The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 3, 2025

FREQUENCY OF CAUSES OF ACUTE ABDOMINAL PAIN AMONG PATIENT PRESENTING IN EMERGENCY DEPARTMENT

Areesha Naz[*1], M Jamal Uddin[2], Masab Ahmed[3], Rabia Ahmed[4], Bushra Tasneem[5], Shakeel Ahmed[6], Hajrah Hilal Ahmed[7]

[*1,2,5,6]*Karachi Medical and Dental College Abbasi Shaheed Hospital*
[3]*Liaquat College of Medicine & Dentistry*
[4]*Hamdard College of Medicine & Dentistry*
[7]*United Medical And Dental College*

[*1]areeshanaz131@gmail.com, [2]drmjdin@gmail.com, [3]drmasabahmed@gmail.com, [4]drrabeea.ahmed@gmail.com, [5]ameerahmad1937@gmail.com, [6]drshakeelmansoori@yahoo.com, [7]hajrahilal@gmail.com

DOI: https://doi.org/10.5281/zenodo.15049666

Keywords
Abdominal abscess, Acute abdomen, Colitis, Gallstone Ileus, Intestinal obstruction

Article History
Received on 11 February 2025
Accepted on 11 March 2025
Published on 19 March 2025

Corresponding Author: *

Abstract

OBJECTIVE

To assess the causes of abdominal pain among patients presenting in the emergency department of Abbasi Shaheed Hospital Karachi.

METHODOLOGY

A cross-sectional design study was employed at the Department of Surgery, Abbasi Shaheed Hospital / KMDC, Karachi, on a cohort of 160 patients aged 18 to 60 years of either gender presented with acute abdominal pain. Each patient underwent a CT scan to confirm the cause of their acute abdominal pain. Data was interpreted and evaluated through SPSS version 26, with a p-value of ≤0.05 considered statistically significant.

RESULTS

The mean age of the patients was found as 36.07 ± 7.29 years. Out of 160 patients, males were 62 (38.7%) and females were 98 (61.3%). The causes of acute abdominal pain were noted as renal calculi (20%), hernia (3.75%), hepatitis (2.5%), ruptured ectopic (1.25%), acute appendicitis (25.6%), acute cholecystitis (6.8%), bowel obstruction (8.12%), bowel perforation (4.37%), colitis (1.8%), constipation (5%), cystitis (3.12%), decompensated liver disease (5.62%), gallstones (6.25%), inflammatory bowel disease (1.87%), liver abscess (3.75%), ovarian cyst (3.12%), ovarian torsion (0.6%), pancreatitis (9.37%), peptic ulcer (3.75%), testicular torsion (2.5%), and ectopic pregnancy (5%).

CONCLUSION

It is to be concluded that acute appendicitis, renal calculi, and pancreatitis was noted as the most frequent causes of acute abdominal pain. Future studies in multiple study centers with larger sample sizes are required to validate the findings of current study.

INTRODUCTION

Acute abdominal pain (AAP), traditionally defined as nontraumatic disease-associated discomfort lasting fewer than five days, is one of the most common presenting complaints to the Emergency Department (ED) [1]. Leading to between 7–10% of all ED visits [2,3]. Although abdominal pain is somewhat common, it can be a symptom of a serious underlying disease. The challenging differential diagnosis can result in adverse outcomes and medicolegal litigation [4,5].

Evaluation of patients in the emergency department (ED) with abdominal pain is challenging and requires history taking supported by clinical, laboratory, and radiographic analyses. Quick evaluation of acute abdominal pain (AAP) may predict prognosis [6–8] and in a bid to reduce morbidity and mortality, ER doctors must assess multiple diagnoses and complete flattening of patients for each diagnosis, based on all available clinical, laboratory, and radiologic findings as quickly as possible. Note that unusual symptoms may occur in some groups, such as the elderly and those with impaired immune systems, which makes the assessment of stomach discomfort in these patients more difficult [9].

Cervellin et al showed in their study that the most common diagnoses were nonspecific abdominal pain (NSAP) (31.46%) and renal colic (31.18%). In patients over age > 65 years, biliary colic/cholecystitis, and diverticulitis was more common (13.17% vs. 5.95%, and 7.28% vs. 2.47%, respectively) [13]. In another study acute appendicitis was the commonest acute abdomen, constituting 57.5% of all admissions. Next were acute intestinal obstruction (20.7%) and acute cholecystitis (10.4%) [14]. Acute appendicitis is the most prevalent cause of acute abdomen at tertiary care hospital of Kharian 21.4% [15].Secondmost prevalent abdominal emergencies were gastrointestinal obstructions 14.5%,cholecystitis were 12.4%, and perforation were 11.8% [15].

This study was performed to determine the frequency of underlying etiology of acute abdominal pain in emergency room patients. We found many international studies, but so few local ones on this topic. Acute abdominal pain poses a challenge to emergency physicians due to potentially life-threatening causes. The results from our study will help in local burden analysis of aetiology and in aiding emergency physicians to plan judicious allocation of resources for timely management of these conditions. Our findings will also lay a foundation for future studies on determinants of acute abdominal pain. Prompt diagnosis and management are critical in alleviating the morbidity and mortality associated with AAP.

METHODOLOGY

A cross-sectional study was conducted at the Department of Surgery, Abbasi Shaheed Hospital /KMDC from 20th December 2022 to 15 July 2024. A non-probability, consecutive sampling technique was employed to select 160 patients. Inclusion criteria consisted of patients aged between 18 to 60 years, both male and female, who presented with acute abdominal pain. Patients with recent abdominal surgery, a history of trauma, malignancy, or pregnancy were excluded from the study.

Data collection began with obtaining informed consent from each patient after stabilizing them in the emergency department. Once consent was obtained, baseline details were recorded. Each patient underwent a CT scan to confirm the cause of their acute abdominal pain.

Acute abdomen was defined as a sudden, severe abdominal pain with a visual analog scale (VAS) of greater than 6, requiring urgent and specific diagnosis. The causes of acute abdomen were categorized as follows: intestinal obstruction was diagnosed when CT imaging revealed distended bowel loops proximal to collapsed loops. Volvulus was identified by the X-marks-the-spot sign and the split wall sign. Intussusception was characterized by two concentric enhancing rings, mesenteric fat forming a crescent around the compressed lumen, and the lead point if present.

Pancreatitis was identified when MDCT showed focal or diffuse parenchymal enlargement, density changes due to edema, indistinct pancreatic margins, and surrounding retroperitoneal fat stranding. Cholecystitis was diagnosed when MDCT revealed gallbladder distension, wall thickening, mural or mucosal hyper-enhancement, peri-cholecystic fluid, inflammatory fat stranding, and enhancement of the

adjacent liver parenchyma. Appendicitis was identified when MDCT showed a dilated appendix (>6 mm), wall thickening (>2 mm), mesenteric fatty stranding, appendicolith, and peri-intestinal fluid.

Pelvic masses were characterized by solid masses with helical or vortex-like opacities, or micro nodules, sometimes calcified, on MDCT. Perforation was identified by MDCT showing discontinuity of the bowel wall, extra-luminal air, and abrupt bowel wall thickening with or without phlegmon or abscess. Liver abscess was diagnosed when MDCT revealed peripherally enhancing, centrally hypo-attenuating lesions. Abdominal adhesion was observed as an abrupt transition from dilated to collapsed bowel segments in the absence of concomitant diseases.

Crohn's disease was identified when CT revealed mural hyperenhancement, fat halo, bowel wall thickening (1-2 cm), and the comb sign (engorgement of the vasa recta), with regional fat proliferation, strictures, and fistulae. Bezoar was identified by CT as a mass in the obstructed segment with fluid outlining it and air trapped within. Gallstone ileus was diagnosed by CT showing bulging of the bowel just before the transition point, with the site of fistulization.

Acute mesenteric ischemia was characterized by CT showing gas in the intestinal wall, mesenteric veins, submucosal hemorrhage, and free fluid. Colonic pseudo-stricture was identified by CT revealing marked dilation of the large bowel, often near the splenic flexure, without an abrupt transition point. Paralytic ileus was diagnosed when CT showed marked distension of bowel loops with air-fluid levels, but no evidence of mechanical obstruction. Acute colitis was identified by CT showing wall thickening with homogeneous enhancement, low attenuation, pericolonic fat inflammation, and multiple gas-fluid levels.

Leaking abdominal aneurysm was diagnosed when CT showed retroperitoneal hemorrhage, draped aorta sign, and a hyperattenuating crescent sign. Intra-abdominal abscess was identified by CT showing a low-attenuation necrotic core, fibrous capsule, and surrounding peritoneal fat stranding.

The Statistical Package for Social Sciences was used to evaluate the collected data. Quantitative variables were presented as mean and standard deviation. Qualitative variables were presented as frequencies and percentages. The Chi-square test was applied to find out the statistical test of significance with a p-value of ≤ 0.05 considered statistically significant.

RESULTS

The study included 160 participants with a mean age of 36.07 ± 7.29 years. Among them, 89 (55.6%) were between 18 and 35 years old, while 71 (44.4%) were older than 35 years. The mean body mass index (BMI) was 25.75 ± 3.55 kg/m², with 102 (63.7%) participants having a BMI between 20 and 28 kg/m², and 58 (36.3%) having a BMI greater than 28 kg/m². Regarding gender distribution, 98 (61.3%) participants were female, and 62 (38.7%) were male as shown in Table I.

The most common cause of acute abdominal pain among the 160 study participants was acute appendicitis, affecting 41 (25.6%) individuals, followed by renal calculi in 32 (20.0%). Gender distribution showed that acute appendicitis was more frequent in females (32.3%) than males (21.4%), though the difference was not statistically significant (p=0.126). Similarly, renal calculi were observed in 19 (19.4%) males and 13 (21.0%) females (p=0.808). Gallstones were significantly more common in females (11.3%) than males (3.1%) (p=0.041). Liver abscess (p=0.033) and ovarian cysts (p=0.008) also showed statistically significant gender differences, with a higher prevalence in females. Notably, ectopic pregnancy was exclusively observed in females (12.9%) with a highly significant p-value (p=0.0001). Other conditions, including pancreatitis, bowel obstruction, and cholecystitis, had relatively balanced distributions between genders, with no statistically significant differences as shown in Table II.

Among the 160 study participants, the most common cause of acute abdominal pain was acute appendicitis, affecting 41 (25.6%) individuals, with a higher prevalence in those older than 35 years (29.6%) compared to the younger age group (22.5%), though the difference was not statistically significant (p=0.200). Renal calculi were observed in 18 (20.2%) participants aged 18–35 years and 14 (19.7%) in those older than 35 years (p=0.937). Bowel obstruction was more frequent in the younger age group (11.2%) than in the older group (4.2%) but did not reach statistical significance (p=0.091). Similarly, pancreatitis was more common in younger

individuals (12.4%) compared to older individuals (5.6%) (p=0.119). Gallstones were slightly more prevalent in the older age group (7.0%) than in the younger group (5.6%) (p=0.479). Notably, ovarian cysts were found only in younger individuals (5.6%), but the difference was not statistically significant (p=0.051). Overall, no significant differences were observed between age groups for any cause of acute abdominal pain as shown in Table III.

DISCUSSION

Acute abdominal pain (AAP) is a frequent presenting complaint to emergency department (ED) and poses a substantial diagnostic dilemma, given its innumerable potential causes [16]. The objective of our study was to determine the prevalence and spectrum of causes of acute abdominal pain patients presenting to the ED at Abbasi Shaheed Hospital, Karachi. Our study mirrors earlier studies demonstrating similar distribution of causes, notable predominance of acute appendicitis, renal calculi and acute cholecystitis.

Acute appendicitis (25.6%), renal calculi (20%), and pancreatitis (9.37%) accounted for the most common causes of AAP in our study. This corroborates the findings of others studies including that of Cervellin et al. who reported frequent causes of AAP to be nonspecific abdominal pain and renal colic [13]. In addition, acute appendicitis was invariably the main etiology of acute abdominal pain mentioned elsewhere 22[24]. See for example Velissaris et al. and Parker et al. Appendicitis was also identified as the most common cause of acute abdomen in the two different populations by the same author [17,18]. The 25.6% acute appendicitis we found is similar to the 21.4% prevalence of acute appendicitis amongst acute abdominal cases found by another group [15]. Acute appendicitis and renal calculi were the most common, accounting for 23.30% and 18.75% respectively [19].

Similarly to previous studies, bowel obstruction, acute cholecystitis, and gallstones were also relatively common causes in our study (8.12%, 6.8%, and 6.25%, respectively). An example is another study in which acute cholecystitis was found in 10.4% of cases, and bowel obstruction was still the second AAP cause, being in 20.7% of cases [14]. The acute presentation more commonly seen in our cohort than others may be due to the local practice of surgical referral at first clinical suspicion rather than imaging where applicable, while the greater proportion of bowel obstruction has been attributed to differences in patient demographics.

It is also interesting to note that some rarer diagnoses such as ruptured ectopic pregnancy (1.25%), torsion of the ovary (0.6%) and torsion of the testis (2.5%) added to the general burden of acute abdominal pain but their impact was lower. Both the importance of broadening the differential diagnosis in patients presenting with AAP, and the serious consequences that can impact patient outcome if diagnoses are missed or delayed as noted in the study by Dadeh et al. [20], are also underscored by these findings.

The findings from studies about the diagnosing the AAP have shown the role of multi-detector computed tomography (MDCT) in confirmation of the AAP. This aligns with the suggestions from Murali and El Hayek that imaging may be helpful in excluding abdominal pain mimickers from serious underlying pathology [21]. In cases of bowel perforation, pancreatitis, and inflammatory bowel disease, imaging was critical in optimizing the surgical approach and treatment of the disease.

The strength of our study is its in-depth investigation of the full range of causes of AAP, which gives local data for fellow in the ED (emergency department) for clinical decision making. Use of non-invasive imaging can ensure accurate diagnosis, such as MDCT to establish the presence of coronary artery disease, the accuracy of which would certainly make a notable contribution to our findings. Moreover, our study also gives a glimpse about the frequency of different causes behind AAP in a tertiary care hospital of Karachi, which is an important addition considering the commonality of this clinical problem in a local setting.

On the other hand, the study had some limitations as well. Although the non-probability sampling method is convenient, it restricts the generalization of findings to the population. Single center study, thereby not completely representative of the different causes of AAP seen in different geographic regions or healthcare systems. Also, and the exclusion criteria where patients with certain

conditions, like recent abdominal surgery, malignancy or pregnancy, in my opinion further bias the results and lead to under-representation of specific causes of abdominal pain, especially in high risk groups.

Considering the limitations of this study, we suggest a larger and multicenter study to increase the generalizability of the patient population. Future studies may also need to incorporate a broader spectrum of diagnostic modalities, including laparoscopy, if imaging is ambiguous. Moreover, and because of the extensive differential for acute abdominal pain, examining the effect of delayed diagnosis on clinical outcomes in special populations would be essential, as postulated by Dadeh et al. [18]. Including decision support algorithms derived from clinical, laboratory, and radiologic data can also enhance emergency diagnosis with a greater speed and accuracy.

Our study highlights the importance of a systematic and expedited diagnostic work-up of presenting acute abdominal pain. Timely recognition of the diagnosis, and treatment can facilitate recovery and decrease the morbidity and mortality of this frequent clinical presentation. While years of research have continued to perfect our diagnostic strategies, opportunity still lies in optimal management of patients vis a vis improved outcomes amongst patients presenting with acute abdominal pain in the emergency setting.

CONCLUSION

It is to be concluded that acute appendicitis, renal calculi, and pancreatitis was noted as the most frequent causes of acute abdominal pain. Future studies in multiple study centers with larger sample sizes are required to validate the findings of current study.

Table I: Demographic Characteristics of Study Participants (n=160)	
Variable	**n (%)**
Age (Mean ± SD) = 36.07 ± 7.29	
18 - 35 years	89 (55.6)
>35 years	71 (44.4)
Body Mass Index (Mean ± SD) = 25.75 ± 3.55	
20 - 28 kg/m^2	102 (63.7)
>28 kg/m^2	58 (36.3)
Gender	
Female	98 (61.3)
Male	62 (38.7)

Table II: Causes of Acute Abdominal Pain with Gender (n=160)				
Causes, *n* (%)	**Gender**		**95% C. I**	**P-Value**
	Male	**Female**		

Renal Calculi	19 (19.4)	13 (21.0)	(0.411–1.998)	0.808
Hernia	3 (3.1)	3 (4.8)	(0.121–3.179)	0.429
Hepatitis	3 (3.1)	1 (1.6)	(0.196–18.944)	0.496
Ruptured Ectopic	0 (0.0)	2 (3.2)	N/A	0.149
Acute Appendicitis	21 (21.4)	20 (32.3)	(0.279–1.175)	0.126
Acute Cholecystitis	7 (7.1)	4 (6.5)	(0.313–3.979)	0.568
Bowel Obstruction	7 (7.1)	6 (9.7)	(0.230–2.245)	0.568
Bowel Perforation	5 (5.1)	2 (3.2)	(0.303–8.582)	0.445
Colitis	2 (2.0)	1 (1.6)	(0.113–14.318)	0.667
Constipation	4 (4.1)	4 (6.5)	(0.149–2.563)	0.375
Cystitis	3 (3.1)	2 (3.2)	(0.154–5.836)	0.644
Decompensated Liver Disease	4 (4.1)	5 (8.1)	(0.125–1.881)	0.235
Gallstones	3 (3.1)	7 (11.3)	(0.062–0.999)	0.041
Inflammatory Bowel Disease	2 (2.0)	1 (1.6)	(0.113–14.318)	0.667
Liver Abscess	1 (1.0)	5 (8.1)	(0.013–1.031)	0.033
Ovarian Cyst	0 (0.0)	5 (8.1)	N/A	0.008
Ovarian Torsion	0 (0.0)	1 (1.6)	N/A	0.387
Pancreatitis	8 (8.2)	7 (11.3)	(0.240–2.033)	0.509
Peptic Ulcer	5 (5.1)	1 (1.6)	(0.374–28.757)	0.248
Testicular Torsion	1 (1.0)	3 (4.8)	(0.021–1.995)	0.162
Ectopic Pregnancy	0 (0.0)	8 (12.9)	N/A	0.0001

Table III: Causes of Acute Abdominal Pain with Age Group (n=160)

Causes, *n* (%)	**Age Group**		**95% C. I**	**P-Value**
	18-35	**>35**		
Renal Calculi	18 (20.2)	14 (19.7)	(0.473–2.253)	0.937
Hernia	3 (3.4)	3 (4.2)	(0.155–4.042)	0.547

Hepatitis	2 (2.2)	2 (2.8)	(0.109–5.775)	0.600
Ruptured Ectopic	2 (2.2)	0 (0.0)	N/A	0.308
Acute Appendicitis	20 (22.5)	21 (29.6)	(0.338–1.407)	0.200
Acute Cholecystitis	8 (9.0)	3 (4.2)	(0.571–8.770)	0.194
Bowel Obstruction	10 (11.2)	3 (4.2)	(0.759–10.852)	0.091
Bowel Perforation	4 (4.5)	3 (4.2)	(0.231–4.929)	0.624
Colitis	1 (1.1)	2 (2.8)	(0.035–4.414)	0.415
Constipation	4 (4.5)	4 (5.6)	(0.190–3.269)	0.509
Cystitis	1 (1.1)	4 (5.6)	(0.021–1.742)	0.121
Decompensated Liver Disease	5 (5.6)	4 (5.6)	(0.258–3.859)	0.628
Gallstones	5 (5.6)	5 (7.0)	(0.218–2.828)	0.479
Inflammatory Bowel Disease	0 (0.0)	3 (4.2)	(0.113–14.318)	0.085
Liver Abscess	4 (4.5)	2 (2.8)	(0.289–9.129)	0.453
Ovarian Cyst	5 (5.6)	0 (0.0)	N/A	0.051
Ovarian Torsion	1 (1.1)	0 (0.0)	N/A	0.556
Pancreatitis	11 (12.4)	4 (5.6)	(0.719–7.765)	0.119
Peptic Ulcer	5 (5.6)	1 (1.4)	(0.476–36.505)	0.166
Testicular Torsion	3 (3.4)	1 (1.4)	(0.249–23.994)	0.400
Ectopic Pregnancy	5 (5.6)	3 (4.2)	N/A	0.491

REFERENCES

1. Gans SL, Pols MA, Stoker J, Boermeester MA. Guideline for the diagnostic pathway in patients with acute abdominal pain. Digest Surg. 2015;32(1):23-31.
2. Falch C, Vicente D, Häberle H, Kirschniak A, Müller S, Nissan A, et al. Treatment of acute abdominal pain in the emergency room: a systematic review of the literature. Eur J Pain. 2014;18(7):902-13.
3. Maconi G, Obici L, Carmagnola S, Guzzetti S. Autoinflammatory diseases as a cause of acute abdominal pain in the emergency department. Clin Exp Rheumatol. 2018;36(110): 39-43.
4. 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 Eur Gastroenterol J. 2016;4(2):297-304.
5. Takayama Y, Kaneoka Y, Maeda A, Fukami Y, Takahashi T, Uji M. Etiologies and outcomes of emergency surgery for acute abdominal pain: an audit of 1456 cases in a single center. Eur J Trauma Emerg Surg. 2020;46:363-9.

6. Osterwalder I, Özkan M, Malinovska A, Nickel CH, Bingisser R. Acute abdominal pain: missed diagnoses, extra-abdominal conditions, and outcomes. J Clin Med. 2020;9(4):899.
7. Chanana L, Jegaraj MA, 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.
8. Fagerström A, Paajanen P, Saarelainen H, Ahonen-Siirtola M, Ukkonen M, Miettinen P, et al. Non-specific abdominal pain remains as the most common reason for acute abdomen: 26-year retrospective audit in one emergency unit. Scand J Gastroenterol. 2017;52(10): 1072-7.
9. Cooper GS, Shlaes DM, Salata RA. Intraabdominal infection: differences in presentation and outcome between younger patients and the elderly. Clin Infect Dis. 2014;19(1):146-8.
10. Dadeh AA, Phunyanantakorn P. Factors affecting length of stay in the emergency department in patients who presented with abdominal pain. Emerg Med Int. 2020;2020 (1):5406516.
11. Mjema KM, Sawe HR, Kulola I, Mohamed AS, Sylvanus E, Mfinanga JA, et al. Aetiologies and outcomes of patients with abdominal pain presenting to an emergency department of a tertiary hospital in Tanzania: a prospective cohort study. BMC Gastroenterol. 2020;20: 1-6.
12. Ilgar M, Akçiçek M, Ekmekyapar M. Causes of acute abdomen, preferred imaging methods, and prognoses in geriatric patients presenting to the emergency department with abdominal pain. Rev Assoc Méd Bras. 2022;68:1726-9.
13. 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).
14. Danish A. A retrospective case series study for acute abdomen in general surgery ward of Aliabad Teaching Hospital. Ann Med Surg. 2022;73:103199.
15. Asif M, Hashmi JS, Almas D. Acute abdomen;: causes. Professional Med J. 2008;15(01): 120-4.
16. Thakur JK, Kumar R. Epidemiology of acute abdominal pain: a cross-sectional study in a tertiary care hospital of Eastern India. Int Surg J. 2019;6(2):345-8.
17. Velissaris D, Karanikolas M, Pantzaris N, Kipourgos G, Bampalis V, Karanikola K, et al. Acute abdominal pain assessment in the emergency department: the experience of a Greek university hospital. J Clin Med Res. 2017;9(12):987.
18. Parker R, Bedwell GJ, Hodkinson P, Lourens A, Setshedi M. Managing acute abdominal pain in the emergency centre: Lessons from a patient's experience. Afr J Emerg Med. 2021;11 (4):483-6.
19. 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).
20. Dadeh AA. Factors associated with unfavorable outcomes in patients with acute abdominal pain visiting the emergency department. BMC Emerg Med. 2022;22(1):195.
21. Murali N, El Hayek SM. Abdominal pain mimics. Emerg Med Clin. 2021;39(4):839-50.