

Clinical presentations, Management and Outcomes of Peptic Ulcer Perforations in a Ghanaian Secondary Facility: A Retrospective Cohort Study

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Research Article

Keywords: Peptic ulcer perforation, peptic ulcer disease, NSAID, acute kidney injury

Posted Date: August 8th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10326269/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Peptic ulcer perforation (PUP) remains a surgical emergency with high morbidity and mortality, particularly in resource-limited settings. Data from secondary-level hospitals in Ghana are scarce.

Objective

To evaluate the clinical characteristics, management approaches, and postoperative outcomes of patients presenting with PUP at a secondary-level referral hospital in Ghana.

Methods

A retrospective cohort study was conducted among 69 patients managed between 2021 and 2025. Sociodemographic, clinical, perioperative, and outcome data were extracted and analyzed using SPSS v26. Associations with prolonged hospital stay (> 10 days) were assessed using Chi-square or Fisher's exact for categorical variables and independent t-test or Mann-Whitney U tests for continuous variables.

Results

The mean age was 54.3 ± 17.7 years, with a predominance of females (79.7%). NSAID use was reported in 44.9%; cigarette smoking was uncommon (7.2%), while alcohol intake was reported in about a quarter of patients (26.1%). Among the subset of patients with available radiological findings ($n = 50$), pneumoperitoneum was present in 88.0%. The prepyloric region was the most frequent perforation site (73.3%), and nearly all patients underwent modified Graham's omentopexy (96.7%). Postoperative complications included surgical site infection (26.2%), acute kidney injury (27.7%), and pneumonia (35.4%). Median hospital stay was 10 (IQR 7–19) days, with 47.8% experiencing prolonged admission. Factors significantly associated with prolonged stay included low serum albumin ($p = 0.021$), prior surgery ($p = 0.034$), longer ICU stay ($p = 0.022$), surgical site infection ($p < 0.001$), acute kidney injury ($p = 0.003$), and re-laparotomy ($p = 0.007$). In-hospital mortality was 14.5%.

Conclusion

PUP in this cohort predominantly affected middle-aged and elderly patients, with a marked female predominance, high complication rates, and notable mortality. Early recognition, optimization of nutritional status, and prevention of postoperative infections are critical to improving outcomes in secondary-level Ghanaian hospitals.

Introduction

Peptic ulcer perforation (PUP) is a life-threatening complication of peptic ulcer disease and remains one of the most common indications for emergency gastrointestinal surgery worldwide (Bertleff & Lange, 2010; Lanas & Chan, 2017). Global cohort and registry data indicate that the average mortality rate following perforation is approximately 23%, with some studies reporting rates as high as 30% (Lau et al., 2011; Søreide et al., 2015). These outcomes are strongly influenced by factors such as age, delay to surgery, and burden of other comorbidities (Lau et al., 2011; Søreide et al., 2015). Large population-based studies from high-income settings, such as the Norwegian national registry analysis by Thorsen et al. (2013), show that perforation predominantly affects older male patients and that incidence and case-fatality both rise steeply with age. International guidelines, including the World Society of Emergency Surgery consensus statement, emphasize early diagnosis, prompt source control, and structured perioperative critical care as the principal levers for improving survival (Tarasconi et al., 2020).

Within sub-Saharan Africa, the epidemiological pattern of PUP diverges in several respects from that described in high-income settings. Studies from Tanzania, Ethiopia, and Nigeria consistently report a much younger patient population, with mean ages typically in the third to fifth decade, and a strong male predominance, often exceeding 5:1 (Bupicha et al., 2020; Chalya et al., 2011; Gbenga et al., 2021). NSAID use, alcohol intake, and cigarette smoking feature prominently as risk factors, although their relative contributions vary considerably between settings; alcohol use, for example, has been reported in as few as 30% and as many as 86% of cases across these studies (Chalya et al., 2011; Gbenga et al., 2021). Delayed presentation beyond 24 hours is common across the region and is repeatedly identified as a major determinant of postoperative morbidity and mortality, with reported case-fatality ranging from about 3% to over 20% depending on setting and case-mix (Bupicha et al., 2020; Chalya et al., 2011).

Ghanaian data on PUP originates almost exclusively from large tertiary teaching hospitals in the two largest cities. A previous study at Korle-Bu Teaching Hospital in Accra, involving 326 patients with a male-to-female ratio of 4.5:1, reported that approximately 88% experienced duodenal perforation (Dakubo et al., 2009). In the same study, nearly two-thirds of the patients had documented use of NSAIDs and other substances known to cause ulcers (Dakubo et al., 2009). A separate series from Kumasi similarly described a young, male-predominant population managed largely by simple closure (Ohene-Yeboah & Togbe, 2006). Both studies, however, were conducted at high-volume tertiary referral centres, and comparable data from secondary-level hospitals, which serve as the first surgical point of contact for many Ghanaian patients, remain lacking.

This study therefore aimed to evaluate the sociodemographic and risk factor distribution, clinical and hemodynamic profiles at admission, perioperative characteristics, postoperative complications, and predictors of prolonged hospital stay among patients with PUP managed at a secondary-level referral hospital in Ghana, and to situate these findings within the global, regional, and local literature.

Methodology

Study design/setting

A 5-year retrospective study was conducted at Holy Family Catholic Hospital, Berekum, between January 2021 and December 2025. Holy Family Catholic Hospital, Berekum is a secondary hospital located in Berekum in the Bono Region, Ghana. The hospital has nine (9) departments with a bed capacity of 240 and provides services to patients from neighbouring towns and those referred from peripheral hospitals. The patients were identified and extracted from hospital electronic medical records; 69 patients operated on perforated peptic ulcer for emergency surgery were reviewed, where patient clinical information including patient demographic characteristics, diagnoses, investigative (laboratory and radiological) workup, performed surgical procedure, complications, hospital stay, pathology results, and mortality was reviewed.

Study population and selection

The study was conducted in the surgical unit of Holy Family Catholic Hospital, Berekum. We included all patients undergoing operations with an intraoperative confirmed diagnosis of perforated peptic ulcer at the general surgery department. Patients who declined consent and those who were previously operated in other institutions were excluded from the study.

Data collection and Statistical analysis

Data were entered, coded, and cleaned using Microsoft Excel 2019 before being exported to IBM SPSS Statistics version 26.0 for analysis. Categorical variables were summarized as frequencies and percentages, while continuous variables were summarized as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR), depending on data normality. Associations between categorical variables and prolonged hospital stay were assessed using the Chi-square test or Fisher's exact test, as appropriate. Differences in continuous variables between patients with prolonged and non-prolonged hospital stay were compared using the independent samples t-test for normally distributed variables and the Mann-Whitney U test for non-normally distributed variables. Prolonged hospital stay was defined as a postoperative hospital stay of more than 10 days. A two-sided p-value < 0.05 was considered statistically significant.

Results

Sociodemographic Profile and Risk Factors Distribution among Peptic Ulcer Perforation Patients

In our study, the mean age was 54.3 ± 17.7 years, with the largest proportion aged 46–60 years (42.0%). Females constituted the majority of the study population (79.7%). Approximately two-thirds of participants (63.8%) were covered by the National Health Insurance Scheme, of whom 90.9% had active insurance. Most participants do not take alcohol (73.9%) or smoke cigarettes (92.8%). Nearly half

(44.9%) reported a history of non-steroidal anti-inflammatory drug (NSAID) use, whereas only one participant (1.4%) had a history of steroid use (Table 1).

Table 1
Sociodemographic Characteristics Lifestyle of Study Participants

Variable	Frequency (N = 69)	Percentage (%)
Age category (years)	54.3 ± 17.7	
< 30	6	8.7
31–45	14	20.3
46–60	29	42.0
> 60	20	29.0
Gender		
Male	14	20.3
Female	55	79.7
Health insurance status		
Uninsured	25	36.2
Insured	44	63.8
Insurance status (n = 44)		
Active	40	90.9
Inactive	4	9.1
Alcohol intake		
No	51	73.9
Yes	18	26.1
History of smoking		
No	64	92.8
Yes	5	7.2
NSAID use		
No	38	55.1
Yes	31	44.9
Steroid use		
No	68	98.6
Yes	1	1.4

Clinical and haemodynamic characteristics at admission

Hypertension was the most common comorbidity, affecting 11.6% of patients, while diabetes mellitus was present in 4.3%. Approximately one-third of participants (30.4%) had a previous history of peptic ulcer disease, all of whom were diagnosed clinically. Among patients who had previously received treatment, PPIs were the most commonly used medications (81.8%). Pneumoperitoneum was identified in 88.0% of patients with available radiological findings, and 69.2% were referred from other health facilities.

At presentation, mean systolic and diastolic blood pressures were 114.64 ± 26.74 mmHg and 70.78 ± 18.93 mmHg, respectively. Mean pulse rate was 105.50 ± 20.25 beats/min, oxygen saturation was $96.55 \pm 2.17\%$, haemoglobin concentration was 12.42 ± 2.83 g/dL, and serum albumin level was 28.16 ± 5.23 g/L. Median respiratory rate was 21.0 (IQR: 18.0–27.0) cycles/min, median serum creatinine was 103.9 (IQR: 73.6–215.5) μ mol/L, and median Glasgow Coma Scale score was 15 (IQR: 15–15) (Table 2).

Table 2
Clinical and Hemodynamic Profile of Patients at time of admission

Variable	Frequency (n = 69)	Percentage (%)
Comorbidities		
Diabetes mellitus	3	4.3
Hypertension	8	11.6
Heart failure	1	1.4
Asthma	1	1.4
Liver cirrhosis	2	2.9
Kidney failure	2	2.9
History of previous surgery(Yes)	7	10.1
Peptic ulcer disease(Yes)	21	30.4
Mode of diagnosis (n = 21)		
Clinical	21	100.0
Endoscopy	0	0.0
Past surgery	7	10.1
Previous treatment (n = 11)		
PPIs	9	81.8
Herbal medications	2	18.2
Presence of pneumoperitoneum (n = 50)		
No	6	12.0
Yes	44	88.0
Source of referral (n = 65)		
Self-referred	20	30.8
Hospital referral	45	69.2
Mean $\pm$ SD		
Systolic blood pressure (mmHg)	114.64 $\pm$ 26.74	
Diastolic blood pressure (mmHg)	70.78 $\pm$ 18.93	
Pulse rate (bpm)	105.50 $\pm$ 20.25	

Variable	Frequency (n = 69)	Percentage (%)
Comorbidities		
Oxygen saturation (%)	96.55 ± 2.17	
Haemoglobin (g/dL)	12.42 ± 2.83	
White blood cell count (×10 ⁹ /L)	9.52 ± 8.07	
Urea (mmol/L)	10.06 ± 6.78	
Potassium (mmol/L)	4.83 ± 1.63	
Sodium (mmol/L)	136.33 ± 17.40	
Serum albumin (g/L)	28.16 ± 5.23	
Median (IQR)		
Respiratory rate (cpm)	21.0 (18.0–27.0)	
Creatinine (μmol/L)	103.9 (73.6-215.5)	
Glasgow Coma Scale (/15)	15.0 (15.0–15.0)	

Categorical variables were presented as Frequencies and Percentages while continuous variables as Mean ± SD or Median (IQR) depending on normality.

Perioperative characteristics and postoperative outcomes

Of the 60 participants, prepyloric region was the most common site of perforation (73.3%), while median perforation size was 2.0 cm (IQR: 1.5-2.0). Peritoneal fluid (43.3%) and bile-stained fluid (38.3%) were the predominant intraoperative findings. Nearly all participants (96.7%) underwent modified Graham's omentopexy. Abdominal drains were inserted in 89.4% of cases, with two drains used more frequently (74.6%). Half of patients had drains positioned in both pelvis and over the repair site.

Postoperatively, 17.9% of patients required ICU admission, with ICU stay of 3.0 (IQR: 2.3–3.0) days. Surgical site infection occurred in 26.2% of patients, of which 70.6% were deep infections. Acute kidney injury developed in 27.7% of patients, pneumonia in 35.4%, pleural effusion in 9.2%, and repair leakage in 4.6%. Re-laparotomy was required in 9.2% of patients, mainly due to wound dehiscence, deep surgical site infection, or breakdown of repair. Median duration of hospital admission was 10 (IQR: 7–19) days, with 47.8% of patients experiencing prolonged hospital stay. Overall, in-hospital mortality was 14.5% (Table 3).

Table 3
 Perioperative characteristics and postoperative outcomes of the study participants

Variable	Frequency	Percentage (%)
Site of perforation (n = 60)		
Pylorus	2	3.3
Prepyloric	44	73.3
Lesser curvature	9	15.0
Other	5	8.3
Size of perforation (cm)	2.0 (1.5-2.0)	
Nature of peritoneal fluid (n = 60)		
Peritoneal fluid	26	43.3
Bile-stained fluid	23	38.3
Purulent fluid	3	5.0
Serosanguinous fluid	2	3.3
Other	6	10.0
Amount of peritoneal fluid collected (L)	1.8 ± 1.4	
Method of repair (n = 60)		
Graham's omentopexy	2	3.3
Modified Graham's omentopexy	58	96.7
Abdominal drain placement (n = 66)		
No	7	10.6
Yes	59	89.4
Number of drains (n = 59)		
One drain	15	25.4
Two drains	44	74.6
Drain placement site (n = 58)		
Pelvis only	20	34.5
Pelvis and over repair	29	50.0
Pelvis and other site	4	6.9

Variable	Frequency	Percentage (%)
Site of perforation (n = 60)		
Over repair only	1	1.7
Over repair and other sites	3	5.2
Other site only	1	1.7
ICU admission (n = 67)		
No	55	82.1
Yes	12	17.9
Duration of ICU stay (days)	3.0(2.3-3.0)	
Surgical site infection (SSI) (n = 65)		
No	48	73.8
Yes	17	26.2
SSI classification (n = 17)		
Superficial	5	29.4
Deep	12	70.6
Leakage from repair (n = 65)		
No	62	95.4
Yes	3	4.6
Acute kidney injury (n = 65)		
No	47	72.3
Yes	18	27.7
Pneumonia (n = 65)		
No	42	64.6
Yes	23	35.4
Pleural effusion (n = 65)		
No	59	90.8
Yes	6	9.2
Re-laparotomy (n = 65)		
No	59	90.8

Variable	Frequency	Percentage (%)
Site of perforation (n = 60)		
Yes	6	9.2
Indication for re-laparotomy (n = 6)		
Wound dehiscence	2	33.3
Deep SSI	2	33.3
Breakdown of repair	2	33.3
Number of days on admission		
Not Prolonged (< 10 days)	36	52.2
Prolonged (> 10 days)	33	47.8
Duration of surgery (minutes)		
90.0 (70.0-120.0)		
Mortality (N = 69)		
No	59	85.5
Yes	10	14.5

Categorical variables were presented as Frequencies and Percentages while continuous variables as Mean $\pm$ SD or Median (IQR) depending on normality. PPIs: Proton pump inhibitors

Association between clinical characteristics and prolonged hospital stay

Patients with prolonged hospital stay had significantly lower serum albumin levels than those with non-prolonged hospital stay (26.14 ± 3.78 vs. 31.00 ± 5.81 g/L, $p = 0.021$). A history of previous surgery was also more common among patients with prolonged hospital stay (18.2% vs. 2.8%, $p = 0.034$). No significant associations were observed for other clinical characteristics, comorbidities, laboratory parameters, or haemodynamic variables (all $p > 0.05$) (Table 4).

Table 4
Association between clinical characteristics and prolonged hospital stay

Variable	Not Prolonged (n = 36)	Prolonged (n = 33)	p-value
Diabetes mellitus			0.607
No	34 (94.4)	32 (97.0)	
Yes	2 (5.6)	1 (3.0)	
Hypertension			0.534
No	31 (86.1)	30 (90.9)	
Yes	5 (13.9)	3 (9.1)	
Heart failure			0.293
No	36 (100.0)	32 (97.0)	
Yes	0 (0.0)	1 (3.0)	
Asthma			0.293
No	36 (100.0)	32 (97.0)	
Yes	0 (0.0)	1 (3.0)	
Liver cirrhosis			0.950
No	35 (97.2)	32 (97.0)	
Yes	1 (2.8)	1 (3.0)	
Kidney failure			0.950
No	35 (97.2)	32 (97.0)	
Yes	1 (2.8)	1 (3.0)	
Peptic ulcer disease			0.616
No	26 (72.2)	22 (66.7)	
Yes	10 (27.8)	11 (33.3)	
Previous treatment (n = 11)			0.887
PPIs	4 (80.0)	5 (83.3)	
Herbal medications	1 (20.0)	1 (16.7)	
Past surgery			0.034
No	35 (97.2)	27 (81.8)	
Yes	1 (2.8)	6 (18.2)	

Variable	Not Prolonged (n = 36)	Prolonged (n = 33)	p-value
On oxygen (n = 64)			0.665
No	26 (78.8)	23 (74.2)	
Yes	7 (21.2)	8 (25.8)	
Anaemia status (n = 53)			0.339
Non-anaemic	16 (57.1)	11 (44.0)	
Anaemic	12 (42.9)	14 (56.0)	
Presence of pneumoperitoneum (n = 50)			0.384
No	2 (8.0)	4 (16.0)	
Yes	23 (92.0)	21 (84.0)	
Source of referral (n = 65)			0.934
Self-referred	10 (31.3)	10 (30.3)	
Hospital	22 (68.8)	23 (69.7)	
Systolic blood pressure (mmHg)	114.27 ± 28.06	115.03 ± 25.73	0.911
Diastolic blood pressure (mmHg)	70.70 ± 19.29	70.87 ± 18.86	0.971
Pulse rate (bpm)	103.94 ± 20.54	107.16 ± 20.14	0.529
Oxygen saturation (%)	96.73 ± 2.08	96.35 ± 2.27	0.496
Haemoglobin (g/dL)	13.05 ± 2.50	11.72 ± 3.05	0.087
White blood cell count (×10⁹/L)	9.53 ± 10.08	9.51 ± 5.18	0.995
Urea (mmol/L)	8.44 ± 5.85	11.88 ± 7.39	0.069
Potassium (mmol/L)	4.96 ± 2.06	4.68 ± 0.96	0.568
Sodium (mmol/L)	134.71 ± 19.48	138.17 ± 14.94	0.503
Serum albumin (g/L)	31.00 ± 5.81	26.14 ± 3.78	0.021
Respiratory rate (cpm)	21.5 (18.8–26.3)	20.0 (18.0–28.0)	0.749
Creatinine (μmol/L)	90.4 (63.9–120.3)	156.1 (77.1–215.5)	0.146

Categorical variables were compared using Fisher's exact test, parametric continuous variables using the independent samples t-test, and non-parametric continuous variables using the Mann-Whitney U test. $p < 0.05$ was considered statistically significant, with significant p-values shown in bold.

Association between perioperative characteristics, postoperative outcomes, and prolonged hospital stay

Patients with prolonged hospital stay had a longer median ICU stay than those with non-prolonged hospital stay (3.0 [IQR: 3.0–4.0] vs. 2.0 [IQR: 2.0–3.0] days, $p = 0.022$). Surgical site infection (48.4% vs. 5.9%, $p < 0.001$), acute kidney injury (45.2% vs. 11.8%, $p = 0.003$), and re-laparotomy (19.4% vs. 0.0%, $p = 0.007$) were significantly more frequent among patients with prolonged hospital stay. No significant associations were observed for other perioperative characteristics or postoperative outcomes (all $p > 0.05$) (Table 4).

Association between perioperative characteristics, postoperative outcomes, and prolonged hospital stay

Variable	Not Prolonged (n = 36)	Prolonged (n = 33)	p-value
Site of perforation (n = 60)			0.346
Pylorus	2 (6.3)	0 (0.0)	
Prepyloric	24 (75.0)	20 (71.4)	
Lesser curvature	3 (9.4)	6 (21.4)	
Other	3 (9.4)	2 (7.1)	
Size of perforation (cm)	2.0 (1.5–2.0)	2.0 (1.5–2.0)	0.919
Nature of fluid (n = 60)			0.168
Peritoneal fluid	10 (30.3)	16 (59.3)	
Bile-stained fluid	17 (51.5)	6 (22.2)	
Purulent fluid	2 (6.1)	1 (3.7)	
Serosanguinous fluid	1 (3.0)	1 (3.7)	
Other	3 (9.1)	3 (11.1)	
Amount of fluid collection in abdomen (L)	1.64 ± 1.47	2.13 ± 1.27	0.191
Method of repair (n = 60)			0.124
Graham's omentopexy	0 (0.0)	2 (7.1)	
Modified Graham's omentopexy	32 (100.0)	26 (92.9)	
Abdominal drain placement (n = 66)			0.753
No	4 (11.8)	3 (9.4)	
Yes	30 (88.2)	29 (90.6)	
Number of drains (n = 59)			0.412
One	9 (30.0)	6 (20.7)	
Two	21 (70.0)	23 (79.3)	
Drain placement site (n = 58)			0.550
Pelvis only	12 (41.4)	8 (27.6)	
Pelvis and over repair	12 (41.4)	17 (58.6)	
Pelvis and other site	2 (6.9)	2 (6.9)	
Over repair only	1 (3.4)	0 (0.0)	

Variable	Not Prolonged (n = 36)	Prolonged (n = 33)	p-value
Over repair and other sites	1 (3.4)	2 (6.9)	
Other site only	1 (3.4)	0 (0.0)	
ICU care (n = 67)			0.487
No	29 (85.3)	26 (78.8)	
Yes	5 (14.7)	7 (21.2)	
ICU stay (days)	2.0 (2.0–3.0)	3.0 (3.0–4.0)	0.022
Surgical site infection (SSI) (n = 65)			< 0.001
No	32 (94.1)	16 (51.6)	
Yes	2 (5.9)	15 (48.4)	
SSI classification (n = 17)			0.331
Superficial	0 (0.0)	5 (33.3)	
Deep	2 (100.0)	10 (66.7)	
Leakage from repair (n = 65)			0.063
No	34 (100.0)	28 (90.3)	
Yes	0 (0.0)	3 (9.7)	
Acute kidney injury (n = 65)			0.003
No	30 (88.2)	17 (54.8)	
Yes	4 (11.8)	14 (45.2)	
Pneumonia (n = 65)			0.592
No	23 (67.6)	19 (61.3)	
Yes	11 (32.4)	12 (38.7)	
Pleural effusion (n = 65)			0.460
No	30 (88.2)	29 (93.5)	
Yes	4 (11.8)	2 (6.5)	
Re-laparotomy (n = 65)			0.007
No	34 (100.0)	25 (80.6)	
Yes	0 (0.0)	6 (19.4)	

Variable	Not Prolonged (n = 36)	Prolonged (n = 33)	p-value
Duration of surgery (minutes)	90.0 (70.0–120.0)	90.0 (67.5–120.0)	0.474

Categorical variables were compared using Fisher's exact test, parametric continuous variables using the independent samples t-test, and non-parametric continuous variables using the Mann–Whitney U test. $p < 0.05$ was considered statistically significant, with significant p-values shown in bold.

Discussion

This study highlights the significant burden of PUP in a secondary-level Ghanaian hospital, with nearly half of patients experiencing prolonged hospital stay and a mortality rate of 14.5%. Comparing these findings against the global, regional, and local literature highlights both consistencies and notable departures from the established pattern. The age and sex distribution observed in this cohort diverges markedly from most published series. Whereas global and regional data consistently describe PUP as a disease of younger men, male-to-female ratios of roughly 5:1 to 6.5:1 and mean ages in the third to fifth decade have been reported in Ethiopia, Nigeria, and at both Ghanaian tertiary centres (Bupicha et al., 2020; Dakubo et al., 2009; Gbenga et al., 2021; Ohene-Yeboah & Togbe, 2006; Thorsen et al., 2013), this cohort was predominantly female (79.7%) and older (mean age 54.3 years). This pattern may reflect differences in case-mix at a secondary-level referral hospital, a higher local prevalence of NSAID-associated gastric ulceration among older women, or a referral bias in which younger male patients with duodenal perforations are triaged directly to tertiary centres; further prospective work would be needed to confirm any of these explanations.

Risk-factor profile in this cohort differed from regional comparators in degree rather than kind. NSAID use (44.9%) was broadly comparable to the 54.3% reported in a semi-urban Nigerian series but well above the 10.7% reported in Tanzania (Chalya et al., 2011; Gbenga et al., 2021), consistent with the established role of NSAIDs in ulcerogenesis (Lanas & Chan, 2017; Lau et al., 2011). By contrast, cigarette smoking (7.2%) and alcohol intake (26.1%) were both considerably lower than the 64.3% and 85.7% reported in Tanzania, the 33% and 45.4% reported in Ethiopia, and the 21.7% and 30.4% reported in Nigeria (Bupicha et al., 2020; Chalya et al., 2011; Gbenga et al., 2021). Given the cohort's female predominance, this most likely reflects markedly lower rates of tobacco and alcohol use among Ghanaian women rather than a genuine regional difference in ulcerogenic exposure.

Again, pneumoperitoneum was detected in 88.0% of the subset of patients with available radiological findings (44 of 50), closely matching the 85.6% reported from Ethiopia and supporting the diagnostic utility of plain radiography even in resource-limited settings (Bupicha et al., 2020); its true yield across the full cohort could not be established given incomplete imaging documentation for the remaining patients.

Moreover, the prepyloric region was the dominant perforation site in this cohort (73.3%), which stands in contrast to the duodenal predominance reported almost universally elsewhere; thus, 88% in Accra, 90.4% in Tanzania, 93.8% in Ethiopia, and 63.0% in the Nigerian series (Bupicha et al., 2020; Chalya et al., 2011; Dakubo et al., 2009; Gbenga et al., 2021). This divergence may again relate to the older, female-predominant case-mix, in which gastric and prepyloric ulcers associated with NSAID exposure are more common than the *H. pylori*-driven duodenal ulcers typically seen in younger male populations, though differences in intraoperative anatomical classification cannot be excluded.

Furthermore, postoperative complications were frequent, particularly surgical site infection, pneumonia, and acute kidney injury, echoing the pattern seen in the Nigerian series, where surgical site infection was similarly the leading complication (Gbenga et al., 2021). Surgical site infection was strongly associated with prolonged hospital stay in this cohort, emphasizing the need for improved perioperative infection control (Møller et al., 2009). Hypoalbuminaemia also predicted prolonged admission, highlighting the importance of nutritional optimization in surgical patients (Lau et al., 2011). A history of previous abdominal surgery was likewise associated with prolonged stay, possibly reflecting adhesions, more difficult re-entry, or reduced physiological reserve in previously operated patients, although the small number of patients with this history ($n = 7$) limits firm conclusions. Re-laparotomy, though infrequent, was exclusively observed among patients with prolonged stay, reflecting the severity of complications in this subgroup.

Finally, the in-hospital mortality rate of 14.5% sits within the range reported regionally, though the spread across published series is wide: 3.1% in the Ethiopian multicentre cohort, 10.7% in Tanzania, and generally 10–21% across various Nigerian tertiary series, against a global average of roughly 23% and rates of up to 30% in some series (Bupicha et al., 2020; Chalya et al., 2011; Lau et al., 2011; Søreide et al., 2015). The comparatively low Ethiopian mortality likely reflects that cohort's much younger age profile, while the present cohort's older, more comorbid case-mix and secondary-hospital setting, with more limited ICU capacity than the tertiary centres reporting elsewhere. This may explain why mortality here exceeds the Ethiopian figure despite falling below the global upper bound. Strengthening early diagnosis, timely surgical intervention, and postoperative critical care support remains essential to narrowing this gap.

Limitations include the retrospective design, reliance on clinical diagnosis of peptic ulcer disease in the absence of routine endoscopic confirmation, and incomplete documentation of certain admission variables, including radiological findings for about a quarter of patients. The comparative literature drawn on here also spans differing study designs, hospital tiers, and time periods, which limits the precision of any cross-study comparison. Nonetheless, this study provides valuable insights into PUP management in secondary-level Ghanaian hospitals and highlights a demographic and anatomical pattern – an older, female-predominant, prepyloric-perforation phenotype – that has not been prominently described elsewhere in the West African literature and merits further investigation.

Targeted strategies to improve perioperative nutritional support, infection prevention, and critical care access could substantially reduce morbidity and mortality. Future prospective, multicentre studies across secondary-level Ghanaian hospitals are warranted both to validate the unusual demographic pattern observed here and to guide national surgical policy.

Conclusion

Peptic ulcer perforation remains a major surgical emergency in Ghana, with significant morbidity and mortality even at secondary-level referral hospitals. This study demonstrates that patients are predominantly middle-aged and elderly, with NSAID use as a common risk factor and prepyloric perforation as the most frequent site. Despite standardized surgical management with modified Graham's omentopexy, postoperative complications such as surgical site infection, pneumonia, and acute kidney injury were frequent, and nearly half of patients experienced prolonged hospital stay. Hypoalbuminaemia, prior surgery, surgical site infection, acute kidney injury, and re-laparotomy were identified as key predictors of prolonged admission. The observed in-hospital mortality of 14.5% underscores the urgent need for improved perioperative care, infection prevention, and nutritional optimization. Strengthening critical care capacity and ensuring timely referral pathways are essential to reduce adverse outcomes. By providing evidence from a secondary-level Ghanaian hospital, this study fills an important gap in the literature and highlights actionable priorities for surgical practice and health policy in resource-limited settings.

Declarations

Ethics approval and consent to participate

The study was carried out according to the Helsinki Declaration and samples were processed under approval. Informed consent was obtained from all subjects. The entire study protocol was approved by the Ethical Committee of Christian Health Association of Ghana (CHAG) Institutional Review Board (CHAG/IRB/16/201/26).

Consent of Publication

Not applicable.

Consent of Participate

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

No funding was obtained for this study.

Author Contribution

TAB, FEG, IDI, SBY HKB and RAB participated in Conceptualization, Investigation and Methodology. TAB, EOG, AMA ,SAB,CB,DAA and FAK participated in Data curation and TAB, FEG, MNK,EW and AMA participated in Formal analysis and writing, reviewing, and editing. All authors read and approved the final manuscript

Acknowledgement

Special thanks go to staff at the Department of Surgery and IT Holy Family Catholic Hospital, Berekum

Data Availability

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request

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