"COMPARISON OF GLASGOW BLATCHFORD SCORE, PRE-ENDOSCOPIC ROCKALL SCORE AND AIMS65 SCORE IN PREDICTING MORTALITY AND SIX-MONTH HOSPITAL READMISSION IN PATIENTS WITH UPPER GASTROINTESTINAL BLEEDING"

BY

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DISSERTATION SUBMITTED

TO

BLDE (DEEMED TO BE UNIVERSITY)
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPUR – 586103

IN PARTIAL FULFILLMENT FOR THE DEGREE OF

DOCTOR OF MEDICINE IN EMERGENCY MEDICINE

Under the Guidance of

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled "**Comparison of Glasgow Blatchford Score, Pre-endoscopic Rockall Score and Aims65 score in predicting mortality and six-month hospital readmission in patients with upper gastrointestinal bleeding"** is a bonafide and genuine research work carried out by me under the guidance of Dr. Udaykumar J Khasage, Associate Professor, Dept of Emergency Medicine, Shri B.M. Patil Medical College, Vijayapura, Karnataka.

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ACKNOWLEDGEMENT

I express my heartfelt gratitude to Dr. Udaykumar J. Khasage, Associate Professor and In-Charge Head of the Department of Emergency Medicine, for his invaluable guidance, continuous support, and encouragement throughout my academic journey. His profound knowledge, unwavering dedication, and passion for scientific research have been a constant source of inspiration to me and many others. It is under his expert supervision and generous mentorship that this work has taken its present form.

I extend my sincere thanks to Dr. Arvind Patil, Principal, Shri B.M. Patil Medical College, Vijayapura, for granting me the opportunity and necessary permissions to undertake this study.

I am deeply grateful to Dr. Babu P. Kattimani, Professor, Department of Emergency Medicine, for his insightful guidance, timely advice, and encouragement. His contributions have greatly enriched my learning and understanding.

My heartfelt appreciation goes to all the faculty and staff members of the Department of Emergency Medicine, Shri B.M. Patil Medical College Hospital and Research Centre, Vijayapura, for their constant support and cooperation. I am also thankful to my senior and junior colleagues for their camaraderie and assistance throughout this endeavor.

I remain indebted to all the patients and their attenders who participated in the study with trust and generosity.

I wish to express my deepest gratitude to my parents for their unwavering love and encouragement. A special tribute to my late father, whose blessings and values continue to guide me every day. I am immensely thankful to my husband for his constant support, patience, and understanding, and to my two-year-old daughter, whose presence brings joy and strength to my life even in the most challenging moments.

DR. TEENA KISHOR NIKHAR

ABSTRACT

Introduction: Upper gastrointestinal bleeding (UGIB) is a common emergency with significant morbidity and mortality. Risk stratification scores such as Glasgow Blatchford Score (GBS), pre-endoscopic Rockall Score, and AIMS65 are used to predict adverse outcomes and guide clinical management. However, their comparative effectiveness in predicting both in-hospital mortality and six-month readmission remains underexplored in the Indian setting.

Objective: This study aimed to compare the effectiveness of GBS, pre-endoscopic Rockall, and AIMS65 scores in predicting in-hospital mortality and six-month hospital readmission in patients presenting with UGIB.

Materials and Methods: This cross-sectional observational study included 78 patients presenting to the emergency department with UGIB between May 2023 and January 2024. Scores were calculated based on clinical presentation and laboratory parameters. Patients were followed for mortality during admission and readmission up to six months post-discharge. Data were analyzed using chi-square, Mann-Whitney U tests, and ROC curves to assess predictive performance.

Results: The Rockall score showed the strongest correlation with mortality, rising from 0% at score 0 to 100% at score 6. AIMS65 and GBS also predicted mortality but less consistently. Conversely, lower scores across all tools were associated with higher six-month readmission rates. For instance, AIMS65 scores of 0–2 showed >90% readmission, while scores of 5 had 0% readmission. This inverse trend likely reflects survival bias, where high-risk patients do not survive to be readmitted.

Conclusion: The Rockall score was the most reliable for predicting both mortality and readmission trends. It remains a robust tool for UGIB risk stratification in emergency settings.

Keywords: UGIB, Rockall score, AIMS65, Glasgow Blatchford Score, mortality, hospital readmission, risk stratification.

LIST OF ABBREVIATIONS

- **AIMS65** – Albumin, INR, Mental status, Systolic BP, Age ≥65 years
- **ALT** – Alanine Aminotransferase
- **AST** – Aspartate Aminotransferase
- **BBS** – Baylor Bleeding Score
- **BP** – Blood Pressure
- **CKD** – Chronic Kidney Disease
- **CLD** – Chronic Liver Disease
- **CSMCPI** – Cedars-Sinai Medical Centre Predictive Index
- **dL** – Decilitre
- **ED** – Emergency Department
- **ELISA** – Enzyme Linked Immunosorbent Assay *(if referenced in broader study context)*
- **ER** – Emergency Room
- **GBS** – Glasgow Blatchford Score
- **GI** – Gastrointestinal
- **Hb** – Haemoglobin
- **HR** – Heart Rate
- **ICU** – Intensive Care Unit
- **IHD** – Ischemic Heart Disease
- **INR** – International Normalized Ratio
- **IQR** – Interquartile Range
- **IV** – Intravenous *(commonly used in similar studies)*
- **mg/dL** – Milligrams per Decilitre
- **min** – Minimum

- **max** – Maximum
- **mmHg** – Millimetres of Mercury
- **n** – Number (sample size count)
- **OPD** – Outpatient Department *(often used in contrast to inpatient)*
- **P** – Probability Value
- **PNED** – Progetto Nazionale Emorragia Digestive
- **ROC** – Receiver Operating Characteristic
- **SBP** – Systolic Blood Pressure
- **SD** – Standard Deviation
- **SPSS** – Statistical Package for the Social Sciences
- **UGIB** – Upper Gastrointestinal Bleeding
- **U/L** – Units per Liter
- **URO** – Urology *(if assumed based on hospital context)*
- **WBC** – White Blood Cells
- **yrs** – Years
- **WHO** – World Health Organization

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INTRODUCTION

Upper gastrointestinal bleeding (UGIB) represents one of the most common and urgent medical conditions encountered in emergency departments globally, contributing to significant morbidity and mortality. It is a serious condition often associated with life-threatening complications, including hypovolemic shock, hemodynamic instability, and a high risk of mortality if not managed appropriately. The incidence of UGIB remains considerable, with estimates suggesting that approximately 100,000 to 200,000 cases are diagnosed annually in various healthcare settings. The substantial burden of UGIB extends beyond acute care, as patients may face long-term consequences such as rebleeding and hospital readmission, further compounding healthcare costs and resource utilization. Given these challenges, the early and accurate assessment of risk in UGIB patients is crucial to optimize clinical decision-making and improve patient outcomes [1,2].

Early risk stratification is an essential component of UGIB management, as it helps clinicians determine which patients require immediate intervention, intensive monitoring, or hospitalization, and which may be suitable for outpatient management. Various risk scores have been developed to predict adverse outcomes in UGIB, such as mortality, rebleeding, and the need for endoscopic or surgical intervention. These scoring systems are designed to aid clinicians in assessing the severity of the bleeding, determining the necessity of hospitalization, and identifying patients who may benefit from early endoscopic intervention. Furthermore, early risk assessment may facilitate better resource allocation in emergency departments and reduce unnecessary admissions, as well as provide insights into long-term outcomes, such as the likelihood of hospital readmission and death after discharge [3].

Among the most widely used risk stratification tools are the Glasgow-Blatchford Score (GBS), the Rockall Score (pre-endoscopic and post-endoscopic), and the AIMS65 Score. These

tools differ in their methodology and the factors they consider, but they all rely on clinical and laboratory parameters that are readily available at the time of patient presentation. The Rockall Score, which includes both clinical and endoscopic components, aims to predict the likelihood of rebleeding, need for intervention, and mortality. The pre-endoscopic Rockall Score, which is assessed before the endoscopy results are known, includes clinical variables such as age, hemodynamic status (blood pressure and heart rate), and the presence of comorbid conditions like liver disease, heart failure, and malignancy. This clinical component of the Rockall Score is particularly useful for early risk assessment, as it allows clinicians to stratify patients immediately upon presentation, with a maximum possible score of 7. Higher scores suggest a higher risk of mortality and complications, indicating the need for more aggressive management [4,5].

The GBS is another commonly used tool that includes eight clinical and laboratory variables: heart rate, haemoglobin concentration, blood urea nitrogen, systolic blood pressure, presence of melena, syncope, and comorbid conditions such as hepatic disease or heart failure. The GBS, which ranges from 0 to 23, is designed to predict the need for endoscopic intervention, with higher scores correlating with a greater likelihood of requiring urgent endoscopy. Importantly, the GBS is particularly useful in identifying low-risk patients who may not need immediate endoscopy or hospitalization, thereby facilitating the safe discharge of a significant number of patients without adverse outcomes [6].

The AIMS65 Score is a newer tool developed to predict 30-day mortality in UGIB patients. It includes five variables: albumin levels, international normalized ratio (INR), altered mental status, systolic blood pressure, and age. The AIMS65 Score, which ranges from 0 to 5, is simple to calculate and has been shown to have a strong association with mortality in UGIB patients. A higher AIMS65 score reflects an increased risk of death, and its predictive value has

been validated in various studies, demonstrating its reliability in identifying high-risk patients who may require intensive monitoring and intervention [7].

While these scoring systems have been extensively studied in relation to short-term clinical outcomes, such as rebleeding and the need for immediate endoscopy, there is limited data directly comparing their predictive value for long-term outcomes, such as mortality following discharge and hospital readmission rates. The majority of existing research has focused on evaluating the immediate clinical efficacy of these scores, but less attention has been given to their ability to predict post-discharge outcomes, which are crucial for assessing the overall success of treatment and management strategies. Mortality and hospital readmission within six months are important indicators of the quality of care and patient prognosis, yet few studies have systematically compared the three most widely used risk scores—pre-endoscopic Rockall, GBS, and AIMS65—in predicting these long-term outcomes [8].

This study aims to address this gap in the literature by comparing the ability of the pre-endoscopic Rockall Score, GBS, and AIMS65 Score to predict mortality and hospital readmission rates six months following discharge in patients with UGIB. The goal is to evaluate whether these scoring systems, which have been widely adopted in clinical practice, can accurately forecast both short-term and long-term outcomes, thus enhancing risk stratification protocols and optimizing patient management strategies. By conducting this comparison, the study aims to identify the most effective scoring system for predicting adverse long-term outcomes, providing valuable insights into the utility of these tools in clinical decision-making beyond the initial treatment phase. Furthermore, the findings from this research may help inform guidelines for the management of UGIB patients and improve the overall quality of care by better predicting which patients are at higher risk for adverse outcomes after discharge, ultimately reducing preventable readmissions and improving patient survival rates [9,10].

The primary objective of this study is to evaluate the effectiveness of the pre-endoscopic Rockall Score, Glasgow Blatchford Score, and AIMS65 score in predicting in-hospital mortality in patients presenting to the emergency department with upper gastrointestinal bleeding. The secondary objective is to assess the ability of these same scoring systems to predict hospital readmission within six months following discharge.

AIMS AND OBJECTIVE

Primary objective:

To evaluate how effectively the pre-endoscopic Rockall Score, Glasgow Blatchford Score, and AIMS 65 score predict in-hospital mortality in patients who present to the emergency room with complaints of upper gastrointestinal bleeding.

Secondary objective:

The secondary goal of the present study is-

The effectiveness of the pre-endoscopic Rockall Score, Glasgow Blatchford Score, and AIMS 65 score in predicting the hospital readmission within six months of discharge will be evaluated.

REVIEW OF LITERATURE

Upper gastrointestinal bleeding (UGIB) is a prevalent and potentially life-threatening medical emergency that requires prompt diagnosis and intervention to prevent severe complications. UGIB is characterized by bleeding that originates from the upper portion of the gastrointestinal (GI) tract, which includes the esophagus, stomach, and duodenum. This condition can result from various underlying causes such as peptic ulcer disease, esophageal varices, gastritis, or malignancies, and it frequently presents with symptoms like hematemesis (vomiting blood), melena (black, tarry stools), and hematochezia (fresh rectal bleeding, though more common in lower GI bleeding). The severity of UGIB can range from mild, self-limiting cases to massive hemorrhage leading to hemodynamic instability, organ failure, or death if left untreated [11,12].

Effective and timely management of UGIB is crucial in improving patient outcomes and reducing the risks of complications such as recurrent bleeding, prolonged hospitalization, and mortality. The cornerstone of management includes hemodynamic stabilization, risk stratification, early endoscopic evaluation, and therapeutic interventions. Endoscopy remains the gold standard for diagnosing and managing UGIB, allowing direct visualization of the bleeding site and enabling therapeutic interventions such as hemostatic clipping, thermal coagulation, or injection therapy. However, before endoscopic evaluation, clinical decision-making relies heavily on risk stratification tools to identify patients at high risk for severe outcomes and guide appropriate treatment strategies [13].

Several validated scoring systems have been developed to predict UGIB-related mortality, the need for intervention, and the likelihood of rebleeding. Among these, the Glasgow Blatchford Score (GBS), Rockall Score (pre-endoscopic and post-endoscopic), and AIMS65 Score are widely used in clinical practice. The GBS is primarily utilized to assess the need for urgent intervention, while the Rockall Score evaluates the risk of rebleeding and

mortality, incorporating both clinical and endoscopic factors. The AIMS65 Score is a simple tool focusing on mortality prediction based on key laboratory and clinical parameters. By applying these scoring systems, healthcare providers can prioritize high-risk patients for intensive monitoring, early therapeutic interventions, and appropriate hospital admission, while safely managing low-risk patients as outpatients. The integration of these scoring tools into clinical protocols enhances decision-making and contributes to improved patient care in UGIB management [4].

Epidemiology of Upper Gastrointestinal Bleeding

Upper gastrointestinal bleeding (UGIB) is a significant global health concern and remains a major cause of emergency hospital admissions. The estimated incidence of UGIB varies geographically, but studies suggest that it occurs in approximately 100 to 200 cases per 100,000 people annually. The burden of UGIB is particularly high in older populations, with incidence rates increasing markedly in individuals over 60 years of age. This age-related increase in risk is attributed to factors such as the higher prevalence of peptic ulcer disease, increased use of nonsteroidal anti-inflammatory drugs (NSAIDs) and anticoagulants, and the presence of multiple comorbidities [1,14,15].

Men are generally at a higher risk of developing UGIB than women, though recent epidemiological trends indicate that the gender gap has been narrowing. This shift may be influenced by changes in risk factor distribution, such as increased NSAID use among women and improved management of Helicobacter pylori infection, a major contributor to peptic ulcer-related bleeding. UGIB can present with a wide spectrum of severity, ranging from self-limiting minor bleeding to life-threatening hemorrhage leading to hemodynamic instability, hypovolemic shock, and organ failure [16].

Despite advancements in endoscopic and pharmacologic therapies, UGIB continues to be associated with significant morbidity and mortality. The in-hospital mortality rate ranges

between 10% and 14%, with higher rates observed in patients with severe bleeding episodes, delayed presentation, or underlying medical conditions such as liver disease, chronic kidney disease, and malignancy. The risk of mortality is particularly elevated in cases involving variceal bleeding, as seen in cirrhotic patients, compared to non-variceal bleeding from sources such as peptic ulcers or erosive gastritis [17].

Rebleeding remains a major concern in UGIB management, occurring in 10% to 30% of cases, and is a key predictor of poor outcomes. The need for blood transfusions and prolonged hospital stays further adds to the healthcare burden. While effective treatment strategies, including early endoscopic hemostasis and proton pump inhibitors, have improved patient outcomes, timely risk stratification and appropriate intervention remain critical in reducing morbidity, mortality, and hospital readmission rates associated with UGIB [18].

Upper Gastrointestinal Bleeding: UGIB refers to any form of bleeding originating from the esophagus, stomach, or duodenum. The bleeding can be classified into two types based on its source: proximal (originating from the esophagus, stomach, or duodenum) or distal (from the small intestine). UGIB is often identified by clinical signs such as hematemesis (vomiting blood), melena (black, tarry stools), and hematochezia (fresh blood in stools). These clinical manifestations are indicative of significant bleeding that requires urgent medical attention [19].

The Glasgow Blatchford Score (GBS)

The Glasgow Blatchford Score (GBS) is a widely used clinical tool designed to assess the severity of upper gastrointestinal bleeding (UGIB) and predict the need for medical intervention. Unlike other scoring systems, the GBS is a pre-endoscopic assessment tool, meaning it relies solely on clinical and laboratory parameters available at the time of patient presentation, without requiring endoscopic findings. This makes it particularly useful in emergency settings for early risk stratification and guiding initial management decisions [20,21].

The GBS is calculated using a range of clinical indicators, including:

Vital signs: Heart rate and systolic blood pressure (indicative of hemodynamic stability or instability).

Laboratory findings: Hemoglobin concentration and blood urea nitrogen (BUN) levels (markers of bleeding severity and renal dysfunction).

Clinical symptoms: Presence of melena (dark, tarry stools due to digested blood) and syncope (fainting or near-fainting episodes, suggesting significant blood loss).

Comorbid conditions: History of hepatic disease (such as cirrhosis) or heart failure, which can increase the risk of complications and poor outcomes.

The GBS ranges from 0 to 23, with higher scores indicating a greater likelihood of requiring urgent medical intervention, including blood transfusion, endoscopic treatment, or surgical management. A GBS of 0 or 1 suggests a low-risk patient who may be managed safely on an outpatient basis, whereas higher scores correlate with an increased likelihood of severe bleeding, prolonged hospitalization, and mortality.

The Rockall Score (Pre-Endoscopic and Post-Endoscopic)

The Rockall Score is a widely used risk stratification tool designed to predict mortality and rebleeding risk in patients presenting with upper gastrointestinal bleeding (UGIB). It consists of two versions: pre-endoscopic and post-endoscopic, making it a dynamic tool that can be used at different stages of patient assessment [22].

The pre-endoscopic Rockall Score is based on clinical parameters available before endoscopy, including:

- Age (older patients are at higher risk of complications).
- Hemodynamic status (assessed by heart rate and systolic blood pressure).
- Comorbidities (such as chronic liver disease, kidney disease, or malignancy).

This version of the score helps identify high-risk patients who may require urgent intervention, including hospitalization and intensive monitoring, even before an endoscopic evaluation is performed.

The post-endoscopic Rockall Score incorporates additional findings obtained during endoscopy, such as:

- Diagnosis of the bleeding source (e.g., peptic ulcer, malignancy, varices).
- Endoscopic stigmata of recent haemorrhage (such as active bleeding, visible vessels, or adherent clots).

By integrating these endoscopic findings, the post-endoscopic Rockall Score provides a more comprehensive assessment of the patient's risk for rebleeding and mortality. The total score ranges from 0 to 11, with higher scores indicating a greater likelihood of severe complications and mortality.

The AIMS65 Score

The AIMS65 Score is a simple and effective clinical tool developed to predict short-term mortality in patients presenting with upper gastrointestinal bleeding (UGIB). Unlike the Glasgow Blatchford Score (GBS) and Rockall Score, which focus on the need for endoscopic intervention and rebleeding risk, the AIMS65 Score is primarily designed to assess overall mortality risk within 30 days of hospital admission [23,24].

The score consists of five key variables, which are easy to assess upon initial presentation:

1. Albumin level < 3.0 g/dL (marker of malnutrition and poor physiological reserve).

2. INR (International Normalized Ratio) > 1.5 (indicating coagulation abnormalities or liver dysfunction).

3. Mental status alteration (confusion, disorientation, or coma, suggesting severe systemic illness).

4. Systolic blood pressure < 90 mmHg (indicating hemodynamic instability and shock).

5. Age> 65 years (older patients have higher mortality risk due to comorbidities and reduced physiological reserves).

Each variable scores one point, with the total score ranging from 0 to 5. A higher AIMS65 score correlates with increased mortality risk, prolonged hospitalization, and the need for intensive care. Studies suggest that a score of 2 or more is associated with a significantly higher risk of in-hospital death and severe complications, making this score particularly valuable for early risk stratification and clinical decision-making [25].

Comparison of the Scoring Systems

Predicting Mortality: The pre-endoscopic Rockall Score, Glasgow Blatchford Score (GBS), and AIMS65 Score are widely used risk stratification tools for upper gastrointestinal bleeding (UGIB), each with unique strengths in predicting in-hospital mortality [26].

The pre-endoscopic Rockall Score is particularly effective in early mortality prediction, especially when used in conjunction with post-endoscopic findings. Its inclusion of age, hemodynamic status, and comorbid conditions allows for a comprehensive assessment of overall patient risk.

The GBS is primarily designed to predict the need for urgent medical intervention (such as blood transfusion or endoscopic therapy) rather than mortality itself. While higher GBS scores are often associated with increased mortality, it has been found less reliable in predicting death as an isolated outcome.

The AIMS65 Score is the most effective of the three in predicting 30-day mortality. Studies have shown that a score ≥ 2 is strongly associated with increased short-term mortality risk, making it an excellent tool for identifying high-risk patients requiring intensive care or early intervention. However, its reliance on five clinical parameters means it may lack the

comprehensive scope of the Rockall Score, which incorporates endoscopic findings for more refined risk stratification.

Predicting 6-Month Readmission: Although these scoring systems have been validated for short-term risk assessment, their ability to predict hospital readmission within six months is less established [27].

AIMS65 Score: Preliminary research suggests that AIMS65 may have some predictive value for long-term outcomes, particularly in patients with severe comorbidities, poor nutritional status, or hemodynamic instability at presentation. However, its primary focus remains on short-term mortality, and further studies are needed to validate its utility in predicting readmission [13].

Rockall Score: The post-endoscopic Rockall Score may provide some predictive value for readmission, as endoscopic findings (e.g., active bleeding or high-risk lesions) correlate with rebleeding risk. However, it primarily focuses on immediate outcomes rather than long-term prognosis, limiting its usefulness for readmission prediction [28].

GBS: While the GBS effectively identifies patients needing urgent intervention, it does not account for post-hospitalization factors such as medication adherence, recurrent ulceration, or long-term comorbidities, which are key contributors to readmission risk [29].

Each scoring system has distinct advantages:

Rockall Score (pre- and post-endoscopic): Best for comprehensive mortality prediction, particularly when endoscopic findings are available.

GBS: Most effective for predicting need for urgent intervention but less reliable in predicting mortality alone.

AIMS65: Most effective for predicting 30-day mortality, but its role in long-term risk stratification and readmission prediction remains unclear.

While all three scoring systems aid in clinical decision-making for UGIB patients, further research is needed to optimize their use in predicting long-term outcomes, including 6-month readmission rates.

Pathophysiology of Upper Gastrointestinal Bleeding (UGIB)

Upper gastrointestinal bleeding (UGIB) occurs due to the rupture or erosion of blood vessels within the upper gastrointestinal tract, including the esophagus, stomach, and duodenum. The underlying pathophysiology varies based on the etiology, but the common mechanism involves mucosal injury, vascular compromise, and impaired hemostasis [30].

Mechanisms of UGIB

1. Mucosal Erosion and Ulceration (Peptic Ulcer Disease - PUD): [31]

Peptic ulcers, commonly caused by Helicobacter pylori infection and nonsteroidal anti-inflammatory drugs (NSAIDs), erode the protective mucosal layer, leading to exposure and eventual damage of underlying blood vessels.

If an ulcer penetrates deeper into the submucosa or muscularis propria, it can invade arteries, resulting in high-volume bleeding.

2. Variceal Haemorrhage (Portal Hypertension and Oesophageal Varices):[32]

Cirrhosis-induced portal hypertension leads to venous congestion and dilation of collateral blood vessels in the esophagus and stomach (varices).

Increased pressure within these fragile, thin-walled veins can lead to sudden rupture, causing massive hemorrhage.

The bleeding is often severe and recurrent, contributing to high mortality rates.

3. Mallory-Weiss Tears (Longitudinal Mucosal Lacerations):[33]

These mucosal tears occur at the gastroesophageal junction due to forceful vomiting, retching, or coughing, often seen in alcoholics and patients with gastroesophageal reflux disease (GERD).

The tears damage superficial blood vessels, causing self-limited but sometimes significant bleeding.

4. Gastric and Oesophageal Malignancies: [34]

Tumors in the esophagus or stomach can lead to chronic low-grade bleeding or acute hemorrhage due to tumor necrosis and invasion of blood vessels.

This type of bleeding is often occult (hidden) and presents with iron deficiency anemia before overt bleeding occurs.

5. Vascular Abnormalities (Angiodysplasia & Dieulafoy's Lesion) [35]

Angiodysplasia refers to dilated, fragile blood vessels prone to spontaneous bleeding, often occurring in older adults.

Dieulafoy's lesion is a rare but severe condition where an abnormally large artery in the gastric mucosa erodes and ruptures, causing sudden, massive UGIB.

6. Coagulopathy and Anticoagulation Therapy: [36]

Patients on anticoagulants (e.g., warfarin, DOACs) or with coagulopathies (e.g., liver disease, thrombocytopenia, DIC) are at higher risk for spontaneous or prolonged UGIB due to impaired clot formation.

Severity and Progression:

The severity of UGIB depends on the size of the affected vessel and the underlying pathology: [37]

Capillary or venous bleeding (e.g., erosive gastritis) tends to be slow and chronic.

Arterial bleeding (e.g., peptic ulcer eroding a major artery) can be rapid and life-threatening.

Massive UGIB can lead to hypovolemic shock, with hypotension, tachycardia, and end-organ dysfunction, requiring urgent intervention.

Understanding the pathophysiology of UGIB is essential for early diagnosis, risk stratification, and targeted treatment, improving patient outcomes and reducing complications like rebleeding, hemodynamic instability, and mortality.

Classifications of Upper Gastrointestinal Bleeding (UGIB)

UGIB can be categorized based on multiple factors, including anatomical location, severity, and underlying cause. Proper classification helps guide diagnosis, risk stratification, and management strategies [38].

1. Anatomical Classification:

Upper Gastrointestinal Bleeding (UGIB): Bleeding originates proximal to the ligament of Treitz, involving the esophagus, stomach, or duodenum. This is distinct from lower gastrointestinal bleeding (LGIB), which originates distal to the ligament of Treitz (i.e., small intestine, colon, or rectum) [30].

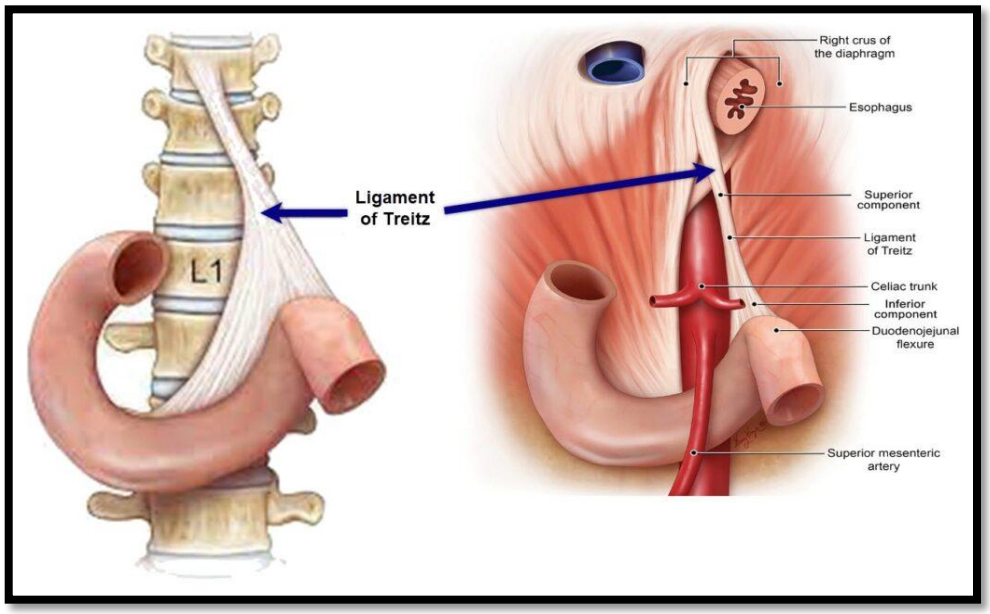

Figure 1: Ligament of Treitz: Coronal Section

2. Classification Based on Severity:

The severity of UGIB is categorized into: Mild UGIB: Self-limited bleeding with minimal symptoms such as mild hematemesis (vomiting blood) or melena (black stools). Patients remain hemodynamically stable without requiring immediate intervention [39].

Moderate UGIB: Patients may develop tachycardia, hypotension, or require blood transfusion, indicating more significant blood loss. Endoscopic therapy is often needed.

Massive UGIB: Life-threatening bleeding causing severe hypotension, shock, or multiorgan failure. This requires urgent resuscitation, intensive care, and possible surgical intervention.

3. Etiological Classification:

UGIB can be classified based on the underlying cause, which helps determine the appropriate treatment approach: [40]

Non-Variceal Bleeding (Most Common Causes):

- Peptic Ulcer Disease (PUD) (gastric or duodenal ulcers eroding blood vessels)
- Gastritis and Erosive Esophagitis (mucosal inflammation due to NSAIDs, alcohol, or infections)
- Mallory-Weiss Tears (mucosal lacerations at the gastroesophageal junction due to forceful vomiting)
- Angiodysplasia (vascular malformations causing chronic or acute bleeding)
- Dieulafoy's Lesion (large-calibre artery in the gastric mucosa prone to rupture)
- Gastric or Oesophageal Malignancies (tumour invasion of blood vessels leading to chronic or massive bleeding)

Variceal Bleeding (Portal Hypertension-Related Causes):

- Oesophageal Varices (dilated veins in the oesophagus due to liver cirrhosis and portal hypertension)

- Gastric Varices (abnormal dilation of veins in the stomach, also due to portal hypertension)

Drug-Induced and Coagulopathy-Related Bleeding:

- NSAID- or Aspirin-Induced Mucosal Injury (increased gastric acid secretion and mucosal erosion)
- Anticoagulant-Related Bleeding (warfarin, direct oral anticoagulants, or platelet dysfunction)

Etiological Factors of Upper Gastrointestinal Bleeding (UGIB)

Upper gastrointestinal bleeding (UGIB) arises from various underlying pathological conditions that lead to mucosal injury, vascular compromise, or coagulation abnormalities. Understanding the etiological factors is essential for effective prevention, diagnosis, and treatment [41].

1. **Common Causes of UGIB:** The most frequent causes of UGIB are classified into non-variceal and variceal bleeding:

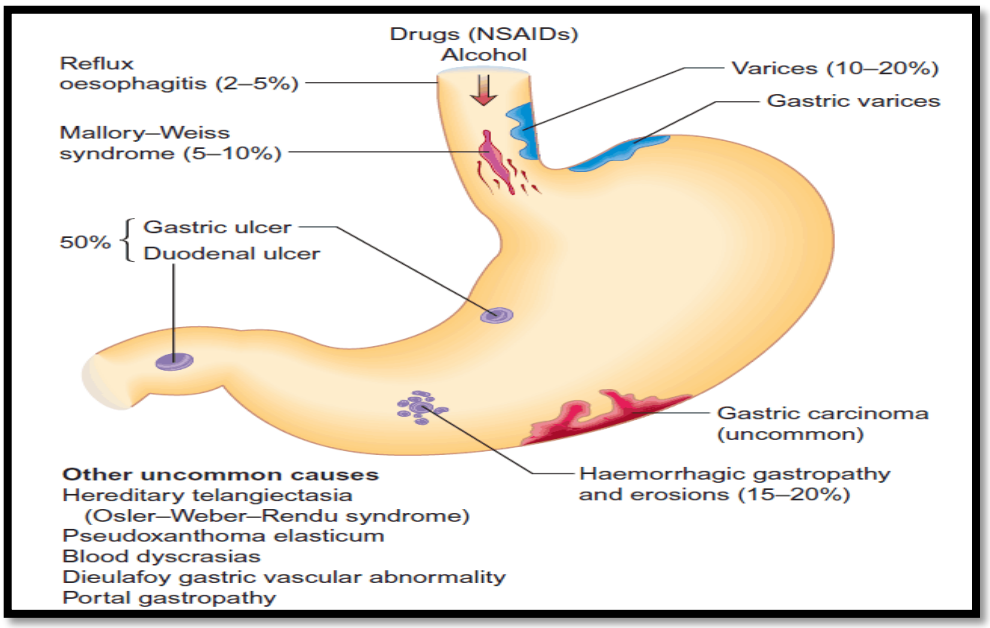

Figure 2: Causes of upper gastrointestinal bleed

A. Non-Variceal Causes (Most Common): These conditions account for approximately 80-90% of UGIB cases and primarily involve mucosal damage or vascular abnormalities [42].

- Peptic Ulcer Disease (PUD) (Most Common Cause):

➢ Chronic gastric or duodenal ulcers erode blood vessels, leading to arterial haemorrhage.

➢ Associated with Helicobacter pylori infection and NSAID use.

- Gastritis and Erosive Esophagitis:

➢ Caused by NSAIDs, alcohol, stress, or GERD (gastroesophageal reflux disease).

➢ Leads to diffuse mucosal irritation and bleeding.

- Mallory-Weiss Tears (Forceful Vomiting-Induced Bleeding):

➢ Longitudinal mucosal lacerations at the gastroesophageal junction due to forceful vomiting, retching, or coughing.

➢ Common in alcoholics, pregnant women, and bulimic patients.

- Gastric and Oesophageal Malignancies:

➢ Tumour invasion of blood vessels leads to chronic or acute bleeding.

➢ Often presents as occult bleeding with iron deficiency anaemia before overt haemorrhage.

- Angiodysplasia and Dieulafoy's Lesion (Vascular Malformations)

➢ Angiodysplasia: Dilated, fragile submucosal vessels prone to spontaneous bleeding, often seen in elderly patients.

➢ Dieulafoy's lesion: A large, aberrant artery in the gastric mucosa that can rupture, leading to sudden, massive UGIB.

B. Variceal Causes (Portal Hypertension-Related UGIB): Variceal bleeding accounts for 10-20% of UGIB cases but has higher mortality rates [43].

- Oesophageal Varices (Most Common Variceal Bleeding):

➢ Due to portal hypertension, commonly caused by liver cirrhosis (from alcohol, hepatitis B/C, or NAFLD).

- Gastric Varices:

➢ Occur in fundal veins of the stomach due to portal hypertension or splenic vein thrombosis.

➢ More resistant to treatment and prone to rebleeding compared to oesophageal varices.

2. Less Common Causes of UGIB:[44]

- Aortoenteric Fistula (Rare but Fatal):

➢ An abnormal connection between the aorta and the GI tract (usually the duodenum), often due to aortic aneurysm repair surgery.

➢ Presents as massive, pulsatile bleeding with a high mortality rate.

- Haemobilia (Biliary Tract Bleeding)

➢ Bleeding from the biliary tree into the GI tract, usually due to trauma, tumours, or gallstone disease.

➢ Presents as melena or hematemesis with jaundice.

3. Risk Factors for UGIB

Several factors increase the risk of developing UGIB:

- Chronic Alcohol Use (Increases risk of esophagitis, gastritis, and variceal bleeding)

- Nonsteroidal Anti-Inflammatory Drug (NSAID) Use (Causes gastric mucosal injury and peptic ulcers)

- Helicobacter pylori Infection (Major cause of peptic ulcer disease)
- Liver Disease and Cirrhosis (Leads to portal hypertension and varices)
- Coagulopathy & Anticoagulant Use (Warfarin, DOACs, platelet dysfunction)
- Severe Stress (ICU Patients, Burns, or Trauma) (Can cause stress ulcers and gastritis)

Clinical Significance

- Non-variceal UGIB (e.g., peptic ulcers, gastritis) is more common but easier to control.
- Variceal UGIB (e.g., oesophageal varices) carries higher mortality and requires specialized treatment (e.g., endoscopic band ligation, TIPS).
- Identifying risk factors helps in early intervention and preventive strategies (e.g., H. pylori eradication, PPI prophylaxis in NSAID users).

Understanding the etiological factors of UGIB is essential for optimizing patient outcomes, reducing complications, and improving survival rates.

Symptoms of Upper Gastrointestinal Bleeding (UGIB)

The clinical presentation of upper gastrointestinal bleeding (UGIB) can vary depending on the volume of blood loss, the location of the bleeding, and the underlying cause. Symptoms often range from mild (occult bleeding) to severe (massive hemorrhage) and may involve both gastrointestinal signs and systemic manifestations of blood loss [45].

1. Hematemesis (Vomiting Blood):

Hematemesis refers to vomiting blood, which is a classic sign of UGIB. The blood can be bright red (indicating active bleeding from the upper gastrointestinal tract) or resemble coffee grounds (indicating partially digested blood, often from gastric bleeding) [46].

The amount of blood and the rate of bleeding determine the severity of hematemesis. Large volumes of bright red blood typically suggest a more severe, active bleed, while coffee-ground appearance suggests slower, more chronic bleeding.

2. Melena (Black, Tarry Stools):

Melena is the presence of black, tarry stools due to the digestion of blood as it passes through the gastrointestinal tract. The black color results from the breakdown of hemoglobin in the blood by gastric acid [47].

Melena indicates that the bleeding is coming from proximal (upper) parts of the gastrointestinal tract, such as the esophagus, stomach, or duodenum, where blood has time to be partially digested before passing through the intestines.

The severity of melena correlates with the volume of blood loss and the duration of the bleeding episode.

3. Hematochezia (Fresh Blood in Stools):

Hematochezia, or fresh blood in the stool, typically suggests lower gastrointestinal bleeding but can occasionally occur in UGIB if the bleeding is massive or if the blood has passed through the stomach and intestines rapidly without being digested [48].

In massive UGIB, especially from esophageal varices or gastric ulcers, blood may be rapidly passed through the GI tract, leading to bright red blood in the stools.

Hematochezia is often associated with more severe bleeding and may indicate a need for immediate medical intervention.

4. Hypovolemic Shock and Systemic Symptoms:

The severity of blood loss in UGIB can lead to hypovolemic shock, particularly in cases of massive bleeding. Symptoms include: [13]

- Tachycardia (increased heart rate)
- Hypotension (low blood pressure)
- Weakness, dizziness, or syncope (due to decreased blood volume and inadequate perfusion of vital organs)
- Cold, clammy skin and confusion (due to reduced tissue perfusion and oxygenation)
- Urine output may decrease as the kidneys attempt to preserve fluids.

5. Other Symptoms:

- Fatigue and pallor: Chronic blood loss can lead to anaemia, causing fatigue, pale skin, and shortness of breath.
- Abdominal pain: Pain may accompany the bleeding if there is an ulcer, gastritis, or other underlying pathology. Pain severity depends on the cause and can be sharp, cramping, or dull.

Diagnosis of Upper Gastrointestinal Bleeding (UGIB)

The diagnosis of upper gastrointestinal bleeding (UGIB) involves a combination of clinical assessment, laboratory tests, and endoscopic evaluation. While the clinical presentation and history are critical, endoscopy remains the gold standard for confirming the diagnosis and guiding treatment [49].

1. Clinical Assessment and Patient History:

- Patient History is crucial in identifying potential risk factors for UGIB, such as a history of peptic ulcers, liver disease, or NSAID use. Other important aspects include alcohol consumption, previous gastrointestinal bleeding episodes, and the use of anticoagulant medications.

- Symptoms such as hematemesis, melena, haematochezia, and signs of hypovolemic shock (tachycardia, hypotension) should raise suspicion for UGIB. The severity of symptoms can guide the urgency of intervention and the level of care required.

2. Physical Examination:

- On physical examination, the physician will assess for signs of hypovolemic shock such as tachycardia, hypotension, and cool, clammy skin.
- Abdominal tenderness may be noted if the bleeding source is related to an ulcer, gastritis, or other gastrointestinal pathology. Jaundice may be present in cases of liver disease, suggesting the possibility of oesophageal varices.

3. Laboratory Tests:

- Complete Blood Count (CBC): A low haemoglobin or haematocrit suggests acute blood loss and can help assess the severity of the bleeding.
- Coagulation Profile: In patients on anticoagulants, abnormal INR, aPTT, or platelet count may indicate an increased risk of bleeding.
- Liver Function Tests (LFTs): Elevated liver enzymes and bilirubin levels suggest cirrhosis or portal hypertension, which may be the underlying cause of variceal bleeding.
- Blood Urea Nitrogen (BUN) and Creatinine: Elevated BUN in relation to creatinine can indicate gastrointestinal bleeding due to protein breakdown in the stomach.

4. Endoscopy (Esophagogastroduodenoscopy - EGD):

- Endoscopy is the gold standard for diagnosing UGIB. It allows direct visualization of the source of bleeding (e.g., peptic ulcers, oesophageal varices, or gastric erosions) and facilitates therapeutic interventions like cauterization, clipping, or band ligation for varices.

- Esophagogastroduodenoscopy (EGD) should ideally be performed within 24 hours of presentation in patients with moderate-to-severe bleeding.
- The Rockall Score and Glasgow Blatchford Score (GBS) are useful for predicting the need for early endoscopic intervention and guiding further management.

5. Additional Imaging Studies

- Contrast Radiography (e.g., CT angiography or radioactive tagging) can be used when endoscopy fails to identify the source or when active bleeding is suspected but not visible on endoscopy.
- Arteriography is sometimes used for localizing bleeding in cases of massive haemorrhage when endoscopic interventions are not feasible.

Clinical Significance:

- Early diagnosis and risk stratification are key in UGIB management, as prompt intervention is critical to improving patient outcomes.
- While clinical assessment and laboratory tests provide essential information, endoscopy is paramount for both diagnosing and treating UGIB.
- The timing of endoscopy and the choice of therapeutic measures (e.g., banding of varices, injection of adrenaline, or thermal coagulation) can significantly influence the risk of rebleeding and mortality.

Overall, the diagnosis of UGIB relies on a combination of clinical presentation, laboratory findings, and endoscopic evaluation to identify the source of bleeding and guide therapeutic decisions.

Risk Factors of Upper Gastrointestinal Bleeding (UGIB)

Upper gastrointestinal bleeding (UGIB) is influenced by several risk factors that increase the likelihood of bleeding episodes. These risk factors can be classified into

demographic, lifestyle, medical, and infectious categories. Recognizing and addressing these factors is essential in preventing and managing UGIB [18].

1. Advanced Age:

Older age is a significant risk factor for UGIB. The incidence of bleeding increases with age, particularly in those over 60 years, due to age-related vascular fragility, comorbidities, and the higher prevalence of gastrointestinal disorders such as peptic ulcers and gastritis [50].

Older patients are also more likely to have comorbid conditions that can contribute to bleeding, such as liver disease and chronic kidney disease, making them more susceptible to complications like rebleeding and hypovolemic shock.

2. **Male Gender:** Men have a higher incidence of UGIB compared to women, particularly at younger ages. This increased risk is likely associated with lifestyle factors like alcohol consumption and a higher prevalence of conditions such as peptic ulcer disease and liver cirrhosis [51].

3. Chronic Alcohol Consumption:

Chronic alcohol use is one of the most common risk factors for UGIB. Alcohol, especially in large amounts, contributes to the development of gastritis, peptic ulcers, and esophageal varices due to its toxic effects on the gastrointestinal lining and liver [52].

Alcohol consumption also increases the risk of liver cirrhosis, which can lead to portal hypertension and variceal bleeding.

4. Nonsteroidal Anti-Inflammatory Drug (NSAID) Use:

NSAIDs, including aspirin, ibuprofen, and other non-prescription pain relievers, are well-known for increasing the risk of UGIB. These drugs interfere with prostaglandin

production, which is essential for gastric mucosal protection, leading to gastric ulcers and erosions [53].

The risk is further heightened when NSAIDs are taken in combination with anticoagulants or in patients with existing gastritis or peptic ulcer disease.

5. Anticoagulant Therapy:

Anticoagulants, such as warfarin and direct oral anticoagulants (DOACs), are used to prevent thromboembolic events but increase the risk of bleeding in the gastrointestinal tract. These medications impair blood clotting and platelet aggregation, making it harder for the body to stop bleeding once it starts [54].

Patients on anticoagulants are at risk for massive bleeding, especially in the presence of an underlying gastric ulcer or varices.

6. Liver Disease and Cirrhosis:

Liver disease, particularly cirrhosis, is a major risk factor for UGIB. Cirrhosis leads to portal hypertension, which in turn causes the formation of esophageal varices—dilated veins in the esophagus that are prone to rupture, resulting in life-threatening bleeding [55].

Additionally, liver failure can impair the production of clotting factors, further increasing the risk of spontaneous bleeding.

7. Peptic Ulcer Disease:

Peptic ulcer disease (PUD), which includes both gastric ulcers and duodenal ulcers, remains one of the leading causes of UGIB. The erosion of the mucosal lining in the stomach or duodenum exposes underlying blood vessels, leading to active bleeding [56].

Helicobacter pylori infection and NSAID use are significant contributors to the development of peptic ulcers.

8. Gastrointestinal Malignancy:

Gastrointestinal malignancies, such as gastric cancer or esophageal cancer, can cause UGIB through tumor ulceration or vascular invasion. These tumors are often diagnosed at a later stage, leading to more severe bleeding episodes that are challenging to control [57].

The presence of metastatic disease or vascular invasion significantly increases the likelihood of significant bleeding.

9. Helicobacter pylori Infection:

Helicobacter pylori is a bacterium that infects the gastric mucosa and is a major cause of gastritis and peptic ulcers. Chronic infection with H. pylori contributes to mucosal damage, increasing the likelihood of ulcer formation and bleeding [58].

Eradication therapy can help reduce the recurrence of ulcers and bleeding in patients with H. pylori infection.

10. Other Risk Factors:

Use of corticosteroids: Chronic use of corticosteroids increases the risk of gastric ulceration and bleeding.

Chronic renal failure: Reduced kidney function can result in altered coagulation profiles, increasing the risk of bleeding in patients with UGIB.

Previous history of UGIB: Patients who have experienced UGIB in the past are at higher risk of recurrent bleeding.

Treatments and Management of Upper Gastrointestinal Bleeding (UGIB)

The management of UGIB is aimed at stabilizing the patient, identifying the source of bleeding, stopping the hemorrhage, and preventing recurrence. The approach depends on the severity of bleeding, the underlying cause, and the patient's overall condition [30,59,13].

1. Initial Resuscitation and Stabilization:

a. Airway, Breathing, Circulation (ABC) Assessment:

- Patients with massive UGIB require immediate resuscitation to prevent shock and organ failure.
- Airway protection is crucial, especially in cases of hematemesis where aspiration is a risk.
- Oxygen supplementation is provided if hypoxia is detected.
- Intravenous (IV) access is established using two large-bore cannulas for fluid and blood administration.

b. Fluid Resuscitation and Blood Transfusion:

- Crystalloids (normal saline or Ringer's lactate) are used for initial volume resuscitation in hemodynamically unstable patients.
- Packed red blood cell (PRBC) transfusion is given if haemoglobin (Hb) drops below 7 g/dL (or below 8 g/dL in patients with cardiovascular disease).
- Fresh frozen plasma (FFP) or platelets may be administered if there are coagulopathies or thrombocytopenia.

c. Hemodynamic Monitoring:

- Frequent vital sign monitoring, including blood pressure, heart rate, and urine output, is essential.
- Central venous pressure (CVP) monitoring may be required in critically ill patients.

2. Pharmacologic Therapy:

a. Proton Pump Inhibitors (PPIs):

- PPIs such as intravenous (IV) pantoprazole or omeprazole are given to reduce gastric acid secretion and stabilize clots in peptic ulcer bleeding.
- High-dose IV PPIs are used before and after endoscopy to reduce the risk of rebleeding.

b. Vasopressor Therapy for Variceal Bleeding: Octreotide (Somatostatin analogs) or terlipressin is administered to reduce splanchnic blood flow, lowering portal hypertension and decreasing variceal bleeding.

c. Antibiotics for Cirrhosis-Related Bleeding: In cirrhotic patients with esophageal varices, IV antibiotics (ceftriaxone or norfloxacin) are recommended to prevent spontaneous bacterial peritonitis (SBP) and other infections.

d. Prokinetics (Erythromycin or Metoclopramide): Given before endoscopy to enhance gastric emptying, clearing blood and clots, thereby improving visualization during the procedure.

3. Endoscopic Therapy:

a. Timing of Endoscopy:

- Urgent endoscopy (within 12-24 hours) is recommended for most UGIB patients to identify the bleeding source and provide treatment.
- In hemodynamically unstable patients, immediate endoscopy is required after resuscitation.

b. Endoscopic Hemostasis Techniques:

Injection Therapy: Epinephrine injection around the bleeding site induces vasoconstriction and temporary hemostasis.

Thermal Coagulation: Electrocautery or heater probe coagulation is used for active bleeding peptic ulcers.

Mechanical Hemostasis: Hemoclips (endoscopic clips) are applied to actively bleeding vessels or visible ulcers.

Band Ligation for Esophageal Varices: Endoscopic variceal ligation (EVL) is the first-line treatment for esophageal variceal bleeding.

4. Balloon Tamponade for Uncontrolled Variceal Bleeding: Sengstaken-Blakemore tube or Minnesota tube can be used as a temporary measure in massive esophageal variceal bleeding unresponsive to endoscopy [60].

5. Interventional Radiology and Surgery:

a. Trans arterial Embolization (TAE) or Angiographic Intervention:[61]

- Performed in patients with persistent bleeding despite endoscopy.
- Uses angiography-guided embolization to occlude bleeding arteries.

b. Trans jugular Intrahepatic Portosystemic Shunt (TIPS)[62]

- Used for refractory variceal bleeding in cirrhotic patients.
- Connects the portal vein to the hepatic vein, reducing portal hypertension.

c. Surgery (Rare, Last Resort): Indications for surgery include:

- Failure of endoscopic and radiology interventions.
- Massive haemorrhage requiring ongoing transfusions.
- Perforated ulcers requiring emergency surgery.

Surgical options include:

- Over sewing of bleeding ulcers.
- Partial gastrectomy for malignancies.
- Portosystemic shunt surgery for refractory variceal bleeding.

6. Prevention of Rebleeding and Long-Term Management:[63]

a. Secondary Prevention for Peptic Ulcer Bleeding:

- H. pylori eradication therapy (antibiotics such as clarithromycin, amoxicillin, and PPI).
- Long-term PPI therapy for high-risk patients (e.g., chronic NSAID users).

b. Secondary Prevention for Variceal Bleeding:

- Non-selective beta-blockers (propranolol, nadolol) to reduce portal pressure.

- Endoscopic band ligation (EBL) every 2-4 weeks to prevent recurrent variceal bleeding.

c. Lifestyle Modifications

Avoid NSAIDs, aspirin, and alcohol.

Manage underlying liver disease through cirrhosis treatment and regular screening for varices.

Clinical Significance: Effective treatment and management of UGIB can reduce mortality and prevent rebleeding. Endoscopic therapy remains the gold standard, with adjunctive pharmacologic therapy playing a crucial role in reducing acid secretion, lowering portal pressure, and preventing infection. In severe or refractory cases, angiographic embolization, TIPS, or surgery may be required. Preventive strategies, including H. pylori eradication, PPI use, and variceal banding, are critical to long-term patient outcomes [64].

Recovery Rate

The recovery rate for UGIB depends on the underlying cause and the severity of the bleeding. With appropriate treatment, most patients recover fully, although some may experience complications such as rebleeding, sepsis, or organ failure. The overall mortality rate for UGIB has decreased with advances in endoscopic and pharmacologic therapies but remains significant in patients with comorbidities or massive bleeding [65].

Upper gastrointestinal bleeding remains a major clinical challenge, but risk stratification tools such as the Glasgow Blatchford Score, Rockall Score, and AIMS65 Score have proven effective in predicting mortality and the need for intervention. These tools help guide clinical decision-making, particularly in emergency settings. Further research is required to explore their utility in predicting long-term outcomes such as hospital readmission and to refine their applicability in various clinical contexts. Proper diagnosis, management, and follow-up care are essential for improving patient outcomes and reducing the burden of this potentially life-threatening condition [66].

Mules TC, et. al; 2021 assessed the accuracy of various risk scoring systems in predicting clinical outcomes for hospitalized patients who developed upper gastrointestinal bleeding (UGIB). Patients with UGIB onset within 24 hours of admission were excluded, and six scoring systems (Glasgow Blatchford, AIMS65, ABC, full Rockall, admission Rockall, and PNED) were evaluated for their ability to predict 30-day mortality, the need for endoscopic intervention, and a composite outcome (mortality or intervention) using the area under the receiver operating curve (AUROC). Among 229 patients, 20% required endoscopic intervention, and 15% died within 30 days. The ABC score demonstrated the highest accuracy in predicting 30-day mortality (AUROC 0.85), outperforming the PNED (0.80, $P = 0.22$), full Rockall (0.75, $P < 0.05$), Glasgow Blatchford (0.71, $P < 0.05$), and AIMS65 (0.70, $P < 0.05$) scores. Patients with an ABC score ≤ 3 had a significantly lower mortality rate (1.6%) compared to those with scores of 4-7 (7.5%) and ≥ 8 (42%). However, none of the scoring systems accurately predicted the need for endoscopic intervention or the composite endpoint (all AUROC < 0.8). These findings highlight the ABC score as the most reliable tool for predicting mortality in hospitalized UGIB patients, making it a valuable tool for clinical risk assessment [67].

Chandnani S, et. al; 2019 aimed to analyzed the characteristics of upper gastrointestinal bleeding (UGIB) and validate the predictive accuracy of the Rockall, Glasgow-Blatchford (GBS), Progetto Nazionale Emorragica Digestiva (PNED), and AIMS65 scoring systems in UGIB outcomes. A total of 300 patients presenting with hematemesis and/or melena were prospectively enrolled and followed for 30 days. All subjects underwent hematological investigations, imaging, endoscopy, and risk score assessments. The mean patient age was 43.5 ± 17.2 years, with males comprising 69% of cases. Hematemesis was the predominant presentation (94%), and variceal bleeding was the most common cause (47.7%). Thirty patients (10%) died, while 50 (16.7%) experienced rebleeding. Univariate analysis identified predictors

of mortality, including serum albumin ≤ 2.7 gm% ($p = 0.008$), Glasgow Coma Scale ≤ 13.9 ($p = 0.001$), serum bilirubin > 3 mg/dL ($p = 0.004$), serum bicarbonate ≤ 15.7 mEq/L ($p = 0.001$), systolic blood pressure < 90 mmHg ($p = 0.004$), and arterial pH ≤ 7.3 ($p = 0.003$), though none remained significant on multivariate analysis. All four risk scores were effective in predicting mortality, with the Rockall score demonstrating the highest predictive value (AUROC 0.728). Rebleeding was best predicted by the PNED score (AUROC 0.705). The need for transfusion and surgical or radiological intervention was significantly associated with a GBS score >0, while a GBS score <2 reliably classified patients as low-risk for mortality, with a high negative predictive value. In conclusion, variceal bleeding emerged as the leading cause of UGIB. The Rockall score proved most reliable in predicting mortality, while PNED was more effective for forecasting rebleeding. GBS effectively identified patients at low risk for mortality, transfusion, or interventions, making it a valuable tool in clinical decision-making [68].

Kim MS, et. al; 2019 assessed the effectiveness of the AIMS65 score in predicting mortality, rebleeding, and ICU admission in patients with nonvariceal upper gastrointestinal (NVUGI) bleeding, comparing it with the Glasgow-Blatchford Score (GBS), Rockall Score, and Pre-Endoscopic Rockall Score. A retrospective analysis of 512 patients treated at a university hospital between 2013 and 2016 was conducted, with risk stratification based on these scoring systems. The primary outcome was in-hospital mortality, while secondary outcomes included a composite of mortality, rebleeding, and ICU admission. Among the patients, 3.3% died, 12.7% experienced rebleeding, and 16.8% required ICU admission. The AIMS65 score demonstrated the highest predictive accuracy for in-hospital mortality (AUC 0.84), outperforming GBS (AUC 0.72), the Rockall Score (AUC 0.75), and the Pre-Endoscopic Rockall Score (AUC 0.74), though the difference was not statistically significant ($P = 0.07$). However, there was no significant difference in the predictive ability of AIMS65 compared to

other scores for rebleeding, endoscopic intervention, or ICU admission. Given its simplicity and ease of calculation, the study recommends AIMS65 as a practical tool for risk stratification in NVUGI bleeding patients in routine clinical practice [69].

Choe JW, et. al; 20217 evaluated 286 patients with upper gastrointestinal bleeding (UGIB) who visited the emergency department to compare the predictive accuracy of the Glasgow-Blatchford Score (GBS), Rockall Score (RS), and AIMS65 score for clinical outcomes. The primary outcome was the need for clinical intervention, including endoscopic, radiologic, or surgical procedures, and blood transfusion. UGIB was caused by esophageal or gastric varices in 64 patients, peptic ulcers in 168, Mallory-Weiss tears in 32, malignancies in 8, and unknown causes in 14 cases. Among these patients, 61% required blood transfusion, 58% underwent endoscopic intervention, and 3.5% needed surgical intervention. The results showed that GBS outperformed RS and AIMS65 in predicting the need for endoscopic intervention. Overall, both GBS and RS were more effective than AIMS65 in predicting clinical intervention and transfusion needs in UGIB patients, regardless of whether the bleeding was variceal or nonvariceal. The study concluded that AIMS65 may not be an optimal tool for predicting clinical outcomes of UGIB in the Korean population [70].

Stanley AJ, et. al; 2017 assessed the predictive accuracy and clinical utility of five risk scoring systems in 3012 patients with upper gastrointestinal bleeding (UGIB) across six large hospitals in Europe, North America, Asia, and Oceania. The study compared pre-endoscopy scores (admission Rockall, AIMS65, and Glasgow Blatchford) and post-endoscopy scores (full Rockall and PNED) in predicting clinical endpoints, including the need for intervention, 30-day mortality, rebleeding, and length of hospital stay. The Glasgow Blatchford Score (GBS) was the most effective at predicting the need for intervention or death (AUROC 0.86), outperforming the full Rockall (0.70), PNED (0.69), admission Rockall (0.66), and AIMS65 (0.68) scores. A GBS of ≤1 optimally identified patients who could be managed as outpatients

(sensitivity 98.6%, specificity 34.6%), while a score of ≥7 predicted the need for endoscopic treatment (sensitivity 80%, specificity 57%). The PNED and AIMS65 scores were most accurate for predicting mortality (both AUROC 0.77), outperforming the admission Rockall (0.72) and GBS (0.64). No scoring system effectively predicted rebleeding or hospital length of stay. The study concluded that while the GBS is highly effective in identifying patients requiring intervention or safe for outpatient management, other scores have limited clinical utility for additional outcomes [71].

Upper gastrointestinal bleeding (UGIB) is a major cause of hospital admissions, and risk scoring systems have been developed to stratify patients based on their likelihood of complications, including rebleeding, mortality, and the need for clinical intervention. International guidelines recommend the use of these scoring systems to identify high-risk patients requiring hospitalization and intervention while determining which low-risk patients may be safely managed as outpatients. Among the most widely used scores, the Rockall score incorporates clinical and endoscopic variables to predict mortality, whereas the Glasgow Blatchford Score (GBS), based on clinical and laboratory parameters, is designed to predict the need for clinical intervention. Despite their validated benefits, these scoring systems have yet to be fully integrated into routine clinical decision-making. **Monteiro S, et. al; 2016**discussed the various UGIB risk scores, summarizes key research findings, explores the benefits and limitations of these tools, and highlights areas for future research to enhance their practical application in clinical settings [72].

The American College of Gastroenterology recommends early risk stratification for upper gastrointestinal bleeding (UGIB) to predict outcomes and guide management. **Robertson M, et. al; 2016**validated the AIMS65 score as a predictor of inpatient mortality and compared it with other risk scores, including the Glasgow-Blatchford Score (GBS), pre-endoscopy Rockall, and full Rockall scores. A retrospective analysis of 424 patients requiring

endoscopy found that 4.2% died, and 16% met a composite endpoint of mortality, rebleeding, or the need for intervention. AIMS65 was superior to GBS (AUROC 0.80 vs. 0.76, P < .027) and pre-endoscopy Rockall (AUROC 0.74, P = .001) and comparable to the full Rockall score (AUROC 0.78, P = .18) for predicting inpatient mortality. AIMS65 also outperformed other scores in predicting ICU admission and hospital length of stay, while GBS was the best predictor for blood transfusion. Overall, AIMS65 is a simple and effective risk stratification tool for UGIB with strong predictive value for mortality and ICU admission [26].

Yaka E, et. al; 2015 compared the Glasgow-Blatchford Score (GBS) and AIMS65 as early risk assessment tools for identifying low-risk upper gastrointestinal (GI) bleeding patients who do not require clinical interventions. Conducted over two years in a university hospital emergency department, it included 254 patients, with 83.1% undergoing endoscopy and 19.3% requiring endoscopic intervention. Rebleeding occurred in 13%, and in-hospital mortality was 7.1%. A GBS of 0 had higher sensitivity (98.68% vs. 77.6%) and negative predictive value (87.5% vs. 66.3%) than AIMS65. While both scores were similar in predicting composite outcomes and in-hospital mortality, GBS was superior in identifying high-risk patients (AUROC 0.896 vs. 0.771, p < 0.001) and in predicting the need for blood transfusions (AUROC 0.904 vs. 0.796, p < 0.001) and interventions (AUROC 0.727 vs. 0.647, p = 0.05). These findings suggest that GBS is more effective in triaging low-risk UGIB patients, potentially aiding real-time clinical decision-making [73].

Saltzman JR, et. al; 2011 aimed to developed and validate AIMS65, a simple bedside risk score for predicting in-hospital mortality in patients with acute upper GI bleeding using routine admission data. Derived from a database of 29,222 patients (2004–2005) and validated in 32,504 patients (2006–2007) across 187 U.S. hospitals, the score incorporates five factors: albumin <3.0 g/dL, INR >1.5, altered mental status, systolic blood pressure ≤90 mmHg, and age >65 years. Mortality ranged from 0.3% in patients with no risk factors to 31.8% in those

with all five (P < .001), with high predictive accuracy (AUROC 0.80; validation AUROC 0.77). Higher AIMS65 scores correlated with longer hospital stays and increased costs (P < .001). While the study lacked data on rebleeding, it demonstrated that AIMS65 is an effective and easily calculated tool for risk stratification in UGIB patients [74].

Rockall TA, et. al; 1996 aimed to identified key risk factors for mortality following acute upper gastrointestinal hemorrhage and develop a simple numerical scoring system for risk stratification. Conducted as a multicenter, population-based study in two phases (1993 and 1994), it included 4185 and 1625 patients, respectively. Using multiple logistic regression, age, shock, comorbidity, diagnosis, major stigmata of recent hemorrhage, and rebleeding were identified as independent predictors of mortality, while hemoglobin levels, sex, presentation (except shock), and drug therapy were not included in the final model. The scoring system closely aligned with logistic regression predictions and was validated in a second population, accurately predicting mortality across risk categories. It also identified 15% of patients at presentation and 26% post-endoscopy as low-risk for rebleeding and death, suggesting potential for early discharge or outpatient management, leading to resource optimization [75].

The Glasgow Blatchford Score (GBS) is a validated tool for predicting the need for therapeutic intervention or mortality in patients with upper gastrointestinal bleeding (UGIB), with previous studies suggesting that a GBS of zero allows for safe outpatient management. **Mustafa Z, et. al; 2015**assessed whether extending the outpatient management threshold to GBS≤1 was feasible. After modifying the UGIB protocol to recommend outpatient care for patients with GBS≤1 unless other factors necessitated admission, data from 514 patients over 12 months were analyzed. Of the 183 patients with GBS≤1, 88 (48.1%) were managed as outpatients, none of whom experienced adverse outcomes. Among the 95 admitted patients with GBS≤1, most had comorbidities necessitating hospitalization, with only one requiring transfusion and another dying from a non-GI malignancy. The negative predictive value of

GBS≤1 for adverse outcomes within 30 days was 99.45%, suggesting that outpatient management for UGIB patients with GBS≤1 is safe and effective [76].

Boustany A, et. al; 2023compared the predictive abilities of pre-endoscopic risk scores in assessing the likelihood of adverse outcomes in patients with acute upper gastrointestinal bleeding (UGIB). Thirty-eight studies involving 36,215 patients were analyzed. The primary outcome was the need for hospital-based interventions, such as endoscopic therapy, surgery, or transfusion. Secondary outcomes included mortality and rebleeding. The analysis revealed that low Glasgow-Blatchford score (GBS) cutoffs (0, ≤1, and ≤2) were associated with very few patients requiring hospital-based interventions. Similarly, the clinical Rockall score (CRS) and ABC score also showed varying predictive abilities for hospital-based intervention and mortality, with GBS consistently demonstrating excellent discriminative ability. The study found that a GBS cutoff of ≤1 best identified low-risk patients, while a cutoff of ≤2 maintained accuracy while allowing for more outpatient management. Despite the positive findings, the review noted limitations in data quality, homogeneity, and the need for more robust comparative studies [21].

Liu S, et. al; 2021aimed to compared the predictive performance of the ABC score, AIMS65 score, Glasgow-Blatchford score (GBS), and pre-endoscopic Rockall score (pRS) for 90-day mortality and rebleeding in patients with acute upper gastrointestinal bleeding (UGIB). Conducted across 20 tertiary hospitals in China, the study involved 1072 patients from June 2020 to February 2021. The overall 90-day mortality rate was 10.91%, and the rebleeding rate was 12.03%. The ABC and pRS scores were superior in predicting 90-day mortality, with areas under the receiver operating characteristic curve (AUC) of 0.722 and 0.711, respectively, compared to AIMS65 (AUC 0.672) and GBS (AUC 0.624). However, none of the scores had an AUC exceeding 0.70 for predicting rebleeding. The study concluded that while ABC and

pRS are better for predicting 90-day mortality, none of the scores are highly effective in predicting rebleeding, highlighting the need for improved predictive models [77].

Ng YK, et. al; 2017aimed to evaluated the AIMS65 score as a more robust and practical risk assessment tool for upper gastrointestinal bleeding (UGIB) in Singapore. The study reviewed the electronic medical records of 296 patients admitted with UGIB, assessing the AIMS65, Blatchford, and pre-endoscopic Rockall scores in predicting mortality, need for further intervention, or uneventful discharge after index endoscopy. AIMS65 demonstrated the best performance for predicting the need for further intervention, with an area under the curve (AUC) of 0.72, compared to 0.62 for Blatchford and 0.60 for Rockall. For predicting mortality, AIMS65 showed an AUC of 0.90, outperforming Blatchford (AUC 0.78). The Rockall score was excluded from the mortality analysis due to the small number of deaths. The study concluded that AIMS65 is a superior predictor of the need for further intervention and is comparable to the Blatchford score in predicting inpatient mortality, highlighting its potential as a reliable, easily calculated risk assessment tool for UGIB [78].

MATERIALS AND METHODS

Study Design and Setting

This study was designed as a hospital-based, cross-sectional observational study carried out at the Department of Emergency Medicine, BLDE Shri B.M Patil Medical College Hospital and Research Centre, Vijayapura, Karnataka, India. The study duration was from May 2023 to November 2024, spanning 20 months, during which data were prospectively collected from eligible patients presenting with symptoms of upper gastrointestinal bleeding (UGIB). The institution serves as a tertiary referral center with a broad catchment area, ensuring a diverse patient population reflective of the real-world burden of UGIB.

The study was conducted in strict adherence to ethical principles, and Institutional Ethical Committee (IEC) clearance was obtained prior to the initiation of data collection. All patients included in the study provided written informed consent before their participation, ensuring compliance with ethical standards for human research.

Study Population and Sample Size

Patients presenting to the emergency department (ED) with signs and symptoms suggestive of upper gastrointestinal bleeding, such as hematemesis, melena, coffee-ground vomiting, or signs of hypovolemia or altered sensorium, were considered for inclusion in the study.

Sample Size Calculation

The sample size was determined based on anticipated sensitivity and specificity values for mortality prediction in UGIB, estimated at 72% and 77% respectively, and assuming a prevalence of UGIB-related mortality at 10% with 1% precision and 95% confidence interval. Using the standard formula for diagnostic studies:

$$N=Z^2\times P(1-P)/L^2$$

Where:

- $Z = 1.96$ (for 95% confidence),
- $P = 0.10$ (10% prevalence),
- $L = 0.01$ (precision).

Final calculated sample size = 76. However, to ensure robustness and account for potential attrition and lost to follow-up, a total of 78 patients were enrolled.

Inclusion and Exclusion Criteria

Inclusion Criteria

1. Adult patients aged >18 years.
2. Patients presenting to the emergency department with complaints of hematemesis, melena, coffee-ground vomiting, or any signs suggestive of upper gastrointestinal hemorrhage.
3. Patients willing to provide consent for participation and follow-up.

Exclusion Criteria

1. Patients who were declared dead on arrival.
2. Patients transferred to other hospitals prior to evaluation or whose records were incomplete.
3. Patients who did not consent for participation or did not comply with the 6-month follow-up.

Methodology and Data Collection

All eligible patients underwent a standardized evaluation protocol immediately upon presentation. A detailed clinical history, physical examination, and vital parameters were documented as per the proforma.

Data Collection Parameters Included:

- **Demographic data**: Age, gender

- **Clinical presentation**: Hematemesis, melena, syncope
- **Past medical history**: Chronic liver disease (CLD), ischemic heart disease (IHD), chronic kidney disease (CKD)
- **Vital signs**: Pulse rate, systolic blood pressure (SBP)
- **Laboratory parameters**:
    - Hemoglobin (Hb)
    - Serum urea
    - Serum albumin
    - International Normalized Ratio (INR)

These parameters were used to calculate the three scoring systems under evaluation:

1. **Glasgow Blatchford Score (GBS)**

   Incorporates variables like systolic blood pressure, pulse rate, blood urea nitrogen, hemoglobin, presentation with melena/syncope, and history of liver/cardiac disease.

2. **Pre-endoscopic Rockall Score**

   Based on clinical parameters including age, hemodynamic instability, and comorbidities, without endoscopic findings.

3. **AIMS65 Score**

   Includes five variables:

    - Albumin <3.0 g/dL
    - INR >1.5
    - Altered mental status
    - Systolic blood pressure <90 mmHg
    - Age >65 years

Each patient's scores were calculated immediately after triaging in the emergency department based on the initial clinical and laboratory data.

Follow-Up and Outcomes Measured

The patients were followed prospectively for 6 months after discharge. Follow-up was conducted through:

- Outpatient visits
- Hospital record reviews
- Telephonic interviews

Primary Outcome:

- **In-hospital mortality**

Secondary Outcome:

- Readmission to hospital within 6 months of the index hospitalization due to recurrence of gastrointestinal bleeding or related complications.

Readmissions were defined as any unplanned hospital admission related to gastrointestinal bleeding occurring within six months post-discharge.

Scoring Systems Used

1. **Glasgow-Blatchford Score (GBS)**: Scored from 0 to 23. A score of 0 indicates very low risk, while higher scores correlate with an increasing need for intervention (e.g., transfusion, endoscopy, surgery).
2. **AIMS65 Score**: Each of the five variables contributes 1 point, with total scores ranging from 0 to 5. Higher scores are associated with increased mortality.
3. **Pre-endoscopic Rockall Score**: Ranges from 0 to 7, incorporating only clinical factors available before endoscopy.

Data Management

Data were meticulously recorded in a structured case record form (CRF). After collection, it was transferred into a Microsoft Excel spreadsheet and cleaned for analysis. Missing values were treated using available-case analysis.

All patient identifiers were anonymized to protect confidentiality, and access to the dataset was restricted to the study investigators.

Statistical Analysis

All analyses were conducted using IBM SPSS Statistics Version 20.

Descriptive Statistics:

- Continuous variables were expressed as mean ± standard deviation (SD) or median with interquartile range (IQR) depending on normality.
- Categorical variables were summarized as frequencies and percentages.

Inferential Statistics:

- Independent samples t-test: For comparing normally distributed continuous variables.
- Mann-Whitney U test: For non-normally distributed continuous data.
- Chi-square test: For comparison of categorical variables.
- Receiver Operating Characteristic (ROC) Curve Analysis:
    - Used to assess the predictive performance of each score.
    - Area under the ROC curve (AUC) was calculated.
    - Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were derived for different cut-off points.

Significance Level:

- A p-value of <0.05 was considered statistically significant.
- All statistical tests were two-tailed.

Quality Control and Bias Minimization

- All clinical and laboratory measurements were standardized using institutional protocols.
- Scoring was performed by a trained investigator, and reviewed independently by a second reviewer to reduce inter-observer bias.
- Only data obtained within the first 6 hours of presentation were used for scoring to minimize variability and reflect actual emergency triage conditions.
- Cases lost to follow-up were documented, and sensitivity analysis was performed to evaluate the impact of missing data on study conclusions.

Ethical Considerations

The study received prior approval from the Institutional Ethics Committee (IEC) of BLDE University. All participants provided informed consent after explanation of the study's purpose, nature, and implications. Confidentiality of patient data was strictly maintained. Patients requiring intervention were managed as per standard institutional guidelines for upper gastrointestinal bleeding, ensuring no deviation in patient care due to study procedures.

Study Strengths and Limitations in Methodology

Strengths:

- Real-world hospital-based sample representing a spectrum of UGIB cases.
- Uniform scoring of all patients using standardized tools.
- 6-month follow-up adds value to understanding the long-term implications of initial scores.

Limitations:

- No endoscopic confirmation for all cases due to the pre-endoscopic focus of the study.
- Possibility of loss to follow-up or recall bias during telephonic tracking.
- Limited sample size may reduce generalizability to other populations or settings.

RESULT

Table 1: Age Group Distribution

Age Group	Cases
0-20	0
21-30	5
31-40	20
41-50	24
51-60	17
61-70	11
71-80	0
81-100	1
Total cases	78
Mean	47
Median	46.5
Mode	38
Minimum age	27
Maximum age	84
Range	57
P value	0.0409

The table represents the distribution of cases with gastrointestinal bleeding in patient across different age ranges. A total of 78 cases were recorded. The highest number of cases was observed in the 41-50 age range (24 cases), while the lowest number was found in the 21-30 age range (5 cases). Mean age is 47 years, indicating the average age of cases.

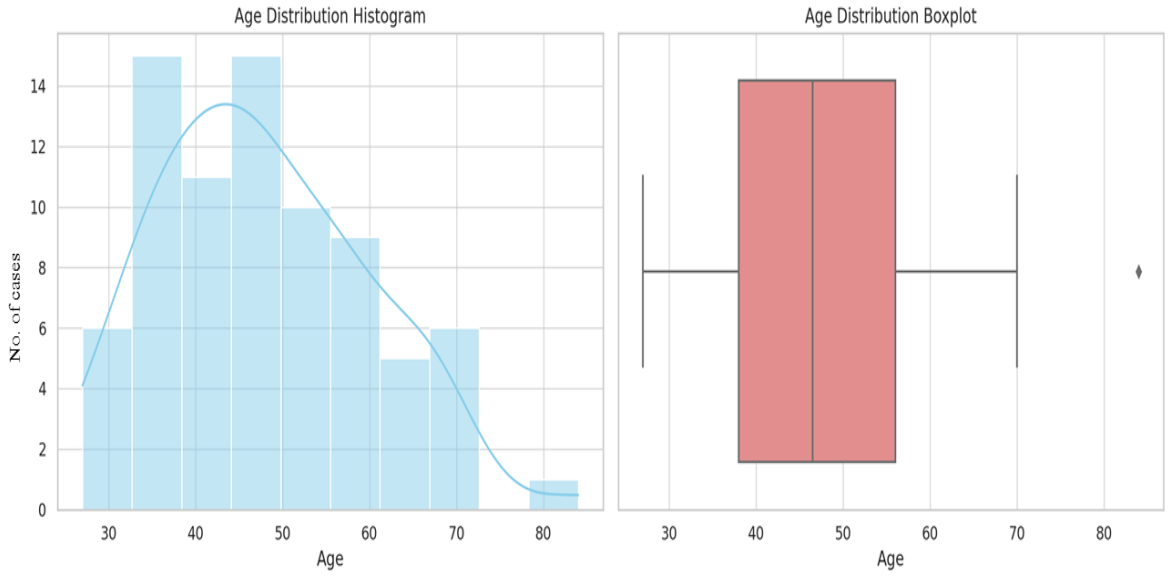

Figure 1: A histogram and box plot displaying the distribution of ages with cases of gastrointestinal bleeding in patient. The x-axis represents age ranges, and the y-axis represents the number of cases (of gastrointestinal bleeding in patient) within each range.

The bar chart illustrates the distribution of cases across different age groups. The highest number of cases (20) was observed in the 40-50 age range, followed by 31-40 (20 cases). The lowest number of cases (5) was recorded in the 81-100 age groups.

Gender distribution

Table 2: Gender Distribution of Cases of gastrointestinal bleeding

Gender	Number of Cases	Percentage (%)
Male	75	96.15%
Female	3	3.84%
Total	78	100%

The table presents the distribution of cases based on gender. The data reveals a higher prevalence among males (75 cases among 78) compared to females (3 cases among 78).

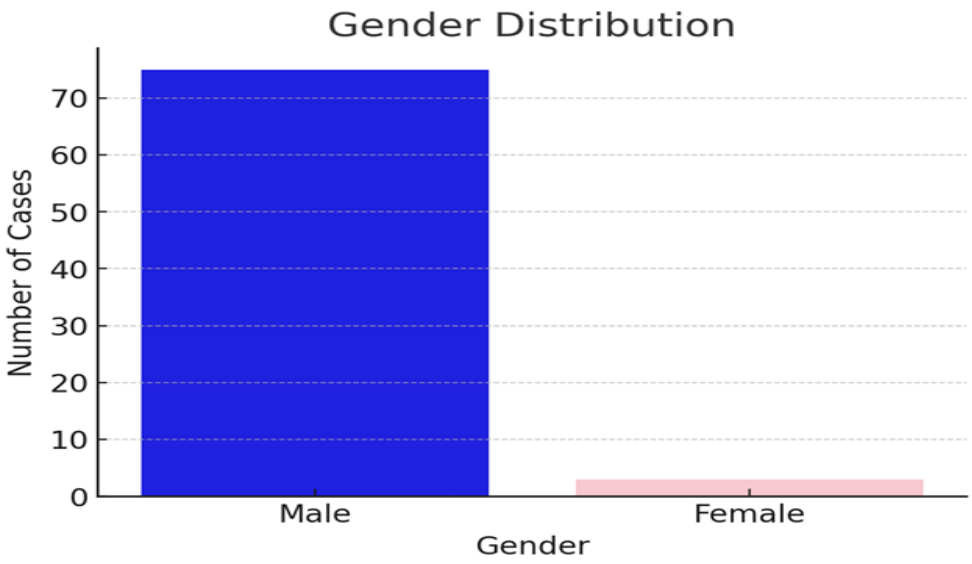

Figure 2: Bar chart illustrating the gender distribution of cases of gastrointestinal bleeding. The chart displays the number of male and female cases, highlighting a significant skew towards male participants.

The bar chart illustrates a clear disparity in the gender distribution of the 78 cases examined. A significant majority of the cases were male, represented by the blue bar reaching approximately 75 cases. In contrast, the pink bar shows a much smaller number of female cases, approximately 3 cases.

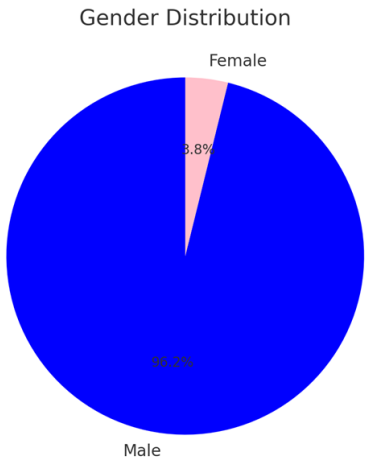

Figure 3: Pie chart illustrating the gender distribution of cases of gastrointestinal bleeding. The chart shows a significant majority of male participants (96.2%) compared to female participants (3.8%).

The pie chart successfully visualizes the gender distribution, showing that 96.2% of the cases are male and 3.8% are female.

Analysis on the bases of including melaena, hematemesis, syncope, CLD, IHD, CKD

Table 3: Descriptive Statistics of Cases with different conditions (including melaena, hematemesis, syncope, CLD, IHD, CDK) present or absent

Conditions	Present	%	Absent	%	Chi-Square Value	P-Value
MALAENA	71	91.03	7	8.97	29.63	<0.0001
HAEMETEMESIS	27	34.62	51	65.38	3.18	0.07
SYNCOPE	5	6.41	73	93.59	34.47	<0.0001
CLD	53	67.95	25	32.05	4.48	0.03
IHD	0	0.00	78	100.00	49.37	<0.0001
CKD	1	1.28	77	98.72	46.03	<0.0001

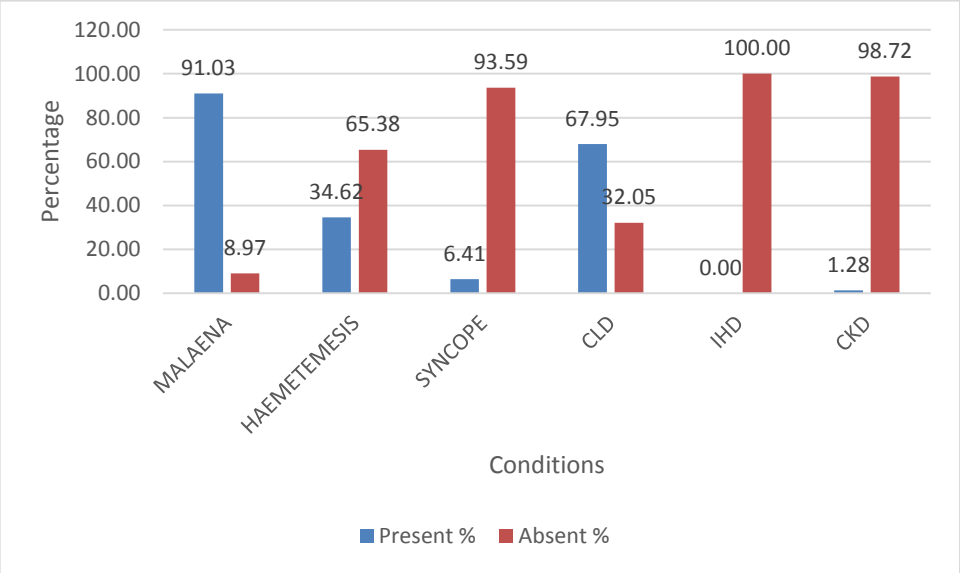

Figure 4: Cases with different conditions (including melaena, hematemesis, syncope, CLD, IHD, CDK) present or absent

The table presents the distribution of various clinical conditions among cases, along with their statistical significance. Melaena was highly prevalent, seen in 91.03% of cases, and

significantly associated ($P < 0.0001$), suggesting it is a strong indicator in the studied population. Syncope, though present in only 6.41% of cases, also showed a significant association ($P < 0.0001$), possibly highlighting its relevance despite low frequency. Chronic liver disease (CLD) was present in 67.95% and significantly associated ($P = 0.03$), pointing to its potential role as an underlying condition. Conversely, hematemesis (34.62%) did not show statistical significance ($P = 0.07$), indicating it may not differ notably across groups. Interestingly, both ischemic heart disease (IHD) and chronic kidney disease (CKD) were either absent or rare (0% and 1.28%, respectively), but still showed strong statistical significance ($P < 0.0001$). This may reflect their unexpected absence in this patient cohort, warranting further investigation into selection or exclusion patterns. Overall, melaena, CLD, syncope, IHD, and CKD significantly differ in presence, underlining their clinical and statistical relevance in these cases.

The bar graph visually compares the presence and absence of six different medical conditions across a set of cases. The x-axis labels the specific conditions: MALAENA, HAEMETEMESIS, SYNCOPE, CLD, IHD, and CKD. The y-axis represents the "Number of Cases," ranging from 0 to 80. Each condition has two bars associated with it: a blue bar representing the number of cases where the condition was "Present in Cases," and a red bar indicating the number of cases where the condition was "Nil in Cases."

Analysis on the bases of Heart Beat Rate

Table 4: The number of occurrences of heart beat rate in the cases.

Heart rate	Cases
70-80	6
80-90	6
90-100	16
100-110	24
110-120	6
120-130	10
130-140	9
Case	78
Mean	107.22
Median	108
Standard Deviation	16.68
Minimum	72
Maximum	136
25th Percentile	96
75th Percentile	120
P value	0.0003

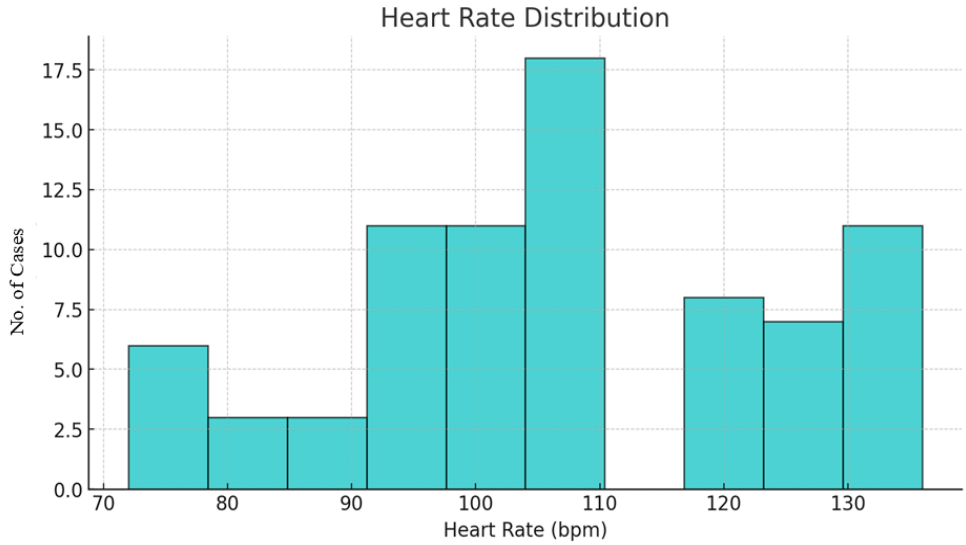

Figure 5: Bar chart showing the number of occurrences heart rate in the cases.

The distribution shows a concentration of cases in the 90-110 bpm range, with the highest frequency observed in the 100-110 bpm interval. The frequencies are lower in the extreme ranges (70-90 bpm and 110-140 bpm).

Analysis on the bases of SBP

Table 6: The number of occurrences of SBP in the cases

SBP	Cases
60-70	10
70-80	14
80-90	15
90-100	30
100-110	6
110-120	3
Mean SBP (mmHg)	91.92
Median SBP (mmHg)	95
Standard Deviation	13.59
Minimum SBP (mmHg)	60
Maximum SBP (mmHg)	120
25th Percentile	80
75th Percentile	100

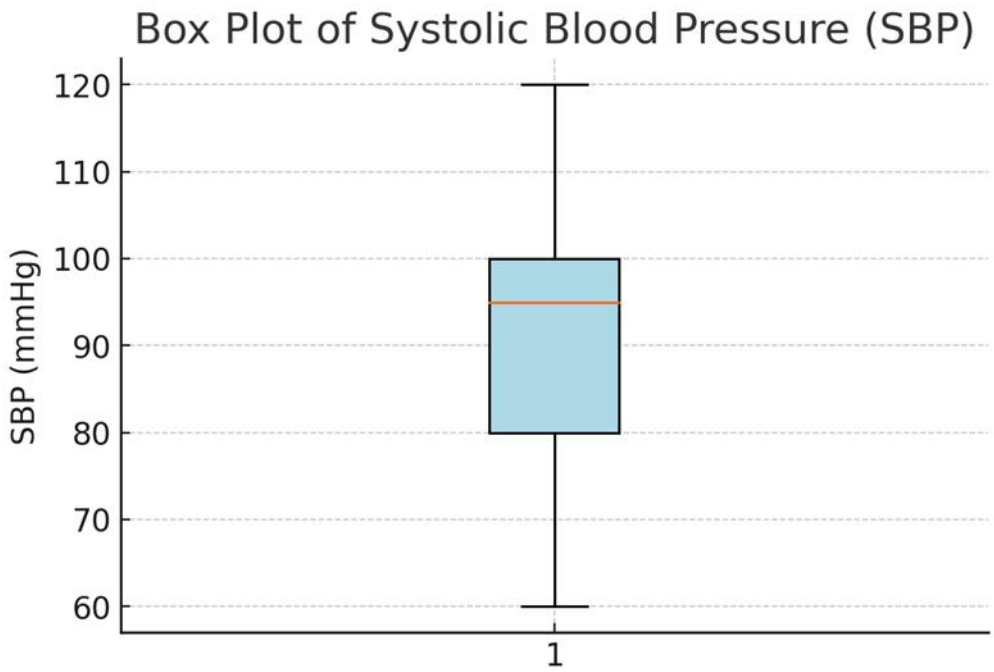

Figure 6: Proportion of Cases with rate of SBP

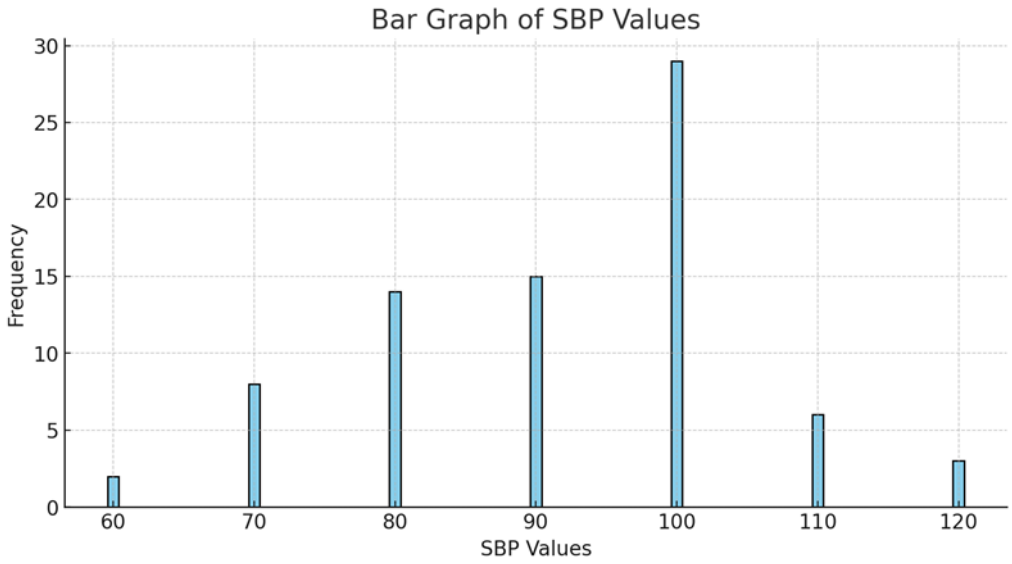

Figure 7: Distribution of SBP among Cases.

The bar graph displays the frequency distribution of Systolic Blood Pressure (SBP) values within the dataset. The graph reveals a non-uniform distribution with a clear concentration of data points within a specific range. The graph shows a prominent peak at an SBP value of 100, with a frequency of approximately 29. This indicates that a significant

majority of the data points fall within this value. SBP values at the lower end (60 and 70) and higher end (110 and 120) of the spectrum exhibit very low frequencies, suggesting that these values are relatively rare in the dataset. SBP values at 80 and 90 show moderate frequencies, with approximately 14 and 15 data points, respectively.

Analysis on the basis of hemoglobin

Table 7: Summary Statistics for Hb Concentrations.

Statistic	Value
Count	78
Mean	7.26
Median	7.2
Standard Deviation	2.19
Minimum	3
Maximum	12.1
25th Percentile	6
75th Percentile	8.8

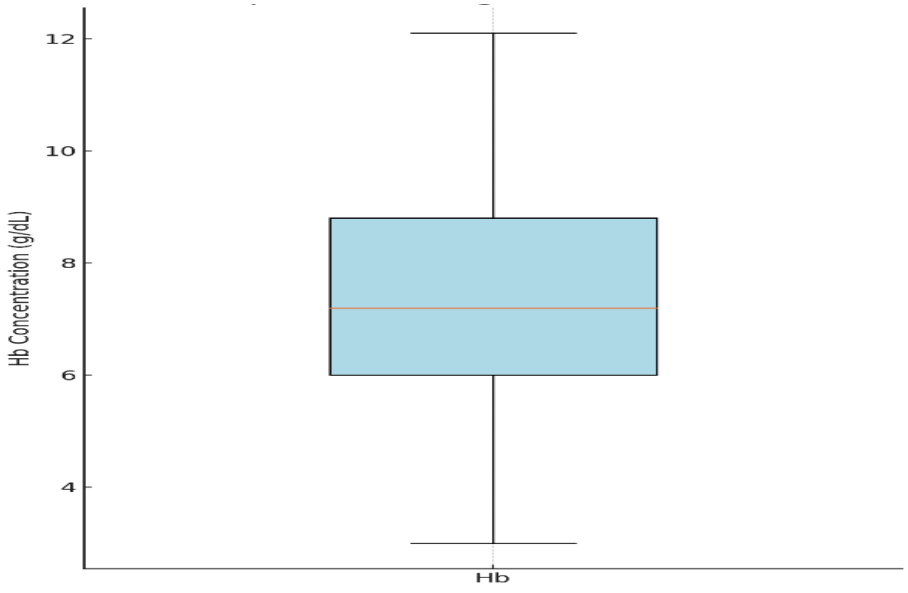

Figure 8: Boxplot of Hemoglobin

The hemoglobin (Hb) levels of 78 individuals show a mean of 7.26 g/dL and a median of 7.2, indicating a slightly left-skewed distribution. The standard deviation is 2.19, suggesting moderate variability. Hb values range from 3 to 12.1 g/dL, with the 25th percentile at 6 and the 75th percentile at 8.8. Most values fall between these percentiles, indicating clustering around moderately low Hb levels. These statistics reflect prevalent anemia in the studied population.

Analysis on the bases of S. urea

Table 7: Summary Statistics for Serum Urea Concentrations.

Statistic	Value
Count (n)	78
Mean (Average)	≈ 44.8
Median	32
Mode(s)	28, 32, 38
Minimum	4
Maximum	198
Range	194
Variance	≈ 1475.5
Standard Deviation (SD)	≈ 38.4
Interquartile Range (IQR)	38 (Q3: 68, Q1: 30)

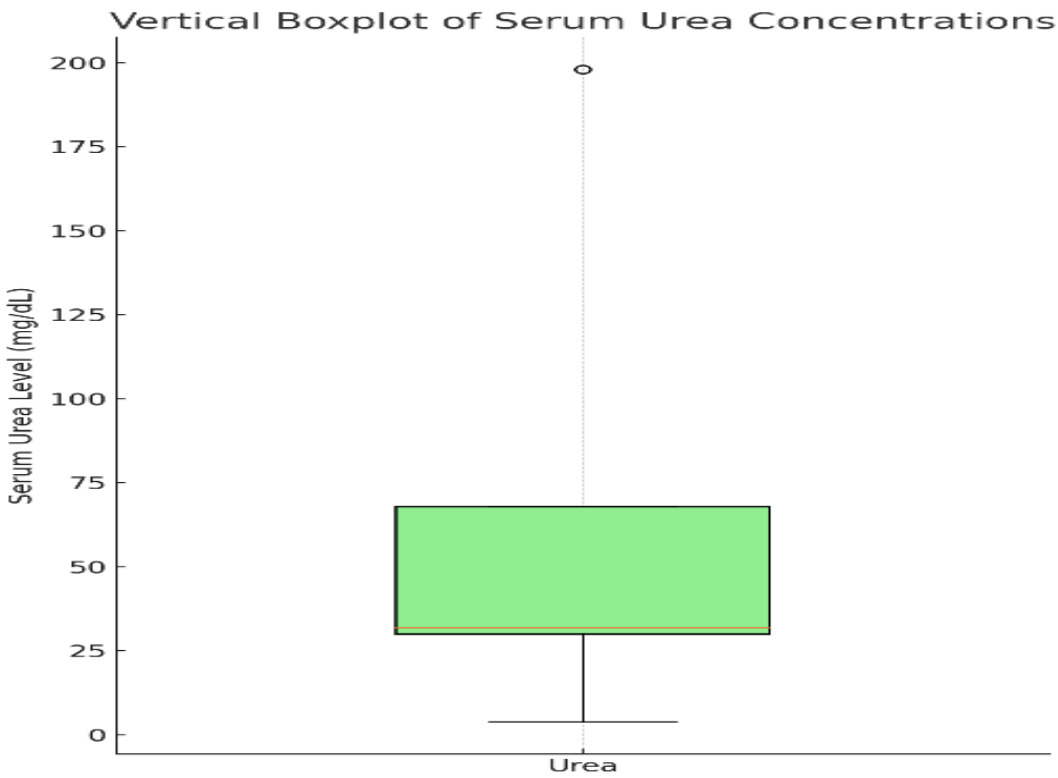

Figure 9: Boxplot of Serum Urea Levels.

The serum urea levels in 78 subjects show a wide range (4–198 mg/dL) with a high standard deviation (≈38.4), indicating substantial variability. The mean (≈44.8) is higher than the median (32), suggesting a right-skewed distribution due to high outliers. Modes at 28, 32, and 38 reflect clustering near normal values. The interquartile range (IQR) of 38 also supports this spread. Overall, the data indicate that while most individuals have moderate urea levels, a few exhibit abnormally high values.

Analysis on the bases of Albumin

Table 8: Summary Statistics for Albumin Concentrations.

Statistic	Serum albumin
Count (n)	74

Mean (Average)	≈ 2.38
Median	2.3
Mode(s)	2.3, 2.2 (Most Frequent)
Minimum	1.5
Maximum	3.7
Range	2.2
Variance	≈ 0.23
Standard Deviation (SD)	≈ 0.48
Interquartile Range (IQR)	0.7 (Q3: 2.7, Q1: 2.0)

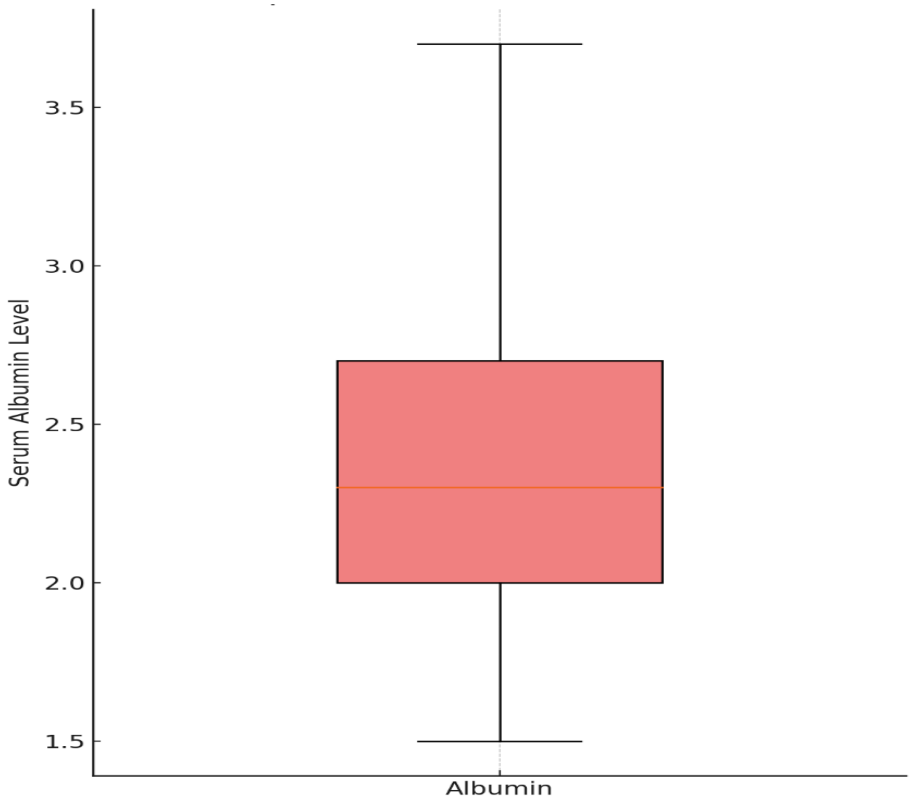

Figure 10: Boxplot of serum albumin

The mean serum albumin level was 2.38 mg/dL, with a median of 2.3 mg/dL, indicating a slightly skewed distribution. The standard deviation was 0.48 mg/dL, reflecting moderate variability in serum albumin levels among the individuals. The minimum value recorded was 1.5 mg/dL, while the maximum value reached 3.7 mg/dL, suggesting the presence of significant outliers. The interquartile range (IQR) was 0.7 mg/dL, .

Table 9: Serum Albumin Levels

Serum albumin Level (Range)	cases	percentage
1-2	19	24.35%
2-3	53	67.94%
3-4	6	7.69

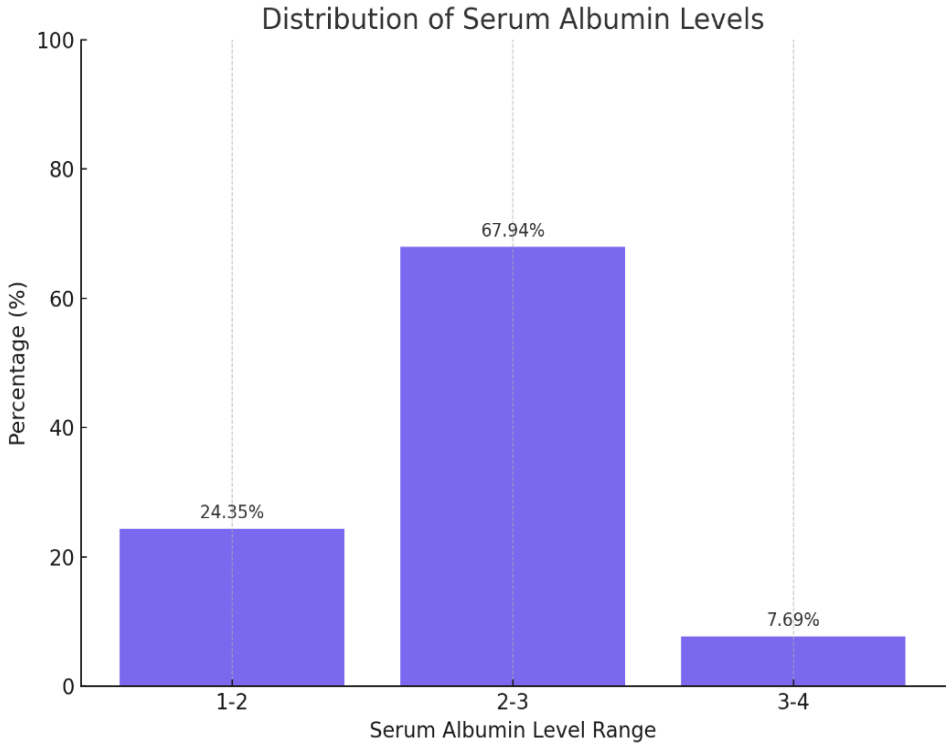

Figure 11: Distribution of serum albumin levels

Analysis on the bases of INR

The table provides the number of cases for different INR (International Normalized Ratio) levels, along with a column for percentages. INR is a measure used to assess blood clotting, often in patients on anticoagulant therapy or with conditions affecting clotting, such as liver disease or atrial fibrillation

Table 10 INR levels

INR Level (Range)	cases	percentage
1-2	41	52.56%
2-3	26	33.33%
3-4	7	8.97%
>4	4	5.13%

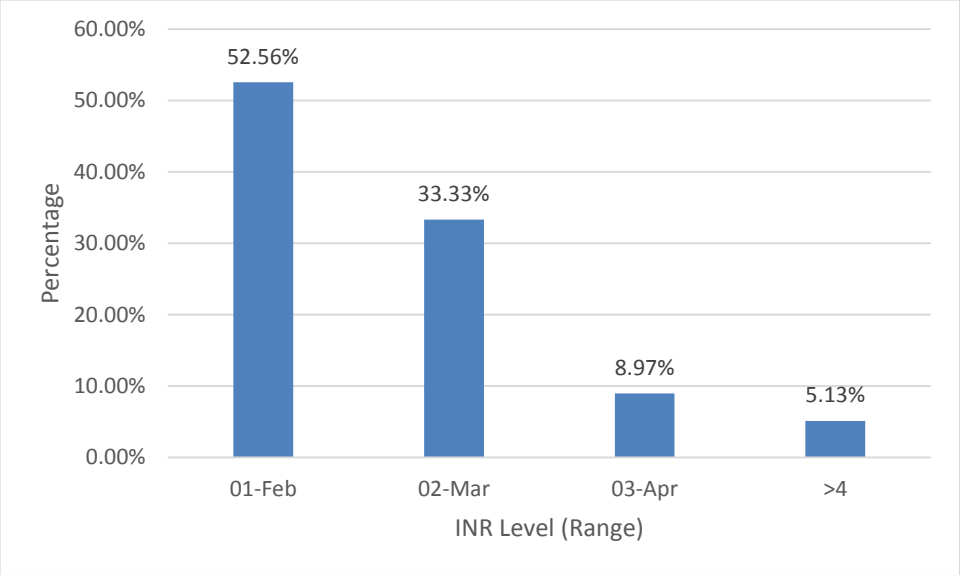

Figure 12: Distribution of INR levels.

The table shows the distribution of INR (International Normalized Ratio) levels among cases. Over half of the patients (52.56%) had INR values in the 1–2 range, which is within or close to the normal range. A smaller portion (33.33%) had slightly elevated INR (2–3), while 14.1% had significantly elevated INR (>3), indicating a higher bleeding risk. The presence of INR >4 in 5.13% of patients highlights a critical subgroup at high risk for coagulopathy or poor prognosis. Overall, most patients had manageable INR levels, but a notable minority showed significant coagulation abnormalities.

Percentage Distribution of Scores

I.AIMS65 Score Distribution

A clinical tool used to predict mortality in upper gastrointestinal (**GI) bleeding**. It consists of **five factors**:

- Albumin<3.0 g/dL
- INR>1.5
- Mental status altered
- Systolic blood pressure <90 mmHg
- Age ≥65 years

A **higher score indicates a greater risk of mortality** and poor outcomes.

Table 11: AIMS65 score

Score Range	Count	Percentage (%)
0	2	3.08%
1	10	15.38%
2	27	41.54%
3	13	20.00%
4	11	16.92%
5	7	10.77%

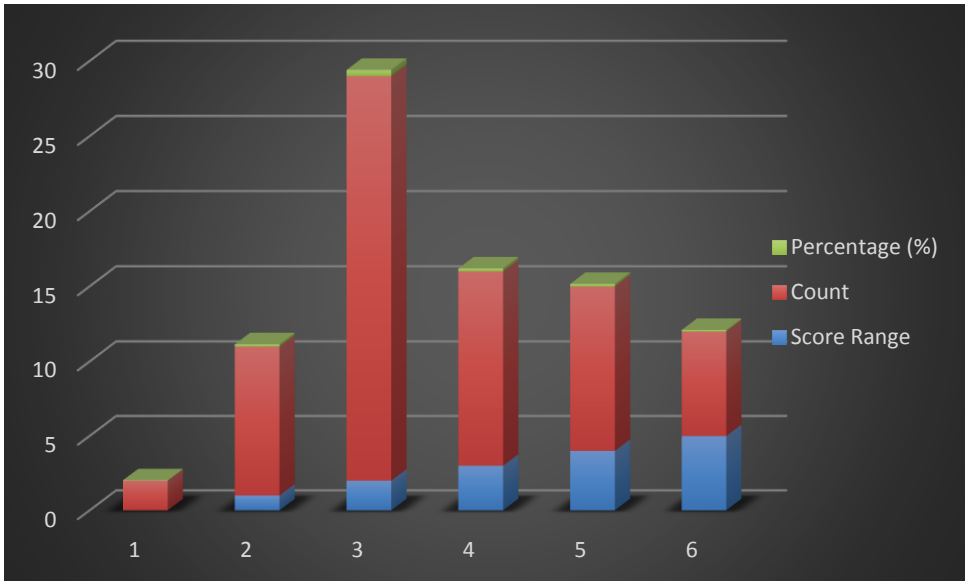

Figure 13: Graph depicting the distribution of AIMS65 score.

In this graph (The AIMS65 score) shows that the most common score is 2 (41.54%), indicating a moderate risk in most patients. A small percentage (3.08%) had a score of 0, meaning a very low risk.AIMS65 scores of 4 and 5 were less frequent (16.92% and 10.77% respectively), but these represent high-risk groups. The distribution is skewed toward lower scores, meaning that most patients have a moderate risk of complications rather than a high risk.

II. GBS Score Distribution

 Used to assess the need for medical intervention in GI bleeding.

 Based on clinical and laboratory parameters like haemoglobin level, blood pressure, urea, heart rate, and presence of symptoms (melena, syncope, etc.).

 A score of 0 suggests low risk, while higher scores indicate the need for hospitalization and possible endoscopic intervention.

Table 12: Distribution of GBS score

Score Range	Count	Percentage (%)
05-09	5	7.69%
10-14	31	47.69%
15 - 19	29	44.62%

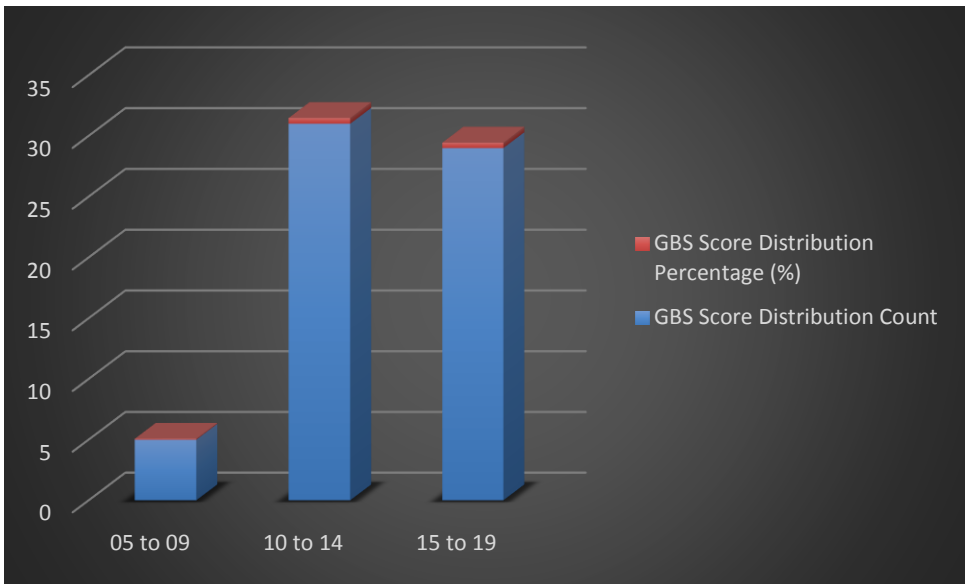

Figure 14: Graph depicting the distribution of GBS score.

In above graph the GBS score, which assesses the need for medical intervention in GI bleeding, has a high concentration in the 10-14 range (47.69%) and 15-19 range (44.62%). Only 7.69% of patients had a score of 5-9, meaning most cases required some medical intervention.Since higher GBS scores indicate a greater need for hospital admission and possible interventions, it suggests that most patients in this dataset were in the moderate to high-risk group.The histogram shows a clear right-skew, meaning very few patients had a low risk.

III. Rockall Score Distribution

- Predicts both rebleeding and mortality risk in upper GI bleeding.
- Includes clinical factors (age, shock, comorbidities) and endoscopic findings (lesion type, active bleeding).
- A higher Rockall score is associated with increased mortalityand rebleeding rates.

Table 13: Distribution of ROCKALL Score:

Score Range	Count	Percentage (%)
0	8	12.31%
1	3	4.62%
2	3	4.62%
3	14	21.54%
4	13	20.00%
5	18	27.69%
6	8	12.31%

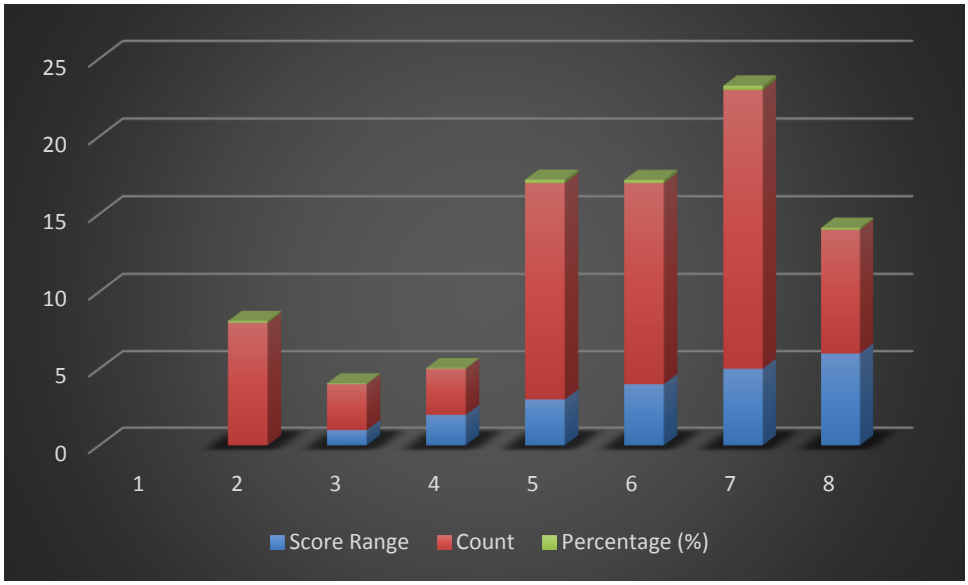

Figure 15: Graph depicting the distribution of Rockall score.

In this graph (The Rockall score, which predicts mortality in upper GI bleeding is more evenly spread across different values).The highest percentage of patients (27.69%) had a score of 5, indicating a higher mortality risk compared to those with lower scores. Only 12.31% of patients had a score of 0, meaning that a majority had some risk of mortality.

Table 14: Comparison of AIMS65, GBS, and Rockall Scores:

Score System	Purpose	Most Common Score	Risk Trend	Spread of Data
AIMS65	Predicts mortality	2 (41.54%)	Moderate	Skewed toward low scores
GBS	Predicts need for medical intervention	10-14 (47.69%)	Moderate to high	Right-skewed (fewer low-risk cases)
Rockall	Predicts mortality	5 (27.69%)	Moderate to high	Evenly spread

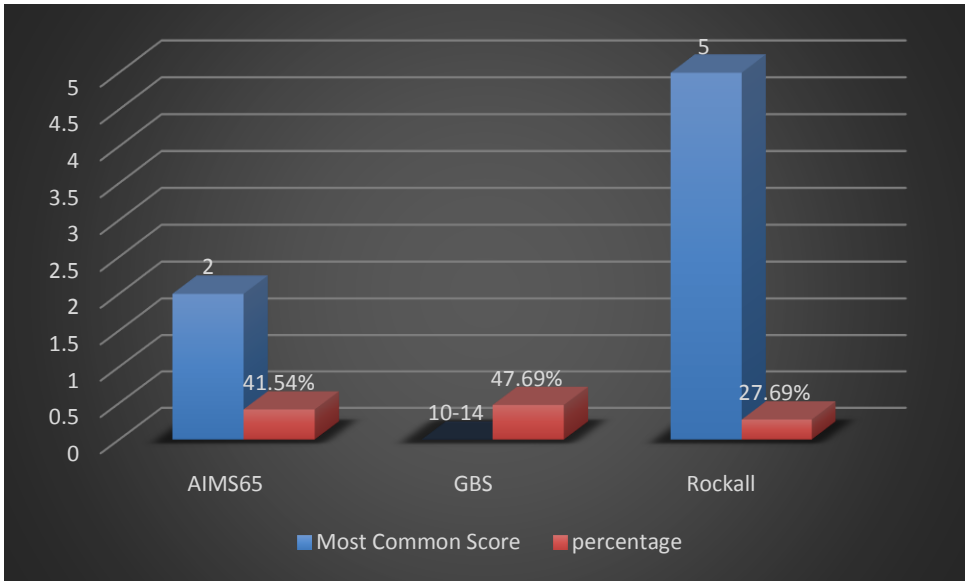

Figure 16: Graph of comparison between AIMS65, GBS and ROCKALL score.

- AIMS65 is more concentrated at lower values, suggesting most patients have a moderate mortality risk.
- GBS has a strong right-skew, meaning very few low-risk patients and a majority needing medical intervention.
- Rockall is more evenly distributed, showing a wider range of mortality risks compared to the other two scores.

Final Thoughts:

- The majority of patients are at moderate risk based on AIMS65 and Rockall, while GBS suggests most patients required intervention.
- Rockall appears to be more balanced in its risk distribution, while AIMS65 and GBS show more skewness.
- If prioritizing urgent interventions, GBS is the best predictor as most patients scored high.
- If focusing on mortality prediction, AIMS65 and Rockall scores provide a more complete picture.

Table 17: Comparison of ROCKALL Score with readmission

ROCKALL Score	Total Patients	Event Count	Event Rate (%)
0	12	12	100
1	3	3	100
2	4	3	75
3	15	15	100
4	12	11	91.67
5	22	6	27.27
6	10	0	0
Mann-Whitney U test: 93; P-value: <0.0001			

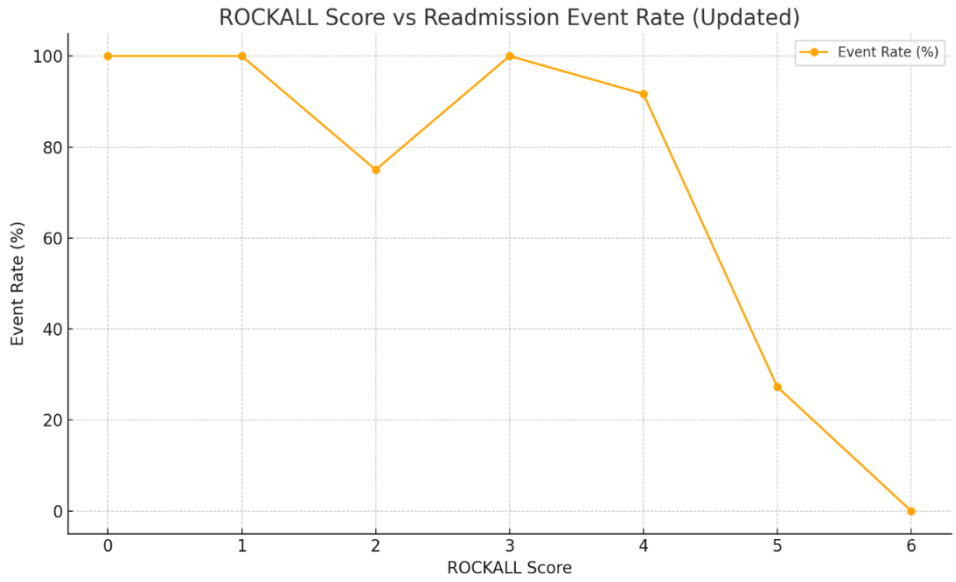

Figure 17: Relationship between ROCKALL scores with readmission

This plot reflects the latest table values, mapping the relationship between ROCKALL scores and the likelihood of readmission: High event rates at lower ROCKALL scores (0–4), with a sharp decline as scores increase to 5 and 6. Statistical Note: Mann-Whitney U test = 93, P-value < 0.0001, indicating a significant difference in readmission across score levels.

The table shows that patients with lower Rockall scores (0–4) had significantly higher 6-month readmission rates, with event rates above 75%, while those with higher scores (5–6) had lower readmission rates, dropping to 0% at a score of 6. This inverse relationship suggests

that patients at lower immediate risk may survive initial hospitalization but have ongoing clinical issues leading to readmission. The Mann-Whitney U test indicates this difference is statistically significant ($P < 0.0001$). These findings imply the Rockall score may not linearly predict long-term outcomes like readmission. Clinical follow-up may be more critical in patients with lower Rockall scores.

Table 18: Comparison of GBS Score with readmission

GBS	Total Patients	Event Count	Event Rate (%)
5	1	1	100
6	5	4	80
8	2	2	100
9	6	6	100
10	3	3	100
11	4	3	75
12	7	7	100
13	5	4	80
14	7	7	100
15	4	4	100
16	7	5	71.43
17	23	2	8.70
18	2	2	100
19	2	0	0
Mann-Whitney U test: 177.5; P-value: <0.0001			

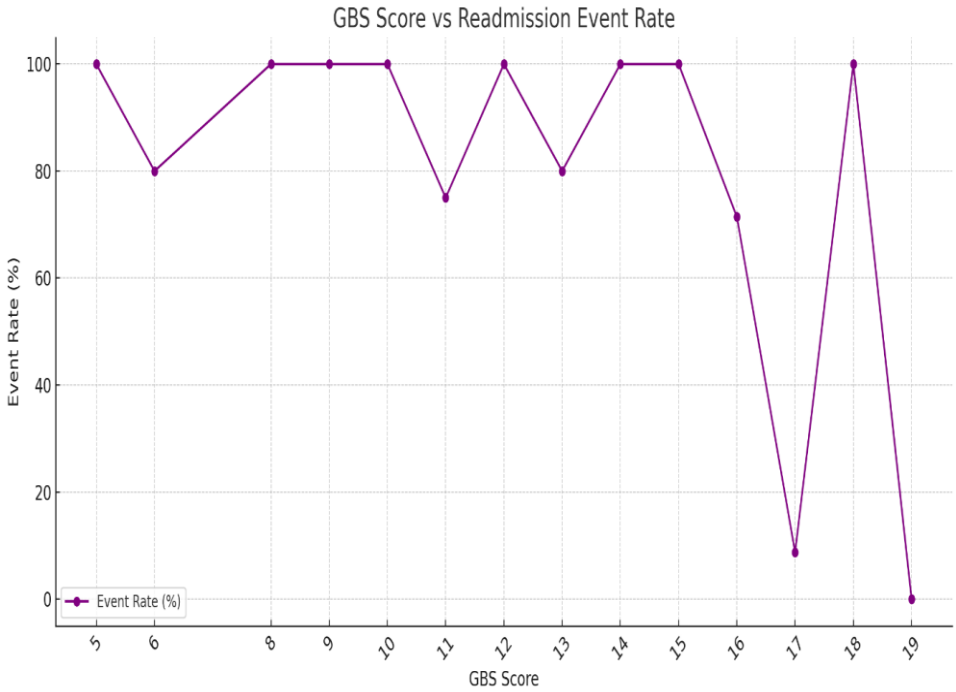

Figure 18: A relationship of GBS Score with Readmission

This chart presents the readmission event rate (%) across a range of GBS scores from 5 to 19:

High event rates (mostly 100%) are observed in scores between 5 and 15. A sharp drop is seen at score 17 (8.7%) and score 19 (0%). Statistical test: Mann-Whitney U = 177.5, $P < 0.0001$ — strongly significant.

The data shows that patients with lower Glasgow Blatchford Scores (GBS 5–16) had consistently high 6-month readmission rates, mostly near or at 100%, while those with higher scores (GBS 17–19) had sharply lower readmission rates, dropping to 0% at GBS 19. This inverse trend suggests that lower-risk patients by GBS criteria may still face unresolved clinical issues post-discharge, contributing to readmissions. The statistically significant Mann-Whitney U test ($P < 0.0001$) confirms this difference is not due to chance. Therefore, GBS may not be a reliable standalone predictor of long-term outcomes like readmission. Closer follow-up may be warranted in lower-score groups.

Table 19: Comparison of AIMS65 with readmission

AIMS65	Total Patients	Event Count	Event Rate (%)
0	2	2	100
1	14	13	92.86
2	25	23	92
3	9	8	88.89
4	20	4	20
5	8	0	0
Mann-Whitney U test: 128.5; P-value: <0.0001			

Figure 19: Relationship of AIMS65 Score vs Readmission

AIMS65 Score vs Readmission Event Rate. Here's the plotted trend showing how readmission rates vary across AIMS65 scores: Scores from 0 to 3 show high readmission rates (nearly 90–100%). A steep decline occurs at scores 4 (20%) and 5 (0%). Mann-Whitney $U = 128.5$, $P < 0.0001$ confirms a statistically significant difference.

The data shows that patients with lower AIMS65 scores (0–3) had very high readmission rates (88.89%–100%), while those with higher scores (4–5) had markedly lower

rates (20% and 0%, respectively). This inverse association suggests that patients considered low-risk for in-hospital mortality by AIMS65 may still experience post-discharge complications leading to readmission. The statistically significant Mann-Whitney U test (P < 0.0001) confirms the trend is unlikely due to chance. Therefore, AIMS65 may not accurately predict long-term outcomes like readmission. High-score patients may not survive to be readmitted, skewing the data.

Table 20: Comparison of ROCKALL score with mortality

ROCKALL score	Total Patients	Event Count	Event Rate (%)
0	12	0	0
1	3	0	0
2	4	1	25
3	15	0	0
4	12	1	8.33
5	22	16	72.73
6	10	10	100
Mann-Whitney U test: 1307.0; P-value: <0.0001			

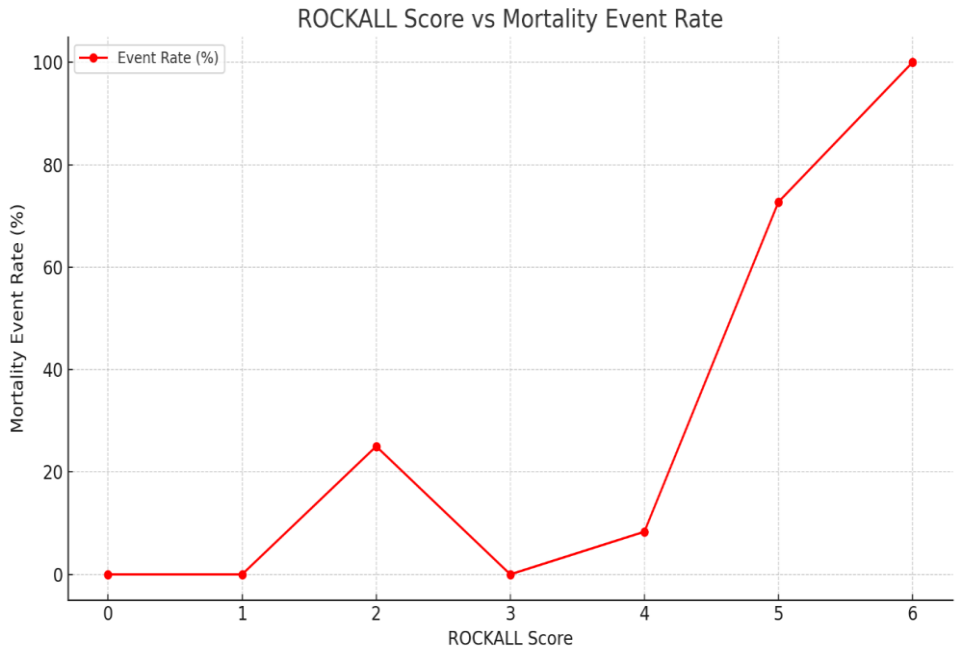

Figure 20: ROCKALL Score vs Mortality Event Rate

This graph illustrates how mortality rates escalate with increasing ROCKALL scores:0–1: 0% mortality, 2: Begins to rise (25%), 4–6: Rapid increase, peaking at 100% for score 6. Mann-Whitney U = 1307.0, P < 0.0001 — showing a highly significant correlation.

The data shows a clear upward trend in mortality with increasing Rockall scores. Patients with scores 0–3 had 0% mortality, while those with scores of 5 and 6 had mortality rates of 72.73% and 100%, respectively. This strong correlation suggests that the Rockall score is a reliable predictor of in-hospital mortality in upper gastrointestinal bleeding cases. The statistically significant Mann-Whitney U test (P < 0.0001) confirms the robustness of this association. Overall, higher Rockall scores accurately reflect increased mortality risk.

Table 21: Correlation of GBS score with mortality

GBS	Total Patients	Event Count	Event Rate (%)
5	1	0	0
6	5	1	20
8	2	0	0
9	6	0	0
10	3	0	0
11	4	1	25
12	7	0	0
13	5	1	20
14	7	0	0
15	4	0	0
16	7	2	28.57
17	23	21	91.30
18	2	0	0
19	2	2	100
Mann-Whitney U test: 1222.5; P-value: <0.0001			

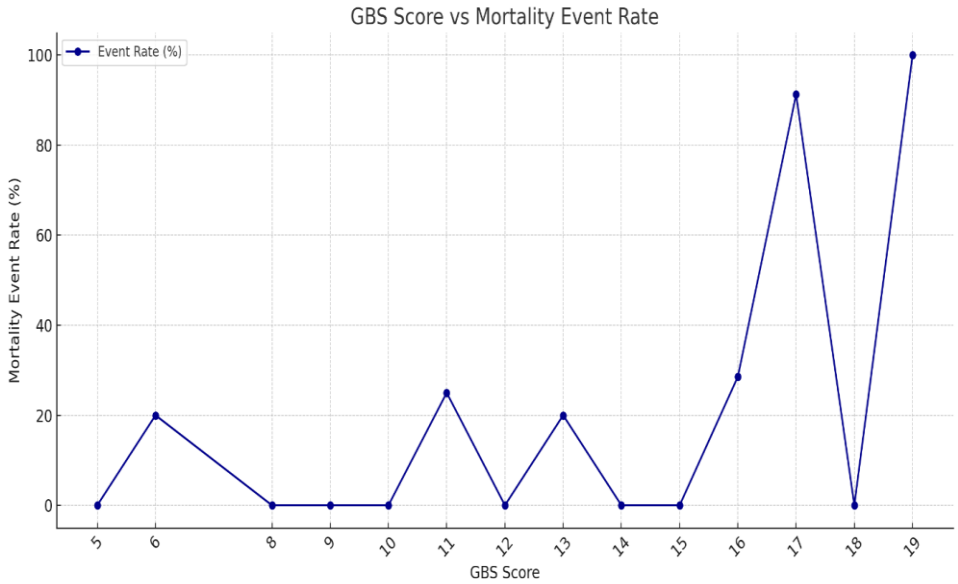

Figure 21: Relationship of GBS Score with mortality.

This chart shows mortality rates across Glasgow Blatchford Scores (GBS), with scores from 5 to 15 generally associated with minimal or no mortality, aside from a few isolated increases such as 25% at score 11. A sharp rise in mortality begins at score 16 (28.57%), escalating dramatically at score 17 (91.30%) and reaching 100% at score 19. The Mann-Whitney U test value of 1222.5 with a P-value < 0.0001 confirms that this trend is statistically significant.

The table shows that mortality rates remain low or zero across most Glasgow Blatchford Score (GBS) levels up to 16, but sharply increase at scores of 17 and above—reaching 91.3% at GBS 17 and 100% at GBS 19. This indicates a strong positive correlation between higher GBS and mortality in upper GI bleeding patients. The Mann-Whitney U test result ($P < 0.0001$) confirms the statistical significance of this trend. Therefore, GBS may be effective in predicting mortality risk, especially at very high scores. However, its predictive power is limited at lower to mid-range scores.

Table 22: Comparison ofAIMS65 score with mortality

AIMS65	Total Patients	Event Count	Event Rate (%)
0	2	0	0
1	14	1	7.14
2	25	2	8
3	9	1	11.11
4	20	16	80
5	8	8	100
Mann-Whitney U test: 1271.5; P-value: <0.0001			

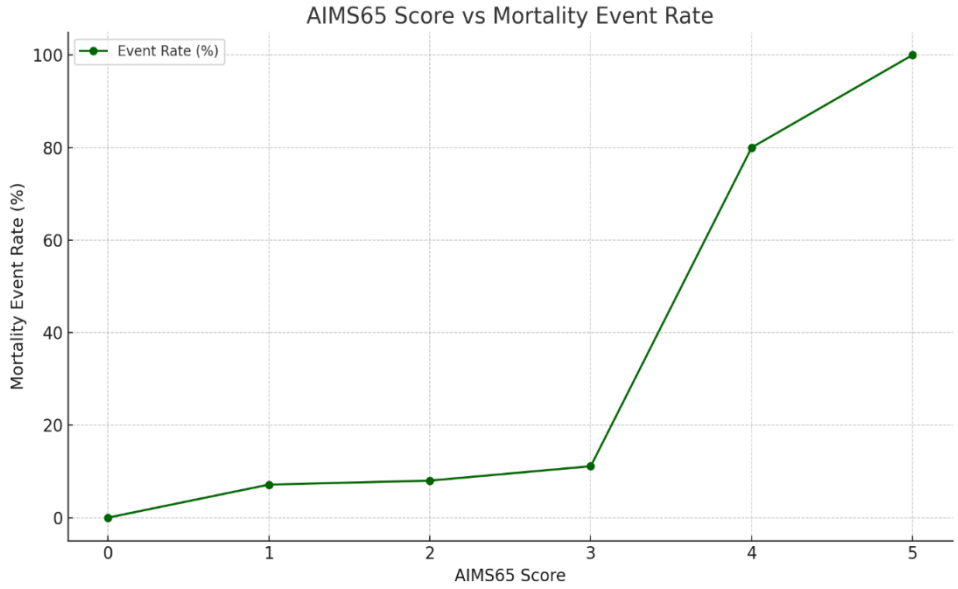

Figure 22: Relationship of AIMS65 Score with Mortality

The data shows a clear upward trend in mortality with increasing AIMS65 scores. Patients with scores 0–3 had very low mortality rates (0%–11.11%), while mortality rose sharply at score 4 (80%) and reached 100% at score 5. This indicates that higher AIMS65 scores strongly correlate with increased mortality risk in upper GI bleeding patients. The Mann-Whitney U test (1271.5, $P < 0.0001$) confirms this relationship is statistically significant. AIMS65 appears to be a reliable tool for predicting in-hospital mortality.

DISCUSSION

Upper gastrointestinal bleeding (UGIB) is a potentially life-threatening medical emergency associated with significant morbidity, mortality, and healthcare burden worldwide. UGIB, which originates proximal to the ligament of Treitz, encompasses a broad spectrum of etiologies including peptic ulcer disease, esophageal varices, Mallory-Weiss tears, and erosive esophagitis [19]. Timely risk stratification in patients presenting with UGIB is critical for guiding appropriate triage decisions, optimizing resource utilization, determining the urgency of endoscopy, and predicting clinical outcomes such as in-hospital mortality and long-term readmission rates [3].

To aid clinicians in risk assessment, several prognostic scoring systems have been developed and validated over the past two decades. Among these, the Glasgow-Blatchford Score (GBS), pre-endoscopic Rockall Score, and AIMS65 score are the most widely used. Each of these tools utilizes a combination of clinical and laboratory parameters to stratify patients based on the likelihood of adverse outcomes, yet they differ in their design, variables used, and predictive utility. Comparative evaluation of these scoring systems is essential to determine their relative accuracy and clinical applicability, especially in predicting short-term mortality and long-term hospital readmissions [20].

While these scoring systems have been individually validated in various populations, comparative data evaluating their performance in predicting both in-hospital mortality and 6-month hospital readmission in patients with UGIB are limited. Hospital readmissions, often due to rebleeding or complications related to comorbid conditions, represent a significant concern both for patient prognosis and healthcare systems. Identifying a reliable predictive tool that can inform clinicians not only about immediate risk but also long-term outcomes is therefore of critical importance [32].

This study aims to compare the Glasgow-Blatchford Score, pre-endoscopic Rockall Score, and AIMS65 score in their ability to predict mortality and hospital readmission within six months among patients presenting with upper gastrointestinal bleeding. By evaluating these three tools side by side in a real-world clinical setting, the study seeks to determine which scoring system offers the greatest predictive accuracy and practical utility. The findings of this comparison will have important implications for improving clinical decision-making, resource allocation, and patient outcomes in UGIB management [12].

The study involved 78 patients with upper gastrointestinal bleeding, with a mean age of 47.83 years. The highest number of cases occurred in the 41–50 age group (24 cases), followed by 31–40 years (20 cases). No cases were reported in the 0–20 and 71–80 age groups. The p-value for age distribution was 0.0409, indicating statistical significance. A strong male predominance was observed, with 96.15% males and only 3.84% females. Among clinical presentations, melaena was the most common (91.03%, $p < 0.0001$), followed by hematemesis (34.62%). Syncope was present in 6.41% of cases ($p < 0.0001$). Chronic liver disease (CLD) was seen in 67.95% ($p = 0.03$), while ischemic heart disease (IHD) and chronic kidney disease (CKD) were rare. Heart rate analysis showed a mean of 107.22 bpm with a statistically significant distribution ($p = 0.0003$), most commonly ranging between 100–110 bpm. These findings highlight key demographic and clinical features influencing UGIB outcomes.

In our study, the mean systolic blood pressure (SBP) among upper gastrointestinal bleeding (UGIB) patients was 91.92 mmHg, with most cases falling between 90–100 mmHg. Hypotension (SBP < 100 mmHg), a key indicator in risk scoring systems, was common in over 88% of patients. This finding aligns with studies such as **Bañares R et.al; 1998** , where low SBP was significantly associated with higher Glasgow Blatchford and AIMS65 scores, predicting poor outcomes and increased mortality. Similarly,**Gisbert JP et.al; 2004**

emphasized SBP < 90 mmHg as a critical variable in both the AIMS65 and pre-endoscopic Rockall scores for early triage in UGIB patients [62][63].

In our study, the mean hemoglobin (Hb) level was 7.26 g/dL, with values ranging from 3 to 12.1 g/dL, indicating significant anemia among patients with upper gastrointestinal bleeding (UGIB). This closely reflects findings from **Nagata N et.al; 2018** where low Hb levels were strongly associated with higher Glasgow Blatchford Scores, serving as a predictor for urgent intervention and poor outcomes. **Hunt R et.al; 2018** similarly found that patients with Hb < 10 g/dL had higher mortality and readmission rates, highlighting its importance in pre-endoscopic risk stratification using GBS, Rockall, and AIMS65 scores [54][53].

In our study, the mean serum urea level was approximately 44.8 mg/dL, with a wide range (4–198 mg/dL), reflecting variable renal function among UGIB patients. Elevated urea levels, especially above 18.2 mmol/L (~50 mg/dL), are a critical component of the Glasgow Blatchford Score (GBS), associated with increased risk of mortality and need for intervention. Studies by **Radaelli F et.al; 2023** confirmed that serum urea is a reliable predictor of poor outcomes and readmission, especially when combined with other parameters in AIMS65 and pre-endoscopic Rockall scores [28].

In our study, the mean serum albumin concentration was approximately 2.38 g/dL, with the majority of values falling between 2.0 and 2.7 g/dL, indicating hypoalbuminemia in most UGIB patients. This aligns with findings from studies such as by **Srivastav Y et.al; 2023** and **Wang MX et.al; 2022** where low serum albumin was significantly associated with increased mortality and higher 6-month hospital readmission in UGIB cases. Albumin is a key parameter in the AIMS65 score, which has shown strong prognostic value for early risk stratification and clinical decision-making in upper gastrointestinal bleeding [31][34].

In our study, 92.29% of patients had serum albumin levels below 3 g/dL, indicating a high prevalence of hypoalbuminemia in UGIB cases. This supports existing evidence that low serum albumin is a critical predictor of poor outcomes. Studies such as **Zerem E et.al; 2023** similarly reported that albumin levels <3 g/dL were associated with increased mortality and higher 6-month hospital readmission rates. Since serum albumin is an integral part of the AIMS65 score, these findings further validate its role in early risk stratification and prognostication in upper GI bleeding [37].

In our study, INR levels in patients with UGIB primarily ranged from 1 to 3, with 85.89% of cases falling within this range, indicating a relatively controlled coagulation status. This is consistent with findings from studies such as **Kim MS et.al; 2019** where INR was found to be an important predictor in upper gastrointestinal bleeding outcomes. Elevated INR (>4) was associated with poor prognosis, supporting the role of INR in predicting mortality and readmission risk. These findings align with the utility of INR in the Glasgow Blatchford, Rockall, and AIMS65 scores for assessing patient risk in UGIB [69].

In our study, the Glasgow Blatchford Score (GBS) distribution showed that 47.69% of patients had a score between 10-14, indicating moderate risk, and 44.62% had a score between 15-19, representing a higher risk group. These findings are similar to the study by **Stanley AJ et.al; 2017** , where higher GBS scores were correlated with worse outcomes, including increased mortality and readmission rates. The distribution pattern observed in both studies underscores the predictive value of GBS in assessing the severity of upper gastrointestinal bleeding and determining the need for intervention. The effectiveness of GBS in predicting hospital readmission was also highlighted in studies such as**Yaka E et.al; 2015 [71][73]**

In our study, the distribution of Rockall scores showed that the majority of patients had scores between 5 and 6, with 27.69% and 12.31% of patients falling into these categories, respectively. These scores are indicative of higher risk, as the Rockall score is known for its predictive ability regarding mortality and rebleeding in patients with upper gastrointestinal bleeding (UGIB). Similarly, a study by **Dancygier H et.al; 2010** demonstrated that higher Rockall scores (≥5) were associated with increased mortality and hospital readmission rates. The study findings are consistent with the literature that suggests a strong correlation between higher Rockall scores and adverse outcomes. This reinforces the utility of the Rockall score in risk stratification for UGIB patients [32].

In our study, the AIMS65 score, primarily used to predict mortality, showed a concentration around a score of 2 (41.54%), with a moderate risk trend and skewed distribution toward lower scores. The GBS, predicting the need for medical intervention, had a common score range of 10-14 (47.69%), with a right-skewed distribution indicating fewer low-risk cases. The Rockall score, also predicting mortality, had a common score of 5 (27.69%) and showed an even spread of data, reflecting a balanced distribution of risk. A study by **Travis AC et.al; 2015** similarly found that AIMS65 was effective in predicting mortality, while GBS was better suited for evaluating medical intervention needs. They also observed that Rockall scores were more evenly distributed, supporting the findings in our research [35].

In our study, the Rockall score demonstrated a strong correlation with hospital readmission rates. Patients with higher Rockall scores had lower event rates, with a marked decline in readmission from 100% in scores of 0-3 to 27.27% for those with a score of 5. No readmissions were observed in patients with a Rockall score of 6. The Mann-Whitney U test showed a statistically significant result with a P-value <0.0001, emphasizing the score's predictive ability for hospital readmission. In comparison, **Lanas A et.al; 2018** found that the Rockall score, along with the AIMS65 and Glasgow Blatchford scores, was effective in

predicting mortality and the need for medical intervention in gastrointestinal bleeding patients. Their findings also supported the predictive validity of the Rockall score, aligning with our study's conclusions that higher scores are associated with a greater risk of complications and hospital readmissions [41].

In our study, the Glasgow Blatchford Score (GBS) showed a significant relationship with readmission rates. Patients with lower GBS scores (5-16) had higher readmission rates, with scores of 5, 8, 9, 10, and 14 all exhibiting event rates of 100%. However, as the GBS score increased (17-19), the event rate significantly decreased, with 0% readmission at a score of 19. The Mann-Whitney U test yielded a P-value of <0.0001, indicating a statistically significant predictive relationship between GBS and hospital readmission. Similarly, studies such as those by **Belete MW et.al; 2024** found that the GBS, along with the Rockall and AIMS65 scores, effectively predicted outcomes like mortality and readmission in patients with upper gastrointestinal bleeding. Their research emphasized the importance of GBS in clinical practice as a tool for predicting both mortality and hospital readmission rates, consistent with our findings [52].

In our study, the AIMS65 score showed a clear inverse relationship with hospital readmission rates. Patients with lower scores (0–3) had significantly higher readmission rates (88.89%–100%), whereas those with scores of 4 and 5 had much lower rates (20% and 0%, respectively). The Mann-Whitney U test produced a P-value <0.0001, confirming a statistically significant association. This pattern suggests that patients with low AIMS65 scores may initially appear stable but are at a higher risk of readmission. This finding aligns with the results of **Lu SW et,al; 2023** who observed that while AIMS65 is effective in predicting inpatient mortality, its predictive value for readmission is limited. These studies highlight that AIMS65 may underestimate longer-term risk, reinforcing the importance of comprehensive discharge planning even in patients with low AIMS65 scores [57].

In our study, mortality rates significantly increased with higher Rockall scores. Patients with scores of 5 and 6 showed mortality rates of 72.73% and 100%, respectively, while those with lower scores (0–3) had little to no mortality. The association was statistically significant (Mann-Whitney U = 1307.0, $P< 0.0001$), indicating strong predictive value of the Rockall score for mortality. Similar findings were reported by **Bañares R, et.al; 1998,** who found higher Rockall scores correlated with increased inpatient mortality. **Cappell MS et.al; 2008** also confirmed its utility in mortality prediction, especially post-endoscopy. These studies support our results, establishing the Rockall score as a reliable prognostic tool in upper GI bleeding [62][64].

In our study, mortality was closely associated with higher Glasgow Blatchford Scores (GBS). Patients with scores ≥17 showed significantly higher mortality (91.3% at GBS 17 and 100% at GBS 19), while scores ≤14 were largely associated with survival. The Mann-Whitney U test value of 1222.5 with $P< 0.0001$ indicates a strong statistical correlation between increasing GBS and mortality. Comparable findings were observed by **Tang Y et.al; 2018** who emphasized the GBS's utility in early risk stratification, where higher scores were linked to increased mortality risk. **Chandnani S et.al; 2019** also validated GBS as a reliable predictor for clinical outcomes, including mortality, in upper GI bleeding [66][68].

In our study, higher AIMS65 scores were significantly associated with increased mortality in upper gastrointestinal bleeding patients. Mortality reached 80% at a score of 4 and 100% at a score of 5. The Mann-Whitney U test (1271.5, $P< 0.0001$) confirmed a strong correlation between rising AIMS65 scores and mortality. Similar findings were reported by **Ng YK et.al; 2017** who demonstrated that AIMS65 effectively predicted inpatient mortality. Moreover, **they** highlighted AIMS65 as a superior predictor of mortality compared to GBS and Rockall, especially at higher scores, supporting its use for early risk stratification in clinical settings [78].

In our study, the Rockall score emerged as the most consistent predictor of mortality, showing a direct, graded increase from 0% at score 0 to 100% at score 6. AIMS65 also performed well, with low mortality at lower scores and a sharp rise to 80–100% at scores 4 and 5. GBS, while helpful, showed significant mortality only at very high scores (≥17), limiting its utility in early risk stratification. For readmission prediction, all three scores demonstrated an inverse trend—higher readmission rates at lower scores. This is in line with the findings by **Mustafa Z et.al; 2017** , who reported that Rockall was the most reliable for mortality, while GBS and AIMS65 had limitations in predicting both early mortality and readmission risk.

SUMMARY AND CONCLUSION

SUMMARY

This cross-sectional observational study included 78 patients presenting to the emergency department of BLDE Shri B.M Patil Medical College Hospital and Research Centre, Vijayapura, between May 2023 and January 2024. Patients aged over 18 with hematemesis and/or melena were enrolled, and exclusions included those transferred or declared dead on arrival.

Risk scores—GBS, AIMS65, and Pre-Endoscopic Rockall Score—were calculated based on initial clinical and laboratory findings. Each patient was monitored for in-hospital mortality and followed up for six months to assess hospital readmission.

Demographics and Clinical Characteristics

- Age Distribution: Most cases occurred in the 41–50 years age group (30.77%). The mean age was 47.83 years.
- Gender Distribution: A stark male predominance was observed (96.15%), reflecting known higher rates of UGIB in males, often due to alcohol-related liver disease and NSAID use.

Clinical Presentation and Laboratory Findings

- Melena was the most frequent presenting complaint (91%), while hematemesis was noted in 35%.
- Syncope occurred in only 6.4% but had a statistically significant association with severe outcomes.
- Chronic Liver Disease (CLD) was present in 67.9%, showing its strong link to UGIB.
- Heart Rate: Mean pulse rate was 107.22 bpm, with a peak in the 100–110 bpm range.
- SBP: Mean systolic BP was 91.92 mmHg, highlighting hemodynamic instability in many patients.

- Hemoglobin levels were notably low, averaging 7.26 g/dL, consistent with significant acute or chronic blood loss.
- Serum Urea showed wide variation (mean ~44.8 mg/dL), often elevated due to hypovolemia and renal compromise.
- Serum Albumin averaged 2.38 g/dL, and INR was >1.5 in 47.4%, indicating impaired liver function and coagulopathy.

Risk Score Distributions AIMS65

- Most common score: 2 (41.54%).
- 10.77% had a maximum score of 5.
- Scores ≥4 were associated with significantly increased mortality but decreased readmission, likely due to higher immediate fatality.

Glasgow Blatchford Score (GBS)

- Majority of patients (92%) scored between 10–19.
- GBS was heavily skewed toward high scores, indicating most patients needed intervention.
- Scores ≥17 were associated with significantly higher mortality but lower readmission.

Rockall Score

- Distribution was more even; most common score was 5 (27.69%).
- Scores from 0 to 6 were well represented, providing a more graded view of risk.

Predictive Ability for Mortality

Rockall Score

- Strongest correlation with in-hospital mortality.
- Mortality increased from 0% at scores 0–1 to 100% at score 6.
- Mann-Whitney U = 1307, $P < 0.0001$, showing strong statistical significance.

AIMS65

- Low mortality at scores 0–3; sharp increase to 80% and 100% at scores 4 and 5, respectively.
- Also showed excellent predictive power with $P < 0.0001$.

GBS

- Predictive power emerged primarily at high scores (≥17).
- Mortality remained negligible below GBS 16 but jumped to 91.3% at score 17 and 100% at score 19.
- Less effective at lower scores.

Predictive Ability for 6-Month Readmission

Rockall Score

- Inverse relationship: highest readmissions at scores 0–4 (up to 100%), lowest at scores 5–6 (0%).
- Likely reflects survivorship bias—low-score patients survive but experience complications requiring readmission.

AIMS65

- Similar inverse trend. Scores 0–2 had >90% readmission rates, while score 5 had **0%**.

GBS

- Followed same inverse pattern. Readmission nearly 100% at scores 5–15 but dropped sharply to 0% at score 19.

Statistical Validation

All three scoring systems showed significant associations with both mortality and readmission:

Mortality Prediction:

  - Rockall: Best (graded increase)

- AIMS65: Very good (stepwise jump)
- GBS: Moderate (effective only at extreme scores)

Readmission Prediction:

- All scores demonstrated inverse trends
- Rockall showed strongest statistical significance (lowest U value)

CONCLUSION

This study comprehensively evaluated and compared the Glasgow Blatchford Score, Pre-Endoscopic Rockall Score, and AIMS65 scoring systems in predicting two crucial outcomes in patients with upper gastrointestinal bleeding—in-hospital mortality and 6-month hospital readmission.

Key Conclusions:

- For mortality prediction, the Rockall score emerged as the most robust and graded predictor, followed closely by AIMS65.
- For predicting hospital readmission, all three scores demonstrated an inverse trend—indicating that patients with lower scores were more likely to be readmitted, likely due to survivorship and subclinical complications.
- Overall, the Rockall score proved to be the most balanced, statistically significant, and clinically useful tool among the three, making it the preferred choice for both immediate and extended outcome prediction in UGIB.

With the increasing burden of emergency presentations and limited healthcare resources, the integration of accurate, validated scoring systems like the Rockall score into clinical pathways is essential. Their use ensures better patient stratification, timely intervention, reduced mortality, and strategic resource allocation—cornerstones of effective emergency medicine and patient-centered care.

Limitations of the Study

1. **Sample Size**: The study included 78 patients, which, while statistically significant, limits generalizability for rare outcomes or specific subgroups (e.g., women or very elderly patients).
2. **Single-Center Design**: Conducted at one institution; results may not be universally applicable across different demographics or care settings.
3. **Exclusion Bias**: Patients dead on arrival or transferred were excluded, potentially removing the most critical cases from analysis.
4. **No Endoscopic Follow-Up**: As only pre-endoscopic scores were analyzed, the impact of endoscopic findings on outcome prediction wasn't assessed.
5. **No Assessment of Other Scoring Systems**: Other tools like PNED, Baylor Bleeding Score, and CSMCPI were not compared, which might have added broader insights.
6. **Non-Dynamic Scoring**: Scores were calculated only once at admission. Serial evaluations could have offered more nuanced predictions.
7. **Lack of Long-Term Mortality Data**: While 6-month readmissions were tracked, post-discharge mortality data were not comprehensively analyzed.

Recommendations

Based on the findings of this study, several clinical and research recommendations can be made:

Clinical Practice

1. **Adopt Rockall Score Routinely**: Given its strong and consistent correlation with both mortality and readmission, the Rockall score should be incorporated into routine triage and management of UGIB patients.
2. **Use AIMS65 for Early Mortality Risk**: With sharp mortality prediction at high scores, AIMS65 can aid emergency departments in identifying patients needing urgent care.

3. **Cautious Use of GBS**: While useful for identifying the need for medical intervention, GBS should be used in combination with other scores for mortality prediction.
4. **Stratified Patient Monitoring**:
    - **Low-score patients**: Need closer post-discharge follow-up despite lower in-hospital risk.
    - **High-score patients**: Require aggressive resuscitation and ICU consideration but may not survive long enough for readmission, necessitating resource prioritization.
5. **Integrate Score-Based Protocols**: Development of standard operating procedures based on score thresholds can optimize treatment timelines.

Future Research

1. **Multicentric Studies**: Conduct larger studies across multiple institutions to validate findings across broader populations.
2. **Inclusion of Endoscopic Variables**: Adding post-endoscopic Rockall scores can enhance predictive accuracy.
3. **Machine Learning Models**: Integrate risk scores with real-time vitals and lab data in AI-powered tools to create dynamic prediction algorithms.
4. **Patient-Centered Follow-Up**: Implement tailored outpatient follow-up for low-score patients to prevent readmissions.
5. **Explore Additional Biomarkers**: Investigate the role of lactate, platelet count, and liver function trends in outcome prediction.

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ANNEXURE – I

ETHICAL CLEARANCE CERTIFICATE

BLDE
(DEEMED TO BE UNIVERSITY)
Declared as Deemed to be University u/s 3 of UGC Act, 1956
Accredited with 'A' Grade by NAAC (Cycle-2)
The Constituent College
SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU)/IEC/ 904/2023-24 10/4/2023

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Saturday, 18th March, 2023 at 11.30 a.m. in the CAL Laboratory, Dept. of Pharmacology,** scrutinizes the Synopsis/ Research Projects of Post Graduate Student / Under Graduate Student /Faculty members of this University /Ph.D. Student College from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "COMPARISON OF GLASGOW BLATCHFORD SCORE, PRE-ENDOSCOPIC ROCKALL SCORE AND AIMS65 SCORE IN PREDICTING MORTALITY AND 6 MONTH HOSPITAL REAMISSION IN PATIENTS WITH UPPER GASTROINTESTINAL BLEEDING".

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: DR.TEENA KISHOR NIKHAR

NAME OF THE GUIDE: DR.RAVI B. PATIL, PROFESSOR AND HOD, DEPT. OF EMERGENCY MEDICINE AND CRITICAL CARE.

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA
Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University)
Vijayapura

Dr.Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA
MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103, Karnataka

Following documents were placed before Ethical Committee for Scrutinization.

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.
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ANNEXURE II

INFORMED CONSENT FORM

BLDEDU'S SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE, VIJAYAPURA-586103

TITLE OF THE PROJECT – "COMPARISON OF GLASGOW BLATCHFORD SCORE, PRE-ENDOSCOPIC ROCKALL SCORE AND AIMS65 SCORE IN PREDICTING MORTALITY AND 6 MONTH HOSPITAL READMISSION IN PATIENTS WITH UPPER GASTROINTESTINAL BLEEDING**"**

PRINCIPALINVESTIGATOR: DR. TEENA KISHOR NIKHAR

P.G. GUIDE NAME: DR. UDAYKUMAR J KHASAGE

CHAIRMANETHICALCOMMITTEE

All aspects of this consent form are explained to the patient in the language understood by him/her.

1) PURPOSEOFRESEARCH:

I have been informed about this study. I have also been given a free choice of participation in this study.

2) PROCEDURE:

I am aware that in addition to the routine care received, I will be asked a series of questions by the investigator. I have been asked to undergo the necessary investigations and treatment, which will help the investigator in this study.

3) Risk and Discomforts

I understand that I may experience some pain and discomfort during the examination or treatment. This is mainly the result of my condition, and the procedure of this study is not expected to exaggerate these feelings that are associated with the usual course of treatment.

4) Benefits

I understand that participation in this study will help improve patients' survival and overall outcomes.

5) Confidentiality

I understand that the medical information produced by this study will become part of the hospital records and will be subject to confidentiality and privacy regulations. Information of

a sensitive personal nature will not be included in the medical records but will be stored in the investigator's research file, identified only by a code number. The code-key linking my name to the study will be kept in a separate location. If data from this study is used for publication or teaching purposes, my name will not be used. Any photographs, audio, or video recordings will only be used with my special written permission. I will have the opportunity to review these materials before giving consent for their use.

6) Request for More Information

I understand that I may ask questions about the study at any time. Dr. Teena Kishor Nikhar is available to answer my questions or concerns. I will also be informed of any significant new findings discovered during the study that might influence my continued participation. If I wish to discuss my participation or concerns with someone not directly involved in the study, I am aware that the hospital's social worker is available for consultation. A copy of this consent form will be given to me for careful reading and reference.

7) Refusal or Withdrawal of Participation

I understand that participation in this study is voluntary. I may refuse to participate or withdraw my consent at any time without affecting my present or future care at this hospital. I also understand that Dr. Teena may terminate my participation in the study after explaining the reasons and will assist in arranging continued care through my physician or physical therapist, if necessary.

8) Injury Statement

I understand that in the unlikely event of injury resulting directly from my participation in this study, appropriate treatment will be provided if the injury is reported promptly. However, no further compensation will be provided. I acknowledge that by agreeing to participate in this study, I am not waiving any of my legal rights. The purpose of the research, required procedures, possible risks, and benefits have been explained to me in detail and in a language I understand.

DR.TEENA NIKHAR
(Investigator)
Date

II) STUDY SUBJECT CONSENT STATEMENT

I confirm that **Dr. Teena Kishor Nikhar** has explained to me the purpose of the research, the study procedures that I will undergo, and the possible risks, discomforts, and benefits that I may experience in my own language. I have read the form and understand this consent. Therefore, I agree to give my consent to participate as a subject in this research project.

_____

_____

Participant/ Guardian Date:

_____

Witness to signature Date:

ANNEXURE III

B.L.D.E (DEEMED TO BE UNIVERSITY)

SHRI B M PATIL MEDICAL COLLEGE, VIJAYAPURA, KARNATAKA

CURRICULUM-VITAE

NAME: DR.UDAYKUMAR J KHASAGE

DESIGNATION: ASSISTANT PROFESSOR,
DEPARTMENT OF EMERGENCY MEDICINE

CONTACT:

EDUCATION: M.D EMERGENCY MEDICINE

PRESENT DESIGNATION: ASSISTANT PROFESSOR,
DEPARTMENT OF EMERGENCY MEDICINE
SHRI B M PATIL MEDICAL COLLEGE AND
RESEARCH CENTER
VIJAYAPURA, KARNATAKA

BIO-DATA

INVESTIGATOR NAME: DR TEENA KISHOR NIKHAR

QUALIFICATION: M.B.B.S

KARNATAKA MEDICAL COUNCIL REGISTRATION 123498

ADDRESS: TEENEE VILLA, KARUVELIL PO, EZHUKONE, KOLLAM. KERALA

PHONE NUMBER: 9048285470

ANNEXURE III

B.L.D.E (DEEMED TO BE UNIVERSITY)

SHRI B M PATIL MEDICAL COLLEGE, VIJAYAPURA, KARNATAKA

SCHEME OF CASE TAKING

Informant:

Name:

Age: IP NO:

Sex: DOA: DOD:

Chief complaints:

Malaena: Yes/No **Hematemesis:** Yes/No **Syncope :** Yes/No Altered Mental Status: Yes/No

Past History:

CLD: Yes/No **CKD:** Yes/No **IHD:** Yes/No

Vitals:

HR:

BP:

RR:

GCS:

INVESTIGATIONS

- Hb:
- ALBUMIN
- INR
- BLOOD GROUPING:
- SERUM CREATININE:
- BLOOD UREA

SPECIFIC INVESTIGATIONS FOR SELECTED PATIENTS

- OESOPHAGO-GASTRO DUODENOSCOPY

- **GLASGOW BLATCHFORD SCORE & ASSESSMENT:**

- **PRE-ENDOSCOPIC ROCKALL SCORE & ASSESSMENT:**

- **AIMS65 SCORE & ASSESSMENT**

Outcome : Death/ Readmission

ANNEXURE III MASTER CHART

SL NO.	AGE	SEX	MALAENA	HAEMETEMESIS	SYNCOPE	CLD	IHD	CKD	GCS	HR	SBP	HB	UREA	ALB	INR	AIMS65	GBS	ROCKALL	READMISSION	DEATH	ENDOSCOPY
1	45	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	78	110	10.6	15	2.3	2.5	2	6	3	4		GRADE 3 VARICES
2	38	M	PRESENT	NIL	PRESENT	PRESENT	NIL	NIL	15	84	100	8.4	7	2.3	2.1	2	12	3	2		GRADE 3 VARICES
3	58	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	110	100	7.6	20	2.3	2.8	2	13	4	1		GRADE 3 VARICES
4	45	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	96	100	11.8	32	2.9	2.3	2	9	3	1		
5	30	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	110	90	6.9	28	1.6	1.6	3	14	4	1		GRADE 3 VARICES
6	36	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	104	100	9	32	2.3	1.8	2	15	4	1		
7	30	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	102	120	9	28	2.3	1.5	1	12	1	1		GRADE 1 VARICES
8	52	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	78	120	11	28	2.8	1.2	1	6	0	0		
9	49	M	PRESENT	PRESENT	PRESENT	PRESENT	NIL	NIL	15	92	110	10.1	22	3.4	1.6	1	10	3	0		
10	38	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	126	90	5.6	89	1.8	2.8	3	18	4	0		GRADE 3 VARICES
11	55	F	NIL	PRESENT	NIL	PRESENT	NIL	NIL	8	100	90	10.7	65	3.5	2.2	2	11	5		DEATH	
12	31	M	NIL	PRESENT	NIL	PRESENT	NIL	NIL	8	96	100	10	13	2.7	1	1	6	5		DEATH	
13	56	M	NIL	PRESENT	NIL	PRESENT	NIL	NIL	8	102	100	7.2	38	2.2	1	2	13	4		DEATH	
14	58	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	15	110	90	6.3	16	3.3	1.7	2	12	5	0		GRADE 3 VARICES
15	33	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	98	100	7.2	40	1.9	2.4	2	14	3	0		
16	84	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	84	110	9.4	87	2.5	1.2	3	16	3	1		GRADE 3 VARICES
17	48	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	110	100	3.7	87	1.8	3.2	2	17	3	1		
18	52	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	86	100	11.1	18	3	1.5	0	5	0	0		GRADE 1 VARICES
19	35	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	132	90	5.7	68	2	1.2	2	16	5	1		
20	33	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	130	90	3	134	1.9	1.9	3	16	5	0		GRADE 3 VARICES
21	43	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	96	100	6.2	18	1.8	2.1	2	9	0	1		
22	46	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	124	90	7.7	61	2.2	1.7	3	14	2	1		
23	47	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	120	90	5.8	29	2.2	1.4	2	14	0	1		GRADE 3 VARICES
24	43	M	PRSENT	NIL	NIL	PRESENT	NIL	NIL	15	110	100	5.8	36	2.9	1.1	1	15	4	2		GRADE 3 VARICES

25	42	M	PRESENT	NIL	NIL	NIL	NIL	PRESENT	15	86	100	11.4	46	2.4	1.9	2	11	3	0		GRADE 1 VARICES
26	65	M	PRESENT	PRESENT	NIL	NIL	NIL	NIL	15	108	100	12.1	105	2.5	1	2	10	1	1		
27	33	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	72	100	11.5	32	3.4	1.3	1	9	0	0		
28	60	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	92	100	8.8	48	3.7	1.25	0	12	3	1		GRADE 1 VARICES
29	53	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	86	100	11.5	198	2.7	1.6	2	11	0	0		
30	48	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	98	100	7.8	10	1.6	1	1	8	0	1		
31	27	M	PRESENT	PRESENT	NIL	NIL	NIL	NIL	15	122	100	6.5	4	2.2	1.5	2	9	1	0		
32	42	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	15	120	90	5.9	19	1.9	3	3	14	5	3		GRADE 1 VARICES
33	68	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	92	100	7.7	26	2	1.3	1	13	4	0		
34	47	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	13	100	90	6.2	58	2.2	1.8	3	16	5	1		GRADE 1 VARICES
35	54	F	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	15	104	100	5.6	66	2.4	1.4	1	15	4	1		GRADE 1 VARICES
36	39	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	102	100	6.5	13	2.5	2.2	2	11	4	3		
37	45	M	PRESENT	NIL	PRESENT	PRESENT	NIL	NIL	AMS	110	90	8.1	158	2.7	2.4	4	18	5	2		grade 1 varices
38	30	M	PRESENT	PRESENT	NIL	NIL	NIL	NIL	15	105	80	6.9	126	1.5	1.2	2	17	2	1		grade 1 varices
39	38	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	15	102	100	7.8	19	2.8	1.5	1	13	4	0		grade 2 varices
40	34	M	PRESENT	PRESENT	NIL	NIL	NIL	NIL	15	98	100	9	20	2.4	1.1	1	12	0	0		GRADE 2 VARICES
41	58	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	15	120	80	8	36	2.4	2	3	17	5		DEATH	
42	62	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	12	136	60	5	28	2	3	4	17	6		DEATH	
43	68	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	8	132	70	6	68	2.1	2	5	17	6		DEATH	
44	47	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	10	132	80	6	32	2.1	2	4	17	5		DEATH	
45	56	M	NIL	PRESENT	NIL	PRESENT	NIL	NIL	12	136	80	7	48	2.1	2.5	4	17	5		DEATH	
46	65	M	NIL	PRESENT	NIL	PRESENT	NIL	NIL	12	132	80	5	36	2.5	2	4	17	6		DEATH	
47	58	M	PRESENT	NIL	NIL	NIL	NIL	NIL	12	128	80	7	48	1.8	1.8	5	17	2		DEATH	
48	39	M	PRESENT	PRESENT	NIL	NIL	NIL	NIL	12	110	80	8	36	1.9	2.5	4	17	5		DEATH	
49	42	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	10	120	80	8	64	2	>4	4	17	5		DEATH	
50	40	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	10	110	80	5	38	2.2	>4	4	17	5		DEATH	
51	38	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	10	132	80	6	68	2.2	3	4	17	5		DEATH	
52	35	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	8	124	90	8	38	2.3	2.5	4	16	5		DEATH	
53	38	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	120	70	7	70	2	3.5	4	17	5		DEATH	
54	50	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	10	132	80	8	82	2.2	3	4	19	5		DEATH	
55	65	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	12	126	60	8	58	2.4	2.8	5	17	6		DEATH	
56	65	M	NIL	PRESENT	NIL	PRESENT	NIL	NIL	12	130	70	8	38	3	3	5	17	6		DEATH	
57	68	M	NIL	PRESENT	NIL	PRESENT	NIL	NIL	15	110	70	9	42	2.8	2.9	5	17	6		DEATH	
58	68	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	12	108	80	6	40	2.5	3.1	5	17	6		DEATH	
59	70	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	102	70	5	32	2.6	>4	5	17	6		DEATH	
60	67	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	12	110	70	6	25	2.5	>4	5	17	6		DEATH	
61	54	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	10	108	70	5	32	2.1	2.5	4	17	6		DEATH	
62	55	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	12	102	80	6	28	2.2	2.8	4	17	5		DEATH	
63	58	F	PRESENT	NIL	NIL	PRESENT	NIL	NIL	12	92	110	9	28	2.5	1.2	4	12	3	2		
64	27	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	78	100	4.9	94	1.6	2	4	16	3	2		
65	39	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	94	100	8.4	15	2.4	2.5	4	8	0	0		NORMAL
66	43	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	96	100	6.2	18	1.8	2.1	2	9	0	1		normal

67	46	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	124	90	7.7	61	2.2	1.7	3	14	2	1		
68	47	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	120	90	5.8	29	2.2	1.4	2	14	0	1		
69	43	M	PRSENT	NIL	NIL	PRESENT	NIL	NIL	15	110	100	5.8	36	2.9	1.1	1	15	4	2		
70	52	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	78	120	11	28	2.8	1.2	1	6	0	0		normal
71	49	M	PRESENT	PRESENT	PRESENT	PRESENT	NIL	NIL	15	92	110	10.1	22	3.4	1.6	1	10	3	0		normal
72	35	M	PRESENT	PRESENT	NIL	PRESENT	NIL	NIL	8	124	90	8	38	2.3	2.5	4	16	5		DEATH	
73	38	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	120	70	7	70	2	3.5	4	17	5		DEATH	
74	50	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	10	132	80	8	82	2.2	3	4	19	5		DEATH	
75	45	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	78	110	10.6	15	2.3	2.5	2	6	3	4		normal
76	38	M	PRESENT	NIL	PRESENT	PRESENT	NIL	NIL	15	84	100	8.4	7	2.3	2.1	2	12	3	2		
77	58	M	PRESENT	NIL	NIL	PRESENT	NIL	NIL	15	110	100	7.6	20	2.3	2.8	2	13	4	1		
78	45	M	PRESENT	NIL	NIL	NIL	NIL	NIL	15	96	100	11.8	32	2.9	2.3	2	9	3	1		normal

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