



Association of Obesity with Complications of Acute Pancreatitis

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Abstract: Background: Acute Pancreatitis is a major clinical issue and has high rate of mortality. So its prevention and early detection of severity is essential for improved clinical results and survival. **Aim:** The aim of this study was to find out the association of Obesity with complications of acute pancreatitis. **Materials and method:** The present prospective study was carried out at the Department of General surgery Bolan medical college Quetta from June 2025 to November 2025 after taking approval from the ethical committee of the hospital. Individuals of both genders and different age groups (ranged 22-70 years) diagnosed with acute pancreatitis based on biochemical (high plasma amylase or lipase, upper or lower abdominal pain) and clinical characteristic (CRP of above 10mg/dl serum concentration) were included in this study. Sample size was determined using WHO calculator. a total of 204 individuals were enrolled out of which 102 were obese and 102 were non obese. clinical and biochemical assessment was done for each participant. Data was entered and analyzed using SPSS version 26. **Results:** A total of 202 individuals diagnosed with acute pancreatitis were enrolled. The mean age of the study population was 54.27 ± 12.21 years and that for obese was 54.32 ± 11.21 and non-obese was 54.23 ± 13.19 years. Obese individuals weighed 91.31 ± 7.26 kg, whereas non-obese participant's weight was 71.63 ± 10.89 kg. Obese individuals had mean height was 163.92 ± 6.60 cm, while non-obese height was 171.40 ± 8.25 cm. There were substantial differences in weight and height across the groups. Gender wise distribution showed that male were more common in non-obese group 62 (60.8%) as compared to female 40 (39.2%). Over all male were 114 (55.9%) and female were 114 (55.9%). Death rate in the hospital was higher in the individuals with obesity 16(15.6%) as compared to non-obese individuals 4(4%). This difference was statistically significant between the two groups. Similarly Obese group had high rate of organ failure 48(47.05%) compared to individuals with no obesity 26(25.4%) (p -value <0.05). Necrosis was high in obese group but was not statistically significant (p-value > 0.05). **Conclusion:** Obesity was shown to be significantly associated with worse outcomes in acute pancreatitis. Obese individuals had higher rate of hospital associated death rate and organ failure than their non-obese individuals.

Keywords: Obesity; Association; Acute Pancreatitis; Outcomes

INTRODUCTION

Acute pancreatitis (AP) is defined as the infection and degeneration of pancreatic acinar cells of pancreas. In

the United States. It is one of the top causes of hospitalizations linked to gastrointestinal illnesses.¹The prevalence of AP ranges from 4 to more

than 100 per 100,000 people annually in Europe. The major risk factors of AP are diabetes mellitus, smoking, alcohol abuse and gallstones.² Severe AP occurs in around 20% of patients and is associated with consequences such as walled-off pancreatic necrosis, acute kidney damage (AKI), including acute respiratory distress syndrome (ARDS). It has a 30% mortality rate, and early detection of severity is essential for improved clinical results and survival.³⁻⁴ A body mass index (BMI) of 30 kg/m² or more of an individual is termed as obesity. Its prevalence increased from 30.5% in 2000 to 41.9% in 2020, making it a global pandemic.⁵ The metabolic and cardiovascular consequences of obesity are well-established in the peer-reviewed literature, and it contributes 0.7% - 2.8% of overall healthcare costs.⁶ Obesity is becoming more common, and so is the prevalence of AP. Obesity has been linked to gallstone development, diabetes, and hyperlipidemia, all of which are risk factors for AP.⁷ Obesity has been linked in certain studies to both local and systemic problems as well as AP mortality. The postulated mechanism being breakdown of adipocytes by pancreatic enzymes during acute inflammation resulting in out flux of unsaturated fatty acids contributing to local and systemic problems.⁷⁻⁸ While some studies identified obesity as a substantial changeable risk variable for AP & related complications, the peer-reviewed literature has inconsistent findings. Certain studies even show a counterintuitive impact of obesity in acute pancreatitis.⁸⁻⁹ The present study was conducted to find out the Association of Obesity with complications of acute pancreatitis.

MATERIALS AND METHODS

The present prospective study was carried out at the Department of General surgery Bolan medical college Quetta from June 2025 to November 2025 after taking approval from the ethical committee of the hospital. Individuals of both genders and different age groups (ranged 22-70 years) diagnosed with acute pancreatitis based on biochemical (high plasma amylase or lipase,

upper or lower abdominal pain) and clinical characteristic (CRP of above 10mg/dl serum concentration) were included in this study. While individual with chronic pancreatitis or not willing to participate were excluded from the study. Written consent was taken from each participant. Serum samples were obtained within twenty-four hours of hospital admission. Sample size was determined using WHO calculator. The sample size determined was 204. According to the WHO guidelines BMI was defined.¹⁰ The study divided the individuals with acute pancreatitis into two groups: those with a normal BMI (102 participants) and those with a BMI >30kg/m². (102 participants). Non-probability sequential sampling method was used for data collection. There were 102 participants, both exposed (obesity) and unexposed (not obese). Clinical, physiological, and biochemical data were documented. Patients were categorized into three categories (mild, moderate, and severe acute pancreatitis) according to the Atlanta classification.¹¹ Patients were monitored for ten days to assess the results of acute pancreatitis. Data was entered and analyzed using SPSS version 26. To evaluate the normality of the data the Shapiro-Wilk test was used. BMI, weight Age, length of ICU admission and height were expressed as means and standard deviations. Frequency and percentages were used for representation of Gender, chronic illnesses such as hypertension, diabetes, a family history of acute pancreatitis, in-hospital mortality, organ failure and necrosis. Acute pancreatitis outcomes have been compared among exposed and unexposed groups using Chi-square or Fisher exact tests, with statistical significance defined as $p < 0.05$ and $RR > 1$ indicating a significant connection. Stratification was performed to control confounders such age, sex, family history of acute pancreatitis, and comorbidities to examine the influence of these on outcomes of the exposure and non-exposed group.

RESULT

A total of 202 individuals diagnosed with acute pancreatitis were enrolled. The mean age of the study population was 54.27 ± 12.21 years and that for obese was 54.32 ± 11.21 and non-obese was 54.23 ± 13.19 years. Obese individuals weighed 91.31 ± 7.26 kg, whereas non-obese participant's weight was 71.63 ± 10.89 kg. Obese individuals had mean height was 163.92 ± 6.60 cm, while non-obese height was 171.40 ± 8.25 cm. There were substantial differences in weight and height across the groups. Gender wise distribution showed that male were more common in non-obese group 62 (60.8%) as compared to female 40 (39.2%). Over all male were 114 (55.9%) and female were 114 (55.9%). Among the study participants 64 patients (31.6%) had mild 104 (51.48%) with moderate and 34 (16.8%) with severe pancreatitis. The frequency of hypertension and family history of acute pancreatitis were comparable between the groups. While diabetes mellitus was more common 65 (63.7%) in non-obese individuals as compared to obese group 54 (52.9%). The mean hospital stay and the length of ICU stay were similar across obese and non-obese groups as explained in **table 1**. Death rate in the hospital was higher in the individuals with obesity 16(15.6%) as compared to non-obese individuals 4(4%). This difference was statistically significant between the two groups. Similarly Obese group had high rate of organ failure 48(47.05%) compared to individuals with no obesity 26(25.4%) (p -value < 0.05). Necrosis was high in obese group but was not statistically significant (p -value > 0.05) as shown in

table 2.

Table 1. Demographic features of the study population.			
Features	Obese	Non-Obese	Total
Mean age in years	54.32 ± 11.21	54.23 ± 13.19	54.27 ± 12.21
Mean Weight in kg	91.31 ± 7.26	71.63 ± 10.89	82.48 ± 12.81
Mean Height in cm	163.92 ± 6.60	171.40 ± 8.25	167.68 ± 8.35
Mean ICU stay in days	2.86 ± 1.38	2.94 ± 1.40	2.90 ± 1.39
Mean hospital stay in days	8.48 ± 4.55	9.17 ± 4.84	8.81 ± 4.70
Female	50 (49.0%)	40 (39.2%)	90 (44.1%)
Male	52 (51.0%)	62 (60.8%)	114 (55.9%)
Hypertension	42 (41.2%)	48 (47.1%)	90 (44.1%)
Family History of AP	19 (18.6%)	16 (15.7%)	35 (17.2%)

Table 2. Comparison of Acute Pancreatitis Outcomes in Obese (n=102) vs Non-Obese Groups(n=102)				
Outcomes	Obese	Non obese	Relative risk (95% C.I.)	Value of P
Organ failure	48(47.05%)	26(25.4%)	1.602 (1.213 - 2.114)	0.0017*
Necrosis	19(18.6%)	11(10.7%)	1.319 (0.946 - 1.839)	0.144
Hospital mortality	16(15.6%)	4(4%)	1.764 (1.343 - 2.318)	0.0451*
*p (<0.05) is statistically significant, C.I. = Confidence Interval				

DISCUSSION

Acute pancreatitis is defined by the production and activation of an enzyme trypsinogen to trypsin, which leads in tissue destruction. It manifests with stomach pain extending to the back, nausea, vomiting, and fever. The prognosis is variable, but the death rate is high. Most individuals recover without complications. However, a variety of complications, including acute respiratory distress syndrome, systemic inflammatory response syndrome, sepsis, and multi-organ failure with pancreatic necrosis, may occur. Various scoring systems based on clinical and biochemical data, have been used to predict the severity of acute pancreatitis.¹³ Furthermore, the Revised Atlanta classification was utilized to classify acute pancreatitis into mild, moderately severe, and severe categories.¹⁴ Obesity & outcomes in individuals with acute pancreatitis were shown to be significantly correlated in many Asian and Pakistani studies.¹⁵⁻¹⁶

A total of 202 individuals diagnosed with acute pancreatitis were enrolled. The mean age of the study population was 54.27 ± 12.21 years and that for obese was 54.32 ± 11.21 and non-obese was 54.23 ± 13.19 years. Over all male were 114 (55.9%) and female were 90 (44.1%). Among the study participants 64 patients (31.6%) had mild 104 (51.48%) with moderate and 34 (16.8%) with severe pancreatitis. Similar demographic features were reported from the study carried out by Zahoor in which male were dominated over female and most of the participants had moderate pancreatitis which support our study.¹⁷ In our study death rate in the hospital was higher in the individuals with obesity 16(15.6%) as compared to non-obese individuals 4(4%). This deference was

statistically significant between the two groups. Similarly Obese group had high rate of organ failure 48(47.05%) compared to individuals with no obesity 26(25.4%) (p -value <0.05). Necrosis was high in obese group but was not statistically significant. Our findings are comparable to those of Papachristou et al. Obese persons with BMI >30kg/m² had significantly greater incidence of organ failure (31 percent), necrosis (17 percent), & mortality (14%), compared to normal/non-obese adults with BMI <30 kg/m² (14 percent, 8%, & 1.4%, respectively).¹⁸ our findings are also comparable to another study in which it was reported that obesity is strongly associated with AP.¹⁷ Obesity is a known risk factor for acute pancreatitis in all age groups, as it is for many other conditions. Thavamani et al. from the United States investigated the effect of morbid obesity on the clinical outcomes of acute pancreatitis in a juvenile population. Obesity was found to be a co-morbid independent predictor of adverse outcomes in the juvenile group with acute pancreatitis.¹⁹ Another study investigated the influence of demographic variables, obesity, and related health conditions on the onset of acute pancreatitis and discovered that coexisting health conditions, pancreatic necrosis, and those who underwent open surgical necrosectomy within thirty days, were significantly associated with mortality within thirty days as well as chronic organ failure.²⁰ These results are fairly comparable to what we found. Further studies are required to investigate the link between obesity and AP effects.

Limitations of the study

The study failed to investigate the possible mechanisms underlying the connection between

obesity and negative outcomes. Furthermore, the study failed to consider other confounding variables such as inherited traits, lifestyle choices, or specialized medical histories that might have affected the outcome.

CONCLUSION

Obesity was shown to be significantly associated with worse outcomes in acute pancreatitis. Obese individuals had higher rate of hospital associated death rate and organ failure than their non-obese individuals.

BIBLIOGRAPHY

1. Dahiya DS, Sharma NR, Perisetti A et al. The influence of obesity on acute pancreatitis hospitalizations: Does body mass index matter? *Pancreas*. 2023;52:e171–e178.
2. Aune D, Mahamat-Saleh Y, Norat T, Riboli E. High body mass index and central adiposity is associated with increased risk of acute pancreatitis: A meta-analysis. *Dig Dis Sci*. 2021;66:1249–1267. 10.1007/S10620-020-06275-6.
3. Duarte-Rojo A, Sosa-Lozano LA, Saúl Á et al. Methods for measuring abdominal obesity in the prediction of severe acute pancreatitis, and their correlation with abdominal fat areas assessed by computed tomography. *Aliment Pharmacol Ther*. 2010;32:244–253. 10.1111/J.1365-2036.2010.04321.
4. Krishna SG, Hinton A, Oza V et al. Morbid obesity is associated with adverse clinical outcomes in acute pancreatitis: A propensity-matched study. *Am J Gastroenterol*. 2015;110:1608–1619. 10.1038/AJG.2015.343.
5. Centers for Disease Control and Prevention. Overweight and Obesity: Adult Obesity Facts. <https://www.cdc.gov/nchs/fastats/obesity-overweight.html>. Accessed July 1, 2024.
6. Dobszai D, Mátrai P, Gyöngyi Z et al. Body-mass index correlates with severity and mortality in acute pancreatitis: A meta-analysis. *World J Gastroenterol*. 2019;25:729–743. 10.3748/WJG.V25.I6.729.
7. Smeets XJNM, Knoester I, Grooteman KV et al. The association between obesity and outcomes in acute pancreatitis: An individual patient data meta-analysis. *Eur J Gastroenterol Hepatol*. 2019;31:316–322.
8. McGuire SP, Keller SL, Maatman TK et al. Obesity worsens local and systemic complications of necrotizing pancreatitis and prolongs disease course. *J Gastrointest Surg*. 2022; 26:2128–2135. 10.1007/S11605-022-05383-0.
9. Khatua B, El-Kurdi B, Patel K et al. Adipose saturation reduces lipotoxic systemic inflammation and explains the obesity paradox. *Sci Adv*. 2021. 10.1126/SCIADV.ABD6449.
10. Haththotuwa, R.N.; Wijeyaratne, C.N.; Senarath, U. Chapter 1-Worldwide epidemic of obesity. In: *Obesity and Obstetrics*, 2nd ed.; Mahmood, T.A., Arulkumaran, S.Chervenak, F.A., Eds.; Elsevier: Amsterdam, Netherlands, 2020; pp. 3-8
11. Colvin SD, Smith EN, Morgan DE, Porter KK. Acute pancreatitis: an update on the revised Atlanta classification. *Abdom Radiol(NY)*. 2020; 45:1222-31
12. Mederos MA, Reber HA, Girgis MD. Acute pancreatitis: A review. *JAMA*. 2021;325(4):382-90. doi: 10.1001/jama.2020.20317. doi: 10.1001/jama.2021.5789
13. Karunarathna I, De Alvis K, Gunasena P, Jayawardana A. Pancreatitis: Current concepts in diagnosis, management, and complications. 2000;1-12. [Internet] Available from URL <https://www.researchgate.net/publication/381886182> accessed in July 2024.
14. Gliem N, Ammer-Herrmenau C, Ellenrieder V, Neeße A. Management of severe acute pancreatitis: an update. *Digestion*. 2021;102:503-7.
15. Hafeez A, Iqbal J, Hassan A, Bhatti R, Kadir B, Sadik M. Pattern of risk factors and Complications of acute pancreatitis. *Med Forum*. 2023; 34:127.
16. Faham M, Zahid MA, Hameed M, Farooq O, Younus Z, Islam A, et al. Outcome of Patients with acute pancreatitis requiring intensive care admission. a retrospective study. *J Pharmaceutical Negative Results*. 2023;14:2738-46. <https://doi.org/10.47750/pnr.2023.14.S02.322>
17. Zahoor, D. (2024). Association of obesity with complications of acute pancreatitis. *Journal of Surgery Pakistan*, 29(3), 79-84.
18. Papachristou GI, Papachristou DJ, Avula H, Slivka A, Whitcomb DC. Obesity increases the severity of acute pancreatitis: performance of APACHE-O score and correlation with the inflammatory response. *Pancreatol*. 2006;6:279-85. doi.org/10.1159/000092689
19. Thavamani A, Umamathi KK, Roy A, Krishna SG. The increasing prevalence and adverse impact of morbid obesity in paediatric acute pancreatitis. *Pediatr Obes*. 2020 ;15:e12643. doi: 10.1111/ijpo.12643
20. Moran RA, García-Rayado G, de la Iglesia-García D, Martínez-Moneo E, Fort-Martorell E, Lauret-Braña E, et al. Influence of age body mass index and comorbidity on major outcomes in acute pancreatitis, a prospective nation-wide multicentre study. *United*
22. *European Gastroenterol J*. 2018 ;6:1508- 18. doi: 10.1177/2050640618798155