RESEARCH ARTICLE

Evaluation of adherence to quality indicators in managing acute pancreatitis at a tertiary care hospital. A Retrospective Study.

Maida Binte Khalid Quddusi[1], Zahabia Sohail[2], Hafsa Shaikh[3], Neelam Jawed Qureshi[4], Om Parkash[5]

Abstract

Objective: To assess the quality of acute pancreatitis management by evaluating adherence to the quality indicators of a standardised international clinical guideline.

Method: The retrospective observational study was conducted from September 1, 2022, to March 31, 2023, at the Aga Khan University Hospital, Karachi, and comprised data of adult inpatients diagnosed with acute pancreatitis from January 2018 to December 2022. Data was collected from the departments of Gastroenterology, Surgery and Emergency Medicine. A quality checklist with 10 indicators and 5 measures following clinical guidelines from the Acute Pancreatitis Task Force on Quality to make comparative assessments. Data was analysed using SPSS 24.

Results: Of the 150 patients with a mean age 50.47±18.25 years, 82(54.7%) were females. Diagnosis was based on clinical symptoms 124(82.7%) and enzyme levels 26(17.3%). Aetiology remained unknown in 65(43.3%), and 30(46.1%) underwent further imaging. Fluid resuscitation 149(99.3%) and timely endoscopic retrograde cholangiopancreatography for cholangitis 22(78.6%) were common. Biliary pancreatitis 69(46%) was also common. Nutrition 141(85.3%) and pain management 147(98%) adhered to the guidelines. Complications led to more imaging 25(71.4%), and necrotising pancreatitis was treated with minimally invasive interventions. Overall adherence to guidelines ranged from 95 to 150 (63.7-100%).

Conclusion: There was a considerable level of adherence to guidelines in several acute pancreatitis management aspects. However, areas for improvement existed, notably in aetiology determination and imaging utilisation.

Keywords: Acute pancreatitis, Quality indicators, Treatment outcome, Endoscopic retrograde cholangiopancreatography.

(JPMA 76: 887; 2026) **DOI: https://doi.org/10.47391/JPMA.30008**

Introduction

Acute pancreatitis (AP), marked by pancreatic inflammation, arises from various factors contributing to its development, primarily gallstones and excessive alcohol consumption.[1] In severe cases, it can lead to multiple organ failure and decreased quality of life (QOL).[2]

Global AP rates surged by 62.9% between 1990 and 2019, reaching approximately 44.4 cases per 100,000.[3] Hospitalisation rates also increased globally in the last two decades.[4] However, in the Asian region, the incidence remained relatively stable at approximately 4%, partly due to limited research, especially in low- and middle-income countries (LMICs), like Pakistan.[4] There has been a scarcity of studies in Pakistan aimed at evaluating the severity of pancreatitis, especially in its initial stages. Data from a tertiary care hospital in Rawalpindi showed that patients with pancreatitis had a mortality rate of 14.03%.[5] A study in Islamabad showed an 8.4% mortality rate.[1] Studies in Karachi identified gallstones as the predominant cause, with mortality rates ranging from 3.64% to 20%, which correlated with the extent of pancreatic necrosis.[1]

Multiple scoring systems and guidelines assess AP severity and mortality risk, each having its strengths and limitations.[6] To ensure optimal patient care, healthcare providers and systems should consistently adopt evidence-based practices (EBPs) and conduct routine evaluations to identify areas for improvement.[2] In Pakistan, evidence-based medicine (EBM) is not yet common compared to the developed countries. This disparity in managing AP leads to poor outcomes, like recurrent admissions and prolonged hospital stays.[7] Delivering personalised and high-quality care is essential to the task of managing AP. Healthcare providers rely on clinical practice guidelines (CPGs) to guide patient care, while quality indicators assess healthcare performance based on patient outcomes.[2]

The current study was planned to examine the effectiveness of quality indicators in the management of AP in a tertiary care setting.

Materials and Methods

The retrospective observational study was conducted from September 1, 2022, to March 31, 2023, at the Aga Khan University Hospital (AKUH), Karachi, and comprised data of inpatients diagnosed with AP from January 2018 to

[1-3,5]Department of Gastroenterology, Aga Khan University, Karachi, Pakistan; [4]Department of General Surgery, Aga Khan University Hospital, Karachi, Pakistan.

Correspondence: Om Parkash. e-mail: om.parkash@aku.edu

ORCID ID: 0000-0003-3704-6486

Submission completed: 20-02-2025 **1st Revision received:** 03-06-2025

Acceptance: 14-02-2026 **Last Revision received:** 13-02-2026

December 2022. After approval from the institutional ethics review committee, data was collected from the departments of Gastroenterology, Surgery and Emergency Medicine. Data for each case was sourced from an electronic database, or manually from patient files, with International Classification of Diseases (ICD) code 10 for patient identification.[8] Data was collected using Google Forms by trained individuals, and was monitored by independent observers. Inclusion criteria encompassed all admitted cases of AP in individuals aged at least 18 years. Data of patients presenting with chronic pancreatitis, recurrent pancreatitis, and patients referred or shifted from other hospitals was excluded. Patients with incomplete records were not excluded as the study focussed on a measured outcome of the quality assessment.

A checklist tool consisting of 10 quality indicators and 5 quality measures, as outlined in the CPG of the Acute Pancreatitis Task Force on Quality, was used to assess the quality of care.[2] To maintain consistency, validity, reliability and ethical integrity in the research process, a performance standard was established with no exceptions, and the goal was to achieve 100% adherence to all indicators.

For the purpose of the study, "process", as a quality measure, referred to whether patients with AP received the correct treatment. "Process and appropriateness" assessed whether the treatment was both correct and suitable. "Process efficiency" measured how effectively the care was delivered, with minimal effort, cost and waste. The "structure of care" domain reflected resources, infrastructure and policies required to support quality care. Lastly, "outcomes" represented patient health status after treatment (e.g., recovery, complications or mortality). Quality indicators were categorised based on diagnosis, aetiology, initial assessment, risk stratification, initial management (baseline to 72 hours), endoscopic retrograde cholangiopancreatography (ERCP), nutrition, pharmacotherapy, management of early complications (72 hours to 4 weeks), surgery, and the structure of care.[2] Data was analysed using SPSS 24. Data was expressed as mean±standard deviation or frequencies and percentages, as appropriate.

Results

Of the 150 patients with a mean age of 50.47±18.25 years, 82(54.7%) were females. Diagnosis was based on clinical symptoms, 124(82.7%) and enzyme levels, 26(17.3%). Aetiology remained unknown in 65(43.3%), and 30(46.1%) underwent further imaging. Fluid resuscitation 149(99.3%) and timely ERCP for cholangitis 22(78.6%) were common. Biliary pancreatitis 69(46%) was also common. Nutrition (85.3%) and pain management (98%) adhered to the guidelines. Complications led to more imaging 25(71.4%), and necrotising pancreatitis was treated with minimally invasive interventions Table 1). Overall adherence to guidelines ranged from 96 to 150 (63.7-100%).

In terms of quality indicators, the standard performance compared to the targets achieved for each domain was noted, indicating 98.5% adherence rate in surgical process compliance. In the ERCP domain, 100% appropriateness and 78.6% efficiency were achieved (Table 2).

Overall, the mean percentage of quality indicators was noted (Table 3). Based on these two values (out of a total

Table 1: Adherence to Quality Indicators.

Question	Type of measure	N-value	YES%
Diagnosis domain:			
Q.1) If a patient presents with acute onset of severe upper abdominal pain, then was acute pancreatitis suspected and were serum amylase and /or lipase levels obtained?	Process	150	100
Q.2) If Amylase/Lipase were not diagnostic, was imaging done?	Process and Appropriateness	15	57.7
Aetiology domain:			
Q.4.a) Was a history of alcohol consumption was taken?	Process	100	100
Q.4.b) Was a history of smoking taken?	Process	100	100
Q.4.c) Was medicine/drugs history taken?	Process	100	100
Q.5.a) Was history of previous attack noted?	Process	49	99.3
Q.5.b) Was family history of pancreatic disease recorded?	Process	90	60
Q.6.a) Were lab test: LFTs done?	Process and efficiency	150	100
Q.6.b) Was lab test TAG level done?	Process and efficiency	31	20.7
Q.6.c) Was lab test serum calcium level done?	Process and efficiency	109	72.7
Q.7) If aetiology is not found, on history, labs, ultrasound, then was an elective imaging done, after the acute phase of pancreatitis had resolved?	Process and Appropriateness	30	46.1
Q.8) ERCP must not have been done to determine the aetiology	Process and Appropriateness	148	98.1
Q.9) If the aetiology remained unknown, was the patient referred to an elective outpatient pancreatic centre, after their recovery from acute pancreatitis.	Process	50	84.8

Continued on next page .....

Table 1: *Continued from previous page.*

Initial Assessment and Risk Stratification domain:			
Q.10.a) Was intravascular volume depletion/ haemoconcentration by orthostatic vital signs assessed and documented?	Process	150	100
Q.10.b) Was intravascular volume depletion/ haemoconcentration by haematocrit assessed and documented?	Process	148	98.1
Q.10.c) Was intravascular volume depletion/ haemoconcentration by BUN assessed and documented?	Process	39	92.7
Q.10.d) Was intravascular volume depletion/ haemoconcentration by creatinine assessed and documented?	Process	148	98.1
Q.11.a) Was assessment and documentation done on the development of organ failure. To determine severity?	Process	144	96
Q.11.b) Was assessment and documentation done on the development of SIRS? To determine severity?	Process	141	94
Q.11.c) Was assessment and documentation done on age to determine the severity?	Process	100	100
Q.11.d) Was assessment and documentation done on the development of impaired mental status? To determine severity?	Process	100	100
Q.11.e) Was assessment and documentation done on the development of pleural effusion? To determine severity?	Process	100	100
Q.12) If SIR /organ failure present, was the patient labelled to be at risk of severe acute pancreatitis?	Process	37	69.8
Initial Management domain:			
Q.13) Was fluid resuscitation initiated within 2 hours of the time of diagnosis?	Process and Efficiency	149	99.3
Q.14) Was ringers lactate preferred unless contraindicated?	Process	100	66.7
Q.15.a) Was fluid resuscitation titrated during first 48 hours according to assessment of vital signs?	Process	150	100
Q.15.b) Was fluid resuscitation titrated during first 48 hours according to assessment of urine output?	Process	150	100
Q.15.c) Was fluid resuscitation titrated during first 48 hours according to assessment of BUN?	Process	97	64.7
Q.15.d) Was fluid resuscitation titrated during first 48 hours according to assessment of hematocrit?	Process	114	76
ERCP domain:			
Q.16) Were patients having acute pancreatitis with cholangitis underwent ERCP within 24 hrs. of diagnosis?	Process and Efficiency	22	78.6
Q.17) If a patient has biliary pancreatitis and low probability of choledocolithiasis, then ERCP is not indicated	Process and Appropriateness	100	100
Q.18) If biliary pancreatitis and intermediate probability of choledocolithiasis then, was imaging (EUS or MRCP) or IOC performed during cholecystectomy before discharge?	Process	28	75.7
Q.19) If a patient with biliary pancreatitis, but not a surgical candidate, then was ERCP with sphincterotomy and stone extraction, performed before discharge?	Process and Efficiency	9	45
Q.20) If diagnosis of biliary pancreatitis and CDL is confirmed, was ductal clearance achieved before discharge?	Process and Efficiency	22	84.6
Nutrition domain:			
Q.21) Was enteral feeding preferred route unless contraindicated - bowel obstruction/paralytic ileus	Process and Appropriateness	141	85.3
Q.22) Was enteral feeding a low-fat solid diet?	Process and Appropriateness	70	46.6
Q.23) If oral feeding was not tolerated within 72 hours, was NJ / NG feed initiated?	Process and Appropriateness	18	94.7
Pharmacotherapy domain:			
Q.24) Was severity of the pain, assessed and managed according to institutional guidelines?	Process and Appropriateness	147	98
Q.25) If patients diagnosed with biliary pancreatitis with evidence of cholangitis, were they on appropriate antibiotics	Process	145	96.3
Q.26) Prophylactic antibiotic must not have been given	Process and Appropriateness	93	73.8
Management of Early Complications (72 hr–4 wk)			
Q.28) If a patient fails to improve clinically within 72 hours of hospital admission, then, was CECT or MRI performed?	Process and Efficiency	25	71.4
Q.29) If a patient has worsening or persistent abdominal distension in association with severe acute pancreatitis, then, were they evaluated for possible abdominal compartment syndrome (If confirmed, managed appropriately)?	Process	12	85.7
Q.30) If a patient with necrotizing pancreatitis has characteristic findings of infection on imaging or clinically deteriorates, then, was infected necrosis suspected, and appropriate antibiotics prescribed?	Process	150	100
Q.31) If a patient with necrotizing pancreatitis has suspected infection on appropriate intravenous antibiotics and clinically deteriorates, then, was, minimally invasive drainage should be performed?	Process	133	88.9
Q32) If a patient with severe acute pancreatitis demonstrates signs of haemorrhage, then, was appropriate workup for vascular complications done?	Process	8	66.6
Surgery domain:			
Q.33) If a patient has acute biliary pancreatitis, then, was surgery consulted to consider cholecystectomy before discharge?	Process	141	94.1
Q.34) If a patient has acute biliary pancreatitis complicated by necrosis or peri-pancreatic fluid collection, then WAS cholecystectomy should be deferred until active inflammation subsides and fluid collection(s) resolve or stabilize?	Process	150	100
Q.35) If a patient has an asymptomatic pseudocyst(s) and pancreatic and/ or extra-pancreatic necrosis, then, drainage interventions should not be performed?	Process	150	100
Q.36) If a patient has symptomatic necrotizing pancreatitis, then open necrosectomy should not have been performed as a first-line treatment	Process	150	100

Continued on next page .....

Table 1: *Continued from previous page.*

Structure of Care domain:			
Q.37) If a patient diagnosed with acute pancreatitis, and had transient organ failure and/or local or systemic complication without persistent organ failure, was he classified as moderately severe pancreatitis?	Outcome	113	75
Q.38) If a patient diagnosed with acute pancreatitis, and had persistent organ failure, was he classified as severe pancreatitis?	Outcome	79	52.4
Q.39) If a patient is diagnosed with severe acute pancreatitis, then the patient should be managed in a centre with expertise or transferred to an expert centre?	Structure of care	150	100
Q.40) If an institution manages patients with acute pancreatitis, then had the hospital had EUS/ERCP services available, or a transfer agreement with a facility that has those capabilities?	Structure of care	150	100

BUN (Blood Urea Nitrogen), SIRS (Systemic Inflammatory Response Syndrome), NG (Nasogastric), CCK (Cholecystokinin), LFT (Liver Function Tests), TAG (Triacylglycerol), EUS (Endoscopic Ultrasound), MRCP (Magnetic Resonance Cholangiopancreatography), IOC (Intraoperative Cholangiography), ERCP (Endoscopic Retrograde Cholangiopancreatography), CDL (Common Bile Duct), N/J (Nasojejunal), CECT (Contrast-Enhanced Computed Tomography), MRI (Magnetic Resonance Imaging), EUS/ERCP (Endoscopic Ultrasound and Endoscopic Retrograde Cholangiopancreatography).

Table-2: Standard performance and target achieved.

Quality Indicators Domain	Type of Quality Measure	Standard Performance (%)	Targets Achieved (%)
Diagnosis	Process	100	96.35
	Process and Appropriateness	100	57.7
Aetiology of Diagnosed Patients	Process	100	90.68
	Process and Appropriateness	100	72.40
	Process and Efficiency	100	64.47
Initial Assessment and Risk Stratification of Diagnosed Patients	Process	100	94.99
Initial Management of Patients (Baseline - 72 hrs)	Process		81.48
	Process and Efficiency	100	76.30
ERCP	Process	100	75.70
	Process and Appropriateness	100	100
	Process and Efficiency	100	78.60
Nutrition in AP Patients	Process and Appropriateness	100	75.53
Pharmacotherapy in AP Patients	Process	100	96.30
	Process and Appropriateness	100	90.60
Management of Early Complications in AP Diagnosed Patients (72 hrs - 4 weeks)	Process	100	85.30
	Process and Efficiency	100	71.4
Surgery in Diagnosed AP Patients	Process	100	98.5
Structure of Care in Diagnosed AP Patients	Outcome	100	63.70
	Structure of Care	100	100

ERCP – Endoscopic Retrograde Cholangiopancreatography, AP – Acute Pancreatitis

Table-3: Overall mean percentage.

Type of Measure	Quality Measures Target achieved (Overall %)
Process	91
Process and Appropriateness	80.09
Process and Efficiency	71.54
Outcome	63.70
Structure of care	100

Targets achieved for each domain were calculated by averaging all quality measures; for example, in the diagnosis domain, process measures of 100% and 92% yielded a mean of 96.35% (Table 2), with a standard deviation of 4% (population) or 5.66% (sample), indicating the consistency of performance.

sample size of 150), the standard deviation was calculated by determining the deviation of each measure from the mean, squaring these deviations, and then averaging them. Using this approach, the population standard deviation is 4%, while the sample standard deviation (using n-1) is approximately 5.66%.

Discussion

The current study assessed various quality measures and revealed a critical gap between system structure and effective clinical execution. It was found that the diagnostic process closely followed standards in about 96.35% of cases. However, correct treatment (appropriateness) was provided to only about half of the diagnosed patients, suggesting a lack of clinical judgment or expertise rather than a failure of protocols. Aetiology determination was correct for most patients, but there was some lack of efficiency, which indicated operational flaws, such as poor care coordination and logistical delays that inflate effort and waste resources.

Initial assessment and risk stratification were accurate for >75% of the patients, with a similar proportion receiving timely initial management within 72 hours. Most patients received the indicated, appropriate and efficient ERCP. Nutrition and pharmacotherapy for the majority of AP patients followed treatment guidelines.

The current data suggests that the management of early complications in AP met the standards, but it was not efficient in terms of input effort, cost-effectiveness and resource utilisation. Only 71.40% patients experienced efficient management.

Most study participants received surgical input, which adhered to international guidelines. Despite having all the necessary resources, infrastructure and strong hospital policies for optimal patient care, only 63.7% patients achieved expected outcomes, indicating a need for an improved healthcare system. This requires a systemic shift away from adhering to rules towards enhancing clinical competence and streamlining workflows, to close the efficiency and outcomes gap.

The current study revealed that some patients were misdiagnosed with AP without proper imaging tests. This resulted in a significant shortfall in meeting the established

benchmark for the appropriateness of AP diagnosis. Imaging techniques, such as endoscopic ultrasound (EUS), ERCP and computed tomography (CT), may not provide significant additional sensitivity in diagnosing pancreatic disease compared to clinical assessment, including laboratory values (9). The study also focussed on a group of patients with a high suspicion of pancreatic disease, suggesting that advanced imaging techniques may not significantly impact the sensitivity or specificity of a pancreatitis diagnosis compared to the clinical assessment of symptoms and laboratory parameters. Family history is crucial in determining the cause of AP. However, only 60% of the patients provided it, making it difficult to assess the condition. Failure to ask family history of pancreatitis reflects a gap in clinical education and awareness regarding the genetic complexity of AP.[9] It is either being inquired about less frequently or assessed less thoroughly by doctors during the initial assessment. Clinicians may not recognise the critical importance of documenting hereditary pancreatitis risk, which involves gene-environment interactions, so considering genetic risk and hereditary pancreatitis is crucial, especially for first-degree relatives.[9]

Most patients had liver and serum calcium tests for AP, but only 20% had triglyceride tests. This leads to inefficient diagnosis, as hypertriglyceridaemia-induced AP requires a level >1000mg/dl.[9] Further, 72.4% patients had satisfactory aetiology determination. Lack of elective imaging for unclear cases may be due to resource constraints or physician judgment errors, influenced by the young age of the patient and the high prevalence of gallstone-related AP in Pakistan.

The inability to identify the precise cause of pancreatitis can lead to recurring cases. Patients were referred for specialised outpatient evaluation instead of aetiology-specific ERCP, which aligns with good clinical practice. Initial assessment and risk stratification were conducted with 94.99% accuracy. Intravascular volume depletion was thoroughly assessed, including vital signs, haematocrit, Blood Urea Nitrogen BUN, and creatinine. Systemic Inflammatory Response Syndrome SIRS indicators were evaluated and documented. Some patients developed SIRS, with 69.8% classified as cases of severe AP.

The initial management process and efficiency were satisfactory. Most patients received resuscitation within two hours of admission. However, two- thirds preferred Ringer's lactate, while 33.3% used normal saline. A study in Nepal found Ringer's lactate more effective than normal saline in reducing SIRS symptoms, especially within 24 hours.[10] Most patients had their fluid titration and documentation well-managed within 48 hours. However, 18.7% had AP complicated by cholangitis, and in 20% of these cases, ERCP was not performed within the recommended 24-hour timeframe. To avoid post-ERCP pancreatitis, peri-procedural rectal non-steroidal anti-inflammatory drugs (NSAIDs) are recommended by the American Society of Gastrointestinal Endoscopy.[11] ERCP was not performed in low-risk biliary pancreatitis patients. For intermediate-risk patients, adjunctive imaging or intraoperative cholangiography was performed before discharge. More than 75% of the patients who needed ERCP underwent the procedure.

In non-surgical cases, only 45% patients underwent ERCP. In confirmed chronic liver disease (CLD) cases, 84.6% patients had ductal clearance before discharge, resulting in a positive outcome for the ERCP domain of process, appropriateness and efficiency.

Most individuals received appropriate nutrition with enteral feed, which was well-tolerated in diagnosed patients, reducing the need for nasogastric tubes NG tubes. However, over half of the patients transitioned to soft or full liquid diets instead of a low-fat solid diet, possibly due to insufficient awareness of its benefits. Low-fat elemental diet therapy was found useful in pain control in cases of chronic pancreatitis.[12]

Almost all patients received appropriate pharmacotherapy, including pain assessment and the correct antibiotics for those with cholangitis. However, it was noticed that only about 22% of patients received prophylactic antibiotics, which contradicts the guidelines, as they have no role in AP management. It is crucial to emphasise that prophylactic antibiotics are not useful in AP management. To evaluate the role of prophylactic antibiotics, a non-systematic review of current evidence, including meta-analyses and randomised controlled trials, was conducted. The evidence for the role of prophylactic antibiotics in treating Acute Pancreatitis remains inconclusive.[13]

The management process for early complications was satisfactory for >75% patients. However, contrast-enhanced CT (CECT) or magnetic resonance imaging (MRI) scan with contrast was not performed for 28.6% of the diagnosed patients who failed to show clinical improvement within 72 hours, resulting in an overall process score of 71.4%. Most early complication management indicators were appropriately done for most patients, resulting in a process score of >85%. The surgery domain met the standard with a score >95%. Consultations for cholecystectomy were given to almost all acute biliary pancreatitis patients. Same-day cholecystectomy for mild gallstone AP lowers complications compared to delayed cholecystectomy, indicating its benefit for mild AP patients without infection.[14]

A few asymptomatic pseudocysts or necrosis cases

underwent drainage interventions. Most symptomatic necrotising pancreatitis patients did not undergo open necrosectomy as the first choice. The current data showed a suboptimal outcome of 63.7% due to inconsistent documentation for moderate and severe AP cases. However, the optimal care structure was maintained with all necessary expertise and available EUS/ERCP services. High-fat diets stimulate cholecystokinin CCK hormone, which activates pancreatic enzymes. A low-fat diet is recommended for pancreatitis patients. Prophylactic antibiotics have no role in AP treatment, but early use may help patients with elevated inflammatory markers. Further research is needed to confirm the benefits of a low-fat diet for pancreatitis patients.

The current study has limitations as the sample was small, with an even smaller subset having severe AP and necrotising pancreatitis. Data was collected over a single year from a single centre, and there was a lack of information on patient follow-up. Future studies addressing these limitations are needed to validate the current findings.

Based on these findings, it is essential to improve communication among different departments regarding a patient's condition. Sessions focussing on AP management, following international best practices, should be organised and made mandatory for trainees in departments dealing with AP patients. Additionally, clinical trials should be conducted to investigate the benefits of a low-fat diet for AP patients, to explore whether prophylactic antibiotics play a role in AP treatment, and whether probiotics have any adverse effects when administered to patients with severe AP.

Conclusion

There was a considerable level of adherence to guidelines in several acute pancreatitis management aspects. However, areas for improvement existed, notably in aetiology determination and imaging utilisation.

Acknowledgement: We are grateful to medical students Amna Hanfee and Zaib-un-Nisa Kamran for editorial assistance.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

1. Hameed T, Shah I, Khan AQ, Ahmad M, Khan AZ. Factors leading to acute pancreatitis in tertiary care hospitals in Pakistan: a multicentre study. J Rawalpindi Med Coll 2018;22:23-6
2. Vivian E, Cler L, Conwell D, Coté GA, Dickerman R, Freeman M, et al. Acute pancreatitis task force on quality: development of quality indicators for acute pancreatitis management. Am J Gastroenterol 2019;114:1322-42. doi:10.14309/ajg.0000000000000340
3. Li CL, Jiang M, Pan CQ, Li J, Xu LG. The global, regional, and national burden of acute pancreatitis in 204 countries and territories, 1990-2019. BMC Gastroenterol 2021;21:332. doi:10.1186/s12876-021-01936-2
4. Iannuzzi JP, King JA, Leong JH, Quan J, Windsor JW, Tanyingoh D, et al. Global incidence of acute pancreatitis is increasing over time: a systematic review and meta-analysis. Gastroenterology 2022;162:122-34. doi:10.1053/j.gastro.2021.10.035
5. Ahmed R, Shafique MS, Ahmad SH, Hassan M, Adnan N, Rasheed G, et al. Spectrum of acute pancreatitis on surgical floor of a tertiary care hospital. Rawal Med J 2016;41:31-5
6. Kapadia NN, Siddiqui E. Bedside index (BISAP) v/s Ranson scores in predicting mortality and severity in patients with acute pancreatitis. J Pak Med Assoc 2021;71:1988-91
7. Matta B, Gougol A, Gao X, Reddy N, Talukdar R, Kochhar R, et al. Worldwide variations in demographics, management, and outcomes of acute pancreatitis. Clin Gastroenterol Hepatol 2020;18:1567-75.e2. doi:10.1016/j.cgh.2019.10.025
8. World Health Organization. ICD-10 version: 2019. [Online] [Cited 2024 January 21]. Available from: URL:https://icd.who.int/browse10/2019/en
9. Weiss FU, Laemmerhirt F, Lerch MM. Acute pancreatitis: genetic risk and clinical implications. J Clin Med 2021;10:190. doi:10.3390/jcm10020190
10. Karki B, Thapa S, Khadka D, Karki S, Shrestha R, Khanal A, et al. Intravenous Ringer's lactate versus normal saline for predominantly mild acute pancreatitis in a Nepalese tertiary hospital. PLoS One 2022;17:e0263221. doi:10.1371/journal.pone.0263221
11. Buxbaum JL, Freeman M, Amateau SK, Chalhoub JM, Coelho-Prabhu N, Desai M, et al. American Society for Gastrointestinal Endoscopy guideline on post-ERCP pancreatitis prevention strategies: summary and recommendations. Gastrointest Endosc 2023;97:153-62. doi:10.1016/j.gie.2022.10.024
12. Ikeura T, Takaoka M, Uchida K, Miyoshi H, Okazaki K. Beneficial effect of low-fat elemental diet therapy on pain in chronic pancreatitis. Int J Chronic Dis 2014;2014:862091. doi:10.1155/2014/862091
13. Badia JM, Amador S, González-Sánchez C, Rubio-Pérez I, Manuel-Vázquez A, Juvany M, et al. Appropriate use of antibiotics in acute pancreatitis: a scoping review. Antibiotics 2024;13:894. doi:10.3390/antibiotics13090894
14. Mandalia A, Wamsteker EJ, DiMagno MJ. Recent advances in understanding and managing acute pancreatitis. F1000Res 2018;7:1-10. doi:10.12688/f1000research.14894.1

Author Contribution:

MBKQ: Developed the research idea, design, data collection, revision and editing.
ZS: Supervision, developed the research idea, methodology and data collection.
HS: Data collection, analysis and interpretation.
NJQ: Data collection.
OP: Design and supervision.