The Prevalence and Risk Factors of GERD among Indonesian Medical Doctors

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Abstract

Background: Based on our knowledge, the study of gastrointestinal reflux disease (GERD) among certain profession has never been conducted. The aim of this study is to determine the prevalence and risk factors of GERD among Indonesian doctors. **Methods:** A consecutive study involving 515 doctors was conducted in October 2015. The GerdQ score was used to the diagnosis of GERD and determined its impact on daily life. All possible risk factors were also analysed. **Results:** A total of 515 subjects completed the questionnaire. The mean age of them was 41.37 ± 11.92 years old. Fifty-five percent of them were male and 60.6% general practitioners. The prevalence of GERD was 27.4% of which 21.0% was had GERD with low impact on daily life, and 6.4% was GERD with high impact on daily life. The statistically significant risk factors of GERD was found in age >50 y.o ($p = 0.002$; OR = 2.054), BMI >30 kg/m^2 ($p = 0.016$; OR = 2.53), and smokers ($p = 0.031$; OR = 1.982). Sex and education level were not found significant statistically as the risk factors of GERD. **Conclusions:** The prevalence of GERD among Indonesian physician was 27.4%. We found that age over 50 y.o, obesity and smoking habit were the risk factors of GERD in Indonesian doctors.

Keywords: GERD, physicians, prevalence, risk factors

Introduction

Gastroesophageal reflux disease (GERD) is one of the common gastrointestinal problems worldwide with a range of GERD prevalence was 18.1-27.8% in North America, 23.0% in South America, 8.8-25.9% in Europe, 11.6% in Australia and 8.7-33.1% in the Middle East. Lower prevalence was found in East Asia region, ranging from 2.5 to 7.8%.[1] Several studies in Iran population reported the prevalence of GERD was 6.3-18.3%. Also, a study in Pakistan showed higher prevalence, 24.0%.[2,3] Even the prevalence in East Asia region was relatively low, a hospital-based study in Indonesia found the prevalence of GERD among dyspeptic patient who underwent endoscopic procedure was 32.4%, higher.[4] Time trend studies have also reported the increase of GERD prevalence.[2]

GERD is known as a condition caused by abnormal reflux of gastric contents into the oesophagus so that the patients may complain heartburn, a burning sensation in the middle of the chest, and regurgitation, a moving upward sensation of stomach content. The inappropriate lower oesophagal sphincter closure categorised as the cause of gastric contents reflux.[5,6] Besides the gastrointestinal symptoms, GERD can also manifest in vary analysed oesophagal symptoms, such as dysphasia, chronic cough, laryngitis, and asthma-like-symptoms.[7]

Eighty percent of GERD symptoms may be persistent, and it implicates to increase the risk of several complications such as oesophagal ulcer, oesophagal stricture, Barrett's oesophagus, and adenocarcinoma.[8,9] Moreover, the persistent symptoms can reduce the work productivity and quality of life.[10]

The GERD diagnosis can be established in the setting of typical symptoms of heartburn and regurgitation.[11] Many studies develop easier tools to help the physicians in the diagnosing patient with GERD symptoms. The most recent instrument was GERD Questionnaire (GerdQ) which was created from three different validated questionnaires evaluated in the DIAMOND study.[12,13] GerdQ has been used worldwide as an easy way to predict the probability of GERD in patients with gastrointestinal symptoms. Validation study of GERDQ in the Indonesian language has been done before which showed that Indonesian version of GERDQ is reliable to be used to diagnose GERD based on the reported symptoms with the same cut-off point.[6]

Medical doctor has been known as one of high work-hour professions, with a range of 51 to 67 hours per week from various studies.[14-16] The general practitioner, internal medicine resident, and internal medicine specialist and subspecialist work for long hours in a quite stressful environment and spend most of their time

in hospitals.[16] That kind of physician could be highly potential burnout. A Recent study showed that stress and shift duty influenced the amount of daily intake among health provider. Moreover, they were likely to eat fast food and snack, while fruits and vegetables were the less likely to be eaten under stress.[17] A study in Bahrain also revealed that 39% of the physician being overweight and 33% obese.[18] Meanwhile, previous studies have been proved that obesity was related to GERD.[19] Besides, low prevalence of *Helicobacter pylori* infection can influence the prevalence rate of GERD. In the previous study, several ethnics group found to have a lower risk of *H. pylori* infection.[20] Therefore, ethnicity and *H. pylori* infection can also be the factors that contribute the prevalence of GERD.

A Recent study among the certain population in Indonesia has never been conducted. This study was designed to determine the prevalence of GERD among Indonesian medical doctors using GerdQ as the diagnostic tool. We also analysed the demographic characteristics and possible risk factors of GERD.

Methods

Study design. The cross-sectional study involving 515 medical doctors was conducted in October 2015. The subjects fulfilled questionnaire containing demographic questions (i.e. sex, age, weight, height, ethnic, and educational level), validated Indonesian language GERD Questionnaire, and several questions about smoking habit and endoscopy history. People who fulfilled all questions would proceed as research subjects. We ruled out all incomplete questionnaire. All information about the subjects was confidential. The GerdQ score was used to diagnose GERD and determined its impact on daily life. All possible risk factors were also analysed to find its association with GERD. The protocol has been approved by the committee of the Medical Research Ethics of the Faculty of Medicine, Universitas Indonesia.

The GERD Questionnaire (GerdQ). The GerdQ is a self-assessment questionnaire that evaluates the presence of cardinal symptoms of GERD, heartburn and regurgitation, and its impact on daily life.[12] This questionnaire has been developed from three established GERD questionnaire instruments: the Reflux Disease Questionnaire, Gastrointestinal Symptom Rating Scale, and the Gastrointestinal Symptom Scale through Diamond Study.[6,21] The GERDQ is a simple communication tool which has been developed for physicians to identify patients with GERD.

The GerdQ consists of six questions about related symptoms in the last seven days as follows: heartburn, regurgitation, upper stomach pain, nausea, sleep difficulties due to heartburn and regurgitation, and

medication history to relieve the GERD symptoms. The first and last two questions are positive predictors of GERD, where a more frequent of symptoms, the higher the score. Meanwhile, the questions about nausea and abdominal pain are the negative predictors of GERD which is the score is in reverse. The last two questions (sleep difficulty and medication history) assess the influence of symptoms on daily life. GerdQ score of more than 8 is determined as high probability of GERD. If the total score for the last two questions (question number 5 and 6) is more than 2 (two), it is determined as GERD with high impact on daily life.

Data analysis. The survey results were input and analysed using SPSS 22.0 for windows. Descriptive statistics were presented as mean, the standard of deviation (SD), and proportion (%). The BMI was classified into two groups: <30 kg/m^2 and ≥ 30.0 kg/m^2.[22] Total GerdQ score were calculated by summing all of the scores for each question in the questionnaire, then classified as the mention above. Independent factors were analysed using multivariate analysis with backwards logistic regression methods. Statistically significant was determined by *p* value under 0.05 with 95% confidential interval (CI).

Results

Basic characteristics. The demographic distribution was presented in Table 1. As many as 515 subjects were recruited to this study. The mean of age was 41.37 ± 11.92 years old, 55.7% was male, and the mean of body mass index (BMI) was 23.62 ± 4.41 kg/m^2. General practitioner/bachelor graduates were found in 60.6% of subjects and the rest of them were specialist and subspecialist or PhD graduates.

GerdQ results. The prevalence of GERD in Indonesian medical doctors was 27.4% of which 21.0% was GERD with low impact on daily life, and 6.4% was GERD with high impact on daily life (Table 2). 72.6% of subjects had a GerdQ score below eight so that they oesophagal as low probability of GERD.

The heartburn symptoms appear more frequent than regurgitation. Heartburn symptoms found in 17.4% of subjects at least twice a week, meanwhile regurgitation was found in 15% of subjects for the same frequency. Sleep disturbance was experienced in 27.3% of subjects at least once a week. The heartburn and regurgitation symptoms implicated 35% of subjects took medication to relieve the symptoms at least once a week. Table 3 shows the proportion for each GerdQ question in all subjects.

Risk factors of GERD. Our study was analysed for potential risk factors of GERD (Table 4). Previous studies reported age, sex, education level, high body mass index, and smoker possibly increased the risk of

Table 1. Basic Characteristics of Subjects

Characteristics	Frequency (n)	Percent (%)
Mean of age (y.o)	41.37+11.92	
Mean of weight (kg)	64.87+13.50	
Mean of height (cm)	165.6+8.56	
Mean of body mass index (kg/m^2)	23.62+4.41	
Age Groups		
21-30 y.o	106	20.6
31-40 y.o	180	35.0
41-50 y.o	120	23.3
>50 y.o	109	21.2
Sex		
Male	287	55.7
Female	228	44.3
BMI Groups		
<18.5 kg/m^2	55	10.7
18.5-22.9 kg/m^2	171	33.2
23.0-24.9 kg/m^2	106	20.6
25.0-29.9 kg/m^2	152	29.5
>30kg/m^2	31	6.0
Ethnics		
Javanese	188	36.5
Sundanese	90	17.5
Batak	41	8.0
Minang	34	6.6
Chinese	33	6.4
Betawi	33	6.4
Bugis	16	3.1
Minahasa	14	2.7
Aceh	12	2.3
Palembang	11	2.1
Others	43	8.3
Educational Status		
Bachelor degree	312	60.6
Master degree/ specialist	194	37.7
Doctoral Degree/ Subspecialist	9	1.7
Smoking habit		
Non-smoker	467	90.7
Smoker	29	5.6
Ex-smoker	19	3.7

GERD. Then multivariate analysis was performed using backwards logistic regression analysis that can show only the statistic significant probability among the independent factors. Table 5 shows the result of

multivariate analysis of GERD risk factors. The statistically significant risk factors of GERD was found in age over 50 years old ($p = 0.002$; OR 2.054; 95% CI 1.299-3.247). BMI over 30 kg/m^2 ($p = 0.016$; OR 2.53; 95% CI 1.191-5.375), and smokers ($p = 0.031$; OR 1.982; 95% CI 1.063-3.694) also was showed statistical significance as the risk factors of GERD.

Table 2. Prevalence of GERD in Each Group of Age

Age	Low probability of GERD (n,%)	GERD with low impact on daily life (n,%)	GERD with high impact on daily life (n,%)
21-30 years old	77 (72.0)	24 (22.4)	6 (5.6)
31-40 years old	138 (76.7)	32 (17.7)	10 (5.6)
41-50 years old	92 (76.7)	21 (17.5)	7 (5.8)
>50 years old	67 (62.0)	31 (28.7)	10 (9.3)
Total	374 (72.6)	108 (21.0)	33 (6.4)

Table 3. Frequency of Symptoms during Previous Week in GERD Patients

Questions	Frequency of symptoms (n,%)			
	0 days	1 day	2-3 days	4-7 days
How often did you have a burning feeling behind your breastbone (heartburn)?	310 (60.2)	115 (22.3)	63 (12.2)	27 (5.2)
How often did you have stomach contents moving upwards to your throat or mouth (regurgitation)?	275 (53.4)	163 (31.7)	55 (10.7)	22 (4.3)
How often did you have a pain in the centre of the upper abdomen?	21 (4.1)	60 (11.7)	156 (30.3)	278 (54.0)
How often did you have nausea?	30 (5.8)	71 (13.8)	145 (28.2)	269 (52.2)
How often did you have difficulty sleeping because of your heartburn and/or regurgitation?	374 (72.6)	89 (17.3)	31 (6.0)	21 (4.1)
How often did you take additional medication for heartburn and/or regurgitation, other than what we physician told to you take?	335 (65.0)	100 (19.4)	56 (10.9)	24 (4.7)

Table 4. The Association of GERD and Several Possible Risk Factors

Characteristics	GERD (n,%)	Non-GERD (n,%)	p (CI 95%)	OR (CI 95%)
Sex				
Male	88 (30.7)	199(69.3)	0.061	1.460 (0.982-2.171)
Female	52 (23.2)	175(76.8)		
Age				
$\leq$50 y.o	100 (24.6)	307 (75.4)		
>50 y.o	42 (38.5)	67(61.5)	0.008	2.011 (1.195-3.382)
Education Status				
Bachelor/Doctor	86 (27.6)	226(72.4)	0.852	1.039 (0.694-1.555)
Master/Specialist	52 (26.8)	142(73.2)		
PhD/Subspecialist	3 (33.3)	6(66.7)	0.667	1.365 (0.329-5.659)
Body Mass Index				
<30 kg/m^2	127 (26.2)	357 (73.8)		
$\geq$30 kg/m^2	14 (45.2)	17 (54.8)	0.035	2.315 (1.109-4.832)
Smoking Habit				
Smoker	20 (41.7)	28 (58.3)	0.026	2.043 (1.110-3.759)
Non Smoker	121 (25.9)	346(74.1)		

Table 5. Result of Multivariate Analysis of GERD Risk Factors

Variables	p	OR (CI 95%)
Age >50 y.o	0.002	2.054 (1.299-3.247)
BMI >0 kg/m^2	0.016	2.53 (1.191-5.375)
Smoker	0.031	1.982 (1.063-3.694)

Discussion

The prevalence of GERD among medical doctors using GerdQ tools 27.4% (141 subjects). It consists of 21% (108 subjects) of GERD with low impact on daily life and 6.4% of GERD with high impact on daily life. Age > 50 years old, obesity and smoking habit were found statistically significant as the risk factors of GERD among medical doctors in Indonesia.

Our findings were similar to the prevalence in North America but higher than the findings in South America, Europe, Australia, and East Asia.[1] Similar study in Pakistan, Iran, and Korea reported GERD in the population was 6.3-18.3%, 24.0%, and 25% respectively.[2,3,23] Lower prevalence was also found in studies in India (7.6%), Japan (1.6%-16.3%), and China (3.1%).[1,24,25] A comparative study conducted by Mahadeva *et al.* reported the British have more prevalent GERD symptoms than South-east Asian population. They predicted the difference is probably due to both ethnic differences and environmental influences.[26] Therefore, the previous study conducted in Indonesia reported that the prevalence among dyspeptic patients was 32.4%, higher than our findings.[4] It might

be due to the study was conducted only among dyspeptic patients while our study was conducted in the general population. A hospital-based study in Jakarta revealed an increasing trend of GERD prevalence from 6% to 26% within 5 years.[3]

In our study, heartburn and regurgitation symptoms were presented in 39.8% and 46.6% of subjects respectively in vary frequency (from once a week to every day). This result was consistent with the previous study in Indonesia.[3] Because of these symptoms, 4.1% of the subjects had sleep disturbance every day, and 35% need medication to relieve the symptoms at least once a week.

Many factors were expected contribute to these findings, such as of obesity, alcohol consumption, and smoking habit. Medical doctors as one of high workload and high work-hour profession may potentially influence their eating habit. Though the GERD event among medical doctor has not been clear, some studies reported unhealthy diet, shift-work, and obesity among health profession that might be contributing to the GERD event.[17,27]

More male (55.7%) than female (44.3%) were included in this study. Most of the patients with GERD were male (88/62.9%), but it was not significantly difference ($p = 0.061$; OR = 1.460; 95% CI = 0.982-2.171). The association between GERD and gender has not shown consistency. Similar to our study, the study in Chinese population did not show any significant difference in gender related to GERD.[28] On the contrary, the studies in Japan and Greece reported that male is more prevalent than female.[29,30]

We found that age over 50 years old was a significant risk factor of GERD among doctors ($p = 0.002$; OR = 2.054; 95% CI = 1.299-3.247). This study revealed that the older the age, the higher the prevalence of GERD with high impact on daily life.[2] The prevalence of GERD with high impact on daily life in a group of age > 50 years old was 1.75 times higher than 21-30 years old group. Further study is needed to elaborate the reason behind this finding.

Obesity in Asian population was defined as BMI over 24.9 kg/m^2 (24.9-29.9 kg/m2 as obesity grade 1 and over 30.0 kg/m^2 as obesity grade 2).[22] We found that subjects with BMI $\geq$ 30 kg/m^2 have significantly higher risk of GERD ($p = 0.016$, OR = 2.53; 95% CI = 1.191-5.375). This finding was similar to a study in the Danish population.[19] The linkage between GERD and obesity is not clearly understood. It was predicted due to the insufficiency of the barrier to gastric reflux and the increasing intra-abdominal pressure. The alteration of bile and pancreatic function in obese patients are correlated with the composition of the refluxate products which are more toxic for esophagus.[31]

In the present study, GERD was significantly more prevalent in smokers ($p = 0.031$; OR = 1.982; 95% CI = 1.063-3.694). Our results were similar to study in Japan, Northern India, and Denmark.[19,32,33] A study in Japan also reported the risk of GERD among smokers is doubled if it overlaps with other functional gastrointestinal syndromes such as functional dyspepsia and irritable bowel syndrome.[32] Furthermore, a study in Japanese men revealed that an increase in some pack-years of cigarette smoking was significantly associated with an increased risk of GERD.[34] Different mechanisms have been suggested to justify the association between smoking and GERD. Cigarette smoking can reduce the lower oesophagal sphincter (LES) pressure and decrease salivary bicarbonate secretion so that the acid clearance is prolonged and the neutralising effect of saliva on intra oesophagal acid is reduced.[35]

Conclusions

The prevalence of GERD among Indonesian medical doctors was 27.4%. We conclude that age over 50 years old, obesity (BMI > 30 kg/m^2), and smoking habit were the risk factors of GERD in Indonesian medical doctors. Further study is needed to support these findings and explore other potential risk factors of GERD.

Conflict of Interest Statement

The Authors declare that there is no conflict of interest.

Acknowledgements

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