Correlation between Severity of Dyspepsia and *Helicobacter pylori* Infection

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ABSTRACT

***Background**: Dyspepsia is a common complaint in clinical practice. Correlation between Helicobacter pylori (H. pylori) and functional dyspepsia had been reported in many studies, but studies that analyzed the severity of dyspepsia and H. pylori were limited and the results were controversial. This study is about to know the correlation between the severity of dyspepsia and H. pylori infection.*

***Method**: A retrospective descriptive analysis to patients with dyspepsia at Permata Bunda Hospital, Medan was done in 2010-2014. Simple random sampling was done to get 44 patients with dyspepsia, 22 are H. pylori positive and 22 patients are H. pylori negative. The severity of dyspepsia assessed with Porto Alegre Dyspeptic Symptoms Questionnaire (PADYQ) scoring instrument. Univariate and bivariate analysis (Chi-square and Spearman correlation) were done using SPSS version 22.*

***Results**: Epigastric pain is the most common symptom in dyspepsia patients. There is a correlation between ulcer type dyspepsia and H. pylori infection (p = 0.030), while dysmotility type and mixed type were not correlated. The severity of epigastric pain has significant positive correlation with H. pylori (r = 0.386; p = 0.01), while the severity of other symptoms such as nausea, vomit, and abdominal bloating have negative correlation with H. pylori. Dyspepsia total scoring is significantly lower in H. pylori positive than in H. pylori negative (p = 0.033).*

***Conclusion**: There is a positive correlation between the severity of epigastric pain and H. pylori infection, negative correlation between the severity of nausea, vomit, and abdominal bloating and H. pylori infection, and correlation between lower dyspepsia total scoring and H. pylori infection.*

***Keywords:** dyspepsia, Helicobacter pylori, PADYQ, epigastric pain*

ABSTRAK

***Latar belakang:** Dispepsia merupakan keadaan klinis yang sering dijumpai dalam praktek sehari-hari. Hubungan antara Helicobacter pylori (H. pylori) dengan dispepsia fungsional telah banyak dilaporkan, tetapi masih sedikit penelitian yang menganalisis hubungan tingkat keparahan dispepsia dengan H. pylori dan hasilnya menunjukkan kontroversi. Penelitian ini bertujuan untuk mengetahui hubungan berat ringannya dispepsia dengan infeksi H. pylori.*

***Metode:** Penelitian ini merupakan penelitian deskriptif analitik secara retrospektif terhadap pasien dispepsia di Rumah Sakit Permata Bunda, Medan pada tahun 2010-2014. Dilakukan simple random sampling untuk mendapatkan 44 pasien dispepsia yang terdiri dari 22 pasien dengan H. pylori positif dan 22 pasien dengan H. pylori negatif. Berat ringannya gejala dispepsia dengan menggunakan skoring instrumen Porto Alegre Dyspeptic Symptoms Questionnaire (PADYQ). Dianalisis secara univariat dan bivariat (uji Chi-square dan korelasi Spearman) dengan SPSS versi 22.*

***Hasil:** Nyeri epigastrium merupakan gejala terbanyak yang dialami pasien dispepsia. Terdapat hubungan antara dispepsia tipe ulkus dengan infeksi H. pylori (p = 0,030), sementara tipe dismotilitas dan kombinasi tidak berhubungan dengan H. pylori. Terdapat korelasi positif antara beratnya nyeri epigastrium dengan H. pylori (r = 0,386; p = 0,01), dimana beratnya gejala mual dan muntah serta perut kembung berkorelasi negatif dengan*

infeksi H. pylori. Total skor dispepsia lebih rendah secara signifikan pada H. pylori positif dibandingkan H. pylori negatif (p = 0,033).

***Simpulan**: Terdapat korelasi positif beratnya nyeri epigastrium dengan infeksi H. pylori, korelasi negatif beratnya gejala mual dan muntah serta perut kembung dengan H. pylori, serta terdapat hubungan total skoring dispepsia yang lebih rendah pada infeksi H. pylori.*

***Kata kunci**: dispepsia, Helicobacter pylori, PADYQ, nyeri epigastrium*

INTRODUCTION

Dyspepsia (Greek language dys: bad; peptein: digestion) is a heterogen abnormality, presenting as one or more complaints or symptoms in epigastric area. Episode of the complaint appears any time in individual, chronic in characteristic and tends to reccur.[1,2] Dyspepsia is a clinical condition commonly encountered in daily practice. In Indonesia, it is estimated that there are 30% cases diagnosed in general practice and 60% are found in specialist practice.[3] Based on Indonesian Health Profile 2007, dyspepsia had already ranked 10th in the category of most common disease in hospitalized patients with total hospitalized patients of 34,029 or about 1.59% in 2006.[4] Dyspepsia is not a diagnosis, but it is a syndrome. Based on Rome III criteria, typical dyspepsia is the presence of one or more complaints of postprandial fullness, early satiation, epigastric pain, and epigastric burning.[1] Dyspepsia complaints are known as one of the causes of significant financial loss due to the cost for diagnostic procedures or examinations or even due to absence rate and decreased productivity.[5]

Correlation between functional dyspepsia and *H. pylori* has been reported.[6] *H. pylori* is a negative gram bacteria which is able to colonize and infect the stomach. In the stomach, *H. pylori* is found in more than 50% human. *H. pylori* infection is the most common cause of chronic gastritis in the whole world.[7]

Several scoring criteria have been arranged to evaluate presence and severity of dyspepsia. These scoring systems are reliable and valid to measure frequency and severity of dyspepsia symptoms.[8] This study was aimed to evaluate the correlation between severity of dyspepsia and *H. pylori* infection.

METHODS

This study was a retrospective descriptive analytical study performed in dyspepsia patients in Permata Bunda Hospital, Medan in year 2010-2014. Simple random sampling was performed to obtain 44 dyspepsia patients, consisting of 22 patients with positive *H. pylori* and 22 patients with negative *H. pylori*. Positive *H. pylori* was evaluated from one positive result in campylobacter like organism (CLO) test or urea breath test.

Inclusion criteria was all adult patients aged >18 year old with dyspepsia who met diagnosis criteria of dyspepsia based on Rome III criteria; fulfilled by presence of one of the symptoms of postprandial fullness (fullness, discomfort after normal size meal), early satiation (unable to finish normal size meal), epigastric pain, epigastric burning, in which those symptoms has been experienced in the last 3 months with the onset of symptoms at least 6 months before diagnosis, and no structural abnormality from endoscopy. Exclusion criteria are patients with stomach malignancy and presence of stomach surgery which omitted some part of gastric mucosa, such as partial gastrectomy.

Scoring of dyspepsia symptoms was performed using porto alegre dyspeptic symptoms questionnaire (PADYQ), which was a questionnaire instrument with 11 questions to evaluate dyspepsia symptoms including epigastric pain, nausea, vomiting, fullness, and early satiation. Epigastric pain, nausea, upper bloating was evaluated by its intensity, duration, and frequency; while vomiting and early satiation were evaluated by its frequency.[9] Score of each symptom were averaged and summed, also were categorized into 3 types, such as: ulcer type, dysmotility type, and combination type.

Univariate and bivariate analysis were performed (using Chi-square test and Spearman correlation) with significance of $p < 0.05$ using SPSS version 22.

RESULTS

From 44 patients with dyspepsia, it was obtained that the average age of patients was 49 year old, with youngest age 19 year old and oldest age 74 year old. Age group 46-60 year old and 30-45 year old were the most frequent age group who experienced dyspepsia.

Table 1. General characteristics of patients

Characteristics	*Helicobacter pylori*		Total n (%)
	Positive	Negative	
Sex			
Male	16 (36.36%)	15 (34.09%)	31 (70.45%)
Female	6 (13.64%)	7 (15.91%)	13 (29.55%)
Age (years)			
< 30	2 (4.55%)	1 (2.27%)	3 (6.82%)
46 - 45	8 (18.18%)	7 (15.91%)	15 (34.09%)
46 - 60	8 (18.18%)	9 (20.45%)	17 (38.64%)
> 60	4 (9.09%)	5 (11.36%)	9 (20.45%)
Ethnic			
Batak	14 (31.82%)	9 (20.45%)	23 (52.27%)
Acehnese	2 (4.55%)	3 (6.82%)	5 (11.36%)
Javanese	6 (13.64%)	10 (22.73%)	16 (36.36%)
Occupation			
Enterpreneur	6 (13.64%)	8 (18.18%)	14 (31.82%)
Employee	3 (6.82%)	1 (2.27%)	4 (9.09%)
Farmer	2 (4.55%)	3 (6.82%)	5 (11.36%)
Housewife	4 (9.09%)	7 (15.91%)	11 (25%)
Civil servant	2 (4.55%)	1 (2.27%)	3 (6.82%)
Others	5 (11.36%)	2 (4.55%)	7 (15.91%)
Nutrition status			
Normal	14 (31.82%)	18 (40.91%)	32 (72.73%)
Underweight + overweight	8 (18.18%)	4 (9.09%)	12 (27.27%)
Total	22 (50%)	22 (50%)	44 (100%)

Table 2. Clinical manifestation of dyspepsia based on PADYQ

Symptoms	Total n (%)	Average score	Comparison between average score and maximum score
Epigastric pain	28 (63.64%)	6.93 (max. 12)	0.58
Nausea, vomiting	22 (50%)	8.09 (max. 16)	0.51
Bloating	27 (61.36%)	7.85 (max. 12)	0.65
Early satiation	19 (43.18%)	1.68 (max. 4)	0.42

PADYQ: porto alerge dyspeptic syndrome questionnaire

From Table 2, it was shown that main symptoms of dyspepsia patients were epigastric pain 63.64% followed by bloating 61.36%. Patients who experienced nausea and vomiting symptoms 50%, and early satiation 43.18%.

From this study, it was known that epigastric pain was the most common symptom experienced by dyspepsia patients, while bloating was the most severe symptom felt by patients. With average score of 7.85 which in comparison to the maximal score, it was obtained 0.65 score higher compared to the other symptoms. Meanwhile, early satiation was the least frequent symptom experienced by dyspepsia patients, also was less severe complaint compared to the other symptoms.

This scoring was a combination of intensity, duration, and frequency of each symptoms. For early satiation, PADYQ instrument only evaluated the frequency, therefore the maximal score was lower compared to the other symptoms.

Table 3. Classification of dyspepsia symptoms

Symptoms	Total n (%)
Ulcer type	17 (38.64%)
Dysmotility type	15 (34.09%)
Combination type	12 (27.27%)

Dyspepsia symptoms are categorized into three types, which are ulcer type, dysmotility type, and combination type. It could be seen that ulcer type dyspepsia was the most common type (38.64%), followed by dysmotility type (34.09%), and combination type (27.27%).

Table 4. Average scoring of dyspepsia symptoms in positive and negative *Helicobacter pylori*

Symptoms	Average score of *Helicobacter pylori*	
	Positive	Negative
Epigastric pain	5.77	3.05
Nausea, vomiting	2.55	7.09
Bloating	2.18	5.91
Early satiation	0.59	0.86

From Table 4, it was observed that the average score for epigastric pain was higher in positive *H. pylori*. Conversely, average score for nausea and vomitting, bloating, and early satiation were higher in negative *H. pylori*.

Table 5. Correlation between dyspepsia symptoms scoring and *Helicobacter pylori* infection

Symptoms	Coefficient correlation	p
Epigastric pain	0.386	0.010*
Nausea, vomiting	-0.427	0.004*
Bloating	-0.486	0.001*
Early satiation	-0.156	0.313

*p = < 0.05

From Table 5, there was positive correlation between epigastric pain symptoms scoring and positive *H. pylori* (r = 0.386; p = 0.01), where the average score in positive *H. pylori* was higher compared to negative *H. pylori.* Meanwhile the scoring of nausea and vomiting symptoms, and scoring of bloating symptoms were negatively correlated with positive *H.pylori*, r = -0.427; p = 0.004; and r = -0.486; p = 0.001, respectively. Scoring of early satiation did not correlate significantly with *H. pylori* but it could be seen in Table 4 that scoring of early satiation was higher in negative *H. pylori* compared to positive *H. pylori*.

From Table 6, it was known that there was relationship between ulcer type dyspepsia and *H. pylori* (p = 0.030), where from 17 patients experiencing ulcer type dyspepsia, 12 patients were infected with *H. pylori*. Meanwhile dysmotility and combination type dyspepsia did not correlate with *H. pylori* infection.

Although there was no significant association between dysmotility type and *H. pylori* infection (p = 0.112), patients with dysmotility type dyspepsia

were less prone to *H. pylori* infection. From 15 patients with dysmotility type, 10 patients were not infected with *H. pylori*.

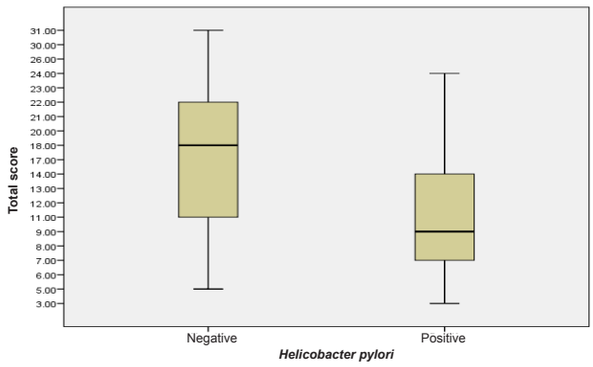

Figure 1. Boxplot correlation between *Helicobacter pylori* infection and total scoring of dyspepsia

From Table 7 and boxplot correlation, there was significant correlation between patients' low total score of dyspepsia and *H. pylori* infection (p = 0.033), where from 25 patients with low total score, 16 patients were infected with *H. pylori*. Therefore, infected *H. pylori* patients tend to have less dyspepsia complaints compared to negative *H. pylori*.

DISCUSSION

Dyspepsia is one of the most common complaints encountered in daily practice. In Western countries, 60% cases of patients is dyspepsia.[10-12] Dyspepsia itself becomes distinctive economic burden because it oftenly afflicts productive age group, thus decreases working performance in addition to diagnostic procedures and treatment expenses. From this study, it was found that the average age of dyspepsia patients was 49 year old which was categorized as productive age, with age group of 46-60 year old and 30-45 year old as age groups which experienced dyspepsia the most. It is not so different with study performed by Garg et al which reported that the average age of dyspepsia patients was 47 year old and was in concordance with study conducted by Aydin et al and Mustapha et al which stated the average age was 47.2 year old.[13-15]

From this study, it was obtained that the majority of dyspepsia patients were male (70.45%). Ratio between male and female was 2.3 : 1. Meanwhile, in positive *H. pylori* group, the ratio between male and female was 2.67 : 1. In negative *H. pylori* group, the ratio between male and female was 2.14 : 1. The result of this study was consistent with other studies, stating that male experienced dyspepsia more frequently than female. Shrivastava et al reported the ratio between male and female was 1.8:1.[6] Darya et al stated the ratio between male and female was 2.2 : 1.[16]

In this study, it was found that epigastric pain was the most common symptom experienced by dyspepsia patients, followed by bloating. This study was in line with the study performed by Lee et al in dyspepsia patients in Jamaica, which concluded that epigastric pain was the most frequent symptoms experienced by 76% dyspepsia patients. Less patients experienced bloating, nausea, vomiting, and early satiation.[5]

Ulcer type dyspepsia was the most common type found in 38.6% patients, followed by dysmotility type (34.1%), and combination type (27.3%). Meanwhile, Saruc et al reported that ulcer type dyspepsia was the most frequent type found (35.6%), followed by combination type (33.1%) and dysmotility type (31.2%) respectively.[17]

There was a correlation between ulcer type dyspepsia and *H. pylori* (p = 0.030). Although there was no significant correlation between dysmotility type dyspepsia and *H. pylori* infection (p = 0.112), patients

Table 6. Relationship between symptoms of ulcer, dysmotility, and combination type and *Helicobacter pylori*

Symptoms	*Helicobacter pylori*		Total n (%)	Value	p
	Positive	Negative			
Ulcer type				4.697	0.030*
Yes	12 (27.27%)	5 (11.36%)	17 (38.64%)		
No	10 (22.73%)	17 (38.64%)	27 (61.36%)		
Dysmotility type				2.529	0.112
Yes	5 (11.36%)	10 (22.73%)	15 (34.09%)		
No	17(38.64%)	12 (27.27%)	29 (65.91%)		
Combination type				0.458	0.498
Yes	5 (11.36%)	7(15.91%)	12 (27.27%)		
No	17 (38.64%)	15 (34.09%)	32 (72.73%)		

p = < 0.05

Table 7. Association between dyspepsia total scoring and *Helicobacter pylori* infection

Symptoms	*Helicobacter pylori*		Total	Value	p
	Positive	Negative			
Total score					
≥ 13	6 (13.64%)	13 (29.55%)	19 (43.18%)	4.539	0.033*
< 13	16 (36.36%)	9 (20.45%)	25 (56.82%)		

with dysmotility type dyspepsia were less prone to *H. pylori* infection. Of all patients with dysmotility type, 66.67% did not experience *H. pylori* infection. This was in concordance with other studies. Perri et al reported that more ulcer type dyspepsia patients experienced *H. pylori* infection significantly compared to patients with dysmotility type ($p = 0.026$).[18] Study conducted by Saruc et al also obtained the similar results, that *H. pylori* infection was more often in ulcer type compared to dysmotility type ($p = 0.01$), but there was no difference compared to combination type ($p = 0.08$).[17]

Average score for epigastric pain was 5.77 in positive *H. pylori*, whereas average score for epigastric pain in negative *H. pylori* was 3.05. Thus, not only more patients with positive *H. pylori* experienced epigastric pain but also the intensity, duration, and frequency were more severe compared to the negative *H. pylori* group. In contrast, other symptoms such as: bloating, nausea and vomiting, and early satiation in which the severity of these symptoms was more correlated with negative *H. pylori*. Average score for bloating in positive *H. pylori* was 2.55 and negative *H. pylori* was 7.09. Average score for nausea and vomiting in positive *H. pylori* was 2.18 and in negative *H. pylori* was 5.91. Meanwhile average score for early satiation in positive *H. pylori* was 0.59 and negative *H. pylori* was 0.86.

Bazzoli et al reported that epigastric pain and epigastric burning were *H. pylori* infection associated symptoms.[19] Other studies by Abahussain et al also reported burning sensation in the epigastric area was related significantly with *H. pylori*.[20] However, because this study used PADYQ instrument, therefore epigastric burning in dyspepsia patients were not evaluated.

In this study Rome III inclusion criteria was used, which was fulfill one symptom of postprandial fullness, early satiation, epigastric pain, epigastric burning; in which this symptom was experienced in the last 3 months with the onset of symptom at least 6 months before diagnosis, also no structural abnormality from endoscopic. However this study did not evaluate the severity of postprandial fullness or epigastric burning because these 2 symptoms were not evaluated in PADYQ instrument. This was the weakness of PADYQ instrument.

There was correlation between PADYQ total score and *H. pylori* ($p = 0.033$), in which patients with positive *H. pylori* tend to have lower total score. Study performed by Bode et al in pre-school children in Germany also obtained similar result, which was total symptoms scoring was significantly lower in *H. pylori* infected children.[21] Similarly, Josh et al reported that dyspepsia scoring in negative *H. pylori* was higher compared to positive *H. pylori*.[22]

Patients with *H. pylori* infection tend to be asymptomatic or had less dyspepsia complaints compared to negative *H. pylori*. From this study, it was obtained that *H. pylori* patients tend to have only epigastric pain which was more severe compared to negative *H. pylori*. While positive *H. pylori* patients were less frequent to experience nausea and vomiting, bloating, and early satiation. Also nausea and vomiting, bloating, and early satiation were more severe (higher score) in negative *H. pylori*. This obviously caused total dyspepsia scoring in *H. pylori* patients to be lower.

This study was expected to be beneficial in helping clinicians predict the presence of *H. pylori* infection by evaluating patients' symptoms before patient undergo CLO test or even urea breath test.

CONCLUSION

From this study, it could be concluded that there was positive correlation between severity of epigastric pain and *H. pylori* infection, negative correlation between severity of nausea and vomitting and bloating with *H. pylori* infection, and correlation between low total dyspepsia score and *H. pylori* infection.

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