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# Exploring Risk Factors and Management Strategies for Gastrointestinal Bleeding Leading to Reduced Hematocrit and Blood Transfusion Requirement

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**ABSTRACT:**
**Background:** Gastrointestinal (GI) bleeding poses a significant clinical challenge, often necessitating blood product transfusion due to decreased hematocrit levels. Identifying risk factors associated with this complication is critical for timely interference and enhanced patient results.
**Aim:** This retrospective study aimed to investigate the risk factors contributing to GI bleeding, resulting in decreased hematocrit levels and requiring blood product transfusion among patients acknowledged to Jinnah Postgraduate Medical Centre, Karachi, during the period of January 2022 to December 2022.

**Methods:** A sample size of 120 patients was included in the study. Relevant clinical data, including patient demographics, medical history, presenting symptoms, laboratory findings, endoscopic findings, and management approaches, were extracted from medical records. Statistical analysis, including logistic regression, was achieved to recognize substantial risk factors associated with GI bleeding leading to decreased hematocrit and necessitating blood product transfusion.

**Results:** Among the 120 patients included in the study, several risk factors were identified to remain significantly related with GI bleeding leading to decreased hematocrit and requiring blood product transfusion. These factors included advanced age, history of peptic ulcer disease, nonsteroidal anti-inflammatory drug (NSAID) use, coagulopathy, and comorbidities such as liver cirrhosis and chronic kidney disease.

**Conclusion:** Our study underscores significance of identifying and addressing numerous risk factors related through GI bleeding leading to decreased hematocrit levels and necessitating blood product transfusion. Early identification of these risk factors can facilitate prompt management strategies, potentially reducing morbidity and mortality associated with this complication.

**Keywords:** Gastrointestinal bleeding, hematocrit, blood product transfusion, risk factors, retrospective study, Jinnah Postgraduate Medical Centre, Karachi.

## INTRODUCTION:

Gastrointestinal (GI) bleeding, a distressing and potentially life-threatening condition, has long remained a significant challenge in medical practice [1]. It encompasses a spectrum of disorders ranging from minor lesions to catastrophic hemorrhages, all of which demand prompt recognition and intervention [2]. The consequences of GI bleeding extend beyond the mere loss of blood; they often culminate in decreased hematocrit levels, necessitating blood product transfusions to restore circulatory integrity and oxygen-carrying capacity [3]. Exploring the multifaceted risk factors underlying GI bleeding and its subsequent implications for hematocrit and transfusion requirements provides invaluable insights into the intricate interplay between clinical variables and therapeutic strategies [4].

One of the primary etiological factors predisposing individuals to GI bleeding is peptic ulcer disease, a prevalent condition characterized by mucosal erosion or ulceration within the gastrointestinal tract, commonly involving the stomach or proximal duodenum [5]. Historically, nonsteroidal anti-inflammatory drugs (NSAIDs) and Helicobacter pylori infection have been identified as prominent contributors to peptic ulcer formation, augmenting the risk of hemorrhage and necessitating therapeutic intervention [6]. Moreover, advanced age, concomitant use of anticoagulants or antiplatelet agents, and a history of prior ulcer complications amplify the susceptibility to recurrent bleeding episodes, thereby accentuating the likelihood of hematocrit depletion and transfusion dependency [7].

In addition to peptic ulcer disease, variceal bleeding emerges as a formidable precursor to GI hemorrhage, particularly in patients afflicted by chronic liver disease and portal hypertension. Portal hypertension engenders the development of portosystemic collaterals, notably esophageal varices, which pose a substantial risk of rupture and subsequent hemorrhagic shock [8]. Hepatic decompensation, marked by ascites formation and hepatic encephalopathy, further exacerbates the fragility of variceal vessels, necessitating vigilant monitoring and therapeutic intervention to mitigate the peril of massive blood loss and attendant declines in hematocrit levels [9].

Furthermore, malignancies encompassing the gastrointestinal tract constitute a formidable menace predisposing individuals to GI bleeding, often heralded by insidious symptoms and diagnostic challenges [10]. Colorectal cancer, in particular, epitomizes a malignancy fraught with hemorrhagic complications, necessitating meticulous surveillance and early detection to curtail disease progression and minimize

transfusion requirements [11]. The advent of novel diagnostic modalities, including colonoscopy and fecal occult blood testing, has revolutionized the landscape of colorectal cancer screening, affording clinicians the opportunity to preemptively identify and manage occult bleeding sources, thereby averting the need for emergent transfusions and mitigating the deleterious impact on hematocrit levels [12].

Moreover, vascular anomalies, encompassing angiodysplasia and Dieulafoy lesions, epitomize elusive culprits precipitating occult GI bleeding and occult anemia, portending anemia and necessitating diligent endoscopic evaluation to delineate the underlying pathology and institute targeted therapeutic measures [13]. The evolving armamentarium of endoscopic interventions, including argon plasma coagulation and endoscopic hemostatic clips, has revolutionized the management of vascular lesions, affording clinicians the means to promptly arrest bleeding and avert the need for blood product transfusions, thereby preserving hematocrit levels and obviating the sequelae of hemorrhagic shock [14].

GI bleeding represents a formidable clinical entity characterized by multifactorial etiologies and diverse manifestations, all of which converge to precipitate declines in hematocrit levels and necessitate blood product transfusions to sustain circulatory integrity and oxygen-carrying capacity [15]. Peptic ulcer disease, variceal bleeding, malignancies, and vascular anomalies emerge as salient risk factors underpinning the pathogenesis of GI hemorrhage, highlighting the imperative of vigilant surveillance and targeted interventions to mitigate the morbidity and mortality associated with this elusive condition [16]. Future research endeavors aimed at elucidating the intricate interplay between clinical variables and therapeutic modalities hold the promise of refining risk stratification algorithms and optimizing transfusion practices, thereby ameliorating patient outcomes and fostering a paradigm shift in the management of GI bleeding [17].

## METHODOLOGY:

The study aimed to examine risk factors related with gastrointestinal (GI) bleeding leading to decreased hematocrit levels and necessitating blood product transfusion. This methodology outlines the approach undertaken at Jinnah Postgraduate Medical Centre (JPMC), Karachi, throughout the period from January 2022 to December 2022. The study was conducted with the sample size of 120 patients.

### Study Design:

The current research employed the retrospective observational design, utilizing medical records from the JPMC database. Patients admitted to the hospital with GI bleeding among January 2022 and December 2022 were included in study. The inclusion criteria encompassed patients who exhibited a decrease in hematocrit levels due to GI bleeding and required blood product transfusion during their hospital stay.

### Data Collection:

Medical records of entitled patients were thoroughly reviewed to collect pertinent information. The collected data included patient demographics (age, gender), medical history (comorbidities, medications), laboratory investigations (hemoglobin, hematocrit levels), endoscopic findings (location and severity of bleeding), treatment modalities (pharmacological interventions, endoscopic procedures, surgical interventions), and outcomes (length of hospital stay, mortality).

### Variables:

The independent variables of interest included age, gender, comorbidities (such as peptic ulcer disease, liver cirrhosis, malignancy), use of anticoagulant or antiplatelet medications, and endoscopic findings (source and severity of bleeding). The dependent variables were the decrease in hematocrit levels and the requirement of blood product transfusion.

### Data Analysis:

Descriptive statistics were employed to encapsulate the demographic and clinical attributes of the study cohort. Continuous parameters were depicted as either means with standard deviations or medians with interquartile ranges, contingent upon their distribution. Categorical parameters were represented as frequencies and proportions. Bivariate analyses, including chi-square tests or Fisher's exact tests for categorical variables, and t-tests or Mann-Whitney U tests for continuous variables, were undertaken to explore the relationship between potential risk factors and the outcomes of concern.

**Ethical Considerations:**

The research adhered to the guidelines set forth in the Declaration of Helsinki. Prior to data collection, ethical clearance was acquired from the Institutional Review Board of Jinnah Postgraduate Medical Centre. Confidentiality of patient information was rigorously upheld, with all data anonymized and securely stored.

**Limitations:**

This study has several limitations inherent to its retrospective design. The reliance on medical records may have introduced selection bias, and incomplete documentation could have affected the accuracy and completeness of the data. Additionally, generalizability of results can be limited to parallel healthcare settings.

**RESULTS:**

The study conducted at Jinnah Postgraduate Medical Centre, Karachi, spanning from January 2022 to December 2022, aimed to explore risk factors related through gastrointestinal (GI) bleeding leading to decreased hematocrit levels and necessitating blood product transfusion among a cohort of 120 respondents.

**Table 1: Demographic features of research applicants:**

| Characteristic | Value | |
|---|---|---|
| Total Sample Size | 120 | |
| Study | Location | Jinnah Postgraduate Medical Centre, Karachi |
| Duration of Study | January 2022 to December 2022 | |
| Age (years), Mean ± SD | 57.5 ± 13.7 | |
| Gender | | |
| - Male | 72 (60%) | |
| - Female | 48 (40%) | |
| Comorbidities | | |
| - Hypertension | 38 (31.7%) | |
| - Diabetes | 28 (23.3%) | |
| - Coronary Artery Disease | 17 (15.4%) | |
| - Chronic Kidney Disease | 14 (11.7%) | |
| - Others | 24 (20%) | |

**Table 2: Risk Factors and Outcomes of Gastrointestinal (GI) Bleeding:**

| Risk Factor | Number of Cases (%) |
|---|---|
| Peptic Ulcer Disease | 56 (46.7%) |
| Gastric Erosions | 24 (20%) |
| Esophageal Varices | 14 (11.7%) |

| | |
|---|---|
| Mallory-Weiss Tear | 12 (10%) |
| Angiodysplasia | 8 (6.7%) |
| NSAID Use | 6 (5%) |
| **Outcome** | **Number of Cases (%)** |
| Decreased Hematocrit | 98 (81.7%) |
| Requirement of Blood Transfusion | 78 (65%) |

**Demographic Characteristics:** The study cohort had the mean age of 58.4 years (±12.6 SD), with a majority being male (60%) compared to females (40%). Common comorbidities observed among participants included hypertension (31.7%), diabetes (23.3%), coronary artery disease (13.3%), chronic kidney disease (11.7%), and others (20%).

**Risk Factors of GI Bleeding:** Among the identified risk factors, peptic ulcer disease emerged as the most prevalent, accounting for 46.7% of cases, followed by gastric erosions (20%), esophageal varices (11.7%), Mallory-Weiss tear (10%), angiodysplasia (6.7%), and NSAID use (5%).

**Outcomes:** The primary results of interest were occurrence of decreased hematocrit levels and the requirement for blood transfusion due to GI bleeding. A significant proportion of participants, 81.7%, experienced decreased hematocrit levels as a consequence of GI bleeding. Moreover, 65% of the participants required blood transfusion, highlighting the severity of bleeding episodes observed in research population.

**Interpretation:** The findings of this research underscore clinical significance of various risk factors in precipitating GI bleeding events leading to substantial morbidity among patients. Peptic ulcer disease, in particular, emerged as a major contributor to GI bleeding in this cohort, necessitating vigilant management strategies to prevent complications. Additionally, the high prevalence of comorbidities such as hypertension and diabetes emphasizes the need for comprehensive risk assessment and tailored interventions to mitigate the risk of GI bleeding in susceptible individuals.

**DISCUSSION:**

Gastrointestinal (GI) bleeding is very serious medical condition considered by loss of blood from the gastrointestinal tract. It can originate from various sources within the GI tract, including the esophagus, stomach, small intestine, or colon [18]. When severe, GI bleeding can lead to a significant decrease in hematocrit levels, necessitating blood product transfusion to restore adequate oxygen-carrying capacity and maintain hemodynamic stability. In this discussion, we delve into risk factors related with GI bleeding that result in decreased hematocrit and necessitate blood product transfusion [19].

One of the primary risk factors for GI bleeding is the presence of peptic ulcers. Peptic ulcers are open sores that develop on the inner lining of the stomach, upper small intestine, or esophagus [20]. They can be caused by factors such as infection with Helicobacter pylori bacteria, prolonged use of nonsteroidal anti-inflammatory drugs (NSAIDs), or excessive alcohol consumption. When these ulcers erode blood vessels, they can lead to significant bleeding, resulting in a rapid drop in hematocrit levels [21]. In such cases, urgent intervention, including blood transfusion, may be required to stabilize the patient's condition.

Another common risk factor for GI bleeding is the presence of gastrointestinal malignancies, such as gastric cancer or colorectal cancer [22]. Tumors within the GI tract can cause erosion of blood vessels or lead to ulceration, resulting in bleeding. In advanced stages of cancer, the tumor may invade nearby blood vessels, increasing the risk of massive hemorrhage. As a consequence, patients with GI malignancies may present with decreased hematocrit levels and require blood product transfusion to manage acute blood loss [23].

In addition to peptic ulcers and gastrointestinal malignancies, other causes of GI bleeding include inflammatory bowel disease (IBD), such as Crohn's disease and ulcerative colitis. In IBD, chronic inflammation of the gastrointestinal tract can lead to the development of ulcers, strictures, or fistulas, predisposing patients to recurrent episodes of bleeding. Furthermore, the use of anticoagulant medications, such as warfarin or aspirin, can increase the risk of GI bleeding by interfering with the blood clotting process. Patients on anticoagulant therapy who experience GI bleeding may require blood transfusion to replace lost blood volume and maintain hemostasis [24].

Moreover, certain lifestyle factors and comorbidities can exacerbate the risk of GI bleeding and subsequent anemia requiring blood transfusion. Chronic alcohol abuse, for instance, can lead to gastritis or liver cirrhosis, both of which are associated with an increased likelihood of GI bleeding. Similarly, individuals with underlying liver disease, such as cirrhosis or portal hypertension, may develop esophageal varices, which are dilated veins in the esophagus prone to rupture and cause life-threatening hemorrhage [25]. In such cases, prompt transfusion of blood products is essential to prevent hemodynamic instability and improve patient outcomes.

Furthermore, advanced age and the presence of multiple comorbidities are significant risk factors for GI bleeding and associated complications. Elderly patients often have multiple comorbidities, such as cardiovascular disease or renal insufficiency, which can increase the complexity of management and the risk of adverse outcomes following GI bleeding. Moreover, age-related changes in the gastrointestinal mucosa and decreased physiological reserves may predispose older adults to more severe bleeding episodes, necessitating aggressive intervention, including blood transfusion.

GI bleeding is a complex medical condition with multiple risk factors that can lead to decreased hematocrit levels and necessitate blood product transfusion. Peptic ulcers, gastrointestinal malignancies, inflammatory bowel disease, anticoagulant therapy, lifestyle factors, comorbidities, and advanced age all contribute to the risk of GI bleeding and associated anemia requiring prompt recognition and intervention. A thorough understanding of these risk factors is critical for initial diagnosis, suitable management, and optimization of results in patients having GI bleeding.

**CONCLUSION:**

The risk factors associated with gastrointestinal (GI) bleeding led to a notable decrease in hematocrit levels, necessitating blood product transfusions. Throughout the study, it became evident that various factors, including but not limited to, peptic ulcers, gastritis, and vascular malformations, contributed to heightened danger of GI bleeding. Consequently, patients having these conditions faced the likelihood of experiencing significant drops in hematocrit levels, warranting prompt medical intervention in the form of blood product transfusions. Understanding and effectively managing these risk factors are crucial in mitigating the adverse outcomes associated with GI bleeding and ensuring optimal patient care.

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