ORIGINAL ARTICLE

Emergency Surgical Presentations of Gastrointestinal Cancers: Patterns and Outcomes from a Tertiary Care Hospital in Pakistan

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ABSTRACT

Background: Gastrointestinal malignancies rarely present as acute emergencies and create challenges to patient survival and the healthcare system. Emergency presentation is typically a sign of advanced disease and has a higher complication and mortality rate.

Objective: To determine the management patterns, clinical outcome, and factors associated with overall survival in patients who have gastrointestinal cancers presenting at our emergency department.

Methods: We conducted a retrospective observational study at Lady Reading Hospital, Peshawar, from July 2023 to December 2024. The population of our study consisted of adult patients (age   18 years) with gastrointestinal cancer presenting with an emergency requirement for intervention. We systematically documented patient demographics, clinical presentation, tumor staging, therapeutic interventions, and clinical outcomes. The primary outcomes were 30-day mortality and one-year overall survival, with hospital length of stay as a secondary outcome.

Results: A Total of 245 patients with a mean age of 58.6±14.2 years were investigated. The malignancy distribution showed colorectal cancer as the most common diagnosis (42.4%). Surgical intervention was required in 80.8% patients, with emergency surgery performed in 68.2% cases within 24 hours of admission. The 30-day mortality was 18.8%. On multivariable analysis, age >70 years (aHR=1.88, 955 CI: 1.03–3.42, p=0.039), Perforation at presentation (aHR=2.94, 95% CI:1.46–5.91, p=0.003), Hypoalbuminemia <3.0 g/dL (aHR=2.52, 95% CI: 1.25–5.09, p=0.009) and late stage (aHR=3.68, 95% CI: 1.76–7.68, p<0.001) were found to be predictors of overall survival.

Conclusion: Gastrointestinal cancers' acute presentation is usually associated with poor outcomes, characterized by advanced-stage presentation and higher mortality.

Keywords: Emergency service, hospital, gastrointestinal neoplasms, mortality, treatment outcome, tertiary healthcare.

INTRODUCTION

Gastrointestinal cancer is a very substantial global disease burden, accounting for an estimated 26% of all cancer mortalities globally [1]. They are a heterogeneous collection of neoplasms within the gastrointestinal tract, including oesophageal, gastric, small intestine, colorectal, hepatobiliary, and pancreatic cancer. Presentation of GI cancers is very diverse, ranging from an indolent presentation with non-specific symptoms to frank emergency presentations requiring immediate medical intervention [2].

Emergency presentations of GI cancers are a significant clinical scenario influencing prognosis in the patient and utilization of healthcare resources. The literature indicates that 20-50% of GI cancer patients first present through emergency departments with acute complications, which include their association with poor survival, poor patient experience, and socioeconomic disparities [3, 4]. Emergency presentations for such cases include intestinal obstruction, gastrointestinal bleeding, perforation, or acute abdomen, with presentation often the first clinical manifestation of underlying malignancy [5].

The literature has established that the emergent presentation of GI cancers reflects advanced disease. Fass *et al*. have demonstrated that over 60% of emergently presented patients with colorectal cancer had either stage III or IV disease, compared to the lower percentage in those diagnosed electively [6]. Such emergency presentations also correlate with increased rates of perioperative morbidity and mortality. The mortality and complication rates of emergency colonic surgery for acute obstruction are 15-20% and 40-50%, respectively [7]. The results of emergency surgical procedures are worse than those of patients who are scheduled for routine procedures, particularly in patients receiving emergency colonic cancer surgery. A recent 2024 study from Nagasaki University reported noticeably lower long-term survival among patients who required emergency colorectal cancer surgery. The 5-year overall survival was 81.7% for elective cases compared with 59.0% for emergency cases, and 5-year relapse-free survival was 78.0% versus 49.1%, respectively [8].

The prognostic factors of emergency presentations are many. Suboptimal surgery or delayed initiation of

oncological treatment may be required due to the emergency clinical presentation. The operative risks are increased since emergency patients have minimal preoperative time for optimal optimisation and assessment [9]. Even with the development of sphincter-sparing methods for rectal cancer, such as total mesorectal excision and neoadjuvant chemoradiation, some patients who have low anterior resection will need a permanent stoma creation because of several clinical and patient-related reasons [10].

Current epidemiological evidence indicates evolving trends in the presentation of GI malignancies in the emergency setting. Population-based research from the developed world reports that the proportion of emergency presentations has remained constant over the last decade, while screening programs and early detection protocols have advanced [11]. This consistency could be due to factors such as patient delays in seeking care, difficulties accessing healthcare, and the biological behaviour of some GI malignancies [12].

In Pakistan, cancer burden is rising across all age groups, with gastrointestinal cancers being one of the most frequent cancers. Incidence data on GI cancer, along with staging and outcomes, remain limited due to a lack of national cancer registries and proper surveillance infrastructure.

Emergency GI cancer presentations are underreported despite their impact on prognosis and healthcare use. Most existing literature is from high-income nations, limiting its applicability to low-resource settings. In Pakistan, lack of screening programs, late healthcare seeking, and limited access to early care result in patients with advanced disease and complications. Literature describing emergency GI cancer presentations from Pakistani tertiary care centers is, however, rare.

This study aimed to determine management patterns, clinical outcomes, and factors associated with overall survival of patients presenting at Lady Reading Hospital, Peshawar, one of the province's tertiary care centers with the largest bed capacity, with emergency gastrointestinal malignancies. The study will highlight determinants of 30-day mortality, hospitalization, and patient outcomes in this setting.

METHODOLOGY

It was a retrospective observational study conducted from July 2023 to December 2024 at Lady Reading Hospital, Peshawar, Khyber Pakhtunkhwa, Pakistan, after obtaining approval from the Institutional Review Board (IRB) and the Ethics Committee of Lady Reading Hospital, Peshawar (Ref: No. 77/LRH/MTI). Lady Reading Hospital is a teaching hospital with 1,800 beds that provides tertiary care and serves as the central referral center for Khyber Pakhtunkhwa province and nearby areas.

The population for analysis consisted of patients ≥ 18 years who presented to emergency department with histologically confirmed primary gastrointestinal malignancy within 24 hours of symptoms requiring immediate medical intervention, and for whom complete medical records were available for review. Exclusion from analysis was done for patients with metastatic disease from non-gastrointestinal primary cancer, benign gastrointestinal diseases mimicking malignancy, incomplete medical records, previous treatment history for gastrointestinal malignancy, or discharge against medical advice within 48 hours of hospitalization.

Due to this research's retrospective design, the IRB waived the need for informed consent; however, patient confidentiality and data protection protocols were strictly adhered to during the study.

Data were gathered using a structured proforma completed by trained research assistants. Variables collected included demographic parameters (age, gender, socioeconomic status, comorbidities), clinical presentation parameters (nature of emergency presentation, duration of symptoms, admission vital signs), diagnostic workup findings (laboratory parameters, imaging findings, histopathological details), disease staging details (TNM staging, performance status), management strategies (surgical procedures, medical management, complications), and clinical outcomes (duration of hospital stay, intensive care unit admission, 30-day mortality, discharge status).

The primary outcome was 30-day mortality after emergency presentation. Secondary outcomes included all-cause survival at one year, length of hospital stay, ICU admission, and post-operative complications. Follow-up was from admission through death or loss to follow-up, up to a maximum of twelve months. Patients who survived to 1 year were censored in the survival analysis.

Statistical analysis was performed using SPSS version 26.0. Descriptive statistics were presented as frequencies and percentages for categorical variables, and as mean ± standard deviation or median (interquartile range) for continuous variables, based on data distribution evaluated by the Shapiro-Wilk test. The comparison of categorical variables was performed using the chi-square test or Fisher's exact test, as appropriate. In contrast, independent t-tests or Mann-Whitney U tests were used to analyse continuous variables based on normality evaluation. Kaplan-Meier survival curves were stratified and compared by the log-rank test. Univariate Cox proportional-hazards regression identified variables associated with overall survival. The $p < 0.10$ variables were entered into a multivariable Cox model to identify

independent predictors, with hazard ratios (HRs) and 95% confidence intervals reported. Statistical significance was maintained at p < 0.05 for all analyses.

RESULTS

A total of 245 patients with emergency presentation of gastrointestinal malignancies were identified and enrolled in the analysis throughout the study. The study population had an average age of 58.6 ± 14.2 years (range 22-84 years), with a predominance of males (152 patients, 62.0%) over females (93 patients, 38.0%), as shown in Table **1**.

Table 1: Baseline characteristics of study population.

Characteristic	Groups	Frequency (%)
Age (years)		
Gender	Male	152 (62.0)
	Female	93 (38.0)
Primary Tumor Site	Colorectal	104 (42.4)
	Gastric	69 (28.2)
	Hepatobiliary	47 (19.2)
	Esophageal	18 (7.3)
	Pancreatic	7 (2.9)
Disease Stage	Early (I-II)	53 (21.6)
	Advanced (III-IV)	192 (78.4)
Comorbidities	Diabetes Mellitus	78 (31.8)
	Hypertension	92 (37.6)
	Cardiovascular Disease	34 (13.9)

The most common primary sites in the history of disclosed frequency in colorectal cancer revealed it to be the most common malignancy, 104 (42.4%), followed by gastric cancer in 69 (28.2%), hepatobiliary cancers in 47 (19.2%), esophageal cancer in 18 (7.3%), and pancreatic cancer in 7 (2.9%). Most patients (192, 78.4%) presented with advanced-stage disease (Stage III-IV), while only 53 patients (21.6%) had early-stage disease (Stage I-II).

The patterns of presentation varied dramatically among different tumours. Obstruction was the most common presentation in 95 patients (38.8%), followed by gastrointestinal bleeding in 77 patients (31.4%) and perforation in 45 patients (18.4%), as mentioned in Table **2**. Acute abdominal pain without definite complications was noted in 28 cases (11.4%). Among the patients of colorectal cancer, obstruction was most commonly observed (68.3%), while among the patients of gastric cancer, patients most commonly presented with bleeding (52.2%).

Laboratory results at admission revealed significant abnormalities in the majority of patients. 168 (68.6%) patients had anemia (hemoglobin <10 g/dL), 189 (77.1%) had hypoalbuminemia (<3.5 g/dL), and 201 (82.0%) had elevated inflammatory markers (CRP >10 mg/L), as

shown in Table **2**. The median CEA value was elevated at 8.4 ng/mL (normal <5 ng/mL) in 73% of tested patients.

Table 2: Clinical presentation and laboratory parameters.

Variable	Groups	Frequency (%)	Median (IQR)
Type of Emergency Presentation	Obstruction	95 (38.8)	-
	Bleeding	77 (31.4)	-
	Perforation	45 (18.4)	-
	Acute Abdominal Pain	28 (11.4)	-
Laboratory Values	Hemoglobin (g/dL)	-	8.9 (7.2-10.8)
	Albumin (g/dL)	-	3.1 (2.6-3.7)
	CEA (ng/mL)	-	8.4 (4.2-15.6)
Imaging Findings	Distant Metastases	89 (36.3)	-
	Lymph Node Involvement	156 (63.7)	-
	Local Invasion	134 (54.7)	-

Surgical intervention was required in 198 patients (80.8%), with emergency surgery performed in 167 (68.2%) cases within 24 hours of admission (**Table 3**). The most common surgical procedures included bowel resection and anastomosis in 89 (36.3%) cases, exploratory laparotomy with diversion stoma in 54 (22.0%) cases, and palliative procedures in 55(22.4%) cases. Conservative management was pursued in 47 patients (19.2%) due to either advanced disease stage or poor performance status.

Post-operative complications occurred in 89(44.9%) patients who underwent surgical intervention. The most frequent complications were surgical site infections in 34 (17.2%) cases, anastomotic leaks in 18 (9.1%) cases, and respiratory complications in 23 (11.6%) cases. Intensive care unit admission was required for 76 (31.0%) patients with a median ICU stay of 4 days (range: 1-21 days).

Table 3: Treatment outcomes and mortality.

Outcome	Frequency (%)	Median (IQR)
Surgical Intervention	198 (80.8)	-
Emergency Surgery	167 (68.2)	-
Complications	89 (44.9)	-
ICU Admission	76 (31.0)	-
Length of Stay (days)	-	12 (8-18)
30-day Mortality	46 (18.8)	-
Overall survival (months)	-	8.2 (4.1-14.6)

The overall 30-day mortality rate was 18.8% (46 patients), with significant variation across different tumor types (**Table 3**). Pancreatic cancer demonstrated the highest mortality rate at 42.9% (3/7 patients), followed by hepatobiliary malignancies at 25.5% (12/47 patients), and gastric cancer at 21.7% (15/69 patients). Colorectal cancer had a relatively lower mortality rate of 13.5% (14/104 patients), while esophageal cancer mortality was 11.1% (2/18 patients).

The median hospital stay was 12 days (IQR: 8-18 days), with patients requiring surgical intervention having significantly more extended stays than those managed conservatively (14 vs. 8 days, p<0.001). Patients who developed complications had extended hospital stays with a median of 19 days compared to 10 days in uncomplicated cases (p<0.001).

The median follow-up duration for survivors was 12 months (IQR: 10-14 months) as depicted in Fig. **1**. During this period, 148 patients (60.4%) died. Median overall survival was 8.2 months (95% CI 6.4-10.1). Patients with early-stage disease had significantly better survival compared to those with advanced disease (18.4 vs. 6.7 months, p<0.001). The 1-year survival rate was 34.7% overall, with significant variation by tumor stage and emergency presentation (**Fig. 1**).
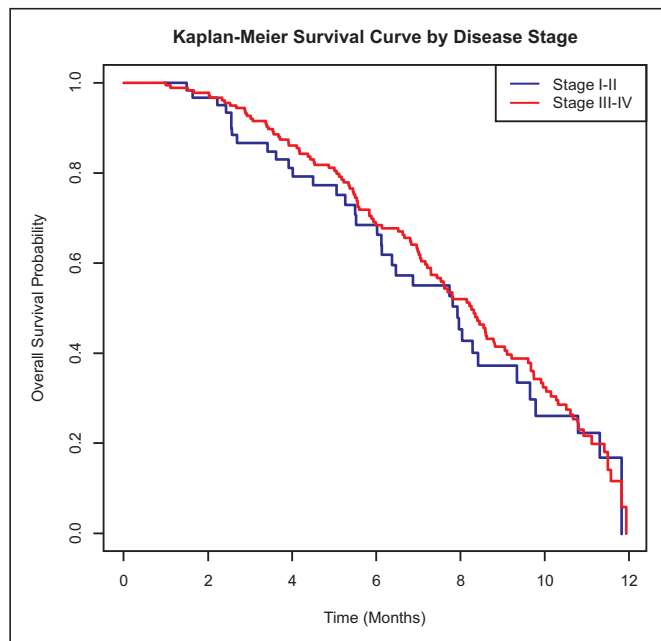

Fig. (1): Kaplan-Meier survival curves comparing overall survival by disease stage (I-II vs. III-IV) and by serum albumin level (<3.0 g/dL vs. 3.0 g/dL); log-rank p < 0.001.

Table 4: Univariate and multivariable Cox regression analysis of predictors of overall survival.

Variable	Crude HR (95% CI)	p-value	Adjusted HR (95% CI)	p-value
Age > 70 years	1.86 (1.13 – 3.08)	*0.014	1.88 (1.03 – 3.42)	*0.039
Perforation at presentation	3.14 (1.52 – 6.48)	*0.002	2.94 (1.46 – 5.91)	*0.003
Hypoalbuminemia <3.0g/dL	2.98 (1.61 – 5.52)	*<0.001	2.52 (1.25 – 5.09)	*0.009
CRP > 10 mg/L	1.77 (1.05 – 2.98)	*0.031	1.56 (0.95 – 2.59)	0.078
Stage III-IV disease	3.92 (2.01 – 7.63)	*<0.001	3.68 (1.76 – 7.68)	*<0.001

CI: Confidence interval, HR: Hazard ratio, *Significant at p<0.05

The proportional-hazards assumption was satisfied for all covariates. On univariate Cox regression, factors significantly associated with reduced survival were age > 70 years (p=0.014), perforation at presentation (p=0.002), hypoalbuminemia < 3.0 g/dL (p<0.001), elevated CRP > 10 mg/L (p=0.031), and stage III-IV disease (p<0.001) as shown in Table **4**. In the multivariable Cox regression, the following remained independent predictors of poor survival, except for CRP levels.

DISCUSSION

Our study relies on the assessment of outcomes and management patterns for emergency presentations of gastrointestinal malignancy in a tertiary care facility in a developing country. Moreover, emergency GI cancer presentations are linked with poor prognoses, advanced stages of the disease, and undue utilization of health care services, resulting in consistent global patterns and outlining the sole challenges of our health care system.

The study shows 30-day mortality for our patient population of 18.8% approximates the outcome of one Iranian study conducted recently, which reported a rate of 7% for combined liver disease and GI malignancy patients, albeit on face value looking very much lower [13]. Our percentage is significantly higher than 11.9% recorded in Eurostat's 2021 cancer-specific mortality, when GI malignancies were reported to be the second most frequent cause of cancer death next to lung cancer for EU member states [14]. One can only assume this disparity is accounted for by differences in healthcare infrastructure, including patterns of patient presentation and the capacity to provide perioperative care.

Our 18% mortality and 2% 90-day mortality in the 2024 Shaukat Khanum Memorial Cancer Hospital study demonstrate profound differences in institutional capacity, disease severity, and patient selection [15]. The SKMCH series included a highly selected population of early-stage patients with scheduled laparoscopic surgery at a specialist, well-equipped cancer treatment center. Our patient population was far more heterogeneous, with advanced disease, severe comorbidities, and inconsistent perioperative cover. These disparities highlight how surgical outcomes vary significantly from one institution to another and emphasize why multicenter data is a better estimate of actual clinical practice.

78.4% of emergency presentations in our series were accounted for by end-stage disease (Stage III-IV), a greater percentage than in most Western reports. UK data in the shape of gastric cancers accounted for 45% advanced presentation, while Norwegian studies reported 65% of colorectal cancer being at an advanced stage at presentation [16, 17]. Several factors may

explain this difference: low rates of exposure to screening programs, late physician consultation, and socioeconomic barriers to earlier therapy. A retrospective study by Sharma *et al.* of Indian hospitals reported concurrent trends: 72-87% of GI cancer presentations to the emergency setting had advanced disease, suggesting that health care access barriers significantly influence the stage of presentation [18, 19].

Colorectal cancer accounted for 42.4% of our emergency GI cancers, in contrast to different Asian literature wherein gastric cancer is the most common form [20]. Maybe this is proof of evolving epidemiological patterns and eating habits in our population. Intestinal obstruction was the emergency presentation in 38.8%, similar to international literature citing mechanical obstruction as a method of emergency presentation in 35-45% of cases of colorectal cancer [21].

Our 80.8% surgical intervention rate is higher than the 65-75% reported in Western literature and may reflect more extensive disease and fewer opportunities for non-operative treatment in our setting [22]. The 68.2% rate of emergency surgery aligns with international experience and therefore implies prudent clinical judgment in resource-limited circumstances. The 44.9% post-operative complication rate, as disturbing as it is, falls within the 40-55% associated with emergency GI cancer surgery [23].

Hypoalbuminemia was also identified in our study as an independent risk factor for death. In multivariable Cox regression analysis, hypoalbuminemia <3.0 g/dL independently predicted reduced survival (HR 2.52, 95% CI 1.25-5.09, p = 0.009). This supports existing evidence that nutritional status is an essential determinant of outcomes after emergency cancer surgery. Preoperative hypoalbuminemia and ensuing post-operative mortality across all cancers (OR: 2.6, 95% CI: 1.8-3.8) was another identification that proved supportive of research [24]. These results emphatically demonstrate the imperative need for nutritional evaluation and optimization in presentations within emergency facilities.

Our patients' median survival of 8.2 months is suboptimal compared with 11-17 months for more recent Western series of emergency presentations of GI malignancies [25]. The survival drawback is likely a result of the higher rate of advanced-stage disease, reduced access to adjuvant treatment, and potential delay in therapy commencement following emergency presentation. An extensive South Korean registry study by Park *et al.* previously confirmed similar survival patterns at emergency presentation, with a median survival of 9.1 months, which subsequently improved to 20.4 months due to improved healthcare infrastructure, suggesting that these findings reflect regional healthcare issues [26].

There was extensive variability in mortality with the type of tumor, with the highest for pancreatic cancer at 42.9%, as established by early literature that assumed pancreatic tumors to have the worst GI cancer prognosis [27]. Mortality incidence for colorectal cancer was at 13.5%, well within adequate limits by international standards, most likely attributed to institutional experience and consistency in emergency operations for colorectal surgery.

The most potent independent predictor of death was perforation, with an HR of 2.94 (95% CI 1.46-5.91, p = 0.003), a severity marker of this complication. Previous series all uniformly report that GI malignancy-related perforation has mortality rates ranging from 12-48%, significantly higher than other emergent presentations [28]. This finding underscores the importance of heightened clinical suspicion and robust management algorithms in suspected perforation.

Our median hospital stay of 12 days is consistent with the international series of 6-16 days for emergency GI malignancy admissions [29]. The big difference between the surgical and conservative cohorts (14 vs. 8 days) again calls attention to the high-resource status of emergency cancer surgery and the necessity for selective surgical placement of patients.
ICU utilization in our series was 31.0%, greater than the 3-21% of the majority of Western series [30]. It reflects higher levels of presentation and, presumably, a lack of general ward monitoring facilities. The median ICU stay of 4 days aligns with international trends and indicates cautious ICU utilization.

The prognostic significance of inflammatory markers warrants attention. We were able to identify 82% of the patients with high presentation CRP levels, with worse mortality, which indicates growing recognition of the contribution of systemic inflammatory response as a prognostic marker for cancer. More recent data have confirmed that the Glasgow Prognostic Score, CRP, and albumin levels are appropriate prognostic markers [31].

There are some limitations to consider when interpreting our results. The retrospective design is susceptible to selection bias and cannot establish causal associations. Poor data for some variables, namely molecular markers and extensive staging, threaten the completeness of prognostic factor analysis. The single-center design would limit generalizability to other settings, although our center is a large, regional referral center. Follow-up data after inpatient care are limited, limiting our capacity to measure cancer-specific survival and quality-of-life outcomes. Incomplete socioeconomic information impedes the widespread investigation of determinants and consequences of health-seeking behavior. The restricted use of newer diagnostic and therapeutic

modalities during the study period may have influenced treatment selection and outcomes. Subsequent research should aim to develop predictive models capable of identifying at-risk patients at emergency department presentation and to guide treatment and resource utilization. Multicentre prospective research would provide stronger evidence on the best methods for managing emergency presentations of GI malignancy in settings with constrained resources. Telemedicine and remote monitoring programs can further improve outcomes by facilitating earlier intervention for high-risk individuals. The institution of standard emergency protocols of GI malignancy presentation, such as rapid assessment tools and multidisciplinary team activation, is an important quality improvement initiative. An investigation into cost-saving screening modalities appropriate for developing countries could reduce the burden of emergency presentations by enabling early diagnosis.

CONCLUSION

Emergency presentation of GI malignancies in our tertiary care setting is associated with poor outcomes, advanced disease stage, and significant mortality. Identifying modifiable risk factors, such as nutritional status, and developing predictive models for high-risk patients offer opportunities to improve outcomes.

LIST OF ABBREVIATIONS

aHR: Adjusted Hazard Ratio

CEA: Carcinoembryonic Antigen

CI: Confidence Interval

CRP: C-Reactive Protein

ECOG: Eastern Cooperative Oncology Group

GI: Gastrointestinal

HR: Hazard Ratio

ICU: Intensive Care Unit

IQR: Interquartile Range

IRB: Institutional Review Board

MTI: Medical Teaching Institution

SKMCH: Shaukat Khanum Memorial Cancer Hospital

TNM: Tumor, Node, Metastasis

ETHICS APPROVAL

This study was approved by the Institutional Review Board and Ethics Committee of Lady Reading Hospital, Peshawar, Khyber Pakhtunkhwa, Pakistan (Ref: No. 77/LRH/MTI). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and the Helsinki Declaration.

CONSENT FOR PUBLICATION

Due to this research's retrospective design, the IRB excused the need for informed consent.

AVAILABILITY OF DATA

The dataset supporting the findings of this study is available from the corresponding author upon reasonable request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

MD: study concept and design, critical review. SA: data collection, analysis, interpretation, and manuscript drafting. MJ: data collection, analysis, and manuscript drafting. WU: study supervision and critical review. HA: data collection and critical review. FM: data analysis, interpretation, and critical review.

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