

Prevalence of Peptic Ulcer Disease among the Patients with Abdominal Pain Attending the Department Of Medicine in Dhaka Medical College Hospital, Bangladesh

Dr. Rafi Abul Hasnath Siddique

Abstract: Peptic Ulcer Disease or PUD, one of the most common ulcers, refers to ulcer of the gastrointestinal tract in the region of the stomach. This is an important cause of morbidity and mortality throughout the world affecting the lives of millions of people in their everyday life. However, sufficient and up-to-date data regarding the disease in Bangladesh are largely lacking. Therefore this descriptive study was conducted from June to December 2013 to explore the prevalence of peptic ulcer disease among the patients attending the department of medicine in Dhaka Medical College Hospital, Bangladesh. Detailed information was collected from the patients (respondents) and hospital files of 196 patients with peptic ulcer on a predesigned pro-forma and analyzed using SPSS 17 for frequencies and distributions. The study shows that 16.3%, 24%, 7.7%, 25.5% and 26.5% of the respondents belongs to age group of 15-20 years, 21-25 years, 26-30 years, 31-35 years and 36-45 years with the mean age Mean \pm SD=3.22 \pm 1.474. The study reveals that most of the respondents (62.8%) are Male and rests of them were Female (37.2%). Majority of the respondents (60.2%) had a family history of the disease and only 39.8% did not. The study shows that most of the respondents (33.7%) were higher secondary, 16.8% were undergraduate, 15.3% were postgraduate, 13.3% were secondary, 10.7% were illiterate and only 10.2% were primary. Most of the respondents (35.2%) are professional followed by 26% were technical, 19.9% were day labour and only 18.9% were farmer. Majority of the respondents' monthly family income about 53.6% was less than 10000 Tk, 36.2% of the respondents had 10001 to 20000 Tk, 3.1% had 20001 to 30000 Tk, 2.6% had 30001 to 40000 Tk, 1.5% had 40001 to 50000 Tk and 3.1% had an income above 50001 Tk. The problems of the disease can be tackled through prevention and treatment which includes education, increasing awareness, reducing stress, smoking and decreased intake of NSAIDs.

I. Introduction

1.1 Introduction

Peptic Ulcer Disease or PUD, one of the most common ulcers, refers to ulcer of the gastrointestinal tract in the region of the stomach. It is characterized by high acidity resulting in mucosal erosions causing extreme pain and discomfort. By definition, mucosal erosions should be equal to or exceed 0.5 cm.¹ It is the end result of an imbalance between the digestive fluids in the stomach and the duodenum. Most ulcers are caused by an infection, not spicy food, acid or stress.

The stomach and the duodenal lining have several mechanisms that prevent ulcers from developing. A coating of mucus protects the stomach lining from the effects of acidic digestive juices. Food and other substances in the stomach neutralize acid. Certain chemicals produced by the stomach protect the cells lining the stomach.

Peptic Ulcers can be broadly classified into Gastric or stomach ulcer and Duodenal Ulcer. Gastric Ulcers occur mainly in the elderly, on the lesser curve. Ulcers elsewhere are often malignant. Duodenal Ulcers are four fold commoner than gastric ulcer. It is identified by the most common symptom i.e. the epigastric pain occurs typically before meals or at night which is relieved by eating or drinking milk.²

Another type of PUD is the Idiopathic PUD (IPUD) is defined as a peptic ulcer without definite causes such as H. pylori infection, NSAIDs use or hypergastrinemia.

For many years, excess acid was believed to be the major cause of ulcer disease. Accordingly treatment emphasis was on neutralizing and inhibiting the secretion of stomach acid. While acid is still considered significant in ulcer formation, the leading cause of ulcer disease is currently believed to be infection of the stomach by a bacterium called "Helicobacter pyloridis" (H. pylori) accounting to about 70-90%. Other risk factors include anticoagulants, NSAIDs, corticosteroids, aspirin, ibuprofen, alcohol, diet (Spicy Food), H. Pylori, stress, past history of PUD and gender. Another cause of PUD is the excess acid production from tumors of the acid producing cells of the stomach which is also known as gastrinomas. It increases the gastric acid output.

NSAIDs cause gastric injury by the damage of the gastric epithelium by intracellular accumulation of these drugs in an ionized state. Then it reduces the hydrophobicity of the mucous gel layer by changing the action of surface active phospholipids followed by the suppression of the prostaglandin synthesis which is then

followed by the injury due to neutrophils adherence to the endothelium of gastric microcirculation. The risk of gastrointestinal bleeding increases steeply with age, and the excess risk from non aspirin NSAIDs are much higher in the elderly than in young subjects, even when the relative risk is assumed to remain constant with age.

H. Pylori infection or NSAID use alone may not be sufficient to cause peptic ulcer disease. Other factors like genetic and environment factors also contribute.. People with duodenal ulcers are more likely to have family members with duodenal ulcers compared to general population. Another risk factor for developing an ulcer is use of tobacco in any form like smoking because it increases the risk of ulcers and impairs the process of healing. Alcohol consumption to some extent also causes the same effect.³

PUD may or may not have symptoms. When the symptoms occur, they include a burning pain in the middle or upper stomach between meals or at night, bloating, heart burn, nausea or vomiting. In severe cases, the symptoms include dark or black stool, vomiting of blood, weight loss and sever pain in the mid to upper abdomen.

H. Pylori cause PUD at first by infection. Then it causes gastritis in the antral region. Then there is a defective inhibition of gastrin release and acid secretion. The gastric acid is then hyper secreted. The duodenal acid load is increased. This is followed by metaplasia in the duodenal bulb. Thus duodenal Helicobacter pylori infection is caused.

Peptic ulcers can heal spontaneously and may occur intermittently. But they can also have a serious fate. The complications might be life threatening without any warning signs. This is most common in elderly patients on NSAID. The most complication that occur include bleeding and perforation. Bleeding can be both gradual and abrupt. If abrupt bleeding occurs, it causes black, tarry stools and a drop in blood pressure. Only about 2 to 5 percent of people with a peptic require surgery. Perforation usually causes abdominal pain suddenly and usually requires surgery.⁴

1.2 Justification of the Study

Peptic ulcer disease is an important cause of morbidity and mortality throughout the world affecting the lives of millions of people in their everyday life. In the United States, approximately four million people have peptic ulcers (duodenal and gastric), and 350,000 and 350, 000 new cases are diagnosed each year. Around 180,000 patients are hospitalized yearly, and about 5000 people die each year as a result of peptic ulcer disease.⁵ The lifetime likelihood of developing peptic ulcer is about 10% for males and 4% for females.⁶

The burden of peptic ulcer disease is much greater in Bangladesh and is a major cause of morbidity and significant cause of mortality affecting large fractions of the population largely due to the poor socio-economic conditions and lack of awareness about the disease. Peptic ulcer disease has a point prevalence of approximately 15% (DU-11.98% and GU-3.58%), which is much higher than that in the developed countries (15% vs 1.5%). And it is among the top 25 leading causes of death according to the World life Expectancy Bangladesh profile data.⁷ Over 95% (95-100%) of DUs and >80% (56-96%) of GU are strongly associated with H. pylori infection.

In Bangladesh, the point prevalence of PUD is 15% (DU-11.98% and GU-3.58%), which is much higher than that in the developed countries (15% vs 1.5%). Over 95% (95-100%) of DUs and >80% (56-96%) of GU are strongly associated with H. pylori infection. However, for unknown reason although about 15% of the infected persons develop PUD many infected persons in Africa never develop PUD. A meta analysis of the several controlled clinical trials showed that H. pylori eradication therapy enhances a rapid ulcer healing at a higher rate and marked reduction in the recurrence rate of PUD particularly DU from 80 to 4% yearly. On this ground, NIH of America in 1994, European H. pylori study group in the Maastricht consensus conference 1996 and FDA of USA in 1998 recommended that all patients with endoscopically documented PUD with H. pylori infection should receive a course of anti-microbial therapy.^{8,9}

Through early detections, simple life style modifications and with the help of modern medical treatment, the problem of peptic ulcer disease can be largely controlled and patients with peptic ulcers can lead a prolonged and healthy life. Mere change of dietary or smoking habits can reduce the problem of having peptic ulcers. And simple affordable treatment such as the antimicrobial therapy for the eradication of helicobacter pylori can drastically reduce the occurrence and recurrence of peptic ulcer disease. However even after having the expertise, methods, and facilities to tackle the problem to some extent, the burden of peptic ulcer in Bangladesh poses a significant health problem largely due to inadequate prevention and intervention strategies and lack of awareness about the disease among the people. And despite peptic ulcer disease being a major health problem in Bangladesh, studies of the active disease, autopsy researches and population surveys regarding peptic ulcer disease are mostly lacking or absent. Thus this research would provide valuable epidemiological information about the magnitude of the disease which will in turn help to create awareness among the people regarding the disease, will open the gateway for further researches and will help design and implement adequate intervention measures.

1.3 Operational definitions

Peptic ulcer disease (PUD):

Peptic Ulcer was defined as a mucosal break at least 3 mm in diameter, with or without a necrotic base in the middle of the lesion, in either the stomach (gastric) or the duodenum (duodenal). In the case of several ulcers/erosions, at least one had to fulfill this definition. In this study PUD is identified by the presence of signs and symptoms through history taking or examinations or from medical records or investigation reports.

Symptom groups:

“Gastroesophageal reflux symptoms” were defined as troublesome heartburn and/or acid regurgitation over the past 3 months.

“Dyspepsia” was defined as troublesome pain or discomfort in the epigastric part of the abdomen, or reporting of one or more of the symptoms “uncomfortable feeling of fullness,” “early satiety,” or “nausea,”

“Abdominal pain” was defined as troublesome pain or discomfort in the abdomen.

“Irritable bowel syndrome” was defined as abdominal pain or discomfort at any site, combined with reported disturbances in bowel habits.

“Atypical PUD symptoms” were defined as other gastrointestinal symptoms, except dyspepsia or “epigastric pain or discomfort” concomitant with PUD.

“No symptoms or minor symptoms” were defined as individual symptoms not fulfilling any of the above symptom classifications, or an absence of symptoms.

The above definitions allowed concomitant reporting of symptoms of gastroesophageal reflux, dyspepsia, and irritable bowel syndrome.

Religion:

Religion refers to the denomination or belief of the family. The major religious groups in the context of the study are Muslims, Hindus, Buddhist, Christians, atheists and other beliefs.

Education:

Education refers to the form of learning the parents received. Education is clustered into the types of education received into informal, formal secular and formal religious. Education is also classified according to the level of education obtained, into Illiterate (no formal school), Primary school (up to 6th grade) Secondary school (up to 10th grade) Higher secondary (Up to college) Some undergraduate education Undergraduate education and Post graduate level.

Occupation:

Occupation refers to the kind of work the parents are involved in. They are categorized into farmers/agriculture, hard labor, idle, clerical/technical and professional/administrative.

Monthly family income:

Monthly income is operationalized as the total sum of family income each month in Takas and is categorized into the following: Less than 2500

- Less than 10000
- 10001 to 20000
- 20001 to 30000
- 30001 to 40000
- 40001 to 50000
- Above 50000

Residence:

Residence refers to the establishment which is being used by the family as a place of dwelling or home. Residence is grouped into slums, rural mud housing (kuccha), rural brick housing (pucca), urban unplanned or cramped housing and urban - planned housing or residential areas.

Diabetes mellitus:

Diabetes mellitus is a group of metabolic diseases in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced. Previous medical records or history are used to assess the presence of diabetes.

Hypertension (HTN)

HTN is a chronic medical condition in which the blood pressure in the arteries is elevated. HTN is assessed by the mother's previous medical records or history.

Pain Killers:

An analgesic, or painkiller, is any member of the group of drugs used to achieve analgesia — relief from pain. They include paracetamol (acetaminophen), the non-steroidal anti-inflammatory drugs (NSAIDs) such as the salicylates, and opioid drugs such as morphine and opium.

Aspirin :

Also known as acetylsalicylic acid, is a salicylate drug, often used as an analgesic to relieve minor aches and pains, as an antipyretic to reduce fever, and as an anti-inflammatory medication.

1.4 Research Question

What is the prevalence of peptic ulcer disease among the patients with abdominal pain attending the Departments of Medicine in Dhaka Medical College and Hospital?

II. Literature Review

Over several years many studies have been done about the incidence, prevalence, causes, effects, complications and other factors of peptic ulcer disease. However even after several advancements in the study of this problem, the disease still persists at a large scale. However I have summarized some of the research that I have gone through.

The endoscopic study of Douthwaite and Lintott in 1938 first documented the ability of NSAID to cause ulceration and bleeding in the upper gastrointestinal tract.¹⁰ In that study, the investigators demonstrated the ability of aspirin to damage the stomach. In the years that followed, more potent NSAIDs, such as indomethacin, phenylbutazone and the fenamates, were brought to market. Shortly thereafter, case reports of melaena associated with the use of aspirin and the newer NSAIDs began to appear in the literature, and in the 1960s and 70s, case-control studies began to document the gastrointestinal toxicity of this class of drug. In recent years, the upper gastrointestinal tract damage caused by NSAIDs has been referred to as an 'epidemic' by a number of investigators.^{11,12} This is in part attributable to the widespread use of these drugs, particularly by patients with osteo-arthritis and rheumatoid arthritis. The world market for NSAIDs is approximately \$8 billion. The cost of treating NSAID-related gastrointestinal adverse effects almost certainly exceeds this amount (the annual cost of treating NSAID gastropathy in rheumatoid arthritis patients in the USA, for example, having been reported to exceed \$4 billion).¹³

In another study, NSAIDs are associated with both upper and lower gastrointestinal tract complications which are commonly prescribed for a variety of musculoskeletal complaints such as rheumatoid arthritis and short-term management of pain in osteoarthritis.^{14,15} Prevalence rates vary significantly¹⁶ as estimates do not take a distinction between causal and non-causal associations or because estimates are observed in high risk populations only.¹⁷ The prevalence of endoscopically confirmed gastrointestinal ulcers in NSAID users is quoted to be between 15% and 30%. About 12% to 30% of NSAID-induced ulcers are gastric ulcers, whereas 2% to 19% are duodenal ulcers. NSAID-induced ulcers are symptomatic only in 1% of patients after three to six months and in 2 to 4% of patients after one year.

According to a study conducted by the Committee of American College of Gastroenterology as many as 25 % of chronic NSAID users will develop ulcer disease^{18,19} and 2 – 4 % will bleed or perforate.^{20,21} These gastrointestinal events result in more than 100,000 hospital admissions annually in the United States and between 7,000 and 10,000 deaths, especially among those who have been designated as being in a high risk category.^{22,23} In a large meta-analysis, the overall relative risk for these complications in patients taking NSAIDs was approximately 2.4.²⁴ However, this relative risk was markedly increased among patients who fall into various high-risk categories.^{25,26}

In a study the incidence and risk factors for peptic ulcer disease in the United States have not been well defined. During the 1989 National Health Interview Survey, a population-based sample of 42,392 individuals responded to questions regarding doctor-diagnosed ulcers with confirmation by either an upper gastrointestinal series or endoscopy. Ulcers present during the previous 12 months were considered either incident ulcers if diagnosed during this period or chronic active ulcers if diagnosed more than 12 months before the interview. The incidence of ulcers over the year prior to the interview was 5.27 per 1,000 adults. Whereas incident duodenal ulcer cases represented only 2.4 percent of all persons with a history of duodenal ulcer, the corresponding value for gastric ulcer was 8.7 percent.²⁷

In Taiwan, a study was conducted on the prevalence of asymptomatic peptic ulcer disease. The prevalence of PUD in asymptomatic subjects is 9.4% in Taiwan. Prior history of PUD, low education level, a high BMI and current smoker are independent risk factors for developing asymptomatic PUD. Of the 572 asymptomatic subjects, 54 (9.4%) were diagnosed as having PUD. The prevalence of gastric ulcer, duodenal ulcer and both gastric and duodenal ulcers were 4.7%, 3.9%, and 0.9%, respectively. Multivariate analysis revealed that prior history of PUD and current smoker were independent predictors of asymptomatic PUD. In contrast, high education level was a negative predictor of PUD.²⁸

In another study regarding the epidemiological trend of the incidence and mortality of the perforated peptic ulcer disease, the adjusted incidence rate, seasonal distribution and mortality rate was stable. PPU frequently presents outside regular work-hours. Increase in incidence and mortality occurs with older age. A total of 172 patients with PPU were identified for the study. The adjusted incidence rate for the overall 10-year period was 6.5 per 100 000 per year (95%CI: 5.6-7.6) and the adjusted mortality rate for the overall 10-year period was 1.1 per 100 000 per year (95%CI: 0.7-1.6). A non-significant decline in adjusted incidence rate from 9.7 to 5.6 occurred during the decade. The standardized mortality ratio for the whole study period was 5.7 (95%CI: 3.9-8.2), while the total 30-d mortality was 16.3%. No difference in incidence or mortality was found between genders. However, for patients ≥ 60 years, the incidence increased over 10-fold, and mortality more than 50-fold, compared to younger ages. The admission rates outside office hours were high with almost two out of three (63%) admissions seen at evening/night time shifts and/or during weekends. The observed seasonal variations in admissions were not statistically significant.²⁹

In a study conducted on the Swedish population regarding the decrease in the incidence of complications of PUD after the introduction of PPI, all cases of gastric and duodenal ulcer complications diagnosed in Sweden from 1974 to 2002 were identified using the National hospital discharge register. Information on sales of ASA/NSAID was obtained from the National prescription survey. When comparing the time-periods before and after 1988 we found a significantly lower incidence of peptic ulcer complications during the later period for both sexes ($p < 0.001$). Incidence rates varied from 1.5 to 7.8/100000 inhabitants/year regarding perforated peptic ulcers and from 5.2 to 40.2 regarding peptic ulcer bleeding. The number of sold daily dosages of prescribed NSAID/ASA tripled from 1975 to 2002. The number of prescribed sales to women was higher than to males. Sales of low-dose ASA also increased. The total volume of NSAID and ASA, i.e. over the counter sale and sold on prescription, increased by 28% during the same period. Thus when comparing the periods before and after the introduction of the proton pump inhibitors we found a significant decrease in the incidence of peptic ulcer complications in the Swedish population after 1988 when PPI were introduced on the market. The cause of this decrease is most likely multifactorial, including smoking habits, NSAID consumption, prevalence of *Helicobacter pylori* and the introduction of PPI. Sales of prescribed NSAID/ASA increased, especially in middle-aged and elderly women. This fact seems to have had little effect on the incidence of peptic ulcer complications.³⁰

In United States, a study was conducted on the trends of hospitalization for this disease. The study reveals that infection with *Helicobacter pylori* increases the risk for peptic ulcer disease (PUD) and its complications. To determine whether hospitalization rates for PUD have declined since antimicrobial drugs to eradicate *H. pylori* became available, we examined 1998–2005 hospitalization records (using the Nationwide Inpatient Sample) in which the primary discharge diagnosis was PUD. Hospitalizations for which the diagnosis was *H. pylori* infection were also considered. The age-adjusted hospitalization rate for PUD decreased 21% from 71.1/100,000 population (95% confidence interval [CI] 68.9–73.4) in 1998 to 56.5/100,000 in 2005 (95% CI 54.6–58.3). The hospitalization rate for PUD was highest for adults >65 years of age and was higher for men than for women. The age-adjusted rate was lowest for whites and declined for all racial/ethnic groups, except Hispanics. The age-adjusted *H. pylori* hospitalization rate also decreased. The decrease in PUD hospitalization rates suggests that the incidence of complications caused by *H. pylori* infection has declined.³¹

In a cohort study conducted in the United Kingdom, an overall incidence of uncomplicated peptic ulcer was 0.75 cases per 1,000 person-years, declining from 1.1 to 0.52 cases per 1,000 person-years between 1997 and 2005. A reduction in *H. pylori*-related peptic ulcers, changing patterns in non-steroidal anti-inflammatory drug (NSAID) use and increasing [proton pump inhibitor](#) (PPI) use may have contributed to this. In the past, duodenal ulcer was 10 times as common in men as in women and gastric ulcer had a male preponderance of 3:2. Now the frequency is much less, largely because of *H. pylori* eradication and the sex incidence being more even.³²

The effects of environmental exposures on the development of gastric and duodenal ulcers were investigated in a prospective study of 7,624 American men of Japanese ancestry in Hawaii. After 149,291 person-years of observation, there were 280 incident cases of gastric ulcer and 149 incident cases of duodenal ulcer. The risk of both gastric and duodenal ulcers progressively increased with increasing pack-years of cigarette smoking. In contrast, alcohol intake was not associated with either type of ulcer. The risk of gastric ulcer was positively associated with the use of table salt/soy sauce, but there was no association with the

consumption of other oriental foods. The risk of duodenal ulcer was inversely associated with western style diet around 1940 and with bread intake of two or more servings per day. The authors did not find any protective or adverse effect of milk and fruit consumption on peptic ulcer risk.³³

According to a nationwide population-based cohort study conducted in Taiwan, diabetic patients have a higher incidence of peptic ulcer disease. In a 7-year follow-up period, type II diabetic patients had significantly higher cumulative hazard of PUB than the controls ($P < 0.001$, log-rank test). By Cox proportional hazard regression analysis, diabetes was independently associated with increased risk of PUB (hazard ratio 1.44, 95% confidence interval 1.11–1.86; $P < 0.001$) after adjusting for age, sex, comorbidities (e.g. hypertension, coronary heart disease, heart failure, chronic renal disease, cirrhosis, and peptic ulcer disease), and ulcerogenic medication. Age, chronic renal disease, history of peptic ulcer disease, and use of non-steroidal anti-inflammatory drugs were risk factors for PUB in diabetic patients.³⁴

According to a study conducted in Bangladesh, a cross sectional type of observational study was conducted to see the prevalence pattern of peptic ulcer diseases among the children who presented with abdominal pain. Upper gastro – intestinal endoscopy was done followed by Campylobacter like organism (CLO) test and histopathology were used as the diagnostic tools. The affected male to female ratio was 2:1 (approx.). About 35% of the cases had a monthly income of <5000 Taka, 45% earned 5000 – 10000 Taka and only 20% earned more than 10000 Taka. The overall life time prevalence is about 12% for men and 9% for women. 80% of adult in countries like Bangladesh can have laboratory evidence of an H. pylori infection. In industrialized country the infection is rare in children and only about 40% of adult are infected. Risk of infection is higher for people who live in overcrowded or low socio economic condition.³⁵

III. Research Methodology

3.1 Study Objectives

General Objectives:

- To determine the prevalence of peptic ulcer disease among the patients with abdominal pain in Dhaka medical college hospital

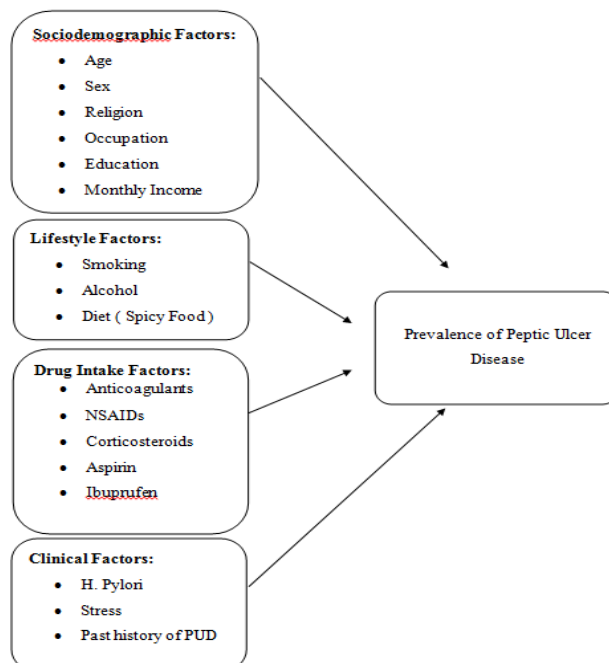
Specific Objectives:

- To estimate the prevalence of cases of peptic ulcer disease among all the patients with abdominal pain attending the medicine department
- To describe the socio-demographic factors of the patients with the disease
- To determine the types of peptic ulcer among different age groups
- To identify the life style factors of the patients with the disease
- To identify the types of drug taken by PUD patients

3.2 Conceptual Framework

INDEPENDENT VARIABLES:

DEPENDENT VARIABLES:



3.3 Study Design

A descriptive cross sectional study was carried out for the attainment of the above mentioned study objectives and to meet the constraints of resource, manpower and time.

3.4 Target Population & Sample Population

The target population included All the indoor and outdoor patients of the Medicine Department of Dhaka Medical College Hospital with abdominal pain and the sample population were patients diagnosed with peptic ulcer disease who were present and were inclined to be interviewed, attending the Departments of Medicine of Dhaka Medical College Hospital.

3.5 Study Site

Department of Medicine, Dhaka Medical College Hospital

3.6 Study Period

June, 2013 to December, 2013

Activities	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
Literature review							
Proposal writing							
Data collection							
Data Entry							
Data analysis							
Draft report							
Final submission							

3.7 Sample Size

Sample Size for cross sectional study:

$$n = \frac{Z^2 pq}{d^2}$$

n = Desired sample size

Z = Standard normal deviation

p = Anticipated population proportion

q = (1 - p)

d = Allowable error

Estimation of sample size for this study:

$$Z = 1.96 \quad p = 15\% \text{ or } 0.15 \quad q = (1 - 0.15) \text{ or } 0.85 \quad d = 5\% \text{ or } 0.05$$

$$n = \frac{(1.96)^2 (0.15)(0.85)}{(0.05)^2}$$

$$= 196$$

Therefore the desired sample size was 196.

3.8 Inclusion & Exclusion Criteria

Inclusion Criteria

- All patients with abdominal pain in the indoor or outdoor under the Department of Medicine in Dhaka Medical College and Hospital.
- Patients who are willing to participate in the study.
- Patients who will be able to communicate.

Exclusion Criteria

- Patients without the abdominal pain
- Patients who are not present at the time of data collection.
- Patients who refuse to participate.

3.9 Sampling Technique

Purposive sampling technique was applied to select sample.

3.10 Data Collection Tools

Data were collected by oral interviews using pre tested structural questionnaire

3.11 Data Management and Analysis

The data collected were checked and edited and then entered into the computer using Statistical Package for Social Sciences (SPSS) software version 17. Descriptive analysis of the variables and frequencies were carried out.

3.12 Quality Control and Quality Assurance

Consent forms, containing a clear explanation of the purpose and procedure of the study as well as options of the respondents were given and explained to the respondents prior interviewing.

Information sheets explaining the research in brief including instructions elucidating the process of questioning and recording of answers were given as well as explained to the research assistants and the data collectors.

The designed questionnaire was pretested in a pilot study in the Medicine Department of Shahabuddin Medical College Hospital before going to the data collection field to check for acceptability, clarity of language, validity, reliability, accuracy of translation and quality of raw data and necessary corrections were made accordingly. During the entire time of the data collection process in Dhaka Medical College Hospital, the researcher (Dr. Rafi Abul Hasnath Siddique) was present and supervised and monitored all aspects of the data collection process including day to day distribution of workload, examination of work performance and proof reading of all data. Errors detected were corrected immediately on site.

All steps of the research process were documented; including tools relied upon, raw observations and progress of research. Data were entered and processed weekly which included registration, editing, coding, computerization, preparation of dummy tables and statistical analysis of the data using SPSS. The final data were rechecked, analyzed and prepared.

3.13 Ethical Considerations

All ethical issues were considered as per the guidelines of the Bangladesh Medical Research Council (BMRC) and World Health Organization (WHO). Permissions were taken from the administrative office of Dhaka Medical College Hospital as well as from the Departmental Heads of Medicine. All interviews were conducted maintaining privacy with prior informed consents of respondents taken stating clearly the purpose and benefits of the study and freedom of refusal to participate. All the data collected were kept anonymous, maintaining confidentiality of all participants.

3.14 Limitations of the study

- This was a hospital based study encompassing a single hospital of Dhaka city. Even though this hospital is the sole largest hospital for the treatment of peptic ulcer, other hospitals also account for similar cases of patients. Therefore the results from this study may not show a complete diversification of peptic ulcer which may be present in the entire city.
- Sample size was limited for which results may not truly represent that of the wider city.
- A large fraction of patients with abdominal pain usually accounted for in the Surgery Department. This fraction could not be taken into the study as cases admitted or treated in the Medicine Department were only included in the study.

IV. Result

This descriptive type of cross sectional study was conducted in Dhaka Medical College Hospital in Dhaka with a sample size of 196. A pre-tested modified interviewer administrated semi questionnaire was used to collect the information. A total of 196 respondents were interviewed to collect the information regarding socio-demographic factors, lifestyle factors, examination of the patient and IEC related variables. All the data were entered and analyzed by using statistical packages for social science (SPSS) software version 17.0.

Table No. 1: Distribution of the respondents by age (n=196)

Age	Frequency	Percent
15 to 20 years	32	16.3
21 to 25 years	47	24.0
26 to 30 years	15	7.7
31 to 35 years	50	25.5
36 to 45 years	52	26.5
Total	196	100.0

Table no. 1 shows that 16.3%, 24%, 7.7%, 25.5% and 26.5% of the respondents belongs to age group of 15-20 years, 21-25 years, 26-30 years, 31-35 years and 36-45 years with the mean age Mean \pm SD=3.22 \pm 1.474.

Table No. 2: Distribution of the respondents by sex (n=196)

Sex	Frequency	Percent	
Male	123	62.8	62.8
Female	73	37.2	%
Total	196	100.0	are
			Male

and rest of them is Female (37.2%).

Table No. 3: Distribution of the respondents by religion (n=196)

Religion	Frequency	Percent
Islam	106	54.1
Hindu	43	21.9
Christian	32	16.3
Buddhist	15	7.7
Total	196	100.0

Majority of the respondents (54.1%) were Muslims, 21.9% were Hindu, 16.3% were Christian and only 7.7% were Buddhist.

Table No. 4: Distribution of the respondents by marital status (n=196)

Marital status	Frequency	Percent
Single	59	30.1
Married	111	56.6
Divorced	16	8.2
Widow	10	5.1
Total	196	100.0

56.6% were married, 30.1% were single, 8.2% were divorced and 5.1% were widow.

Table No. 5: Distribution of the respondents by immunization (n=196)

Immunization	Frequency	Percent
Immunized	144	73.5
Not immunized	52	26.5
Total	196	100.0

73.5% were immunized and 26.5% were not immunized.

Table No. 6: Distribution of the respondents by family history of peptic ulcer disease (n=196)

Family History of Peptic Ulcer	Frequency	Percent	Maj ority of the
Present	118	60.2	
Absent	78	39.8	
Total	196	100.0	

respondents (60.2%) had a family history of PUD and 39.8% did not have.

Table No. 7: Distribution of the respondents by education (n=196)

Education	Frequency	Percent
Illiterate	21	10.7
Primary school	20	10.2
Secondary school	26	13.3
Higher secondary	66	33.7
Undergraduate education	33	16.8
Postgraduate level	30	15.3
Total	196	100.0

33.7% were higher secondary, 16.8% were undergraduate, 15.3% were postgraduate, 13.3% were secondary, 10.7% were illiterate and only 10.2% were primary.

Table No. 8: Distribution of the respondents by occupation (n=196)

Occupation	Frequency	Percent
Farmer	37	18.9
Day labour	39	19.9
Technical	51	26.0
Professional	69	35.2
Total	196	100.0

Most of the respondents (35.2%) are professional, 26% were technical, 19.9% were day labour and only 18.9% were farmer.

Table No. 9: Distribution of the respondents by monthly family income (n=196)

Monthly Family Income	Frequency	Percent
Less than 10000	105	53.6
10001 to 20000	71	36.2
20001 to 30000	6	3.1
30001 to 40000	5	2.6
40001 to 50000	3	1.5
Above 50001	6	3.1
Total	196	100.0

53.6% of the respondent had an income of less than 10000 Tk, 36.2% of the respondents had 10001 to 20000 Tk, 3.1% had 20001 to 30000 Tk, 2.6% had 30001 to 40000 Tk, 1.5% had 40001 to 50000 Tk and 3.1% had an income above 50001 Tk.

Table No. 10: Distribution of the respondents by type of residence (n=196)

Type of residence	Frequency	Percent
Slums	24	12.2
Rural - Kuccha house	26	13.3
Rural - Pucca house	40	20.4
Urban	106	54.1
Total	196	100.0

Most of the respondents (54.1%) live in urban, 20.4% in rural pucca house, 13.3% in rural kuccha house and only 12.2% in slums.

Table No. 11: Distribution of the respondents by smoking habits (n=196)

Smoking habits	Frequency	Percent
Yes	124	63.3
No	72	36.7
Total	196	100.0

Majority of the respondents (63.3%) smokes and 36.7% did not.

Table No. 12: Distribution of the respondents by dietary habits (n=196)

Dietary Habits	Frequency	Percent
Non Spicy food	8	4.1
Spicy food	91	46.4
Only vegetables	22	11.2
Average spicy food	75	38.3
Total	196	100.0

46.4% of the respondents' dietary habits were spicy food, 38.3% were average spicy food, 11.2% were only vegetables and only 4.1% were non spicy food.

Table No. 13: Distribution of the respondents by presence of diabetes (n=196)

Presence of diabetes	Frequency	Percent
Yes	83	42.3
No	113	57.7
Total	196	100.0

42.3% had diabetes and 57.7% did not have diabetes.

Table No. 14: Distribution of the respondents by presence of hypertension (n=196)

Presence of hypertension	Frequency	Percent
Yes	129	65.8
No	67	34.2
Total	196	100.0

65.8% had hypertension and 34.2% did not have hypertension.

Table No. 15: Distribution of the respondents by Alcohol consumption(n=196)

Alcohol consumption	Frequency	Percent
Yes	107	54.6
No	89	45.4
Total	196	100.0

54.6% consumed alcohol and 45.4% did not consume.

Table No. 16: Distribution of the respondents by burning sensation in the epigastric region (n=196)

Burning sensation in the epigastric region	Frequency	Percent
Yes	184	92.9
No	12	6.1
Total	196	100.0

92.9% had burning sensation in the epigastric region and only 6.1% did not have burning sensation in the epigastric region.

Table No. 17: Distribution of the respondents by pain aggravated (n=196)

Pain aggravated	Frequency	Percent
When the stomach is empty	154	78.6
When the stomach is full	42	21.4
Total	195	100.0

78.6% were pain aggravated when the stomach is empty and only 21.4% pain aggravated when stomach is full.

Table No. 18: Distribution of the respondents by intake of pain killers (n=196)

Intake of pain killers	Frequency	Percent
Yes	171	87.2
No	25	12.8
Total	196	100.0

Majority of the respondents (87.2%) took pain killers and 12.8% did not.

Table No. 19: Distribution of the respondents by intake of aspirin (n=196)

Intake of Aspirin	Frequency	Percent
Yes	113	57.7
No	83	42.3
Total	196	100.0

57.7% took aspirin and 42.3% did not take

Table No. 20: Distribution of the respondents by stress, tension or anxiety (n=196)

Stress, tension or anxiety	Frequency	Percent
Yes	173	88.3
No	23	11.7
Total	196	100.0

88.3% had stress, tension or anxiety and 11.7% did not have stress, tension or anxiety.

Table No. 21: Distribution of the respondents by history of similar pain previously (n=196)

History of similar pain previously	Frequency	Percent
Yes	154	78.6
No	42	21.4
Total	196	100.0

78.6% had history of similar pain and only 21.4% had no history of similar pain.

Table No. 22: Distribution of the respondents by pain in the epigastric region (n=196)

Pain in the epigastric region	Frequency	Percent
Yes	191	97.4
No	5	2.6
Total	196	100.0

97.4% had pain in the epigastric region and only 2.6% did not have pain in the epigastric region.

Table No. 23: Distribution of the respondents by burning sensations or pain in the epigastric region (n=196)

Burning sensations or pain in the epigastric region	Frequency	Percent
When the stomach is full	43	21.9
When the stomach is empty	96	49.0
Constantly	57	29.1
Total	196	100.0

21.9% had pain when the stomach is full, 49% when the stomach is empty and only 29.1% had constant pain.

Table No. 24: Distribution of the respondents by investigations on admission

Investigations on admission	Frequency	Percent
CBC	171	87.2
Hb%	157	80.1
Barium X-Ray	182	92.9
Upper GI Endoscopy	167	85.2

Majority of the respondents were given investigations on admission- 87.2% were CBC, 80.1% were Hb%, 92.9% were Barium X-Ray and 85.2% were Upper GI Endoscopy.

Table No. 25: Distribution of the respondents by treatment outcome (n=196)

Treatment outcome	Frequency	Percent
Treated and discharged	160	81.6
Not treated	12	6.1
Referred to Surgery	24	12.2
Total	196	100.0

81.6% were treated and discharged, 6.1% were not treated and only 12.2% were referred to surgery.

Table No. 26: Distribution of the respondents by the knowledge of peptic ulcer

Information on peptic ulcer	Frequency	Percent
TV/Radio/ Mass media	8	4.1
Health worker	64	32.7
Family members/ Neighbor	20	10.2
Doctor	103	52.6
News paper	4	2.0

4.1% of the respondents knew from TV/Radio/ Mass media, 32.7% from Health worker, 10.2% from Family members/ Neighbor, 52.6% from Doctor and only 2% from Newspaper.

V. Discussions

This descriptive study was conducted from June 2013 to December 2013 to explore the prevalence of peptic ulcer disease among the patients attending the Department of Medicine in Dhaka Medical College Hospital. In-depth data were collected from respondents and hospital files of 196 patients with abdominal pain. A pretested modified questionnaire was used to collect the data. All the data were entered and analyzed by using Statistical Package of Social Science (SPSS) 17.0 version.

The current study reveals that 16.3%, 24%, 7.7%, 25.5% and 26.5% of the respondents belongs to age group of 15-20 years, 21-25 years, 26-30 years, 31-35 years and 36-45 years respectively with the mean age Mean \pm SD=3.22 \pm 1.474. The study reveals that most of the respondents (62.8%) are Male and rest of them were Female (37.2%). Majority of the respondents (54.1%) were Muslim, followed by 21.9% who were Hindu, 16.3% were Christian and only 7.7% were Buddhist. Current study reveals that most of the respondents (56.6%) were married, followed by 30.1% were single, 8.2% were divorced and only 5.1% were widow. Most of the respondents (73.5%) were immunized and 26.5% were not immunized. Majority of the respondents (60.2%) had a family history of PUD and 39.8% did not have a family history of the disease. The study shows that most of the respondents (33.7%) were higher secondary, 16.8% were undergraduate, 15.3% were postgraduate, 13.3% were secondary, 10.7% were illiterate and only 10.2% were primary. Most of the respondents (35.2%) are professional followed by 26% who were technical, 19.9% were day labour and only 18.9% were farmer. Majority of the respondents' monthly family income about 53.6% was less than 10000 Tk, 36.2% of the respondents had 10001 to 20000 Tk, 3.1% had 20001 to 30000 Tk, 2.6% had 30001 to 40000 Tk, 1.5% had 40001 to 50000 Tk and 3.1% had an income above 50001 Tk.

. The study also shows that most of the respondents (54.1%) live in urban, 20.4% in rural pucca house, 13.3% in rural kuccha house and only 12.2% in slums. In a similar study conducted in Chittagong Medical College and Hospital, Bangladesh, the affected male to female ratio was 2:1 (approx.). About 35% of the cases had a monthly income of <5000 Taka, 45% earned 5000 – 10000 Taka and only 20% earned more than 10000 Taka. The overall life time prevalence is about 12% for men and 9% for women. 80% of adult in countries like Bangladesh can have laboratory evidence of an H. pylori infection. In industrialized country the infection is rare in children and only about 40% of adult are infected. Risk of infection is higher for people who live in overcrowded or low socio economic condition.³⁵

In this study most of the respondents' dietary habits (46.4%) were spicy food, 38.3% were average spicy food, 11.2% were only vegetables and only 4.1% were non spicy food. It has been found that 42.3% of the respondents have diabetes and 57.7% of them did not have diabetes. The study reveals that majority of the respondents (65.8%) has hypertension and only 34.2% did not present hypertension. According to a nationwide population-based cohort study conducted in Taiwan, diabetic patients have a higher incidence of peptic ulcer disease. Age, chronic renal disease, history of peptic ulcer disease, and use of non-steroidal anti-inflammatory drugs were risk factors for PUD in diabetic patients.³⁴

According to a study conducted in Hawaii, the risk of both gastric and duodenal ulcers progressively increased with increasing pack-years of cigarette smoking. In this study majority of the respondents (54.6%) consumed alcohol and only 45.4% did not consume alcohol. It has also been found that majority of the respondents (92.9%) have burning sensation in the epigastric region and only 6.1% did not present with burning sensation in the epigastric region. Current study shows that majority of the respondents (78.6%) had aggravated pain when the stomach is empty and only 21.4% had aggravated pain when stomach is full.

The endoscopic study of Douthwaite and Lintott in 1938 first documented the ability of NSAID to cause ulceration and bleeding in the upper gastrointestinal tract.¹⁰ In another study, NSAIDs are associated with both upper and lower gastrointestinal tract complications which are commonly prescribed for a variety of musculoskeletal complaints such as rheumatoid arthritis and short-term management of pain in osteoarthritis.^{14,15} In this study majority of the respondents (87.2%) took pain killers and 12.8% did not take pain killers. Majority of the respondents (57.7%) took aspirin and only 42.3% did not take aspirin. It is also found that majority of the respondents (88.3%) had stress, tension or anxiety and only 11.7% did not have stress, tension or anxiety. In the study majority of the respondents (78.6%) gave history of similar pain previously and 21.4% had no history of similar pain previously. Use of NSAID is significant in both the studies.

Most of the respondents (97.4%) had pain in the epigastric region and only 2.6% had no pain in the epigastric region. 21.9% of the respondents reported of pain when their stomach is full, 49% when the stomach is empty and only 29.1% reported of having pain constantly. Majority of the respondents were given investigations on admission 87.2% were CBC, 80.1% were Hb%, 92.9% were Barium X-Ray and only 85.2% were Upper GI Endoscopy. The study reveals that majority of the respondents (81.6%) were treated and discharged, 6.1% were not treated and only 12.2% were referred to surgery.

The study also reveals that 4.1% of the respondents knew about the disease through TV/Radio/ Mass media, 32.7% from health worker, 10.2% from family members/ neighbor, 52.6% from doctor and only 2% from newspaper.

VI. Conclusion And Recommendations

1.1 Conclusion:

A wide variety of patients with abdominal pain was recorded among the study subjects. Health care facilities in Dhaka Medical College Hospital were found to be highly adequate in providing affordable mass scale treatment of peptic ulcer disease with remarkable success rates. However, the socio-economic conditions and educational levels of the patients with the disease were found to be under par. In addition, the patients having a family history of the disease, stress, diabetes, hypertension and those who smoke were affected. These aspects including possible lack of awareness about the disease, its consequences and its available treatment options could be the main contributing elements in aggravating the burden of peptic ulcer disease in Bangladesh with a resultant higher prevalence compared to more developed nations.

1.2 Recommendations:

1. The general educational levels and socio-economic conditions should be given more emphasis in the already ongoing efforts by the government, non-governmental and international organizations in order to increase their actual knowledge and update them with the most current information about the disease.
2. Awareness about the disease, its causes and its available treatment options and facilities should be developed through various approaches of mass communication and education.
3. Use of NSAID can be curbed or package can be labeled recommending use no longer than 10 days in a row or consult a physician.
4. Anxiety, stress and tension can be reduced to reduce the disease
5. Provision of H. Pylori test which are already in place should be enhanced and enforced along with the proper establishment of the health assurance system.
6. Increase awareness through mass media and education among the people smokers are two times more likely to develop the disease.

References

- [1]. Bhat, Sriram, Johannessen T., Cullen DJ, Hawkey GM, Greenwood DC, Peptic Ulcer, (4th July 2013) Available at: http://en.wikipedia.org/wiki/Peptic_ulcer (Accessed: 12th July 2013).
- [2]. Murray Longmore, Ian B. Wilkinson, Edward H. Davidson, Alexander Foulkes, Ahmad R. Mafi, Oxford Handbook Of Clinical Medicine, 8th edn., New York: Oxford University Press Inc.; 2010 .
- [3]. WebMd, Digestive Disorders Health Center, September 2012 Available at: <http://www.webmd.com/digestive-disorders/digestive-diseases-peptic-ulcer-disease> (Accessed: 13th July 2013).
- [4]. Sheila E Crowe, MD, FRCPC, FACP, FACG, AGAF, Peptic Ulcer disease (Beyond the basics), October 2011, Available at: <http://www.uptodate.com/contents/peptic-ulcer-disease-beyond-the-basics> (Accessed: 13th July 2013).
- [5]. Sandler RS, et al: The burden of selected digestive diseases in the United States. *Gastroenterology* 122:1500, 2002.
- [6]. Kumar, Abbas, Fuasto. Robins and Cotran Pathologic Basis of Disease. 7th edition. Elsevier Publications, 2008. Pages 797-847
- [7]. Health profile Bangladesh, World health rankings. World life expectancy 2010. Available online at <http://www.worldlifeexpectancy.com/country-health-profile/bangladesh> (Accessed on October 28, 2013)
- [8]. Mahbul Alam, 'Peptic Ulcer Disease', The Independent, Stethoscope, 1st April, p. 2.
- [9]. Frank Tovey 'Progress report of Peptic Ulcer in India and Bangladesh', *Gut: Peptic Ulcer in India and Bangladesh*, 1979, pp. 329-347 [Online]. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1412386/> (Accessed: 11th July 2013).
- [10]. Douthwaite AH & Lintott SAM. Gastroscopic observation of the effect of aspirin and certain other substances on the stomach. *Lancet* 1938; 2: 1222±1225.
- [11]. Gabriel SE & Bombardier C. NSAID induced ulcers. An emerging epidemic? *Journal of Rheumatology* 1990; 17: 1±4.
- [12]. Singh G, Ramey DR, Morfeld D et al. Gastrointestinal tract complications of nonsteroidal anti-inflammatory drug treatment in rheumatoid arthritis. A prospective observation cohort study. *Archives of Internal Medicine* 1996; 156: 1530±1536.
- [13]. Bloom BS. Direct medical costs of disease and gastrointestinal side effects during treatment of arthritis. *American Journal of Medicine* 1988; 83 (supplement 2A): 20±24.
- [14]. NICE Clinical Guideline. Guidance on the use of cyclo-oxygenase (Cox) II selective inhibitors, celecoxib, rofecoxib, meloxicam and etodolac for osteoarthritis and rheumatoid arthritis. London: National Institute for Clinical Excellence, 2001.
- [15]. Martindale – The Extra Pharmacopoeia. Reynolds JEF, editor. 13th ed. London: The Pharmaceutical Press; 1993.
- [16]. Lanas A. Prevention and treatment of non-steroidal anti-inflammatory drug gastroenteropathy. *Rev Gastroenterol Mex.* 2004; 69(6):251-260.
- [17]. Hawkey CJ, Longman MJS. Non-steroidal anti inflammatory drugs: overall risks and management. Complementary roles for COX-2 inhibitors and proton pump inhibitors. *Gut* 2003; 52:600-608.
- [18]. Larkai EN, Smith JL, Lidsky MD et al. Gastroduodenal mucosa and dyspeptic symptoms in arthritic patients during chronic non steroidal anti-inflammatory drug use. *Am J Gastroenterol* 1987; 82: 1153 – 8.
- [19]. Laine L. Non steroidal anti-inflammatory drug gastropathy. *Gastrointestinal Endoscopy Clinic North America* 1996; 6: 489 – 504.
- [20]. Silverstein FE, Faich G, Goldstein JL et al. Gastrointestinal toxicity with celecoxib vs. nonsteroidal anti-inflammatory drugs for osteoarthritis and rheumatoid arthritis: the CLASS study: A randomized controlled trial. *Celecoxib Long-term Arthritis Safety Study.* *JAMA* 2000; 284: 1247 – 55.
- [21]. Bombardier C, Laine L, Reicin A et al. Comparison of upper gastrointestinal toxicity of rofecoxib and naproxen in patients with rheumatoid arthritis. VIGOR study group. *N Engl J Med* 2000; 343: 1520 – 8.
- [22]. Singh G. Gastrointestinal complications of prescription and over-the-counter non-steroidal anti-inflammatory drugs: a view from the ARAMIS database. *Arthritis, Rheumatism, and Aging Medical Information System.* *Am J - er* 2000; 7: 115 – 21.
- [23]. Singh G, Triada5 lopoulos G. Epidemiology of NSAID induced gastrointestinal complications. *J Rheumatology Supplement* 1999; 56: 18 – 24.
- [24]. Wolfe MM, Lichtenstein DR, Singh G. Gastrointestinal toxicity of non-steroidal anti-inflammatory drugs. *N England J Med* 1999; 340: 1888 – 99.
- [25]. Gabriel SE, Jaakkimainen L, Bombardier C. Risk for serious gastrointestinal complications related to use of non-steroidal anti-inflammatory drugs. A meta-analysis *Ann Intern Med* 1991; 115: 787 – 96.
- [26]. Bellary SV, Isaacs PE, Lee FI. Upper gastrointestinal lesions in elderly patients presenting for endoscopy; relevance of NSAID usage. *Am J Gastroenterology* 1991; 86: 961 – 4.
- [27]. Fries JF, Williams CA, Bloch DA et al. Non steroidal anti-inflammatory drug-associated gastropathy: incidence and risk factor models. *Am J Med* 1991; 91:213 – 222.
- [28]. Fu-Wei Wang, Ming-Shium Tu, Guang-Yuan Mar, Hung-Yi Chuang, Hsien-Chung Yu, Lung-Chih Cheng and Ping-I Hsu (2011) 'Prevalence and risk factors of asymptomatic peptic ulcer disease in Taiwan', *World J Gastroenterology*, 17(1199), pp. 1199–1203 [Online]. Available at: <http://hinari-gw.who.int/whalecomwww.ncbi.nlm.nih.gov/whalecom0/pmc/articles/PMC3063914> (Accessed: 11th July 2013).
- [29]. Kenneth Thorsen, Jon Arne Soreide, Jan Terje Kvaløy, Tom Glomsaker, Kjetil Soreide (2013) 'Epidemiology of perforated peptic ulcer: Age- and gender-adjusted analysis of incidence and mortality', *World J Gastroenterology*, 19(347), pp. 347–354 [Online]. Available at: <http://hinari-gw.who.int/whalecomwww.ncbi.nlm.nih.gov/whalecom0/pmc/articles/PMC3554818/> (Accessed: 11th July 2013).
- [30]. Michael Hermansson, Anders Ekedahl, Jonas Ranstam, Thomas Zilling (2009) 'Decreasing incidence of peptic ulcer complications after the introduction of the proton pump inhibitors, a study of the Swedish population from 1974–2002', *BMC Gastroenterology*, 10(1471-230X-9-25), pp. 9: 25 [Online]. Available at: <http://hinari-gw.who.int/whalecomwww.ncbi.nlm.nih.gov/whalecom0/pmc/articles/PMC2679757/> (Accessed: 10th July 2013).
- [31]. Lydia B. Feinstein, Robert C. Holman, Krista L. Yorita Christensen, Claudia A. Steiner, David L. Swerdlow 'Trends in Hospitalizations for Peptic Ulcer Disease, United States, 1998–2005', *Emerg Infect Dis*, 10(1609.091126), pp. 1410–1418 [Online], 2010, Available at: <http://hinari-gw.who.int/whalecomwww.ncbi.nlm.nih.gov/whalecom0/pmc/?term=peptic+ulcer+disease> (Accessed: 10th July 2013).
- [32]. Dr Hayley Willacy. Peptic Ulcer Disease. <http://www.patient.co.uk/doctor/Peptic-Ulcer-Disease.htm> (accessed 09 July 2013).
- [33]. Ikuko Kato, Abraham M. Y. Nomura, Grant N. Stemmermann and Po-Huang Chyou. A Prospective Study of Gastric and Duodenal Ulcer and Its Relation to Smoking, Alcohol, and Diet. *American Journal of Epidemiology* 1992; 135(05): 521-530. <http://aje.oxfordjournals.org/content/135/5/521> (accessed 09 July 2013).
- [34]. Yen-Ling Peng, Hsin-Bang Leu, Jiing-Chyuan Luo, Chin-Chou Huang, Ming-Chih Hou, Han-Chieh Lin, Fa-Yauh Lee. Diabetes Is an Independent Risk Factor for Peptic Ulcer Bleeding. *Journal of Gastroenterology and Hepatology* 2013; 28(8): 1295-1299. <http://www.medscape.com/viewarticle/809054> (accessed 09 July 2013).

- [35]. Kashem MA, Shoma AK, Hossain S, Uddin M, Alam D. Endoscopic Evaluation of Children Presenting With Abdominal Pain. *Medicine Today* 2011; 23(01): 39-41. <http://www.banglajol.info/index.php/MEDTODAY/article/viewFile/11945/8716> (accessed 10 July 2013).