Prevalence of Peptic Ulcer Disease and Associated Factors Among Dyspeptic Patients At Endoscopy Unit, University of Gondar Hospital, Northwest Ethiopia

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Research Article

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Abstract

Background: Dyspepsia is a common complaint in upper gastrointestinal disorders. It is described as predominant epigastric pain lasting for at least one month. Peptic Ulcer Disease (PUD) occurs in 5-15% of patients with dyspepsia. Helicobacter pylori (H.pylori) infection and non-steroidal anti-inflammatory drugs (NSAIDs)/aspirin (ASA) use are widely known risk factors for PUD. This research article aimed to determine the prevalence of PUD and associated factors among dyspeptic patients at the endoscopy unit, University of Gondar hospital, Northwest Ethiopia.

Methods: A hospital-based cross-sectional study was conducted at University of Gondar hospital. A sample of 218 adults who presented with the complaint of dyspepsia, and underwent endoscopic evaluation were interviewed from June 1 to November 30, 2020. A consecutive sampling method was used to recruit the study subjects. Relevant clinical history was obtained from patients' medical records. Upper gastrointestinal endoscopy was used to confirm the presence of peptic ulcer disease. The Data were entered into EpiData version 4.6.0.2 and exported to SPSS version 20 for analysis. Logistic regression analysis was used to identify associated factors with the occurrence of PUD among dyspeptic patients. P-value <0.05 was used to declare a statistically significant association.

Results: A total of 218 dyspeptic patients who underwent upper gastrointestinal endoscopic evaluations were included in the study. The PUD was diagnosed in one-third of patients with dyspepsia. Dyspeptic patients with active H. pylori infection (AOR=6.3, 95%CI: 2.96-13.38) and NSAIDs/ASA use (AOR=6.2, 95%CI: 2.93-13.36) were at higher risk of developing PUD.

Conclusion: The magnitude of active H. pylori infection among symptomatic PUD patients was high. So then, a "test-and-treat" strategy is advised. Cautious use of NSAIDs/ASA is required as it is readily available over-the-counter.

Background

Dyspepsia is a common complaint in upper gastrointestinal disorders. It is described as predominant epigastric pain lasting for at least one month. It can be associated with abdominal fullness, bloating, nausea, early satiety and epigastric burning. Globally, dyspepsia occurs in 10-20% of adults, and accounts for 3% of medical office visits. Dyspepsia has an impact on quality of life of patients and expenses to the health care service (1, 2). Peptic ulcer disease (PUD) occurs in 5-15% of patients with dyspepsia (3, 4). Imbalances in defensive and aggressive factors play a role in gastroduodenal mucosal injuries (3, 4). Helicobacter pylori (H.pylori) infection and nonsteroidal antiinflammatory drugs (NSAIDs)/aspirin (ASA) use are the major components of aggressive factors (3–8). H. pylori is the most prevalent human pathogen, which establishes chronic infection. H. pylori is widely known to cause gastritis and peptic ulcer disease. Also, it is attributed to gastric cancer and gastric B-cell lymphoma (3–6). Use of NSAIDs is recognized to cause erosive gastritis and peptic ulcer disease. Its use is ubiquitous worldwide and has increased occurrence of PUD by 3-to-5 fold (7–9). Other less frequently implicated risk

factors include genetics, stress, diet, alcohol and smoking (10, 11). This study aimed to determine the prevalence of peptic ulcer disease and associated factors among dyspeptic patients at the University of Gondar hospital, northwest Ethiopia.

Methods

Study design and setting

A hospital-based cross sectional study was conducted at the endoscopy unit, University of Gondar hospital between June 1, 2020 and November 30, 2020. The hospital is located in Northwest Ethiopia, which is 750 km away from the capital, Addis Ababa. The hospital had a catchment population of 5 million people. Endoscopy unit at University of Gondar hospital provides endoscopic services for patients with gastrointestinal disorders.

Study population and study subjects

All patients who underwent endoscopic evaluation at endoscopy unit, University of Gondar hospital were the study population. Adults 18 years or older who presented with a complaint of dyspepsia, and underwent endoscopic evaluation at the endoscopic unit, University of Gondar hospital during the study period were the study subjects. The sample size was calculated using a single population proportion formula with the assumption of 95% confidence level, 5% margin of error, and taking a 15% estimated proportion of peptic ulcer disease among dyspeptic patients. The estimated sample size was 218 and consecutive sampling method was used to recruit them. Adults 18 years or older who presented with a complaint of dyspepsia, and underwent endoscopic evaluation at the endoscopic unit during the study period were included in the study, while study subjects who were on antibiotics or PPI in the last three weeks, had alarm symptoms, had contraindication to endoscopy or refused to undergo endoscopic evaluation were excluded from the study.

Study variables and data collection procedures

The dependent variable for this study was Peptic Ulcer Disease (PUD), and the independent variables were socio-demographic characteristics (include age, gender, residence, marital status, and socioeconomic status), Clinical characteristics (include H. pylori infection, NSAIDs/ASA use, presence of co-morbidities) and Behavioral factors (include smoking and alcohol consumption)

Data were collected through an investigator administered pre-designed questionnaire. The questionnaire was prepared in English and translated into the local language (Amharic) for data collection, and then re-translated back to English while maintaining its consistency. Patients were interviewed to obtain socio-demographic data, and relevant clinical history was obtained from patients' medical records. Lidocaine (2%) throat spray and IV midazolam (2mg/ml) were used as local anesthetic and sedative agents, respectively, before the procedure. A flexible fiber optic endoscope (Olympus, GIF-H170) was used for the procedure. All endoscopic procedures were conducted by trained physicians (internists and surgeons).

Diagnoses of endoscopic appearances were at the discretion of the endoscopist. Endoscopic findings were documented on endoscopy registry book and patients' medical records. Diagnosis of H. pylori infection was made using the H.pylori Ag Rapid Test CE (CTK Biotech) (13).

Data management and analysis

Data were entered into EpiData version 4.6.0.2 and exported to SPSS version 20 for analysis.

Categorical variables were reported as counts (percentages) and continuous variables as mean with standard deviation. The results were summarized by using frequency, tables and graphs. Bi-variate and multi-variate logistic regression models were constructed to identify independently associated factors with peptic ulcer disease among dyspeptic patients. Those variables with a P-value < 0.25 in the bi-variate analysis were exported to multi-variate. The crude odds ratio (COR) and adjusted odds ratio (AOR) were reported. P-value < 0.05 was used to declare a statistically significant association.

Ethical considerations

The research protocol complied with the Declaration of Helsinki and ethical clearance was obtained from the Institutional Review Board (IRB) of the College of Medicine and Health Sciences, University of Gondar (19/02/2020, IRB No. 1267/02/2020). Study subjects were recruited only after written informed consent was obtained. All data obtained were treated confidentially. Those patients who were found to have peptic ulcer disease among H. pylori positive patients were taken care of as per the recommendation of 2017 ACG clinical guideline: Treatment of Helicobacter pylori infection (14).

Definition of Terms

Dyspepsia is predominant epigastric pain lasting for at least one month.

Peptic ulcer disease is a defect in the gastric or duodenal mucosa that extends through the muscularis mucosa layer of the wall.

Alarm symptoms are symptoms likely indicate serious gastrointestinal diseases including malignancy, such as intractable vomiting, dysphagia, anemia, weight loss, or hematemesis or melena.

The endoscopy unit is a dedicated place in the University of Gondar hospital where endoscopic procedures are performed to visualize both upper and lower gastrointestinal structures. The procedures are performed by trained physicians (internists and surgeons) and the unit has additional staff members such as nurses and cleaners.

Results

Socio-demographic characteristics of study subjects

A total of 218 dyspeptic patients underwent upper gastro intestinal endoscopic evaluations were included in the study. The mean age of patients was 42 years (± 16.3 SD). Among the study subjects, more than half (54%) were males and urban dwellers (58%). More than a third (36%) had a history of alcohol consumption, while less than five percent (4.6%) of them smoked cigarettes (Table-1).

Table-1: Socio-demographic characteristics of dyspeptic patients, who underwent upper gastrointestinal endoscopic evaluation at endoscopy unit, University of Gondar hospital, June 1 to November 30, 2020

Characteristics	Category	Frequency	Percentage
Age	18-28	59	27.1
	29-40	56	25.7
	41-55	51	23.4
	56+	52	23.8
Sex	Male	118	54.1
	Female	100	45.9
Marital Status	Single	58	26.6
	Married	139	63.8
	Divorced	14	6.4
	Widowed	7	3.2
Residence	Urban	126	57.8
	Rural	92	42.2
Religion	Orthodox Christian	186	85.2
	Protestant Christian	7	3.2
	Muslim	25	11.6
Level of Education	Didn't join school	72	33.1
	Elementary school	44	20.2
	Secondary school	40	18.3
	College graduate	31	14.2
	Degree graduate and above	31	14.2

Clinical characteristics of study subjects

Endoscopic findings

Peptic ulcer disease (PUD) was diagnosed in one-third (35%) of patients with dyspepsia. Two-thirds (72%) of PUD cases had duodenal ulcers. Other organic causes of dyspepsia were gastritis/doudenitis (19%), gastric mass (6%) and pyloric obstruction (4%). About one-third (36%) had functional dyspepsia (Figure-1).

H. pylori infection rate

Half (49%) of dyspeptic patients had active H. pylori infection. Two-thirds (71.1%) of PUD patients had active H. pylori infection. The majority (85%) of H. pylori infections among PUD cases had duodenal ulcer.

NSAIDs/ASA users

NSAIDs/ASA were used by forty percent (39.5%) of dyspeptic patients. More than half (54.7%) of NSAIDs/ASA users were diagnosed to have PUD.

Co-morbidities

One-third (29%) had co-morbidities, including cardiovascular diseases, rheumatologic diseases, chronic airway diseases, and HIV infection.

Factors associated with risk of developing PUD among dyspeptic patients

Multivariable logistic regression analysis revealed dyspeptic patients with active H. pylori infection and NSAIDs/ASA use were at risk of developing PUD, while unmarried study subjects were protected from developing PUD (Table-2).

Table-2: Bi-variable and multi-variable regression analysis of factors associated with peptic ulcer disease in upper gastrointestinal endoscopy evaluated dyspeptic patients at endoscopy unit, University of Gondar hospital, northwest Ethiopia, June 1 to November 30, 2020

Variables		PUD		COR (CI)	AOR (CI)
		Yes	**No**		
Age	18-28	19	40	1	1
	29-40	20	36	0.897(0.407-1.978)	0.416(0.143-1.209)
	41-55	19	32	1.049(0.476-2.314)	0.796(0.274-2.309)
	+55	18	34	1.122(0.501-2.509)	0.542(0.178-1.670)
Sex	Male	44	74	0.791(0.451-1.388)	1.406(0.702-2.817)
	Female	32	68	1	1
Residence	Urban	45	81	1.093(0.621-1.924)	0.739(0.368-1.484)
	Rural	31	61	1	1
Marital Status	Unmarried	20	59	0.502(0.273-0.925)	0.367(0.154-0.887) *
	Married	56	83	1	1
Alcohol drinking	Yes	24	54	0.752(0.417-1.358)	0.488(0.227-1.047)
	No	52	88	1	1
Cigarettes smoking	Yes	6	4	2.957(0.808-10.823)	3.153(0.585-16.998)
	No	70	138	1	1
Co morbidity	Yes	13	30	0.770(0.375-1.583)	0.721(0.276-1.881)
	No	63	112	1	1
H-Pylori infection	Positive	54	53	4.122(2.259-7.519)	6.298(2.965-13.378)*
	Negative	22	89	1	1
NSAIDS/ASA use	Yes	47	39	4.280(2.369-7.734)	6.252(2.925-13.362) *
	No	29	103	1	1
Key: * indicates P<0.05					

Dyspeptic patients with active H. pylori infection had six times higher odds of having PUD compared with their counter facts (AOR=6.3, 95%CI: 2.96-13.38). Patients who used NSAIDs/ASA had also six times higher of PUD compared with those who did not (AOR=6.25, 95%CI: 2.92-13.3. Unmarried individuals reduced the odds of developing PUD by 63.3% (AOR=0.367, CI=0.15 - 0.89).

Discussion

Among a total of 218 dyspeptic patients, active H. pylori infection was documented in half (49%) of study subjects. Likewise, the H. pylori infection rate among PUD patients was 71%. These findings were congruent with hospital-based sub-Saharan African (SSA) reports. The African reports verified that 40-65% of dyspeptic and 60-90% PUD patients were positive for H. pylori infection (16–19). The Ethiopian pooled prevalence of H. pylori infection was 52% in a recent hospital-based meta-analysis (20). The global magnitude of H. pylori infection was 34% in Western Europe, 37% in Northern America, and 70% in Africa (12). The global difference in the magnitude of the H. pylori infection rate could be explained by the difference in socio-economic status, environmental sanitation, living conditions, and personal hygiene. In this study, PUD (35%) was the commonly observed abnormal endoscopic lesion, followed by gastritis/duodenitis (19%) and gastric mass (6%). A Ghanaian study reported that PUD (54%) followed by gastric cancer (12%) were the most frequently detected endoscopic findings. While studies in Tanzania, Nigeria and Kenya witnessed gastritis (61-86%) followed by PUD (14-24%) were the commonly observed endoscopic pathologies. The difference in the type of gastroduodenal lesions among dyspeptic patients in African reports could be explained by differences in patient characteristics (age, genetics), H. pylori virulence strain, NSAIDs/ASA exposure rate, lifestyle preferences (smoking, alcohol), and other environmental factors (16–18). This study revealed that nearly forty percent (39%) of dyspeptic patients had a history of NSAIDs/ASA use, and more than half (55%) of NSAIDs/ASA users developed PUD. Western literature reviews documented that dyspepsia occurred in up to half (50-60%) of patients taking NSAIDs/ASA, and up to a third (15-30%) of patients using NSAIDs/ASA developed PUD (7–9). On multivariable logistic regression analysis, odds of developing PUD was 6 fold higher among dyspeptic patients with H. pylori infection than those with negative H. pylori infections (AOR=6.298, 95%CI: 2.965 - 13.378). It was confirmed that H. pylori establishes prolonged gastro duodenal mucosal infection, and leads to chronic active gastritis and PUD (3–6, 16–19). Dyspeptic patients who use NSAIDs/ASA had 6 fold increased risk of developing PUD compared to non-NSAIDS/ASA users (AOR=6.252, 95%CI: 2.925-13.362). NSAIDs/ASA interfere with the cyclo-oxygenase (COX) pathway and deplete biosynthesis of gastric prostaglandins. In addition, NSAIDS/ASA are weak acids which cause direct gastric mucosal toxic injury (3, 4, 7–11). Study subjects with unmarried status were 60% protected from developing PUD as compared to their counter parts (AOR=0.367, 95%CI=0.154-0.887). Reduced family size and non-crowded living condition among unmarried subjects might contribute to reduced H. pylori infection rate and occurrence of PUD.

Strength And Limitation Of The Study

The major strength of this study was its prospective study design, which allowed collecting reliable data. The limitation of the study was selection bias as referred patients with dyspepsia were included.

Conclusions

Peptic ulcer disease (PUD) was diagnosed in one-third of patients with dyspepsia. Two-thirds of PUD patients had active H. pylori infection. NSAIDs/ASA were used by forty percent of dyspeptic patients. Half

of NSAIDs/ASA users were diagnosed to have PUD. Dyspeptic patients with active H. pylori infection and NSAIDs/ASA use were at risk of developing PUD. The magnitude of active H. pylori infection among symptomatic PUD patients was high. So then, a ‘test-and-treat’ strategy is advised. Cautious use of NSAIDs/ASA is required as it is readily available over-the-counter.

Abbreviations

ACG: American College of Gasrtoenterology; ASA: Aspirin; AOR: Adjusted Odds Ratio; CI; Confidence Interval; COR: Crude Odds Ratio, H.pylori, Helicobacter pylori, IV: Intravenous; NSAIDs, Nonsteroidal Anti-inflammatory Drugs; PPI: Proton Pump Inhibitors; PUD: Peptic Ulcer Disease

Declarations

Ethics approval and consent to participate

The study was performed in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of College of Medicine and Health Sciences, University of Gondar (19/02/2020, IRB No. 1267/02/2020). Written informed consents for participation were obtained from study subjects or their caregivers.

Consent for publication

Written informed consent for publication was obtained from study subjects.

Availability of data and materials

All data generated and analyzed were included in this research article.

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Authors’ contributions

Belete Assefa contributed to the conception, design, data collection, analysis, writing, and review of the manuscript. Abilo Tadesse contributed to the conception, design, analysis, writing and review of the manuscript. Zenahbizu Abay, Alula Abebe, Tsebaot Tesfaye, Melaku Tadesse and Ayenew Molla

contributed to conception, design, analysis and review of the manuscript. All authors read and approved the final manuscript and approved its submission for publication.

Competing interests

The authors declare that they have no competing interests.

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Figures

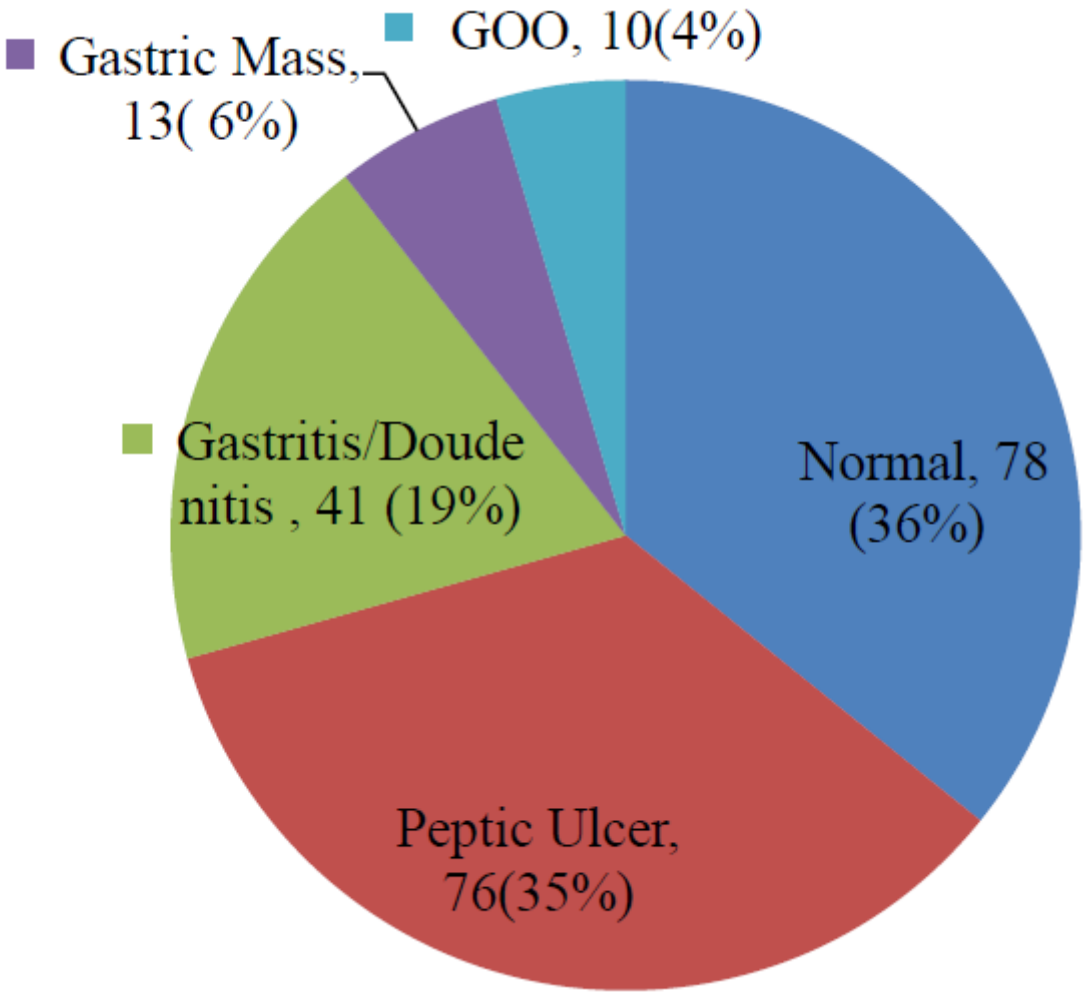

Figure 1

Endoscopic findings among patients with dyspepsia University of Gondar hospital, 2020