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Factors associated with severity and length of hospital stay in patients with acute upper gastrointestinal bleeding: insights from two Ethiopian hospitals

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Abstract

Background Upper gastrointestinal bleeding (UGIB) is a critical emergency with substantial morbidity and mortality. Outcomes depend on bleeding severity, patient risk factors, and comorbidities. This study evaluated clinical patterns and factors influencing disease severity and hospital stay among patients present with UGIB symptoms at two major Ethiopian hospitals.

Methods A retrospective, cross-sectional review was conducted on 199 UGIB patients admitted to Yekatit 12 Hospital Medical College (Y12HMC) and Tikur Anbesa Specialized Hospital (TASH) from September 2022 to September 2023. Data on demographics, clinical presentations, endoscopic findings, and outcomes were analyzed using SPSS version 26. Binary logistic regression assessed associations, with statistical significance set at $P < 0.05$.

Results Of 199 patients, 70.9% were male, predominantly aged 18–40. Hematemesis (63.8%) and hematemesis with melena (27.6%) were common presentations. Endoscopy was not performed on more than half of the participants, with 116 patients (58.3%) not undergoing this procedure. Among the 83 cases who did have endoscopy, esophageal varices emerged as the most common condition, observed in 43.3% (36 cases. Smoking (AOR = 1.77), alcohol intake (AOR = 1.89), and drug use (AOR = 1.34) were linked to higher severity scores. Alcohol use, comorbidities, liver disease, and previous drug use correlated with prolonged hospital stays.

Conclusion UGIB predominantly affects younger males, with hematemesis as the primary presentation. Key factors like smoking, alcohol intake, and drug use were associated with greater disease severity and longer hospital stays. These findings suggest the importance of lifestyle interventions, particularly in resource-limited settings.

Keywords Upper gastrointestinal bleeding, Disease severity, Length of hospital stay, Hematemesis, Esophageal varices, Duodenal ulcers

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Introduction

Upper gastrointestinal bleeding (UGIB) represents a critical medical emergency characterized by hemorrhage originating from the upper gastrointestinal tract, specifically the esophagus, stomach, and duodenum [1, 2]. The acute onset of UGIB necessitates immediate medical intervention, as it poses a significant threat to patient survival [3–5]. The global epidemiology of gastrointestinal bleeding exhibits considerable variability, primarily due to heterogeneity among studies. Incidence rates for UGIB range from 15 to 172 per 100,000 person-years, with a noteworthy decline attributed to improved management of Helicobacter pylori (H. pylori) infections. The implications of these findings underscore the urgent need for effective treatment strategies tailored to the specific challenges posed by UGIB [6–10].

The prevalence of UGIB is notably high, with mortality rates ranging from 2 to 10%. In the United States, the in-hospital mortality rate from UGIB is estimated at 78 cases per 100,000 individuals, resulting in over 300,000 hospital admissions and approximately 30,000 deaths annually [3, 11–13]. Conversely, developing countries face even higher mortality rates, ranging from 16.7 to 23.5%, largely due to limited access to endoscopy, which is essential for effective management. Studies from various populations, including Iceland and Thailand, highlight the global burden of UGIB, indicating the urgent need for comprehensive data to inform local healthcare strategies [14–18].

Risk stratification is paramount in guiding treatment decisions and predicting clinical outcomes in patients with UGIB. Notable risk factors identified include chronic use of non-steroidal anti-inflammatory drugs (NSAIDs), the presence of gastric ulcers, and lifestyle factors such as alcohol consumption and smoking. Additionally, comorbidities like diabetes, hypertension, and liver disease significantly contribute to the risk of UGIB, with H. pylori infection being a predominant underlying cause [19–21] Understanding the multifaceted interplay between medication use, lifestyle choices, and health conditions is crucial for effectively addressing UGIB [22, 23].

Recent studies have provided insights into the clinical presentation and endoscopic findings associated with UGIB. A retrospective analysis revealed that 24% of patients undergoing upper gastrointestinal endoscopy had evidence of UGIB, with melena, hematemesis, and pan-gastritis being common findings [24, 25]. Other research has similarly identified peptic ulcer disease and esophageal varices as leading causes of UGIB, emphasizing the need for early and accurate diagnosis. The variability in etiological factors across different regions necessitates a nuanced understanding of local patterns to inform targeted management approaches [26–29].

Despite advancements in medical and endoscopic therapies, mortality rates associated with UGIB remain concerning, particularly among high-risk populations such as the elderly and those with comorbidities. The significance of achieving rapid hemostasis cannot be overstated, particularly in cases of acute variceal bleeding. Furthermore, while endoscopy serves as the primary diagnostic tool for UGIB, the growing population of older patients with multiple health issues presents ongoing challenges in management [10, 30–33].

Reducing the length of stay (LOS) without compromising patient outcomes is a key objective in managing upper gastrointestinal bleeding (UGIB). This can be achieved through early risk stratification, such as using the Glasgow-Blatchford Score (GBS), and the timely initiation of appropriate treatments. These severity indicators can effectively aid in triaging patients, particularly in resource-limited settings, to optimize resource allocation. Prolonged hospital stays are often linked to increased economic and health-related complications [3, 9, 1]. However, there is limited data on the determinants of severity scores in patients with UGIB, especially in resource-constrained environments. Furthermore, this study is the first in Ethiopia to apply the GBS for assessing UGIB severity [7, 14]. Therefore, the aim of this study is to address knowledge gaps related to disease severity and hospital stay in patients present with UGIB symptoms by identifying factors associated with higher clinical severity scores and extended hospital stays.

Methods and materials

Study setting

The study was conducted at two major tertiary hospitals in Addis Ababa, Ethiopia: Yekatit 12 Hospital Medical College and Tikur Anbessa Specialized Hospital (TASH). Both hospitals are located in the capital city, Addis Ababa, and serve not only the local population but also patients from the surrounding Oromia region. These institutions are affiliated with medical colleges offering both undergraduate and postgraduate programs in medicine. Yekatit 12 Hospital Medical College handles approximately 45,000 emergency cases annually, while Tikur Anbessa Specialized Hospital (TASH), the largest teaching hospital in Ethiopia, manages around 50,000 emergency cases each year. Upper gastrointestinal endoscopy is available during official working hours at Tikur Anbessa Specialized Hospital (TASH) and is performed by trained endoscopists in the Department of Gastroenterology. However, patients from Yekatit 12 Hospital Medical College (Y12HMC) are referred to TASH for the procedure both hospitals provide comprehensive medical services and play a key role in the healthcare system of the region [34, 35].

Study design, study period and study population

This multicenter, institutional-based, retrospective cross-sectional study was conducted from November 1, 2023, to January 30, 2024. The study population comprised all patients aged 18 years of age or older admitted with a diagnosis of upper gastrointestinal bleeding (UGIB) to the emergency wards of Yekatit 12 Hospital Medical College (Y12HMC) and Tikur Anbessa Specialized Hospital (TASH) over a one-year period. A total of 199 cases who met the inclusion criteria were included in the study.

Sample size determination

Convenient sampling were utilized and All patients who visited the Adult Emergency Department at Y12HMC and TASH with a chief compliant of UGIB and full filled the inclusion criterion from September 2022 to September 2023 were included.

Exclusion criteria

Patient who chart lacked critical information on study variables demographic details, clinical presentation and outcome measures (those referred but outcome not able to traced) and patient who left against medical advice before 7 days were excluded. Additionally, those presenting for the second or more time during the study period, as well as cases of upper gastrointestinal bleeding related to trauma, were excluded. Patients who had recently undergone gastrointestinal surgery and those who were pregnant were also excluded from the study.

Study variables

The dependent variables in this study include severity of upper gastrointestinal bleeding (UGIB), and the length of hospital stay. The independent variables encompass various socio-demographic characteristics, presenting symptoms, risk factors, and comorbidities. Additionally, laboratory profiles are considered, along with the employment of guideline-directed medical therapy (GDMT), transfusion of blood components, and the involvement of endoscopic evaluation and intervention. These variables collectively contribute to understanding the factors influencing severity and hospital stay [3]

Data collection tool and procedures

Structured data extraction designed to capture pertinent clinical information from patients' medical records. The tool is prepared from incorporating similar study including Ethiopia [3, 9, 12, 36] The form was organized into several sections to ensure comprehensive data collection. The first section focused on demographic information, including patient age, gender, and ethnicity. The clinical presentation section recorded the symptoms at presentation such as hematemesis and melena, and risk factors. The medical history section documented any history of gastrointestinal disorders, previous episodes of UGIB, and comorbid conditions such as liver disease or cardiovascular issues.

Laboratory investigations, including complete blood count (CBC), liver function tests (LFTs), and coagulation profiles (e.g., INR, aPTT), were also collected. Diagnostic procedures were recorded, including endoscopy findings (if the patient had undergone). The treatment provided to each patient was documented in detail, including the type of treatment (pharmacological or surgical), blood transfusions, and medications administered (such as proton pump inhibitors or vasoactive drugs). Finally, the length of hospital stay were also recorded.

The data collection process began by identifying eligible patients who met the inclusion criteria those aged 18 or older with a diagnosis of UGIB during the study period. Medical records were then retrieved from the hospital databases at Yekatit 12 Hospital Medical College (Y12HMC) and Tikur Anbessa Specialized Hospital (TASH), involving both electronic health records (EHR) and physical charts where necessary. Trained research assistants used the structured data extraction form to systematically collect relevant information from the patients' medical records and entered the data into a secure spreadsheet.

Operational definitions

Guideline-directed medical therapy (GDMT) for upper gastrointestinal bleeding (UGIB) includes the use of proton pump inhibitors (PPIs) and vasoactive agents such as octreotide, somatostatin, and terlipressin. In patients with cirrhosis, antibiotics are recommended. Selective beta-blockers are not recommended in this setting, and pre-endoscopic prokinetics like erythromycin may be employed. Endoscopic interventions for UGIB include techniques such as endoscopic band ligation (EBL), injection of tissue adhesives, alcohol, or epinephrine, as well as the use of bipolar electrocoagulation and heater probes. Hematemesis is defined as the vomiting of red blood or "coffee-grounds" material, melena refers to black, tarry stool, and hematochezia describes the passage of red or maroon blood from the rectum. Anemia, as defined by the World Health Organization (WHO), occurs when hemoglobin levels fall below 12 g/dL in women and 13 g/dL in men. A Mallory-Weiss tear is a tear in the tissue of the lower esophagus, while chronic liver disease is characterized by progressive destruction of the liver parenchyma over a period of more than six months, eventually leading to fibrosis and cirrhosis [2].

Alcohol consumption in our study was categorized based on the frequency of use, following the World Health Organization (WHO) guidelines. Patients who reported consuming alcohol on a daily basis were classified as "Every day" drinkers, while those who drank

alcohol occasionally were grouped as "Occasional" drinkers. Individuals who had previously consumed alcohol regularly but had stopped were categorized as "Ex-alcoholic." Lastly, patients who reported never consuming alcohol were classified as "Never" drinkers. In cases where alcohol consumption history was unavailable or unclear, the information was classified as "Unknown." [37].

Smoking status in our study was categorized based on WHO categorization as follows. as follows: Patients who currently smoke on a regular basis were classified as "Current smokers." Those who had smoked in the past but had quit for at least six months were categorized as "Former smokers." Patients who had never smoked were classified as "Never smokers." In instances where smoking history was not available or unclear, the category was marked as "Unknown." These classifications were based on self-reported data gathered from patient medical records [37].

High-risk drugs for UGIB, including NSAIDs, antiplatelet agents, anticoagulants, corticosteroids, and chemotherapy agents, were operationalized by categorizing patients based on active use of these medications within the past 30 days as documented through patient medical records [38].

In this study, prior medical history was operationalized as follows: Prior Peptic Ulcer Disease (PUD) was categorized into "Yes" for patients with a documented history of PUD, confirmed through medical records or clinical diagnosis, and "No" for those without a history of PUD. Helicobacter pylori (H. pylori) infection was classified into "Positive" for patients with a confirmed H. pylori infection, "Negative" for those who tested negative, and "Not Done" for patients for whom testing was not performed. Hepatitis was categorized into "Hepatitis B" for patients with a positive diagnosis of Hepatitis B, "Hepatitis C" for those diagnosed with Hepatitis C, "Negative" for patients with negative test results, and "Not Done" for patients whose hepatitis status was not assessed. Prior liver disease was defined as a history of chronic liver conditions such as cirrhosis or liver failure, categorized into "Yes" for those with a documented history and "No" for those without such a history [38].

Assessment of severity

The Glasgow-Blatchford Score (GBS), developed and published in 2000, is a tool designed to predict the need for inpatient treatment, including blood transfusion, endoscopic therapy, or surgery. Based on a cohort of 1,748 patients, the score ranges from 0 to 23 and is calculated using seven key variables: hemoglobin, urea, heart rate, systolic blood pressure, comorbidities, and presenting symptoms such as syncope and melena. The GBS has been evaluated in resource-limited settings, demonstrating its effectiveness and applicability across various healthcare environments. Patients were classified as having 'severe' UGIB if their Glasgow-Blatchford Score (GBS) was greater than 1. Those with a GBS of 0 to 1 were classified as having 'mild' UGIB. This classification is based on the need for urgent interventions, such as blood transfusions, endoscopic therapy, or surgery, and has been validated for use in various healthcare settings, including resource-limited environments [39].

Defining length of stay

We defined the length of stay (LOS) as the total number of days a patient spends in the hospital from the time of admission to the time of discharge. Most studies focusing on outcomes, severity, and resource utilization in upper gastrointestinal bleeding (UGIB) management, use 7 days as a cutoff for prolonged hospital stay. Consequently, we define prolonged stay as any hospitalization that extends beyond this 7-day threshold. This duration includes the time required for diagnostic evaluation, therapeutic interventions (such as endoscopy), clinical stabilization, and observation to ensure that there are no further complications or rebleeding [40, 41].

Data management and analysis

Data quality was ensured through the use of a structured questionnaire adapted from related studies, which was pre-tested on 5% of the sample to confirm clarity and relevance to the study objectives in St. Paulos millinium, a teritiery hospital located in Addis Abeba, ethiopia. Data collectors received training before data collection, and a supervisor checked each data entry for completeness. Following data collection, completeness was assessed, and the data were coded and entered into Epi Info before being analyzed using SPSS version 26. Descriptive statistics were generated through frequency, tables and graphs, while binary logistic regression was conducted to calculate odds ratios with 95% confidence level and p-values, testing the association between dependent and independent variables; a P- value <0.2 was used for bi-variate analysis, and <0.05 for multivariate analysis to declare statistical significance.

Results

Socio demographic characteristics

Out of a total of 208 UGIB cases, 199 were included in the study, while 9 cases were excluded. These 199 patients from TASH and Y12 HMC formed the final study sample. Of these, 141 patients (70.9%) were male. Approximately 56.7% of the patients were between the ages of 18 and 40. The majority of the study participants (60.8%) were from Addis Ababa, followed by 24.6% from Oromia Table 1.

Table 1 Socio-demographic characteristics of adult patients with acute UGIB admitted to TASH and Y12HMC between September 2022 to September 2023

Variable	Number	Percent
Sex		
Male	141	70.9
Female	58	29.1
Age		
18-30	62	31.2
31-40	51	25.6
41-50	35	17.6
51-60	29	14.6
>60	22	11.1
Address		
Addis Ababa	121	60.8
Oromia	49	24.6
Amhara	11	5.5
SNNPR	13	6.5
Others	5	2.6

Others=Tigray ($n=2$), Harar ($n=1$), Dredawa ($n=1$), Afar ($n=1$)

Behavioral and clinical characteristics

About 37 (23.6%) of the study participants reported a current history of alcohol consumption, among them 34(17.1%) consume alcohol daily. Additionally, 19 (9.5%) participants had a current smoking history. The majority were not taking medications such as antiplatelets, anticoagulants, NSAIDs, or steroids. A history of peptic ulcer disease (PUD) was noted in 17 (8.5%) patients, and 32 (16.1%) had a documented history of liver disease among the UGIB patients Table 2.

As shown in the chart below, 127 participants (63.8%) presented with hematemesis as their sole clinical symptom, followed by 55 participants (27.6%) who presented with both hematemesis and melena Fig. 1.

Severity and co morbidities

In this study, the majority of participants, 126 (63.3%), had no co-morbidities. However, diabetes mellitus (DM) and hypertension (HTN) were the most common co-morbid conditions, affecting 17 (8.5%) and 16 (8%) of the participants, respectively. Stroke accounted for 12 (6.0%) of the co-morbidities, while chronic kidney disease (CKD), asthma, and HIV were less common, observed in 6 (3.0%), 3 (1.5%), and 1 (0.5%) patients, respectively. Additionally, most participants, 153 (76.9%), had a Glasgow-Blatchford Score (GBS) of greater than 1, while only 46 (23.1%) had a score of 0–1 Table 3.

Laboratory profiles

The majority of patients with upper gastrointestinal bleeding (UGIB) had white blood cell counts within the normal range, with 69.3% falling between 4,000 and 11,000 cells/microliter. Additionally, 16.1% had values below 4,000, while 14.6% had values exceeding 11,000.

Table 2 Behavioral and clinical characteristics of patients with acute UGIB admitted to TASH and Y12HMC between September 2022 to September 2023

Variable	Number	Percent (%)
Smoking		
Current	19	9.5
Former	27	13.6
Never	130	65.3
Unknown	23	11.6
Alcohol using		
Every day	34	17.1
Occasional	13	6.5
Ex-alcoholic	18	9.0
Never	113	56.8
Unknown	21	10.6
Antiplatelet		
Aspirin	12	6.0
Aspirin & Clopidogrel	5	2.5
Clopidogrel only	1	0.5
Not given	181	91
Anticoagulant		
Warfarin	5	2.5
Rivaroxabon	1	0.5
Not given	193	97
NSAID		
Diclofenac	3	1.5
Ibuprofen	4	2.0
Not given	192	96.5
Steroid		
Prednisolone	2	1.0
Not given	197	99.0
Prior PUD		
Yes	17	8.5
No	182	91.5
Helicobacter H Pylori		
Positive	40	20.1
Negative	107	53.8
Not done	52	26.1
Hepatitis		
Hepatitis B	16	8
Hepatitis C	5	2.5
Negative	119	59.8
Not done	59	29.6
Prior liver disease		
Yes	32	16.1
No	167	83.9

A significant proportion (25.6%) of the patients in this study had documented severe anemia, defined as hemoglobin levels below 7 g/dL. Among the patients, 53.8% had hemoglobin levels ranging from 7 to 12 g/dL, and 20.6% had hemoglobin concentrations above 12 g/dL. Moreover, 24.6% of patients had a mean corpuscular volume (MCV) below 80. Platelet counts were largely preserved, with 56.3% of patients having counts between

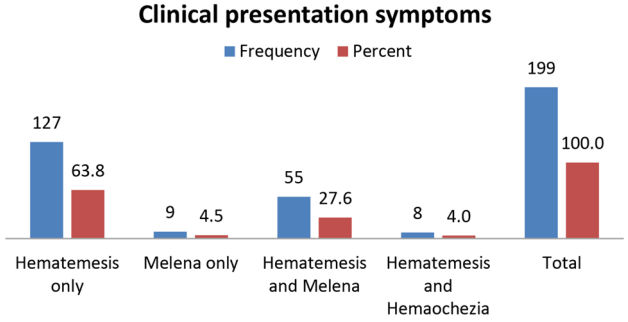

Fig. 1 Clinical presentation of patients with acute UGIB admitted to TASH and Y12HMC between September 2022 to September 2023

Table 3 Severity using the Glasgow-Blatchford score (GBS) of patients with acute UGIB admitted to TASH and Y12HMC between September 2022 to September 2023

Variable	Number	Percent (%)
Glasgow Blatchford Score		
0-1	46	23.1
>1	153	76.9
Co morbidities		
No	126	63.3
HTN	16	8.0
DM	17	8.5
IHD	9	4.6
Stroke	12	6.0
Asthma	3	1.5
CKD	6	3.0
HIV	1	0.5
Others	9	4.6

Others = Gastric ca. ($n=3$), Esophageal ca. ($n=2$), cervical ca. ($n=2$), RA($n=2$)

150,000 and 450,000 cells/microliter, while 73 patients (36.7%) had platelet counts below 150,000 cells/microliter. Elevated serum concentrations of ALT and AST were observed in 29 patients (16.4%) and 40 patients (20.1%), respectively. Liver function parameters assessed by prothrombin time (PT) in 181 patients revealed that 37 had prolonged PT. Among 137 patients with total bilirubin determinations, 18 had elevated bilirubin levels, and of the 144 patients assessed for albumin, 41 had low albumin levels. Renal function, evaluated by serum creatinine concentrations and blood urea nitrogen (BUN), showed that the majority of patients, 166 and 146 respectively, had normal results (Fig. 2).

Abdominal ultrasound and endoscopic profile

Notably, endoscopy was not performed on more than half of the participants, with 116 patients (58.3%) lacking this procedure. Among the 83 cases who had endoscopy the most common condition was esophageal varices, 43.3% of cases (36 cases). Duodenal ulcer was the second most prevalent, with 24 cases, making up 28.9% of the total. Duodenopathy and/or gastropathy appeared in 15.6% of cases (13 cases), followed by gastric esophageal varices, which represented 12.4% (10 cases). Regarding ultrasound findings, the majority of patients, and 80 (40.2%), had normal results. However, cirrhosis was identified in 36 patients (18.1%), and splenomegaly was observed in 26 patients (13.1%). Additionally, ultrasound examinations were not conducted for approximately 44 patients (22.1%) in the study (Table 4).

Management

Among the patients with upper gastrointestinal bleeding, 167 (83.9%) received only conservative medical management without any endoscopic treatment. Endoscopic management was implemented for 32 patients (16.1%), with band ligation being the primary intervention. Additionally, 21 patients (10.6%) had endoscopy planned as an outpatient procedure. Of those who underwent endoscopic treatment, 46 patients (23.1%) received it within 12 to 24 h, while 33 patients (16.6%) had the procedure performed after 24 h, and only 3 patients (1.5%) underwent endoscopy within the first 12 h. Blood transfusions were administered to approximately 25% of the patients, with red blood cell (RBC) transfusion being the most common at 42 patients (21.6%). Other transfusions included platelet (PLT) transfusion for 5 patients (2.5%) and fresh frozen plasma (FFP) transfusion for 3 patients (1.5%) Table 5.

Outcome and in hospital complications

Among the patients with upper gastrointestinal bleeding, only 32 (16.1%) received endoscopic treatment, resulting in controlled bleeding as the initial outcome. In terms of in-hospital complications, acute kidney injury (AKI) was observed in 6% of patients, pneumonia in 4.5%, encephalopathy in 4%, spontaneous bacterial peritonitis (SBP) in 4%, and rebleeding in 0.5%. Notably, approximately 80% of patients experienced no complications. Regarding hospital stays, 44 patients (22.1%) were admitted for more than 7 days, while 52 patients (26.1%) stayed for 3 to 7 days; the remaining patients were discharged before the three-day mark. Additionally, 35 patients (17.6%) required referral to another facility for further management including endoscopy, 7 patients (3.5%) left against medical advice, and 19 patients (9%) did not survive Table 6.

Factors associated with severity of UGIB

In this study, binary logistic regression analysis revealed that smoking behavior and drug use were statistically significant factors associated with higher clinical disease severity scoring ($p<0.05$). In contrast, variables such as sex, alcohol intake, prior peptic ulcer disease (PUD), comorbidities, and prior liver disease did not show significant associations in the analysis. After adjusting

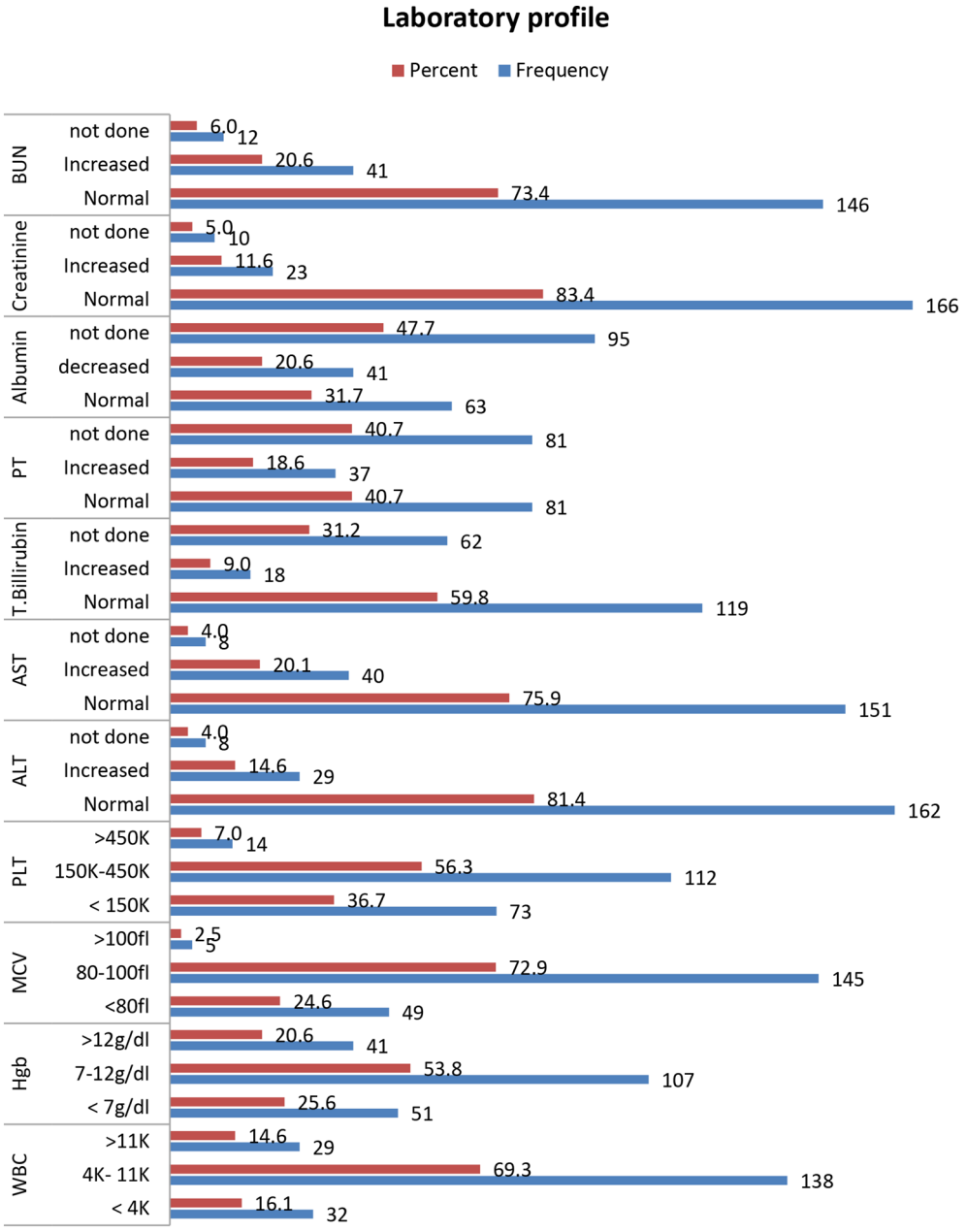

Fig. 2 Laboratory profiles of patients with acute UGIB admitted to TASH and Y12HMC between September 2022 to September 2023

for confounders through multivariable binary logistic regression, smoking behavior, alcohol intake, and drug use remained significantly linked to the outcome variable. Individuals with a history of smoking were 1.77 times higher odds having a high clinical disease severity score [AOR=1.77; CI: 1.19–3.12], while alcohol intake increased the odds disease severity score by 1.89 [AOR=1.89; 95% CI: 1.49–7.21]. Similarly, drug use was associated with a significant increase in odds disease severity score [AOR=1.34; 95% CI: 1.51–3.65] Table 7.

Factors associated with hospital stay for patients with UGIB

In this study the binary logistic regression model analysis showed that alcohol intake, prior liver diseases and drug uses were significantly associated with length of hospital stay ($p<0.05$). Sex, smoking behavior, prior PUD and having co-morbidity were not significantly associated with length of stay in hospital.

After adjusting for potential confounders in the multivariable binary logistic regression analysis, alcohol intake, drug uses, having co-morbidity and prior liver diseases were significantly associated with prolonged hospital stay.

Table 4 Abdominal ultrasound and endoscopic profile of patients with acute UGIB admitted to TASH and Y12HMC between September 2022 to September 2023

Variable	Number	Percent (%)
Ultrasound finding		
Normal	80	40.2
Cirrhosis	36	18.1
Splenomegaly	26	13.1
Periportal fibrosis	12	6.0
PVT	6	3.0
Others	14	7.0
US not done	44	22.1
Endoscopic finding		
Endoscopy not done	116	58.3
Gastric Ulcer	6	7.33
Duodenal Ulcer	24	28.9
Esophageal varices	36	43.3
Gastric Varices	2	2.4
Gastric esophageal Varices	10	12.4
Portal-hypertensive gastropathy	4	4.8
Gastric Cancer	3	3.6
GERD	5	6.0
Duodenopathy and/or gastropathy	13	15.6
Others	5	6.02

Other US finding = Metastatic liver disease ($n=4$), HCC ($n=2$), Splenic vein thrombosis ($n=1$), Budd chiari ($n=1$), CKD ($n=2$), Fatty liver ($n=2$), pancreatic ca. ($n=2$)

Other Endoscopic finding = Esophagitis ($n=3$), unremarkable ($n=2$)

Table 5 Management of patients with acute UGIB in TASH and Y12HMC from September 2022 to September 2023

Variable	Number	%
Conservative (Medical management) only		
Yes	167	83.9
No	32	16.1
Blood transfusion		
RBC transfusion	42	21.6
PLT transfusion	5	2.5
FFP transfusion	3	1.5
Not done	148	74.4
Time to do Endoscopy		
< 12 h	3	1.5
12–24 h	46	23.1
>24 h	33	16.6
Endoscopy not done	117	58.8
Endoscopic treatment given		
Band ligation	32	16.1
No treatment required (clean based)	50	25.1
Facility not available	80	40.2
Patient died before endoscopy	11	5.5
Endoscopy planned as an outpatient	21	10.6

Patients who had history of alcohol intake were 1.39 times higher odds of prolonged hospital stay (>=7 days) compared those who did not have history of alcohol intake [AOR=1.39; 95% CI: 1.38–5.05]. Patients with co-morbidity were 1.95 times higher odds of being stay in hospital compared those without co-morbidity [AOR=1.95; 95% CI: 1.92–4.17]. Furthermore, patients who had liver disease were 1.29 times higher odds of experiencing prolonged hospital stay [AOR=1.29; 95% CI:1.54–3.05]. Similarly, drug use was associated lengthy hospital stay [AOR=1.46; 95% CI: 1.53–3.99] Table 8.

Table 6 Outcome and in hospital complication of patients with UGIB in TASH and Y12HMC between September 2022 and September 2023

Variable	Number	%
Outcomes at first endoscopy		
Controlled bleeding	32	16.1
Endoscopy not done	167	83.9
In Hospital complications		
No complication	158	79.5
Re bleeding	1	0.5
AKI	12	6.0
Encephalopathy	8	4.0
Pneumonia	9	4.5
SBP	8	4.0
Others	3	1.5
Length of stay		
<3 days	103	51.8
3-7 days	52	26.1
>7 days	44	22.1
Discharge Status		
Improved	139	69.8
Referred	35	17.6
Left against medical advice	7	3.5
Dead	19	9.0

Other in hospital complications = GI onset sepsis ($n=3$)

Discussions

The aim of this study was to evaluate the clinical patterns of UGIB and identify the factors associated with higher clinical disease severity score and prolonged hospital stay among patients presenting to the emergency departments of Y12HMC and TASH.

The study showed that males were predominantly suffered UGIB than females; with 2.4:1 male to female ratio. The finding is consistent with reports from other studies [6, 14, 29, 32, 42]. Upper gastrointestinal bleeding (UGIB) is often more common in males due to a combination of lifestyle factors, such as smoking, alcohol use, and NSAID consumption, as well as higher rates of medical conditions like peptic ulcers and chronic liver disease. In developing countries, this gender disparity is further amplified by higher prevalence of infections like hepatitis B, hepatitis C, and schistosomiasis, which are linked to liver disease and variceal bleeding. Men, who are frequently engaged in outdoor labor or water-based occupations, are at greater risk of exposure to these infections. Additionally, limited healthcare access and delayed

Table 7 Factors associated with severity using Glasgow Blatchford score in patients with UGIB treated at TASH and Y12HMC between September 2022 and September 2023

Variables	Glasgow Blatchford Score		COR	*P*-value	AOR	*P*-value
	0-1→1					
Sex						
Male	28	113	1.82(0.91-3.63)	0.08	1.71(0.83-3.52)	0.71
Female	18	40	1.00		1.00	
Age						
<=40	26	87	1.08(0.56-2.09)	0.82	1.09(0.89-3.19)	0.53
>40	21	65	1.00		1.00	
Smoking						
Never	31	99	1.00		1.00	
Yes	10	36	1.95(1.29-3.37)	0.046	1.77(1.19-3.12)	**0.031**
Unknown	5	18	0.89(0.30-2.59)	0.83	0.73(0.20-2.58)	0.62
Alcohol intake						
Never	28	86	1.00			
Yes	12	52	1.73(0.56-5.40)	0.34	1.89(1.49-7.21)	**0.035**
Unknown	6	15	1.23(0.44-3.47)	0.69	1.58(0.46-5.39)	0.47
Prior PUD						
Yes	6	11	1.87(0.65-5.38)	0.24	1.66(0.56-4.95)	0.36
No	41	141	1.00		1.00	
Drugs						
Yes	38	133	1.40(0.57-3.43)	0.03	1.36(1.51-3.65)	0.039
No	8	20	1.00		1.00	
Co morbidity						
Yes	16	50	1.09(0.55-2.20)	0.79	0.87(0.40-1.89)	0.73
No	30	103	1.00		1.00	
Prior liver disease						
Yes	6	26	1.37(0.53-3.55)	0.52	1.34(0.49-3.59)	0.57
No	40	127	1.00		1.00	

1.00=reference, COR=Crude Odds Ratio, CI=confidence interval

treatment in these regions can lead to untreated chronic infections that progress to complications like cirrhosis, further increasing UGIB risk among males [14, 43, 44].

Majority of the patients in this study were below the age of 40. Similar age distribution was seen in studies done in St. Paul Millennium Hospital, Addis Ababa and a study done in Mulago hospital in Kampala, Uganda [14, 23]. Two studies from Tanzania showed a median age of 42 years and 40 year [22, 42]. Similarly, a study done in India showed a mean age of 48±14 years [42] In developing counties the higher prevalence of UGIB in the younger population could be due to The higher prevalence of UGIB in younger populations in developing countries, despite lower life expectancy, is likely due to several factors. Limited access to healthcare, chronic infectious diseases like Helicobacter pylori and liver conditions, nutritional deficiencies, and coexisting tropical diseases (e.g., malaria and schistosomiasis) contribute to early onset of GI bleeding. Additionally, poor nutrition leading to coagulopathies, higher rates of lifestyle factors like smoking and alcohol use, and insufficient preventive care (e.g., screening for esophageal varices and ulcers) further elevate the risk. These combined factors, rather than life expectancy alone, help explain the increased prevalence of UGIB in younger individuals in these regions [23, 45–49].

In this research the most common presentation was (63.8%) hematemesis only followed by (27.6%) hematemesis and melena. This result is consistent with the study done in St.Paul millennium Hospital, in Sri Lanka and Bangladesh [6, 14, 50]. However, according to the result from a study done in Uganda, the most common presenting symptom was hematemesis plus melena followed by hematemesis. A study in Tanzania found melena to be the most common presenting symptom [23, 32].

Outcomes for patients presenting with hematemesis are often worsened when accompanied by concurrent melena, as the combination might suggests a more extensive or severe upper gastrointestinal (UGI) bleed. The presence of both bloody emesis and melena may indicate a larger volume or more prolonged bleeding, which is associated with higher morbidity and mortality. Given this, the combination of hematemesis and melena could serve as a useful clinical marker to help prioritize and expedite endoscopy timing. By identifying patients

Table 8 Factors association with length of hospital stay among patients treated for acute UGIB TASH and Y12HMC between September 2022 and September 2023

Variables	Length of Stay		COR	*P*-value	AOR	*P*-value
	<7 days	→=7days				
Sex						
Male	111	30	1.14(0.56-2.31)	0.71	1.23(0.57-2.67)	0.59
Female	46	12	1.00		1.00	
Age						
<=40	88	25	1.29(0.67-3.47)	0.45	1.12(0.93-4.65)	0.75
>40	63	23	1.00		1.00	
Smoking						
Never	104	25	1.00		1.00	
Yes	34	12	1.31(0.43-4.01)	0.63	1.34(0.36-4.98)	0.67
Unknown	19	5	0.83(0.30-2.29)	0.72	0.98(0.29-3.24)	0.97
Alcohol intake						
Never	95	19	1.00		1.00	0.041
Yes	45	19	1.22(0.41-3.59)	0.03	1.39(1.38-5.05)	0.41
Unknown	15	6	0.57(0.19-1.63)	0.29	0.60(0.18-2.03)	
Prior PUD						
Yes	12	5	1.82(0.63-5.21)	0.27	1.97(0.63-6.16)	0.25
No	142	40	1.00			
Drugs						
Yes	24	7	1.12(0.44-2.76)	0.04	1.46(1.53-3.99)	0.046
No	127	41	1.00		1.00	
Co morbidity						
Yes	51	15	1.63(0.83-3.19)	0.15	1.95(1.92-4.17)	0.034
No	106	27	1.00		1.00	
Medical management only						
Yes	130	37	1.84(0.81-4.16)	0.14	3.34(0.67-16.62)	0.14
No	21	11				
Endoscopic management						
Band ligation	22	10				
Not given	129	38	1.54(0.67-3.54)	0.31	1.36(0.28-6.56)	0.70
Prior liver disease						
Yes	23	9	1.56(0.52-2.59)	0.043	1.29(1.54-3.05)	**0.046**
No ki5	134	33	1.00			

1.00=reference, AOR=Adjusted Odds Ratio, COR=Crude Odds Ratio, CI=confidence interval

at higher risk, this approach could guide more prompt interventions, potentially reducing adverse outcomes and improving overall patient prognosis in cases of upper gastrointestinal bleeding [3, 51]. Thus it is very important to ask for symptoms of melena in patients presenting with hematemesis or in patient who are at risk for UGIB.

Regarding risk factors this study revealed 23.6% of the participates had a history of Alcohol consumption and 23.1% had a history of Smoking. There is a study that reported Alcohol consumption, but not smoking, was associated with an increased risk of sever GIB. Alcohol appeared to potentiate the risk of NSAID-associated GIB [36]. Another study showed current smokers have an increased risk of any major bleeding including gastrointestinal and increased smoking intensity was associated with increased risk of major bleeding [11]. Alcohol consumption and smoking are significant risk factors for gastrointestinal (GI) bleeding, largely due to their impact on the protective mucosal lining of the GI tract. Both substances contribute to mucosal breach and ulceration, the primary pathways through which GI bleeding occurs [1, 52].

In this study drug use was found in 33 patients, of which majority is accounted for antiplatelet agents. In a study done in Iceland LDA was found to be associated with more bleeding [20].

In laboratory assessment of the study participants in this research H.pylori stool Ag test was found to be negative in 53.8% of the cases. In contrary to this overall prevalence of H. pylori infection in Ethiopia was found to be 52.2% [31]. PPIs, which reduce stomach acid, can interfere with H. pylori testing by lowering bacterial activity and density within the stomach, especially in the gastric mucosa. When bacterial load is reduced, stool antigen

tests may fail to detect the presence of H. pylori accurately, leading to false-negative results [38].

In this study only (25.6%) of patients with UGIB in this study had documented severe anemia (Hemoglobin < 7 g/dl). This could be due to reports showing the earliest determination of CBC upon first presentation.

In this study Cirrhosis 36 (18.1%) and Splenomegaly 26 (13.1%) were the most common ultrasound findings followed by perportalk fibrosis 12(6%) and PVT 6(3%). Notably, endoscopy was not performed on more than half of the participants, with 116 patients (58.3%) lacking this procedure. Among the 83 cases who had endoscopy the most common condition was esophageal varices, 43.3% of cases (36 cases). Duodenal ulcer was the second most prevalent, with 24 cases, making up 28.9% of the total. Duodenopathy and/or gastropathy appeared in 15.6% of cases (13 cases), followed by gastric esophageal varices, which represented 12.4% (10 cases). This implies portal HTN following cirrhosis, periportal fibrosis or PVT as a potential cause for varices.

In developing countries though the commonest indication for endoscopic evaluation is dyspepsia revealing duodenal ulcer as the commonest etiology; the commonest endoscopic finding among patents with UGIB remains varices impling the high prevalence of CLD and Hepatoilliary shistosomiasis [26, 27, 32, 53].

In this study majority of the study participants 153(76.9%) had clinical scoring of >1, while only 46(23.1%) had 0–1 scoring. As multivariable binary logistic regression analysis individuals with history of smoking and alcohol intake and had statically significant association with high clinical scoring. This could be either due to the direct effect of alcohol drinking and smoking up on the occurrence and severity of UGIB or through indirect effects following ALD or smoking related H. pylori infection that could increase the risk of peptic ulcer disease.

In our study, among the 19(around 10%) patients who died which is greater than to other conducted studies [24, 27, 29]. It is succumbed to severe bleeding that could likely have been controlled with timely endoscopic intervention, highlighting the critical role of endoscopy in managing UGIB. Additionally, 5 patients died from encephalopathy, which may have been worsened by uncontrolled bleeding, further emphasizing the need for prompt endoscopic treatment. The remaining 4 deaths, whose causes were less clearly defined, also underscore the potential risks associated with delays in diagnosing and managing UGIB. Although we did not initially include patients who died before undergoing endoscopy, these findings clearly indicate the serious consequences of the absence or delay of endoscopy in UGIB management.

In addition a multivariable binary logistic regression analysis showed individuals with history of alcohol intake, co morbidity and prior liver disease and drug had statistically significant association to length of stay. This could be due to presence of ALD and presence of decompensated CLD with multiple complications. As for the comorbidities hypovolemia and anemia following UGIB might precipitate or worsen the underlying medical condition prolonging the length of stay. As for the individuals taking drugs that predispose to UGIB, they tend to have a shorter hospital stay as the condition is usually self-limited.

In hospital mortality among the hospitals was found to be comparable. Yet the referral rate at Y12HMC reached 43.8%.Despite the high referral rate at Y12HMC the significant in hospital mortality can be explained by the high clinical score of patents at presentation leading to unfavorable outcomes despite all effort.

Conclusion

This study provides a comprehensive analysis of adult patients with acute upper gastrointestinal bleeding (UGIB) at two major tertiary hospitals in Ethiopia, revealing a male predominance and a concentration of patients in the 18–40 age group. Behavioral risk factors such as alcohol consumption and smoking were common, with hematemesis being the most prevalent symptom. Co-morbidities like hypertension, diabetes, and stroke were associated with greater disease severity, with many patients presenting with a high Glasgow-Blatchford Score. Diagnostic tools like endoscopy and ultrasound identified conditions such as esophageal varices, duodenal ulcers, cirrhosis, and splenomegaly. All patients who underwent endoscopy successfully controlled their bleeding, highlighting its crucial role in managing UGIB The primary reason the majority of patients did not undergo endoscopy was financial constraints. Limited resources and the high cost of the procedure prevented many patients from accessing this essential diagnostic tool, highlighting the need for affordable or subsidized endoscopy services to improve diagnostic access and patient outcomes in this population. The majority of patients received conservative management, with many requiring blood transfusions. The study underscores the need for enhanced diagnostic and treatment protocols to better manage UGIB in such settings. Additionally, patients with a history of alcohol intake were more likely to experience prolonged hospital stays compared to those without such a history. Patients with co-morbidities, liver disease, or drug use also had higher odds of experiencing extended hospital stays.

Limitations

Although this study is a multicenter investigation involving two hospitals, generalizing the results to the broader population may be challenging. The use of a retrospective

chart review can impact the accuracy of the data collected, potentially introducing biases. Additionally, assessing overall mortality was difficult due to the lack of integrated follow-up for patients after discharge. Other factors that could influence the length of stay, such as the initial hemodynamic condition of the patient, endoscopic diagnoses, and various social factors, were not included in the analysis, which may limit the comprehensiveness of the findings.

Abbreviations

ALT	Alanine transaminase
AST	Aspartate transaminase
AKI	Acute kidney injury
ALD	Alcoholic liver disease
BLH	Black Lion Hospital
CBC	Complete blood count
CKD	Chronic kidney disease
CLD	Chronic liver disease
DU	Duodenal ulcer
EBL	Endoscopic band ligation
ED	Emergency department
EGD	Esophago gastric duodenoscopy
FFP	Fresh frozen plasma
GDMT	Guideline directed medical therapy
GERD	Gastro esophageal reflux disease
GU	Gastric Ulcer
H pylori	Helicobacter pylori
HR	Heart rate
HTN	Hypertension
ICU	Intensive care unit
IHD	Ischemic Heart disease
IV	Intravascular
LDA	Low dose Asprin
LFT	Liver Function Test
NSAID	Nonsteroidal anti-inflammatory drug
NVB	Non variceal bleeding
PPI	Proton Pump Inhibitor
PT	Prothrombn Time
PUD	Peptic Ulcer disease
PCM	Paracitamol
PRBC	Packed Red Blood Cell
RA	Rheumatoid Arthritis
RFT	Renal function test
SBP	Spontaneous bacterial peritonitis
SSRI	Selective Serotonin Receptor Inhibitors
TASH	Tikur Anbessa Specialized Hospital
TIPS	Trans jugular intrahepatic portosystemic shunt
UGIB	Upper gastrointestinal bleeding
Y12HMC	Yekatit 12 Hospital Medical College

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Author contributions
MWB: Conceptualization, investigation, data collection, methodology, and writing, MAK: Conceptualization, investigation, data collection, methodology, and writing, MA: Statistical analysis, validation, and writing, review, and editing, TTB: Validation and writing, review and editing, ABT: Validation and writing, review and editing., EPS: Validation and writing, review and editing.MAE: Validation and writing, review and editing., GDB: Validation and writing, review and editing. BYL:

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethical approval
Ethical approval for the study was granted by the Institutional Review Boards (IRB) of Yekatit 12 Hospital Medical College and Tikur Anbessa Specialized Hospital (TASH). The research was conducted in accordance with the Declaration of Helsinki. Strict measures were taken to maintain privacy and confidentiality, ensuring that no personal identifiers, including names, were recorded in the data.

Consent for publication and consent for participation
Since we used secondary data informed consent was not applicable.

Competing interests
The authors declare no competing interests.

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