DOI: 10.7860/JCDR/2026/85746.23541

Original Article

Internal Medicine Section

Clinical Profile and Predictors of Outcomes in Patients with Acute Abdomen Presenting in the Emergency Department: A Prospective Cohort Study from a Tertiary Care Centre

HIMANSHI BAID[1], MUKTA SINGH[2], KOMAL THAKUR[3], SAACHI GOEL[4], VAIBHAV GUPTA[5]

ABSTRACT

Introduction: Acute abdomen is a common emergency presentation with variable causes and outcomes. The clinical profile, aetiologies, and outcome predictors vary from region to region. Understanding regional patterns of disease enables protocolised care and improves efficiency and decision-making in Emergency Departments (ED).

Aim: To study the clinical profile and predictors of outcomes in acute abdomen in the emergency department.

Materials and Methods: This prospective cohort study was conducted over three months (June 2024- August 2024) in a tertiary-care ED in Northern India. Consecutive adults (>18 years) with acute abdominal pain were enrolled. Demographic, clinical, laboratory, and imaging data were collected in a structured proforma. Outcomes were classified as favourable (ED discharge or hospital stay ≤7 days) or unfavourable (surgical intervention, hospital stay >7 days, High Dependency Units (HDU) /Intensive Care Units (ICU) admission, or death). Data were analysed using appropriate parametric and non parametric tests, and multivariable logistic regression was used to identify independent predictors of various outcomes (p-value <0.05).

Results: Of 499 screened patients, 198 were analysed (mean age 43.3±17.2 years; 54% male). Co-morbidities were present in 26.3%, most commonly hypertension (9.6%) and diabetes (8.1%); 33.8% reported substance use. The most frequent provisional ED diagnosis was non specific “acute abdomen” (39.9%). Common definitive diagnoses were ureteric colic (13.2%), pancreatitis (8.8%), and acid peptic disorders (10%). Favourable outcomes occurred in 44.4%. Unfavourable outcomes included prolonged hospital stay (19.7%), HDU admission (17.7%), ICU admission (6.1%), surgical intervention (9.1%), and in-hospital mortality (1%). Hypoalbuminaemia was independently associated with reduced odds of ED discharge (OR 0.03, 95% CI 0.00-0.45; p-value=0.012), prolonged stay (OR 0.34, 95% CI 0.17-0.67; p-value=0.002), and HDU/ ICU admission (OR 0.33, 95% CI 0.16-0.67; p-value=0.002). Abnormal abdominal examination predicted prolonged stay (OR 1.07, 95% CI 1.01-1.13; p-value=0.021) and HDU/ICU admission (OR 1.07, 95% CI 1.01-1.14; p-value=0.033). Fluid resuscitation predicted HDU/ICU admission (OR 3.71, 95% CI 1.15-11.94; p-value=0.028).

Conclusion: Hypoalbuminaemia independently predicted unfavourable outcomes in adults presenting with acute abdominal pain and may represent a simple, low-cost marker for early risk stratification in the ED.

Keywords: Abdominal pain, Emergency medicine, Hypoalbuminaemia

INTRODUCTION

Acute abdomen is a frequent but often perplexing presentation, encompassing a broad spectrum of causes, and may appear benign yet prove to be life-threatening, or vice versa. The complexity has multiple causes. These include overlapping presentations, non abdominal sources of pain, and atypical signs and symptoms, rather than the classic ones, especially in a subset of the population due to underlying co-morbidities, age, and sex [1].

Acute abdomen accounts for 5-10% of all ED visits [2] although corresponding data from Indian ED remain limited [3]. A comprehensive approach is essential, as a significant number of patients are managed and discharged directly from the ED. Rapid identification of patients requiring urgent intervention is essential, as approximately one-quarter undergo surgery, and are associated with mortality ranging from 0.5% to 4.5% [3-6]. Failure to do so may result in missed diagnoses, inappropriate dispositions, readmissions, and unfavourable outcomes [4]. In several cases, even the combined use of medical history, physical examination, and laboratory testing falls short of achieving a definitive and accurate diagnosis [7].

The need to balance thorough evaluation with avoidance of over- or under-investigation, while arriving at a reasonable differential diagnosis, presents a formidable challenge. Research in this area has led to substantial improvement and extensive use of imaging techniques, including Computed Tomography (CT). Despite this, diagnostic pitfalls remain, leading to misdiagnoses and/ or avoidable surgeries [8-10]. A substantial proportion of cases remain classified as Non specific Abdominal Pain (NSAP), with reported rates varying widely across studies (9.5% to 33%) [4-8]. The complexity of managing acute abdomen makes it challenging to develop a universally applicable algorithmic approach. Patients with acute abdomen in the ED have varied outcomes; however, the factors affecting these outcomes are still not completely explored. Earlier studies have focused on the surgical interventions and measures affecting the outcome of such patients [5,6,11]. Dadeh, explored the various factors associated with unfavourable outcomes in these patients, suggesting clinical signs like Diastolic Blood Pressure (DBP), tachypnea, right lower quadrant tenderness, abdominal distension, hypoactive bowel sounds, and the presence of specific abdominal signs as poor outcome measures, while Cacciatori FA et al., developed a scoring system for predicting outcome in these patients [5,6]. However, these studies were conducted in different geographical and healthcare settings, which limit their generalisability to the South Asian ED population.

Despite the high-burden of acute abdominal pain presentations, there is a lack of prospective, ED-based studies in India that examine both surgical and non surgical cases to identify predictors of adverse outcomes across the full clinical spectrum. This study aimed to describe the epidemiology and clinical profile of patients presenting with acute abdominal pain to a North Indian ED and to identify factors associated with various outcomes, in the context of the region's distinct lifestyle, dietary patterns, and substance use, to provide pragmatic insights to emergency physicians for triage and disposition decisions.

MATERIALS AND METHODS

This prospective cohort study was conducted over three months (June 2024- August 2024) in the Emergency Department of a tertiary-care hospital (Himalayan Institute of Medical Sciences, SRHU, Dehradun) in Northern India. The study was approved by the Institutional Ethics Committee (HIMS/RC/2024/83), and written informed consent for participation and publication was obtained from all study participants.

Inclusion criteria: All patients of 18 years of age and above with the complaint of recent-onset abdominal pain of less than seven days duration were included in the study.

Exclusion criteria: Pregnant females, individuals referred from another centre with a diagnosis, those suffering from chronic abdominal pain and traumatic cause of abdominal pain were excluded from the study.

Sample size: Patients were enrolled using convenience sampling, with sample size determined by case availability during the study period.

Study Procedure

Baseline demographics, clinical history, examination findings, and investigation details were recorded prospectively in a structured proforma for all eligible patients presenting with acute abdominal pain who provided consent. Demographic details included age, sex, co-morbidities, and history of addictions (such as tobacco and alcohol use) were collected. A detailed assessment of pain characteristics was performed, including duration of pain, mode of onset (sudden/insidious), character of pain (dull, colicky, sharp, burning, stabbing, diffuse, or non specific), radiation of pain, and anatomical site of pain. Associated symptoms such as vomiting, nausea, fever, urinary complaints, abdominal distension, altered bowel habits, jaundice, cardiorespiratory symptoms, and generalised weakness were systematically documented. Abdominal examination findings were recorded with special emphasis on the presence, site, and nature of tenderness (generalised or localised to specific abdominal regions). Pain severity at presentation was assessed using the Numerical Rating Scale (NRS). Baseline vital parameters, including respiratory rate, oxygen saturation, pulse rate, systolic and diastolic blood pressure, were also recorded at the time of presentation.

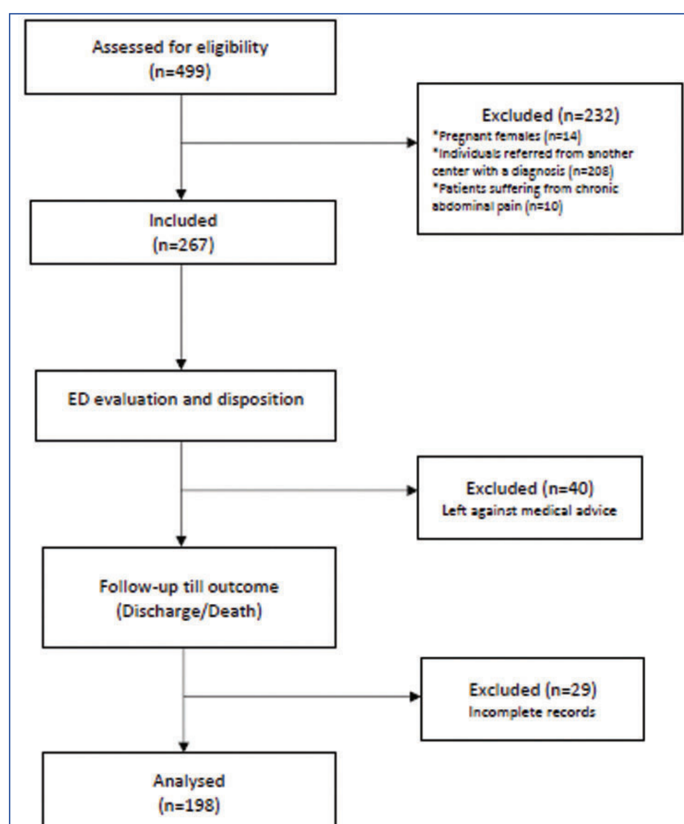
Acute abdomen was defined as recent-onset abdominal pain of less than seven days' duration requiring urgent evaluation, as described in standard surgical literature [12]. They underwent routine investigations, including a 12-lead ECG, complete blood count, liver/kidney function tests, and venous blood gas analysis. Additional laboratory investigations and imaging studies were performed based on the attending physician's clinical judgment. Provisional diagnoses guided imaging and disposition (discharge, ward, HDU/ICU, or ED death). Patients were followed to discharge or death; definitive diagnoses were recorded at the outcome. Outcomes were operationally classified as favourable (ED discharge or hospital stay ≤7 days) or unfavourable (surgical intervention, hospital stay >7 days, HDU/ICU admission, or death for the purpose of this study. Efforts were made to minimise selection bias by including consecutive patients and to reduce information bias through the use of standardised data collection forms.

STATISTICAL ANALYSIS

Data were analysed using Stata Version 15. Categorical variables were presented as frequencies and percentages; continuous variables as means±SD or medians (IQR), depending on distribution (assessed by the Shapiro-Wilk test). Group comparisons used Chi-square or Fisher's exact test for categorical variables, and t-test or Wilcoxon rank-sum test for continuous variables. Variables with p-value <0.10 in univariate analysis were entered into binary logistic regression to identify independent predictors. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 499 patients presented with an acute abdomen during the study period. After applying inclusion and exclusion criteria, 198 patients were included in the final analysis [Table/Fig-1].



[Table/Fig-1]: STROBE flowchart showing the patient selection, inclusion, exclusion, follow-up, and analysis.

The cohort had a mean age of 43.3±17.2 years with a slight male predominance. One-quarter had co-morbidities, and one-third reported substance use, predominantly alcohol [Table/Fig-2].

Characteristics	n (%)
Age in years, mean±SD	43.3±17.2
Men	107 (54.04)
Women	91 (45.96)
Co-morbidities: Disease-wise distribution	
1. None	146 (73.7)
2. Hypertension	19 (9.6)
3. Diabetes	16 (8.1)
4. Coronary artery disease	4 (2)
5. Hypothyroidism	5 (2.5)
6. Chronic pancreatitis	2 (1)
7. Others	10 (5.1)
8. More than one co-morbidity	12 (6.06)
Addiction: Substance-specific distribution	
1. Alcohol	39 (19.7)

2. Smoking	20 (10.1)
3. Tobacco	4 (2.02)
4. Others	2 (1.01)
5. >/= 2 addictions	17 (8.6)

[Table/Fig-2]: Socio-demographic characteristics, co-morbidities, and substance use profile of patients with acute abdomen (n=198).
*Percentages are based on total patients (N=198); patients with multiple symptoms are counted in each applicable category.

Most patients presented with recent-onset abdominal pain of poorly characterised nature, minimal localising examination findings, and largely stable physiological parameters [Table/Fig-3].

Parameters	n (%)
Duration of pain in days, median (IQR)	3 (1-5)
Onset of symptoms	
Sudden	118 (59.6)
Insidious	80 (40.4)
Pain character:	
Non specific	89 (44.9)
Dull/Dull aching	47 (23.7)
Colicky	29 (14.6)
Sharp/Sharp shooting	18 (9.1)
Pricking/Pin-pricking	9 (4.5)
Diffuse	4 (2.0)
Burning	1 (0.5)
Stabbing	1 (0.5)
Radiation of pain	
Present	58 (29.3)
To back	41
To groin	5
To right iliac fossa	3
To left iliac fossa	1
To paraumbilical/umbilical/pubic region	4
To flank	3
To tip of penis	1
Absent	140 (70.7)
Associated symptoms	
Vomiting	95 (48)
Nausea	22 (11.1)
Fever	20 (10.1)
Urinary symptoms	19 (9.6)
Abdominal distention	12 (6.1)
Diarrhoea	9 (4.5)
Constipation	6 (3)
Obstipation	4 (2)
Jaundice	6 (3)
Generalised weakness	6 (3)
Shortness of breath	4 (2)
Palpitations	2 (1)
Chest pain	1 (0.5)
Others	6 (3)
No associated symptoms	67 (33.8)
Site of pain	
Generalised	79 (39.9)
Epigastric/Paraumbilical	4 (2)
Left upper quadrant	6 (3)
Left lower quadrant	23 (11.6)
Right upper quadrant	28 (14.1)
Right lower quadrant	30 (15.2)
Multiple quadrants	27 (13.7)
Lower abdomen	1 (0.5)
Tenderness	
Absent	91 (45.96)
Generalised	44 (22.22)
Localised	63 (31.82)
Right hypochondrium	15
Epigastric / Epigastrium	10
Right lumbar region	6
Left lumbar region	5
Right iliac fossa/RLQ	5
Periumbilical region	3
Left hypochondrium	3
Right flank/Renal angle	3
Left flank/Left iliac	2
Right + Left hypochondrium / Lumbar	2
Other / Unspecified	4
Severity of pain (NRS), mean±SD	5.66±1.73
Respiratory rate (/min), median (IQR)	18 (17-20)
Saturation (%), median (IQR)	98 (97-99)
Pulse rate (/min), median (IQR)	82 (76-93)
Systolic BP (mm Hg), mean±SD	128.6±21.01
Diastolic BP (mm Hg), mean±SD	78.25±13.17

[Table/Fig-3]: Presenting symptoms, pain characteristics, and vital parameters of the study population (n=198).

A provisional diagnosis of "acute abdomen" was assigned to 39.9% of patients. Renal/ureteric colic, pancreatitis, cholecystitis, and appendicitis were other common considerations. Final diagnoses were predominantly renal/urological, pancreatic, hepatobiliary, and gastrointestinal, with multiple pathologies seen in several patients [Table/Fig-4,5].

Provisional diagnosis (Grouped)	n (%)
Acute abdomen	79 (39.89)
Renal/ureteric colic or calculi	37 (18.68)
Acute pancreatitis (all types)	20 (10.10)
Gastritis (all types)	9 (4.55)
Acute appendicitis	8 (4.04)
Acute cholecystitis	10 (5.05)
Acute intestinal obstruction	2 (1.01)
Subacute intestinal obstruction	3 (1.51)
Liver abscess	2 (1.01)
Acute gastroenteritis	3 (1.51)
Perforation peritonitis	2 (1.01)
AKI	2 (1.01)
Chronic liver disease	3 (1.51)
Abdominal Koch's / Disseminated TB	2 (1.01)
Obstructive jaundice/Jaundice	3 (1.51)
Acute dysentery	1 (0.51)
Right-sided inguinal hernia	1 (0.51)
ACS (Low Probability)	1 (0.51)
CA urinary bladder	1 (0.51)
Cholangiocarcinoma	1 (0.51)
Cholangitis	1 (0.51)
Cholelithiasis/Choledocholithiasis	3 (1.51)
UTI	2 (1.01)

Dyspepsia	1 (0.51)
Obstructive uropathy	1 (0.51)

[Table/Fig-4]: Provisional diagnoses made in ED (n=198).
AKI: Acute kidney injury; TB: Tuberculosis; ACS: Acute Coronary Syndrome; CA: Carcinoma; UTI: Urinary tract infection

System	Final diagnosis	n (%)
Cardiovascular	Acute coronary syndrome	1 (0.4)
	Congestive heart failure	1 (0.4)
	Aortic stenosis	1 (0.4)
Endocrine / Diabetic	Diabetic ketoacidosis	1 (0.4)
	Uncontrolled T2DM	1 (0.4)
Gastrointestinal (GI)	Acid peptic disorders	25 (10)
	GERD/ hiatal hernia	2 (0.8)
	Acute gastroenteritis	5 (2)
	Chronic constipation	1 (0.4)
	Inflammatory bowel disease	2 (0.8)
	Malignant duodenal thickening	1 (0.4)
	Diffuse fissure in ano	1 (0.4)
Hepatic/ Metabolic	Chronic liver disease	5 (2)
	Fatty liver disease	4 (1.6)
	Liver abscess	4 (1.6)
	Alcoholic hepatitis	1 (0.4)
	Liver haemangioma	1 (0.4)
Hepatobiliary	Cholecystitis	10 (4)
	Cholelithiasis	3 (1.2)
	Choledocholithiasis	2 (0.8)
	Empyema gall bladder	1 (0.4)
	Mucocele gall bladder	1 (0.4)
	Perforated gall bladder	1 (0.4)
Infectious / Systemic	Disseminated TB/Abdominal Koch's	4 (1.6)
	Tropical fever	1 (0.4)
	Hepatitis B	1 (0.4)
	Fungal oesophagitis	1 (0.4)
	Acute dysentery	1 (0.4)
Intestinal / Colorectal	Acute appendicitis	5 (2)
	Appendicular perforation/rupture/abscess	4 (1.6)
	Mucocele appendix	1 (0.4)
	Subacute appendicitis	2 (0.8)
	Acute intestinal obstruction	4 (1.6)
	Subacute intestinal obstruction	2 (0.8)
	Paralytic ileus	1 (0.4)
	Sigmoid diverticulitis	1 (0.4)
	Internal haemorrhoids	1 (0.4)
Oncology	CA gall bladder	2 (0.8)
	CA pancreas	2 (0.8)
	Cholangiocarcinoma	2 (0.8)
	Adenocarcinoma stomach	1 (0.4)
	CA urinary bladder	1 (0.4)
	Malignant duodenal thickening	1 (0.4)
Others	Functional neurosomatic disorder	1 (0.4)
	Atypical chest pain	1 (0.4)
	Hamartoma	1 (0.4)
	Moderate anaemia (microcytic)	1 (0.4)
	Mild ascites	1 (0.4)
	Inguinal hernia	1 (0.4)
	Medial arcuate ligament syndrome	1 (0.4)
Pancreatic	Pancreatitis (all types)	22 (8.8)
Renal / Urological	Ureteric colic	33 (13.2)
	Renal colic	13 (5.2)
	AKI (obstructive)	1 (0.4)
	BPH	2 (0.8)
	Complicated UTI	3 (1.2)
	Uncomplicated UTI	1 (0.4)
	Acute tubular interstitial nephritis	1 (0.4)
	CKD	1 (0.4)
	Non functioning kidney	1 (0.4)
	Prostatic calculi	1 (0.4)
Reproductive / Gynaecological	PCOS	1 (0.4)
	Adnexal mass	1 (0.4)
	Bulky ovary	1 (0.4)
	Haemorrhagic ovarian cyst	1 (0.4)
	Cervicitis	1 (0.4)
	Fibroid/Endometrial polyp	1 (0.4)
	Pelvic inflammatory disease	1 (0.4)

[Table/Fig-5]: System-wise definitive diagnosis (in alphabetical order) of the study population (n=198, total diagnosis=250).
The data represent the frequency of diagnoses, not the unique patient count. Multiple diagnoses in a single patient have been counted separately. Total patients=198; Total diagnoses=250.
T2DM: Type 2 diabetes mellitus; TB: Tuberculosis; GERD: Gastroesophageal reflux disease; AKI: Acute kidney injury; BPH: Benign prostatic hypertrophy; UTI: Urinary tract Infection; CKD: Chronic kidney disease; PCOS:Polycystic ovary syndrome

Over one-third of patients were discharged from the ED, while the remainder required admission. HDU and ICU care were required in 17.7% and 6.1% of cases, respectively. Surgical intervention was performed in 9.1%. Mortality (n=2) and re-attendance (2.5%) were low [Table/Fig-6]. Several additional diagnostic and therapeutic procedures were performed based on clinical indication and are detailed in [Table/Fig-7]. The remaining patients were managed conservatively.

On multivariate analysis, serum albumin emerged as an independent predictor of ED discharge, hospital length of stay, and HDU/ICU admission. Abnormal abdominal findings and fluid resuscitation were also associated with higher-level care [Table/Fig-8]. Complete multivariate regression models, including non significant variables, are presented in [Table/Fig-9-11]. Mortality analysis was limited by small numbers, and no significant predictors were identified.

DISCUSSION

In the current study, the major patients affected were middle-aged adults with a slight male preponderance, reflecting the typical working-age population seeking emergency care. A significant proportion of patients had pre-existing co-morbidities, most commonly hypertension and diabetes. Uniquely, the present study also documents substance use patterns, including alcohol and smoking, a parameter that has not been studied in any previous cohorts, thereby broadening the understanding of patient risk

Outcome	n (%)
Discharged from ED	69 (34.9)
Discharge after hospital stay	127 (64.1)
In-hospital mortality	2 (1.0)
HDU admission	35 (17.7)
ICU admission	12 (6.1)
Surgical intervention required	18 (9.1)
Return to ED with same complaints	5 (2.5)
Duration of hospital stay	
<7 days	88 (44.4)
>7 days	39 (19.7)

[Table/Fig-6]: Summary of outcome measures among study participants (n=198).
ED: Emergency department; HDU: High dependency Unit; ICU: Intensive care unit

Surgical intervention (n=18)	Number	Non surgical intervention (n=45)	Number
Explorative laparotomy	5	Upper/Lower GI endoscopy	18
Laparoscopic appendectomy	5	ERCP	9
Laparoscopic cholecystectomy	2	Diagnostic/Therapeutic paracentesis	4
Urological surgeries	5	USG-guided aspiration for abscess/pigtail insertion	4
PTBD	1	Haemodialysis	2
		Non invasive ventilation	1
		Pap smear	3
		Primary PCI	1
		Renal biopsy	1
		Bladder irrigation	1
		Cystoscopy	1

[Table/Fig-7]: Type and frequency of surgical and non surgical procedures performed during hospital management (n=63).
ERCP: Endoscopic retrograde cholangiopancreatography; PCI: Percutaneous Coronary Intervention; PTBD: Percutaneous transhepatic biliary drainage

Outcome	Variable	Odds Ratio (OR)	95% CI	p-value
ED discharge	Albumin	0.03	0.00-0.45	0.012
	Hospital LOS (days)	3.19	1.50-6.80	0.003
	Pulse rate	1.10	0.99-1.21	0.074
	Respiratory rate	0.70	0.47-1.06	0.092
Hospital LOS <7 days	Albumin	0.34	0.17-0.67	0.002
	Abdominal examination (normal)	1.07	1.01-1.13	0.021
HDU/ICU admission	Albumin	0.33	0.16-0.67	0.002
	Abdominal examination (abnormal)	1.07	1.01-1.14	0.033
	Fluid resuscitation	3.71	1.15-11.94	0.028

[Table/Fig-8]: Multivariate logistic regression analysis of predictors for key clinical outcomes in patients with acute abdominal pain.
Odds ratios, 95% confidence intervals, and p values are derived from multivariate binary logistic regression analysis.
CI: Confidence interval; LOS: Length of stay; HDU: High dependency unit; ICU: Intensive care unit

Variable	Odds Ratio	95% CI	p-value
Aspartate aminotransferase (AST)	1.07	0.98-1.17	0.16
Alanine aminotransferase (ALT)	1.03	0.95-1.11	0.52
Albumin	0.03	0.00-0.45	0.012
Age	1.02	0.95-1.09	0.61
Pulse rate (per minute)	1.10	0.99-1.21	0.074
Systolic BP	1.04	0.96-1.12	0.30
Diastolic BP	0.94	0.84-1.05	0.31
Respiratory rate	0.70	0.47-1.06	0.092
Sodium	1.18	0.86-1.62	0.30
Lactate	0.82	0.27-2.53	0.74
No. of co-morbidities	0.84	0.21-3.36	0.81
Abdominal examination	0.93	0.80-1.09	0.38
Localised tenderness	1.18	0.94-1.48	0.14
Hospital LOS (duration in days)	3.19	1.50-6.80	0.003

[Table/Fig-9]: Multivariate logistic regression analysis for predictors of ED discharge outcome.
*pH and bowel sounds were excluded from the final multivariate model due to statistical instability and perfect prediction, respectively.
Odds ratios, 95% confidence intervals, and p-values are derived from multivariate binary logistic regression analysis

profiles in emergency presentations. Previous Indian studies show wide variability in the demographic patterns, though some studies report findings similar to the present study [3,4,13,14]. In contrast, International cohorts show variations like an older population with female predominance in an Italian cohort, [8] a

Variable	Odds Ratio	95% CI	p-value
Albumin	0.34	0.17-0.67	0.002
Sodium	1.02	0.96-1.08	0.560
Lactate	0.90	0.57-1.42	0.656
Abdominal examination	1.07	1.01-1.13	0.021
Fluid resuscitation	1.66	0.63-4.38	0.308
Surgical intervention	0.77	0.56-1.07	0.116
Provisional diagnosis	1.01	0.99-1.04	0.285
Final diagnosis	0.99	0.98-1.00	0.157
Addiction total	1.29	0.67-2.46	0.444

[Table/Fig-10]: Multivariate logistic regression analysis for predictors of hospital stay outcome.
*pH, bowel sounds, and Alkaline Phosphatase (ALP) were excluded from the final multivariate model due to unstable estimates, perfect prediction, or lack of variability that limited clinical interpretability.
Odds ratios, 95% confidence intervals, and p-values are derived from multivariate binary logistic regression analysis.

Variable	Odds Ratio	95% CI	p-value
Duration of pain	0.99	0.94-1.04	0.624
Co-morbidities	0.75	0.35-1.58	0.45
Pulse rate per minute	1.01	0.97-1.05	0.536
Lactate	1.23	0.66-2.27	0.513
Base excess	1.00	0.81-1.25	0.977
Total leukocyte count	1.09	0.97-1.23	0.141
Neutrophils	1.01	0.98-1.03	0.524
Alkaline Phosphatase (ALP)	1.00	0.998-1.00	0.470
Albumin	0.33	0.16-0.67	0.002
Abdominal examination	1.07	1.01-1.14	0.033
Bowel sounds	0.34	0.02-6.80	0.484
Resuscitation	1.40	0.04-43.67	0.849
Fluid resuscitation	3.71	1.15-11.94	0.028
Surgical intervention	0.71	0.45-1.10	0.121

[Table/Fig-11]: Multivariate logistic regression analysis for predictors of HDU/ICU stay outcome.
*pH, endotracheal intubation, and blood product transfusion were excluded from the final model due to wide confidence intervals and sparse data, which could compromise the model's stability and interpretability.
Odds ratios, 95% confidence intervals, and p-values are derived from multivariate binary logistic regression analysis.

lower comorbidity burden reported in a Nigerian study [15] and a higher comorbidity prevalence in a Thai cohort [5]. These differences likely reflect variations in population structure, healthcare access, and regional disease patterns. These regional variations highlight the importance of comorbidity assessment in acute abdomen management.

Ureteric colic emerged as the most frequent cause of acute abdomen in the present study, followed by acid peptic disorders and pancreatitis. A different regional clinical profile is indicated by the large prevalence of pancreatitis in the present study, which has received less attention in previous literature and may be related to the higher prevalence of substance use (alcohol) in our population. In contrast, most Indian and international studies identify acute appendicitis as the leading diagnosis, while appendicular pathology formed only a small proportion of cases in the present study [3,14-16]. Acid peptic disease, commonly reported as the predominant cause in other studies, was relatively less frequent in our population [5,13,17]. These variations may be attributed to the different healthcare-seeking behaviour of the patients in developing countries, increased dependence on surgical outpatient services, thus highlighting the challenge of establishing definitive diagnoses at initial presentation. This is supported by the frequent use of the provisional label "acute abdomen," a trend similarly observed in other emergency department studies [8,11,18].

About two-thirds of the present study patients needed to be admitted as inpatients, and only a small percentage required intensive care unit treatment. A third of the patients were discharged straight from the emergency department. Because medical reasons predominated and conservative therapy was preferred, there was a low number of surgical interventions in the present study. The extent of emergency management of the acute abdomen was highlighted by the present study, which also included non surgical yet invasive therapies. Mortality and revisit rates were low. Similar trends were observed by Chanana L et al., in discharge rates and critical care utilisation, whereas several Western studies report much higher discharge rates and lower critical care utilisation [4-6,8,11]. This contrast may reflect differences in outpatient follow-up systems, thresholds for discharge, and the tendency of Indian emergency departments to manage more severe or delayed presentations through inpatient care [4,13,14]. The low mortality and revisit rates were also comparable to other Indian studies, possibly reflecting cautious admission practices, access to observation care, and timely intervention, though the limited study duration may also have influenced these findings [3-6,8].

Adverse outcomes were infrequent in this cohort, with low surgical intervention and mortality rates. Specific clinical and laboratory parameters were associated with the need for HDU/ICU care, particularly abnormal abdominal examination findings, hypoalbuminaemia, and the requirement for fluid resuscitation, while vital signs such as pulse and respiratory rate showed trends toward influencing ED disposition. International studies by Dadeh A and Cacciatori FA have identified demographic, physiological, and laboratory predictors such as male gender, age ≥50 years, fever, anaemia, leukocytosis, and hyperamylasaemia, ED Length Of Stay (EDLOS) >4 hours, diastolic blood pressure <80 mmHg, respiratory rate ≥24, right lower quadrant tenderness, leukocytosis (WBC ≥12,000/mm^3), and elevated neutrophil counts (ANC >75%) of unfavourable outcomes in acute abdomen [5,6]. However, to the best of our knowledge, no Indian emergency department- based study has comprehensively evaluated outcome predictors in such patients. These findings contribute to improving risk stratification and outcome prediction in the Indian emergency care context. Lower serum albumin levels were independently associated with prolonged hospital stay, increased need for HDU/ICU care, and reduced likelihood of ED discharge. Since albumin is a negative phase reactant, the existing literature has established the prognostic value of albumin in elective surgical populations but its role across the broader spectrum of acute abdomen presentations including the emergency department remains yet to be investigated. Gibbs J et al., and Tan SBT et al., demonstrated that hypoalbuminaemia strongly predicted mortality, morbidity, and postoperative complications in abdominal surgery patients [19,20]. The findings from the present study suggests that serum albumin may serve as an early marker of disease severity even in a mixed cohort of surgical and non surgical acute abdomen cases, thus expanding the scope of using serum albumin levels for risk stratification.

This study provided one of the first comprehensive descriptions of the clinical profile, diagnostic spectrum, and outcomes of acute abdomen in a North Indian emergency department, using data from a high-volume tertiary centre. It evaluated key outcomes, including admission trends HDU/ICU use, mortality, and revisits- parameters rarely detailed in the Indian literature and identifies relevant predictors. Hypoalbuminaemia showed a consistent association with escalation of care and prolonged hospitalisation, supporting its potential role in routine triage.

Limitation(s)

This was a single-centred study, with a short duration of study period, with only 1% in-hospital death, which restricts the generalisability of the study to the population.

CONCLUSION(S)

This study is among the first from an Indian emergency department to comprehensively evaluate not only the clinical and diagnostic profile of acute abdomen but also patient outcomes and predictors of disposition. It highlights distinct regional patterns in disease spectrum and admission practices that differ from commonly reported international data. Importantly, it identifies hypoalbuminaemia as a simple, early marker associated with escalation of care and prolonged hospitalisation across both surgical and non surgical causes. By integrating outcome assessment with real-world emergency data, this study adds context-specific evidence to guide risk stratification and triage in acute abdomen presentations.

REFERENCES

[1] Cartwright SL, Knudson MP. Evaluation of acute abdominal pain in adults. Am Fam Physician. 2008;77(7):971-78.
[2] Kamin RA, Nowicki TA, Courtney DS, Powers RD. Pearls and pitfalls in the emergency department evaluation of abdominal pain. Emerg Med Clin North Am. 2003;21(1):61-72, vi. Doi: 10.1016/s0733-8627(02)00080-9.
[3] Kishore K, Rao Mandalapu S. Clinical profile of patients with non-traumatic acute abdomen at a tertiary care hospital. MedPulse Int J Surg. 2022;21(2):36.
[4] Chanana L, Jegaraj MosesAK, Kalyaniwala K, Yadav B, Abilash K. Clinical profile of non-traumatic acute abdominal pain presenting to an adult emergency department. J Family Med Prim Care. 2015;4(3):422.
[5] Dadeh AA. Factors associated with unfavorable outcomes in patients with acute abdominal pain visiting the emergency department. BMC Emerg Med. 2022;22(1):195.
[6] Cacciatori FA, Ronchi AD, Sasso SE. Outcomes prediction score for acute abdomen: A proposal. Rev Col Bras Cir. 2019;46(6):e20192285.
[7] Laurell H, Hansson LE, Gunnarsson U. Diagnostic pitfalls and accuracy of diagnosis in acute abdominal pain. Scand J Gastroenterol. 2006;41(10):1126-31.
[8] Cervellin G, Mora R, Ticinesi A, Meschi T, Comelli I, Catena F, et al. Epidemiology and outcomes of acute abdominal pain in a large urban Emergency Department: Retrospective analysis of 5,340 cases. Ann Transl Med. 2016;4(19):362.
[9] Flum DR, Morris A, Koepsell T, Dellinger EP. Has misdiagnosis of appendicitis decreased over time? A population-based analysis. JAMA. 2001;286(14):1748-53. Doi: 10.1001/jama.286.14.1748.
[10] Patterson BW, Venkatesh AK, Alkhawam L, Pang PS. Abdominal computed tomography utilization and 30-day revisitation in emergency department patients presenting with abdominal pain. Acad Emerg Med. 2015;22(7):803-10. Doi: 10.1111/acem.12698
[11] Caporale N, Morselli-Labate AM, Nardi E, Cogliandro R, Cavazza M, Stanghellini V. Acute abdominal pain in the emergency department of a university hospital in Italy. United European Gastroenterol J. 2016;4(2):297-304.
[12] Silen William, Cope Zachary. Cope's early diagnosis of the acute abdomen. 21st ed. William Silen, editor. Oxford University Press; 2005. 1-7 p.
[13] Kumar NR, Krishna BS, Satyanarayana V, Reddy VV, Madhusudhan M, Subramanyam P. Study of clinical features and outcomes in patients presenting to the emergency department with acute abdomen. J Clin Sci Res. 2019;8(4):172.
[14] Shinde V, Dixit Y, Penmetsa P, Nair KR. Clinical and epidemiological profile of patients presenting with acute abdomen to the emergency department of a tertiary care hospital. Cureus. 2024;16(8):e67017.
[15] Agboola J, Olatoke S, Rahman G. Pattern and presentation of acute abdomen in a Nigerian teaching hospital. Nigerian Med J. 2014;55(3):266.
[16] Danish A. A retrospective case series study for acute abdomen in general surgery ward of Aliabad Teaching Hospital. Ann Med Surg (Lond). 2021;73:103199.
[17] Thapa R, Pokharel M, Paudel S, Khadka T, Sapkota P, Rana R, et al. Acid peptic disease among patients with acute abdomen visiting the department of emergency medicine in a tertiary care centre. J Nepal Med Assoc. 2023;61(264):636-38.
[18] Börner N, Kappenberger AS, Weber S, Scholz F, Kazmierczak P, Werner J. the acute abdomen structured diagnosis and treatment. Dtsch Arztebl Int. 2025;122(5):137-44.
[19] Gibbs J, Cull W, Henderson W, Daley J, Hur K, Shukri SF, et al. Preoperative serum albumin level as a predictor of operative mortality and morbidity results from the national VA surgical risk study. Arch Surg. 1999;134(1):36-42.
[20] Tan SBT, Lin X, Rosley MF, Lamparelli M. Pre-operative serum albumin as a predictor of adverse outcomes in open abdominal surgery: A retrospective study in central Queensland. Cureus. 2025;17(2):e79681.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Emergency Medicine, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India.
2. Associate Professor, Department of Emergency Medicine, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India.
3. Assistant Professor, Department of Emergency Medicine, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India.
4. Medical Student, Department of Emergency Medicine, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India.
5. Junior Resident, Department of Emergency Medicine, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Mukta Singh,
Associate Professor, Department of Emergency Medicine, HIMS, Swami Rama Himalayan University Campus, Swami Rama Nagar, Jolly Grant, Dehradun, Uttarakhand, India.
E-mail: mukta234@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Dec 29, 2025
- Manual Googling: Feb 09, 2026
- iThenticate Software: Feb 11, 2026 (2%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Dec 06, 2025**
Date of Peer Review: **Jan 15, 2026**
Date of Acceptance: **Feb 13, 2026**
Date of Publishing: **Jun 01, 2026**