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## Risk factors of duodenal ulcer perforation: A study in a tertiary care hospital in Bangladesh

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### Abstract

**Background:** Duodenal ulcer perforation is a life-threatening complication of peptic ulcer disease, characterized by the sudden onset of severe abdominal pain and requiring urgent surgical intervention. Its incidence is influenced by several modifiable and non-modifiable risk factors, including *Helicobacter pylori* infection, prolonged NSAID use, smoking, and socioeconomic conditions. This study aimed to identify the risk factors associated with duodenal ulcer perforation.

**Methods:** This observational cross-sectional study was conducted at the Department of Surgery, Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh, from January to December 2010. A total of 95 diagnosed cases of duodenal ulcer perforation were purposively enrolled. The diagnosis was confirmed based on the patient's history and clinical findings. Data were analyzed using MS Office tools.

**Results:** This study revealed that duodenal ulcer perforations were predominantly observed in males (94.74%), with the highest occurrence in the fourth decade of life (31.58%). Cases were less frequent in individuals under 18 and over 60 years. Perforations were most common in individuals from low socioeconomic backgrounds (77.89%), primarily farmers (48.42%) and day laborers (29.47%). A strong association with smoking was identified, with 82.11% of cases being smokers, most consuming fewer than 20 cigarettes daily. The underprivileged adult males (aged 31–60), smokers, and individuals with low socioeconomic status were the most affected.

**Conclusion:** Age, sex, occupation, socio-economic status, and smoking habits may significantly contribute as risk factors for duodenal ulcer perforation in our country. However, a comprehensive nationwide study is essential to uncover the complete truth in this area.

**Keywords:** Duodenal ulcer, gastrointestinal tract, peptic ulcer disease, perforation, pud, risk factors

### Introduction

Duodenal ulcer perforation (DUP) is a critical complication of peptic ulcer disease (PUD) that results in the leakage of gastrointestinal contents into the peritoneal cavity, leading to peritonitis, septic shock, and potentially fatal outcomes. Despite advances in medical management, the incidence of duodenal ulcer perforation remains a significant concern, particularly in developing countries like Bangladesh, where it contributes to a substantial number of emergency abdominal surgeries each year [1, 2]. The pathophysiology of duodenal ulcers involves an imbalance between aggressive factors such as gastric acid secretion and pepsin, and protective mechanisms such as mucosal defense and prostaglandin synthesis [3]. Infection with *Helicobacter pylori*, nonsteroidal anti-inflammatory drugs (NSAIDs), and smoking are well-established risk factors for the development of duodenal ulcers [4, 5]. However, the transition from ulceration to perforation is less well understood, with several factors such as delayed diagnosis, lack of timely treatment, and the size and depth of the ulcer contributing to this progression [6, 7]. Clinical presentation of perforated duodenal ulcers typically includes sudden, severe abdominal pain, often localized to the epigastrium, and associated with nausea, vomiting, and signs of peritonitis [8]. Early surgical intervention is critical, as delays in treatment can result in increased mortality due to complications such as sepsis and multi-organ failure [9]. In addition to clinical presentation, the prognosis of DUP is influenced by patient-related factors such as age, gender, comorbid conditions, and lifestyle choices [10, 11]. Several studies have explored the epidemiological and clinical factors associated with duodenal ulcer perforation, with findings indicating that male patients, older age, and lower socioeconomic status are major contributors to the incidence of perforation [12, 13].

The use of NSAIDs and corticosteroids has been found to significantly increase the risk of perforation in individuals with pre-existing ulcers or chronic gastric irritation [14, 15]. Furthermore, untreated H. pylori infection is a major risk factor, emphasizing the importance of eradication therapy in preventing complications [16]. The management of duodenal ulcer perforation typically involves resuscitation with fluids, antibiotics, and prompt surgical intervention, often in the form of omental patch repair, which remains the gold standard in most cases [17]. Despite advances in surgical techniques, mortality rates remain high in patients with advanced age or comorbidities, underlining the need for early diagnosis and intervention [18]. This study aimed to evaluate the risk factors for duodenal ulcer perforation in patients presenting to a tertiary care hospital in Bangladesh, to identify sociodemographic and clinical variables that contribute to its occurrence.

**Methodology**

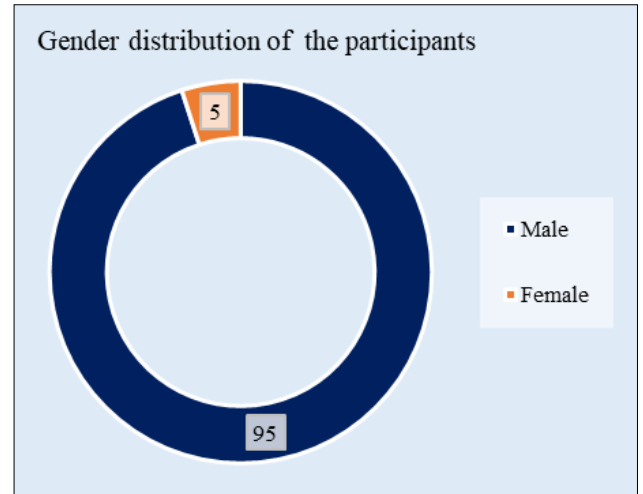
This observational cross-sectional study was conducted in the Department of Surgery at Shaheed Ziaur Rahman Medical College Hospital, Bogra, Bangladesh, from January to December 2010. A total of 95 diagnosed cases of duodenal ulcer perforation were enrolled using a purposive sampling method. The diagnosis was established based on clinical history, examination findings, relevant radiological evidence, and laparotomy findings. Information on age, sex, occupation, socioeconomic status, and smoking habits was systematically recorded. The study received approval from the hospital's ethical committee. Inclusion criteria encompassed patients aged 18 years and above with a history of peptic ulcer disease, while individuals younger than 18 years were excluded. Data analysis was performed using MS Office tools.

**Results**

In this study, the age distribution revealed that nearly one-third of the cases (31.58%) fell within the 31–40 years age group. Additionally, 23.16% of cases were from the 20–30 years age group, followed by 20.00% in the 41–50 years group. Analysis of the gender distribution revealed that 94.74% of the 95 patients were male, while only 5.28% were female, resulting in a male-to-female ratio of 18:1. In this study, among the cases of duodenal ulcer perforations, farmers constituted the highest proportion at 48.42%, followed by day laborers (29.40%), drivers (6.32%), shopkeepers (6.32%), housewives (5.26%), service holders (2.11%), and salesmen (2.11%). Regarding the socio-economic status of the patients, the majority (54.74%) belonged to the upper-lower class, followed by 31.58% in the lower-lower class and 13.68% in the lower-middle class. In this study, it was observed that 81% of the patients were smokers, while 17.89% were non-smokers, resulting in a smoker-to-non-smoker ratio of 4.59. All female patients (5) were non-smokers. In our study, regarding smoking habits based on the number of cigarettes smoked per day, it was found that among the total number of smokers (78), only 16.07% were heavy smokers, consuming more than twenty cigarettes per day. The majority of smokers (46.15%) consumed 11–20 cigarettes, while 37.18% smoked fewer than 10 cigarettes per day.

**Table 1:** Age distribution of cases (N=95)

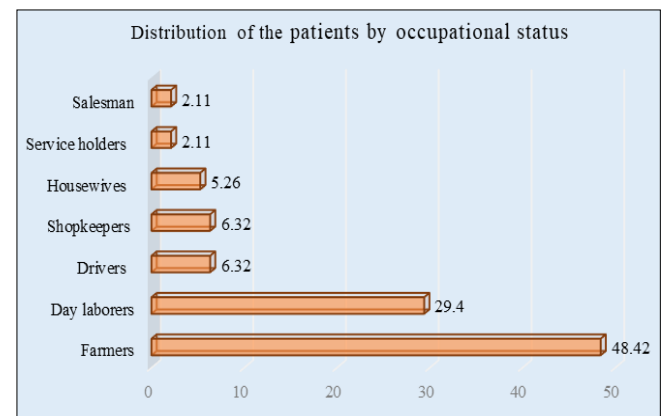
Age (Years)	n	%
20-30 Yrs.	22	23.16%
31-40 Yrs.	30	31.58%
41-50 Yrs.	19	20.00%
51-60 Yrs.	13	13.68%
61-70 Yrs.	10	10.53%
71-80 Yrs.	1	1.05%



**Fig 1:** Ring chart showed gender wise patients distribution (N=95)

**Table 2:** Occupational status (N=95)

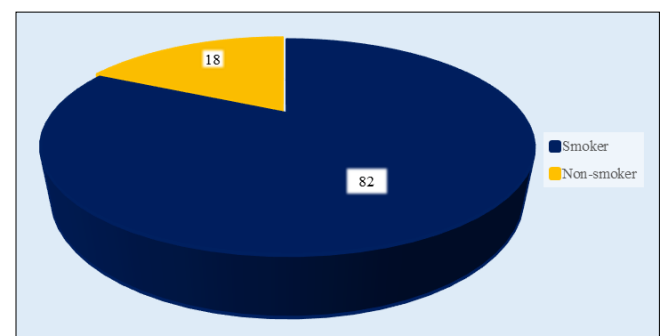
Occupation	n	%
Farmers	46	48.42%
Day laborers	28	29.40%
Drivers	6	6.32%
Shopkeepers	6	6.32%
Housewives	5	5.26%
Service holders	2	2.11%
Salesman	2	2.11%



**Fig 2:** Bar chart showed occupational status wise patients distribution (N=95)

**Table 3:** Socio-economic status (N=95)

Socio-economic group	n	%
Upper-lower class	52	54.74%
Lower-lower class	30	31.58%
Lower-middle class	13	13.68%



**Fig 3:** Pie chart showed smoking status of the patients (N=95)

**Table 4:** Smoking habit according to sticks used per day (N=95)

Sticks per day	n	%
01-10	29	37.18%
11-20	36	48.15%
>20	13	16.67%

### Discussion

In our study, the age distribution of patients with duodenal ulcer perforations showed that nearly one-third (31%) were aged 31–40 years, followed by 23.16% aged 20–30 years and 20% aged 41–50 years. This contrasts with another study [19] indicating that duodenal ulcer perforations are more common in older populations, with a median age of 68 years. However, other research has noted a significant incidence among younger adults, with 40% of perforated peptic ulcer cases occurring between 18–30 years [20]. The gender distribution in our cohort revealed a significant male predominance, with a male-to-female ratio of 18:1. This finding aligns with historical data where male predominance was observed, such as a 10:1 ratio reported in earlier decades [21]. However, more recent studies have shown a shift towards equal gender distribution, with some reporting a male-to-female ratio of 1:1 [19]. Occupational analysis indicated that farmers constituted the largest proportion of cases (48.42%), followed by day laborers (29.40%). This aligns with research suggesting that individuals engaged in manual labor are at increased risk for duodenal ulcer perforation due to factors like physical stress and irregular meal patterns [23]. Conversely, other studies have found a higher incidence among urban professionals, indicating that occupational risk factors may vary by region and lifestyle [23]. Regarding socioeconomic status, the majority of patients (54.74%) belonged to the upper-lower class. This finding is consistent with studies indicating that lower socioeconomic conditions are associated with an increased risk of *Helicobacter pylori* infection, a major risk factor for peptic ulcer disease [24]. However, some research has shown a higher prevalence of peptic ulcer disease among higher socioeconomic groups, possibly due to lifestyle factors such as increased stress and dietary habits [23]. In the same study, it was also reported that smoking was prevalent among our patients, with 81% being smokers. This is consistent with global data linking tobacco use to an increased risk of peptic ulcer disease and its complications. However, some studies have reported lower smoking rates among peptic ulcer patients, suggesting that other factors, such as *Helicobacter pylori* infection or NSAID use, may play a more significant role in certain populations [24].

### Conclusion and Recommendation

In this study, an attempt was made to identify probable etiological factors and their correlations with duodenal ulcer perforation. The findings revealed that underprivileged young adult males aged 31–50 years were the primary sufferers. These individuals predominantly belonged to low socioeconomic strata and exhibited mild to moderate smoking habits. In conclusion, age, sex, occupation, socioeconomic status, and smoking habits appear to be significant risk factors for duodenal ulcer perforation in our country. However, a comprehensive, nationwide study is required to provide more conclusive insights into the underlying factors and their impact.

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