

Association between Obesity and Mortality in Patients with Acute Pancreatitis

Nawal Moeen^{1*}, Muhammad Imran Anwar¹, Bilal Afsar¹, Aqsa Javaid²

¹Department of General Surgery and Surgical Oncology, Unit-1, Sheikh Zayed Medical Complex, Lahore, Pakistan

²Department of General Surgery, Lahore General Hospital, Lahore, Pakistan

*Corresponding author's email address: nawalmn871@gmail.com

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Abstract: Obesity is increasingly recognized as an important modifier of disease severity and outcomes in acute pancreatitis. Excess adiposity may worsen the inflammatory response, leading to a more severe clinical course and higher mortality. Limited local data are available regarding this association in the Pakistani population. This study assessed the impact of obesity on disease severity, complications, and mortality in patients with acute pancreatitis. **Methods:** An observational analytical study was conducted among 80 patients diagnosed with acute pancreatitis at Shaikh Zayed Hospital, Lahore, from June to December 2024. Demographic variables, body mass index (BMI), etiology, severity based on the Revised Atlanta Classification, and clinical outcomes were recorded. Patients were categorized as obese or non-obese using WHO South Asian BMI cutoffs. Outcomes compared between the two groups included severity, ICU admission, organ failure, length of stay, and mortality. Logistic regression identified independent predictors of mortality. Data were analyzed using SPSS 26. **Results:** The mean age of patients was 47.6 ± 13.2 years, with 52.5 percent males. Obesity was present in 35.0 percent of the cohort. Gallstones were the most common etiology (45 percent). Severe pancreatitis occurred more frequently in obese patients compared with non-obese patients (35.7 percent vs 15.4 percent). Obese patients also had significantly higher rates of ICU admission (42.8 percent vs 19.2 percent), organ failure (32.1 percent vs 11.5 percent), longer hospital stay (9.1 ± 3.4 vs 6.8 ± 2.9 days), and higher mortality (25 percent vs 5.8 percent). In multivariable analysis, obesity (adjusted OR 3.84), severe pancreatitis (adjusted OR 5.76), and organ failure (adjusted OR 4.19) emerged as independent predictors of mortality. **Conclusion:** Obesity was strongly associated with increased severity, complications, prolonged hospitalization, and higher mortality in patients with acute pancreatitis. These findings highlight the need for early risk stratification and tailored management strategies for obese individuals presenting with acute pancreatitis.

Keywords: Acute pancreatitis, Obesity, Severity, Mortality, Risk factors

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Introduction

Acute pancreatitis (AP) is an inflammatory condition of the pancreas that can lead to significant morbidity and mortality, making it a critical gastrointestinal emergency. The pathophysiology of acute pancreatitis involves an interplay of various risk factors, of which obesity emerges as a significant contributor. Obesity, defined by a body mass index (BMI) of 30 kg/m^2 or higher, is associated with a higher incidence and severity of AP, ultimately influencing patient outcomes (1,2,3). In obese patients, visceral adiposity may exacerbate the inflammatory response, leading to greater complications, including acute kidney injury and systemic inflammatory responses (4,5,2).

Emerging evidence underscores that obesity not only predisposes individuals to AP but also correlates with increased mortality rates. A meta-analysis demonstrated that obese individuals have nearly three times the odds of developing severe acute pancreatitis (SAP) compared to their non-obese counterparts (2). Moreover, the severity of AP further escalates mortality among obese patients, as highlighted in various studies that quantified the adverse outcomes associated with increased BMI in the context of acute pancreatitis (6,7,8).

Furthermore, the global incidence of acute pancreatitis, particularly in the context of rising obesity rates, is increasing. This trend poses substantial challenges for healthcare systems worldwide, including in Pakistan, where lifestyle-related changes are prevalent (8,9). Patients with obesity often develop metabolic syndrome, which not only increases their risk for acute pancreatitis but also complicates their recovery and increases mortality rates (4,2,10). The metabolic alterations associated with obesity, including altered inflammatory pathways, contribute to worse outcomes following an acute pancreatitis episode (10,11).

The association between obesity and pancreatitis mortality underlines the importance of understanding this demographic's needs in clinical management and prevention strategies. With the rising prevalence of obesity in Pakistan, a detailed evaluation of its impact on acute pancreatitis outcomes is paramount. Recent analyses indicated that localized lifestyle factors, such as dietary habits and physical activity, uniquely affect the Pakistani population's health outcomes, further emphasizing the need to tailor intervention protocols specifically for this demographic (9,12).

Rationale in the Pakistani context emerges from these findings; given the national increase in obesity and related health complications, concentrated public health efforts are necessary to mitigate the risk factors for acute pancreatitis. Investigating the specific influence of obesity on mortality in Pakistani patients with acute pancreatitis will not only contribute to global health literature but also provide targeted insights that can enhance healthcare outcomes in a region experiencing high rates of obesity-related morbidity.

Methodology

This observational analytical study was conducted in the Shaikh Zayed Hospital, Lahore

from June to December 2024. Consecutive adult patients diagnosed with acute pancreatitis were enrolled after confirmation by clinical presentation, elevated serum amylase or lipase levels at least 3 times the upper normal limit, and, where required, characteristic radiological findings on contrast-enhanced CT. Exclusion criteria included chronic pancreatitis, recurrent episodes with incomplete records, pregnancy,



trauma-related pancreatitis, and patients discharged against medical advice.

Demographic data, including age, gender, BMI, and clinical parameters such as etiology and disease severity, were recorded using a structured proforma. BMI was categorized according to the WHO South Asian criteria. Severity was classified using the Revised Atlanta Classification. Outcomes assessed included ICU admission, organ failure, length of stay, and in-hospital mortality. Laboratory and radiological findings were cross-verified using patient records.

Data analysis was performed using SPSS version 26. Continuous variables were expressed as mean and standard deviation, while categorical variables were reported as frequencies and percentages. Group comparisons between obese and non-obese patients were evaluated using chi-square or Fisher's exact test for categorical variables and independent t-tests for continuous variables. Logistic regression was used to identify independent predictors of mortality, adjusting for clinically relevant

confounders. A p-value less than 0.05 was considered statistically significant. Ethical approval was obtained from the institutional review board, and all patient identifiers were kept confidential throughout.

Results

The study included 80 patients with a mean age of 47.6 ± 13.2 years, and the gender distribution was nearly equal, with 52.5% males and 47.5% females. Most participants were non-obese (65.0%), while 35.0% were obese. Gallstones were the most common cause of pancreatitis (45 percent), followed by idiopathic cases, hypertriglyceridemia, and alcohol related etiologies. According to the Revised Atlanta Classification, nearly half had mild pancreatitis, 30 percent had moderately severe disease, and 22.5 percent presented with severe disease. Overall mortality was 12.5 percent (Table 1).

Table 1. Baseline Demographic and Clinical Characteristics of Study Participants

Variable	Total (n=80)
Age (years), mean \pm SD	47.6 \pm 13.2
Male gender, n percent	42 (52.5)
Female gender, n percent	38 (47.5)
BMI category	
• Non-obese (<27.5 kg/m ²)	52 (65.0)
• Obese (\geq 27.5 kg/m ²)	28 (35.0)
Etiology	
• Gallstone pancreatitis	36 (45.0)
• Alcohol-related	10 (12.5)
• Hypertriglyceridemia	12 (15.0)
• Idiopathic	22 (27.5)
Severity (Revised Atlanta Classification)	
• Mild	38 (47.5)
• Moderately severe	24 (30.0)
• Severe	18 (22.5)
Mortality	10 (12.5)

When comparing outcomes, obese patients had significantly worse clinical profiles than non-obese patients. Severe pancreatitis was more common among obese individuals, ICU admission rates were higher,

and their hospital stay was longer. Organ failure and mortality were also more frequent in the obese group, with strong statistical significance (Table 2).

Table 2. Comparison of Clinical Outcomes Between Obese and Non-Obese Patients

Outcome	Non-obese (n=52)	Obese (n=28)	p-value
Severe pancreatitis, n percent	8 (15.4)	10 (35.7)	0.032
ICU admission, n percent	10 (19.2)	12 (42.8)	0.018
Length of stay (days), mean \pm SD	6.8 \pm 2.9	9.1 \pm 3.4	0.001
Organ failure, n percent	6 (11.5)	9 (32.1)	0.017
Mortality, n percent	3 (5.8)	7 (25.0)	0.010

In multivariable logistic regression, obesity remained an independent predictor of mortality along with severe pancreatitis and organ failure.

Age 60 years or older increased the odds of mortality, but this difference was not statistically significant (Table 3).

Table 3. Logistic Regression Showing Predictors of Mortality

Variable	Adjusted OR	95 percent CI	p-value
Obesity (BMI \geq 27.5 kg/m ²)	3.84	1.31–11.25	0.014
Severe pancreatitis	5.76	2.02–16.43	<0.001
Organ failure	4.19	1.52–11.56	0.006
Age (>60 years)	2.11	0.77–5.89	0.138

Discussion

In evaluating the outcomes and clinical characteristics of patients with acute pancreatitis (AP) in relation to obesity, our study highlights several noteworthy comparisons consistent with the recent literature. In our cohort of 80 individuals, the average age was 47.6 years, with a slight male predominance (52.5%). Notably, 35.0% of participants were classified as obese based on their BMI.

The data indicated that gallstones were the predominant etiology for AP (45.0%), corroborating findings from other studies that consistently indicate gallstone disease as a leading cause of acute pancreatitis (13). Importantly, idiopathic cases, as well as conditions attributed to hypertriglyceridemia and alcohol consumption, revealed diverse contributing factors represented across different populations (13). Such variability emphasizes the necessity for thorough diagnostic evaluations in AP.

Our study's classification of pancreatitis severity according to the Revised Atlanta Classification shows that nearly half of our cohort had mild pancreatitis (47.5%), consistent with reports of similar proportions in larger populations (14). The mortality rate of 12.5% observed in our study is consistent with findings across various cohorts, where mortality rates can vary widely depending on the severity classification (15).

A significant finding of our study is the adverse clinical outcomes associated with obesity in AP patients. Specifically, severe pancreatitis was found to be more prevalent in obese individuals (35.7% vs. 15.4% in non-obese), corroborating evidence from Pellegrini et al., who noted that obesity exacerbates the severity of acute pancreatitis, driven by increased visceral fat and a consequent pro-inflammatory state (16). Our ICU admission rates were also higher among obese patients (42.8% vs. 19.2% in non-obese), consistent with findings suggesting that obesity significantly contributes to poor clinical outcomes and extended hospital stays (16,15).

The length of hospital stay was notably longer for obese patients in our study (9.1 days vs. 6.8 days), further highlighting the impact of obesity on recovery and hospitalization costs. These results resonate with Huang et al., who reported that obesity exacerbates gastrointestinal injuries in the context of acute pancreatitis, potentially extending the duration of hospitalization (17).

In our logistic regression analysis, obesity remained a significant risk factor for mortality, with an adjusted odds Ratio of 3.84. This finding is in line with multiple studies, which emphasize that obesity undermines overall outcomes in critically ill patients and correlates strongly with increased mortality rates in acute illnesses, as reported by Ayoup et al. (18). The association of severe pancreatitis and organ failure as independent predictors of mortality is consistent across the literature.

Our findings underscore the detrimental framework obesity creates in the setting of acute pancreatitis, thereby impacting severity, clinical outcomes, and mortality rates. Recognizing obesity as an independent predictor of adverse outcomes in AP necessitates tailored management strategies for this patient population. Given the rising obesity epidemic, particularly in regions like Pakistan, healthcare systems should prioritize early identification and intervention strategies for obese patients with acute pancreatitis to improve clinical outcomes and reduce health expenditure.

In Pakistan, the increasing prevalence of obesity, alongside rising cases of acute pancreatitis related to dietary changes and lifestyle factors, highlights the urgent need for public health initiatives. Addressing obesity-related complications necessitates a multifaceted approach, including lifestyle modification programs and improved clinical management protocols that could significantly impact health outcomes in the Pakistani populace.

Conclusion

This study demonstrates that obesity significantly worsens the clinical course of acute pancreatitis, increasing the likelihood of severe disease,

organ failure, prolonged hospital stay, and in-hospital mortality. Obesity remained an independent predictor of death even after adjusting for clinical confounders. These findings emphasize the importance of early recognition of high-risk obese patients, proactive monitoring, and optimized supportive care. With rising obesity rates in Pakistan, targeted strategies in prevention, early diagnosis, and clinical management are essential to improve outcomes in this vulnerable population.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMS-033-24)

Consent for publication

Approved

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Conflict of interest

The authors declared no conflict of interest.

Author Contribution

NM (PGR General Surgery)

Manuscript drafting, Study Design,

MIA (Head Of Department, Director of Medical Education, Director of Accident & Emergency)

Review of Literature, Data entry, Data analysis, and drafting articles.

BA (PGR General Surgery)

Conception of Study, Development of Research Methodology Design,

AJ (PGR General Surgery)

Study Design, manuscript review, and critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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