daily habits, including age, alcohol, tea, or coffee consumption, and body mass index (BMI). However, these studies show contradicting results.

Most previous studies have reported that the prevalence of reflux esophagitis (RE) increases along with the increasing age, although the association between GERD and age is still controversial.[8,9] In their study, Bhatia et al have stated that GERD patients are usually older than non-GERD patients.[10] The incidence of GERD increases with age, particularly at the age older than 40 years. Minatsuki et al have reported that age is positively associated with oesophagitis reflux, while the age and GERD are inversely associated.[11] In this study, it was found that the average age of patients with GERD complaints was higher compared to those without GERD, although this was not statistically significant. If analysis based on age group was performed, the highest prevalence was observed in two age groups, which were 30-39 years with 25.5% and 50-59 years with 29.4%.

Development of GERD symptoms can be affected by the increase of gastric aggressive factors, such as acid, the use of irritative substance or medications, in addition to the decreasing tone of the lower oesophageal sphincter (LES). Alcohol is suggested as one of the factors which provoke GERD symptoms because it can disrupt the antireflux system. Alcohol consumption can trigger the incidence of GERD by decreasing the tone of the lower oesophageal sphincter, declining oesophageal motility, increasing secretion of gastric acid, and delaying gastric emptying. In their study, Bhatia et al reported that there was no significant association between alcohol consumption and GERD symptoms, but Hung et al, who studied the correlation between alcohol consumption and the incidence of GERD, found that there was a direct association between erosive oesophagitis and alcohol consumption (Pearson's correlation coefficient: 0.091, P-0.01).[12] In addition, the study by Lee et al showed that the habit of alcohol consumption was more commonly found in erosive oesophagitis compared to GERD patients (OR = 2.9; 95% CI: 1.0-8.3).[13] Further, Japanese researcher found the association between the amount of alcohol consumption with the incidence of oesophagitis. It was found that in heavy alcoholics (ethanol > 50 gr/day): moderate alcoholics (ethanol 25-50 gr/day): mild alcoholics (ethanol < 25 gr/day) the OR of those who suffered from erosive oesophagitis were 1.988 (95% CI : 1.120-3.534; p = 0.0190), 1.880 (95% CI: 1.015-3.484; p = 0.0445) and 1.110 (95% CI: 0.553-2.228; p = 0.7688), respectively.[14] In this study, similar proportion was found, although statistically no significant correlation was observed. In active drinker, a higher proportion of GERD was found, which was 60 % compared to inactive drinker with 47.8%. This is not statistically significance findings could be caused by the habit of individuals in Eastern countries, where alcohol is not routinely consumed; thus, the number of active drinkers was not so many.

Tea is processed from the leaves of *Camellia sinensis*.[15] Tea contains theophylline as the main component. This substance causes relaxation of the LES and decreases the proliferation of *H. pylori*, which leads to decreased gastric acid production.[16] A study in Taiwan regarding the influence of alcohol and tea to asymptomatic erosive oesophagitis concluded that alcohol and tea consumption of more than 4 days a week posed a risk of developing erosive oesophagitis.[17] Nonetheless, this condition was influenced by many biases which make it difficult to draw a straightforward conclusion from it. A study performed by the author found a significant association between tea consumption and incidence of GERD. However, there were several limitations, including the amount and type of tea being consumed. Therefore, although statistically we found a specific correlation between tea and GERD, this needs more specific studies, considering that tea consumption is a general habit in the Indonesian population.

Smoking can decrease the LES tone and decrease bicarbonate production in the saliva. Active smoker is significantly associated with the proportion of GERD. This was in accordance with the study performed by Watanabe et al. Watanabe conducted an observational study in male workers complaining of heartburn, in which it was found that active smoker has increased the risk of GERD (OR = 1.35; 95% CI: 1.01-1.82).[18]

However, this study did not find a statistically significant association between smoking and incidence of GERD. This could be caused by baseline characteristics of the study sample, in which more than 70% of patients who participated in the study did not smoke and only 17% were active smokers.

Obesity is defined as body mass index (BMI) > 30 kg/m^2; the prevalence was increased in the United States and several regions in Europe and Asia. Two surveys by NHANES showed that among adults aged 20-74 years, the prevalence of obesity increased from 15.0% in 1976-1980 to 32.9% in 2003-2004.[19,20] From epidemiological studies which assessed the correlation between obesity and GERD, the development of GERD in obese patients were probably caused by mechanical changes in the upper digestive tract. Extrinsic gastric compression by the surrounding adipose tissue may occur in obese individuals. This causes the increase of intragastric pressure and disrupts the lower oesophageal sphincter relaxation, which causes an anatomical disturbance in gastroesophageal junction. Anatomical changes in the gastroesophageal junction may lead to the development of hiatal hernia.[21]

Hampel et al conducted a meta-analysis of the association of obesity and GERD-associated problems from nine studies which evaluated the association of body mass index (BMI) with GERD symptoms. From this meta-analysis study, it was found that there was an association between BMI and the increase of odds ratio (adjusted pooled) for GERD symptoms 1.43 (95% CI: 1.158-1.774) for BMI 25 kg/m^2 to 30 kg/m^2 and 1.94 (95% CI: 1.468 -2.566) for BMI more than 30 kg/m^2. Obesity was associated with the statistically significant increase of GERD symptoms and the risk of this problem seemed to increase along with the increase of weight.[22]

To assess the association of coffee consumption on GERD, Kim et al performed a meta-analysis from fifteen case-control studies. From this meta-analysis, it was found that there was no significant association between coffee consumption and GERD. Odds ratio was 1.06 (95% CI: 0.94-1.19). However, in the subgroup analysis of the GERD group who were diagnosed using endoscopy, it was revealed that the odds ratio was significantly higher. In the subgroup analysis where the group was stratified based on the amount of coffee consumption, study quality, and exposure assessment, there was no significant association between coffee consumption and GERD.[17] Similarly, this study also did not observe a significant association between the habit of coffee consumption and GERD.

The strength of this study was its settings, in a district hospital as primary referral center of patients with recurrent dyspepsia; thus, the prevalence of GERD and GERD-associated factors in the community can be identified since many dyspepsia patients seek for treatment in primary health care centres.[23] With this study and the high prevalence of GERD, all patients with dyspepsia complaints should be screened for GERD using the validated GERD questionnaire. The limitation of this study was the cross-sectional study design and the limited study variables; thus, a thorough analysis of all associated factors could not be performed.

CONCLUSION

The higher prevalence of GERD was found in patients complaining of dyspepsia. Dyspepsia is one of the most common symptoms observed in the primary health care centres. Dyspepsia can easily be screened and diagnosed using GERDq questionnaire in the Indonesian language which has been validated. Higher prevalence of GERD was obtained along with the increasing age, BMI, in active smoker, alcohol, coffee, and tea consumer. Further studies are required to assess the role of these habits and lifestyles in the development of GERD. Following the high prevalence of GERD in patients complaining of upper abdominal discomfort in this study, it is suggested to conduct screening using the validated Indonesian language GERDq questionnaire in primary health care centres, so that GERD can be diagnosed earlier and adequate treatment can be given.

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