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Original Article

A Prospective Study of the Various Etiological and Surgical Management Strategies in Case of Intestinal Obstruction and Prevalence in and Around Salem City and Outcome

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ABSTRACT

Introduction: Acute intestinal obstruction (AIO) remains a common and serious surgical emergency, contributing significantly to morbidity and mortality. Despite advances in diagnostic imaging and surgical techniques, delayed presentation and varied etiologies continue to challenge clinical outcomes, particularly in resource-limited settings. **Objectives**: This study aimed to evaluate the frequency, clinical presentation, etiological patterns, and outcomes of intestinal obstruction in patients admitted to a tertiary care hospital in Salem. Methods: A hospital-based prospective observational study was conducted over two years, involving 50 patients diagnosed with intestinal obstruction. Data were collected on demographics, symptoms, laboratory values, imaging findings, etiology, type of management, complications, and outcomes. Statistical analysis was performed using standard descriptive and inferential methods. **Results**: The most affected age group was 51–70 years, with a male predominance. Adhesions were the leading cause (32%), followed by hernias and malignancies. Conservative management was successful in select cases, while surgical intervention—primarily adhesiolysis and resection-anastomosis—was required in the majority. Postoperative complications occurred in 38% of cases, with an overall mortality rate of 10%. **Conclusion**: Adhesive obstruction remains the predominant etiology, and early recognition with prompt surgical intervention is crucial for favorable outcomes. Risk stratification based on clinical and laboratory indicators can guide timely management and reduce complications.

Keywords: *Acute intestinal obstruction, adhesions, etiology, conservative treatment, laparotomy.*

INTRODUCTION

Intestinal obstruction is one of the most common surgical emergencies worldwide and accounts for around 20% of urgent surgical hospital admissions [1]. It occurs when the normal movement of food, fluids, and gas through the intestines slows down or stops, either due to a blockage or due to the intestines not working properly [2]. This condition is serious not just because it is common, but also because it can cause major complications and even death in about 10% of cases, even with modern treatment [3].There are many causes of intestinal obstruction, and they have changed over time. In developed countries, previous surgeries causing scar tissue (adhesions) are the main reason for small bowel obstruction, making up 60–70% of cases. However, in developing countries, hernias are still a major cause, along with cancers, inflammatory bowel disease, and twisting of the intestines (volvulus) [4,5].Time is critical—if the intestine's blood supply is completely cut off, serious damage begins within 6 hours and may become irreversible after 12 hours [13]. Obstructions higher up in the intestines show symptoms faster and cause more serious fluid issues, while lower obstructions develop more slowly but have a higher risk of complications like twisting and strangulation [14].Patients usually show four key symptoms:

crampy abdominal pain, vomiting, bloating, and inability to pass stool or gas [15]. However, not everyone has all symptoms, especially elderly patients or those on medications.Modern imaging has improved diagnosis. Plain X-rays were once commonly used, but now CT scans with contrast are preferred because they are more than 90% accurate and help locate the blockage and check for complications [16]. Ultrasound is useful for children and pregnant women because it avoids radiation [17]. MRI gives excellent detail without radiation but is not always available and takes longer [18].Lab tests help assess how severe the condition is, even though they don't directly diagnose the obstruction. A high white blood cell count, lactate, or CRP level may indicate tissue damage or infection. Electrolyte imbalances reflect fluid losses [19]. New biomarkers like I-FABP and citrulline are being studied for early detection of intestinal tissue damage [20].Treatment has changed over the years from immediate surgery to a more careful, step-by-step approach. The first step in all cases is to stabilize the patient by giving fluids, correcting electrolytes, and using a tube to remove contents from the stomach (nasogastric tube) [21].Doctors then decide whether to treat the obstruction without surgery or to operate. If the obstruction is partial and there are no signs of serious complications, doctors may try conservative treatment—resting the bowel, decompressing with a tube, fluids, and monitoring [22]. This approach works in 70–90% of patients with partial obstructions caused by adhesions, with low short-term recurrence [23].When surgery is needed, minimally invasive procedures like laparoscopy are used if possible. These surgeries cause less pain and help the patient recover faster, but not all patients are suitable for this, especially if they have had many prior surgeries or signs of strangulation [24,25].For cancer-related obstructions, the plan must consider both relieving the blockage and treating the cancer. In left-sided colon blockages, placing a stent can help avoid emergency surgery and reduce the need for a stoma [26]. In very sick patients, staged surgeries may be done—first controlling the infection or bleeding, then doing the full surgery later [27].This study looks at these issues by evaluating the current causes of intestinal obstruction in our setting and analyzing the outcomes of different treatment methods. By recording symptoms, scan results, treatments, and outcomes, we aim to improve how doctors make decisions and treat patients with this condition.Intestinal obstruction remains a challenging and serious condition due to its various causes and complications. Although treatment options have improved, further research is needed to refine when and how each treatment should be used. This study will contribute to better care by exploring the current trends and results of different treatment strategies in our hospital population.

Aims and Objectives

Aim: The Aim of my study is to "evaluate frequency, clinical presentation, prevalence of intestinal obstruction in and around salem city, lines of surgical management, and outcome

Objectives: A) To study various patterns of presentation ,various causes, significance of early recognition, diagnosis and treatment. B) To study various influencing factors like age,sex,diet and socio-economic status in pathogenesis of acute bowel obstruction . C) To study morbidity and mortality rates in acute intestinal obstruction

METHODOLOGY

Study Design and Setting: This study is a hospital-based prospective observational study conducted in the Department of General Surgery, GMK Medical College and Hospital, Salem, over a two-year period from 2023 to 2025. The study focused on patients admitted with a clinical diagnosis of intestinal obstruction.

Ethical Considerations: Prior to the commencement of the study, ethical clearance was obtained from the Institutional Ethics Committee (IEC) of GMK Medical College and Hospital. Written informed consent was obtained from all participants or their legal guardians. Confidentiality and anonymity of the patients were maintained throughout the study.

Sample Size: The sample size for the study was 50 patients, based on the number of eligible cases admitted with intestinal obstruction during the study period.

Sampling Method: A consecutive sampling method was employed. All patients fulfilling the inclusion criteria and admitted with features suggestive of intestinal obstruction during the study period were recruited consecutively until the sample size was achieved.

Study Population: Patients admitted with clinical features consistent with intestinal obstruction were evaluated, and those meeting the selection criteria were included in the study.

Inclusion Criteria: 1) Patients aged more than 12 years.2)Patients presenting with abdominal pain and diagnosed clinically or radiologically with intestinal obstruction

Exclusion Criteria: Patients below 12 years of age and Patients with incomplete clinical data or those who did not provide consent

Data Collection: Data were collected using a structured and pre-tested proforma designed specifically for this study. At the time of admission, patients underwent a comprehensive clinical evaluation. Information was gathered on presenting complaints (abdominal pain, vomiting, distension, constipation), demographic data (age, sex), past medical and surgical history, and comorbidities.Diagnostic workup included routine hematological and biochemical investigations—hemoglobin, total and differential leukocyte counts, serum electrolytes, urea, creatinine, and relevant radiological investigations (abdominal X-ray, ultrasonography, or CT abdomen with contrast) to confirm the diagnosis and identify the level and cause of obstruction.Treatment details were recorded, including the decision for conservative or surgical management, type of surgery (if performed), intraoperative findings, postoperative course, and complications. Final outcomes such as duration of hospital stay, morbidity, and mortality were documented. Data were securely stored and regularly reviewed for accuracy and completeness.

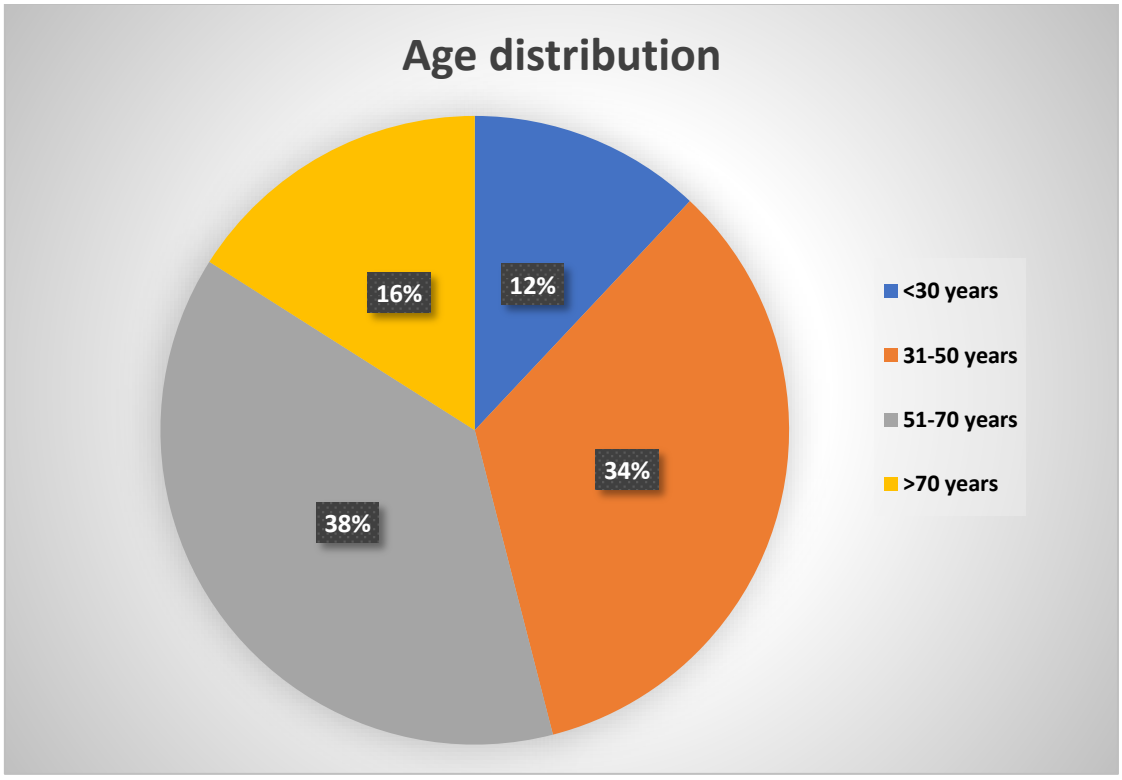
Statistical Analysis: Descriptive statistical methods were used to analyze and present the collected data. Categorical variables were expressed as frequencies and percentages, and continuous variables were summarized using means and standard deviations. Statistical significance was tested using the Chi-square test or Fisher's exact test for categorical data and Student's t-test for continuous data, as applicable. A p-value <0.05 was considered statistically significant.

RESULTS:

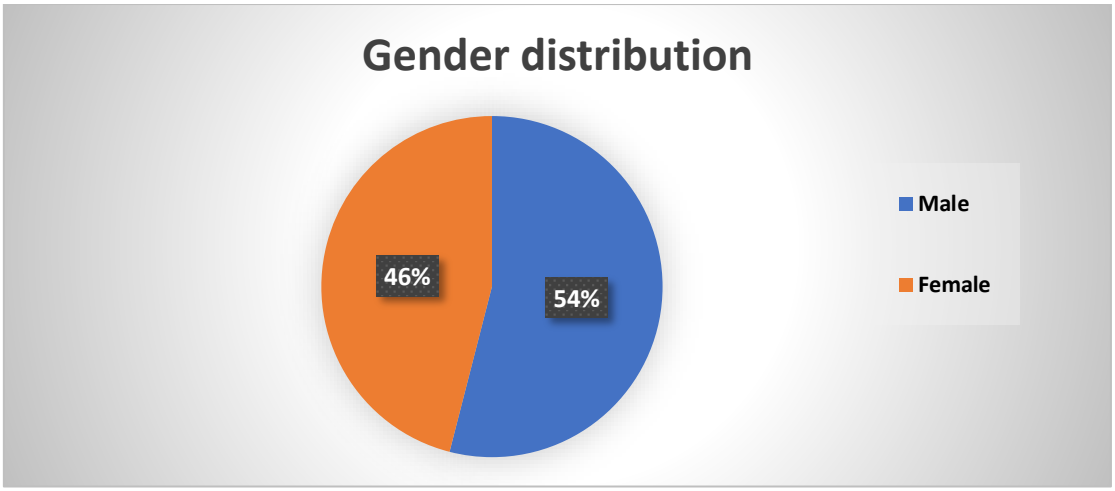
This study included 50 study participants with an objective to assess the pattern of clinical presentation of intestinal obstruction. This section elaborates the observations from the study participants, as explained below.

DESCRIPTIVE STATISTICS

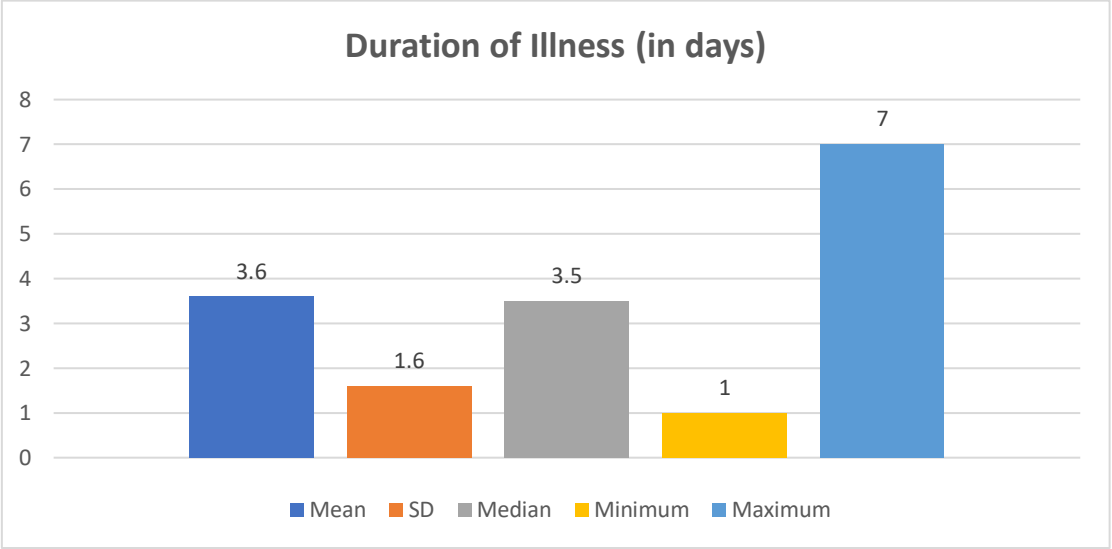
Age distribution: The mean age of the study participants was 53.68 $\pm$ 16.89 years, ranging from 25 years to 85 years. The median age of the participants was 54.5 years. Majority of them belonged to the age group of 51-70 years followed by 31-50 years, The figures below show the distribution of age and age category among the study participants.



Gender distribution: Majority of the study participants were Males (54%) and the remaining 46% were females. The figure below show the distribution of gender among the study participants.



Duration of Illness: The mean duration of illness among the study participants was 3.6 ± 1.58 days, ranging from 1 day to 7 days. The median duration of illness was 3.5 days. The figure below show the distribution of duration of illness among the study participants.

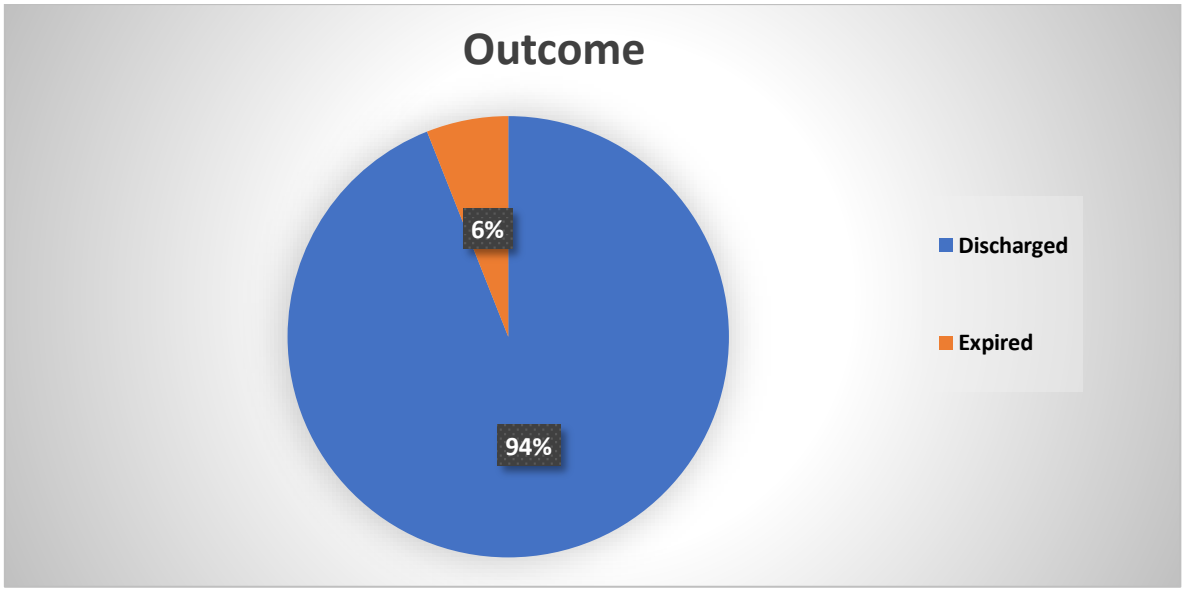


Etiology: Adhesive etiology (32%)was the most common etiology for acute intestinal obstruction among the study participants , followed by Incisional hernia (10%), Rectosigmoid growth (10%), SMA thrombolysis (8%), Descending colon growth (6%) and Ileal stricture (6%). The table and figure below displays the etiology behind the acute intestinal obstruction among the study participants.

Etiology	Frequency	Percent
Adhesion	16	32.0
Incisional hernia	5	10.0
Rectosigmoid growth	5	10.0
SMA thrombosis	4	8.0
Descending colon growth	3	6.0
Ileal stricture	3	6.0
Caecal growth	2	4.0
Inguinal hernia	2	4.0
Umbilical hernia	2	4.0
Anal canal growth	1	2.0
Ascending colon growth	1	2.0
Intussuception	1	2.0
Malrotation	1	2.0
Paraduodenal hernia	1	2.0

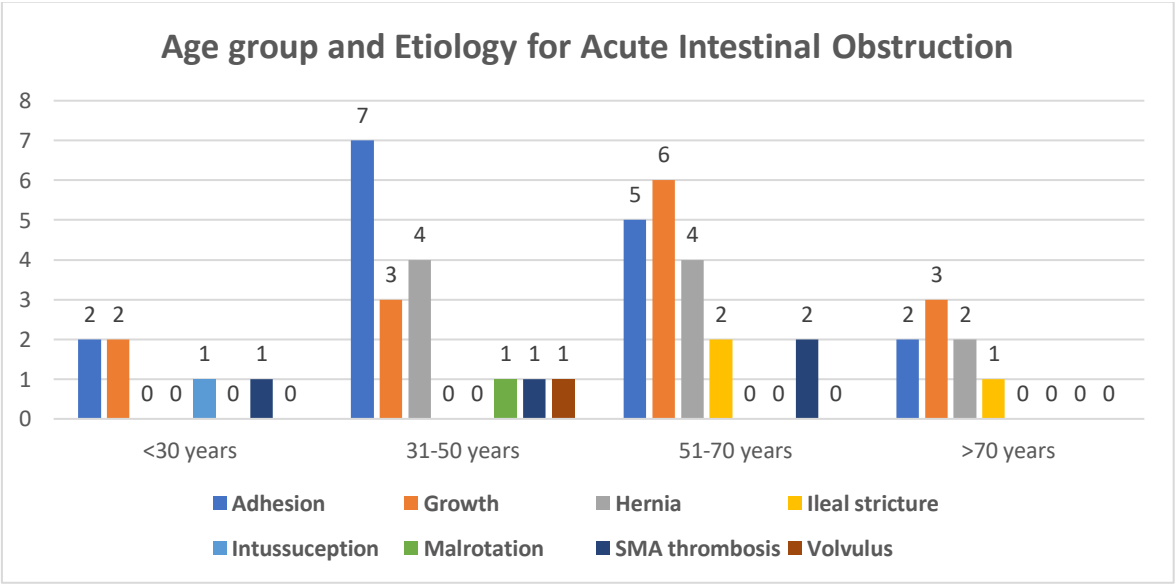
Rectal growth	1	2.0
Sigmoid volvulus	1	2.0
Transverse colon growth	1	2.0
Total	50	100.0

Outcome: 94% of the study participants had an uneventful course during the period of management and got discharged, whereas,6% (n=3) expired. The figure below shows the distribution of outcome among the study participants.

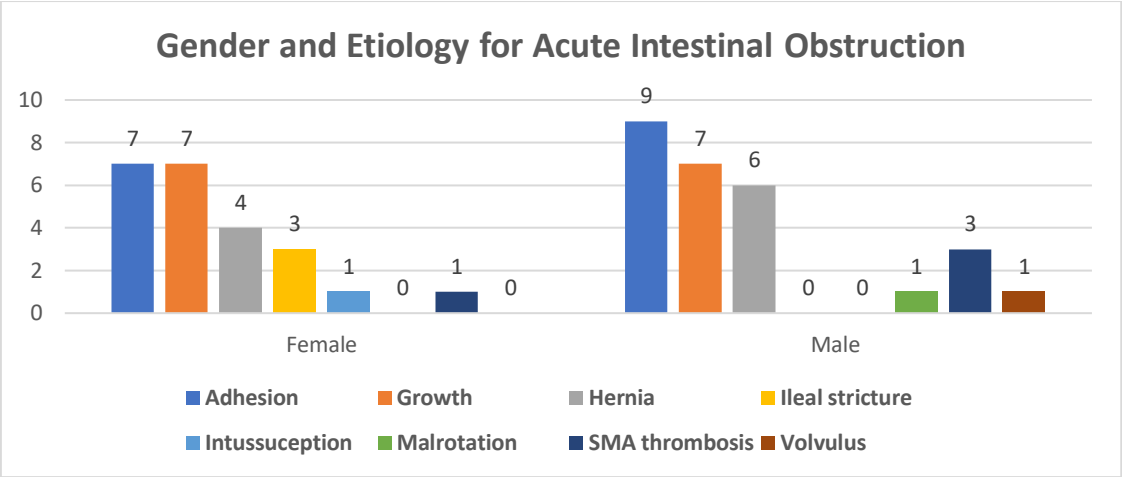


INFERENTIAL STATISTICS

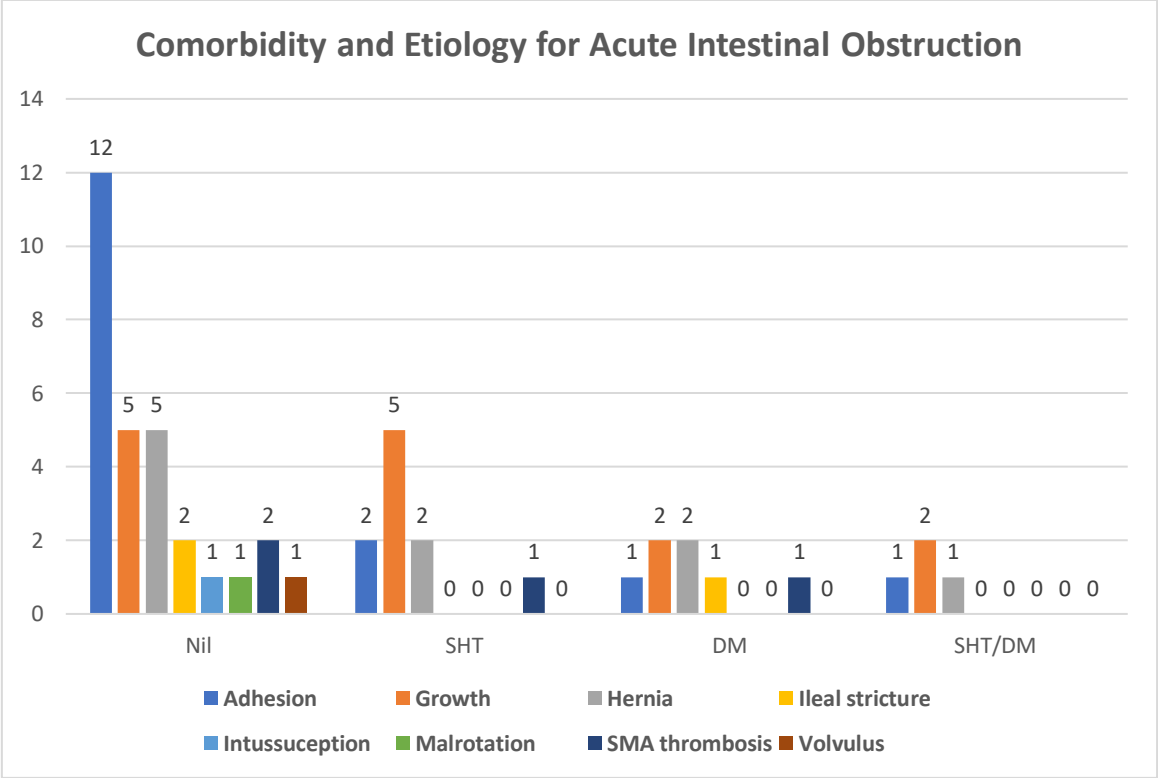
Association between Age and Etiology for Acute Intestinal Obstruction: >40% of participants who had Adhesion etiology was in 31-50 years age group and those with growth etiology was predominantly in the 51-70 years age group (42.9%). Similarly, ileal stricture (66.7%), SMA thrombosis (50%) and Hernia (40%) was also major etiologies in the age group of 51-70 years. However this association is not statistically significant, by chi-square test statistics, with a p-value>0.05.



Association between Gender and Etiology for Acute Intestinal Obstruction; >50% of participants with adhesion as etiology for acute intestinal obstruction were males (56.3%). Similarly, for Hernia (50%), Malrotation (100%) and SMA thrombosis (75%) it was male predominance. However this association is not statistically significant, by chi-square test statistics, with a p-value>0.05.



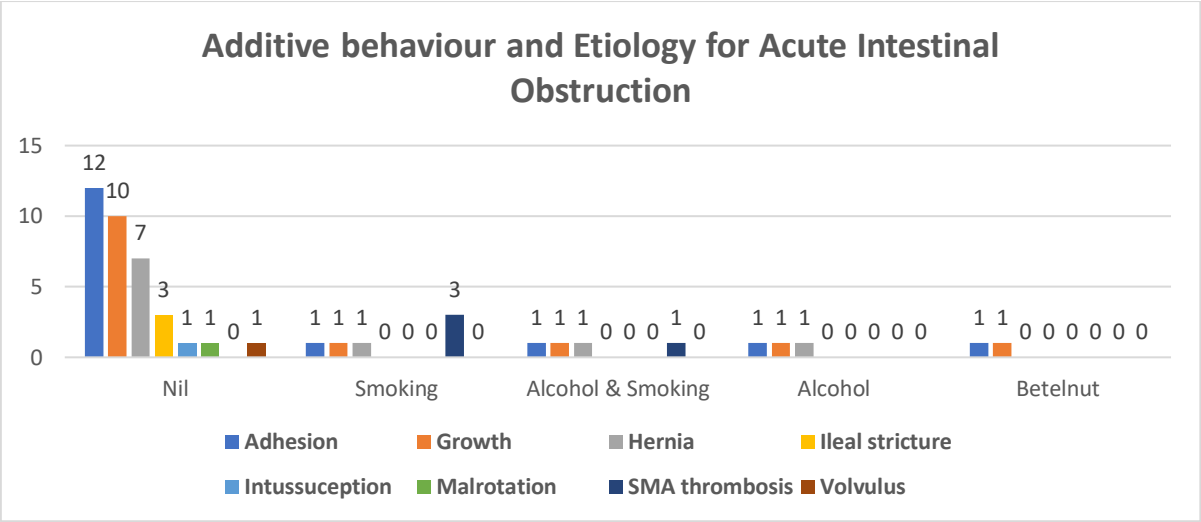
Association between Comorbidity and Etiology for Acute Intestinal Obstruction: Although around 60% of the study participants were without any significant comorbidity, among those participants with growth as etiology behind acute intestinal obstruction, there was a predominance noted with systemic hypertension (35.7%), and similarly Diabetes mellitus (33.3%) for ileal stricture. However this association is not statistically significant, by chi-square test statistics, with a p-value>0.05.



Association between Additive behaviour and Etiology for Acute Intestinal Obstruction

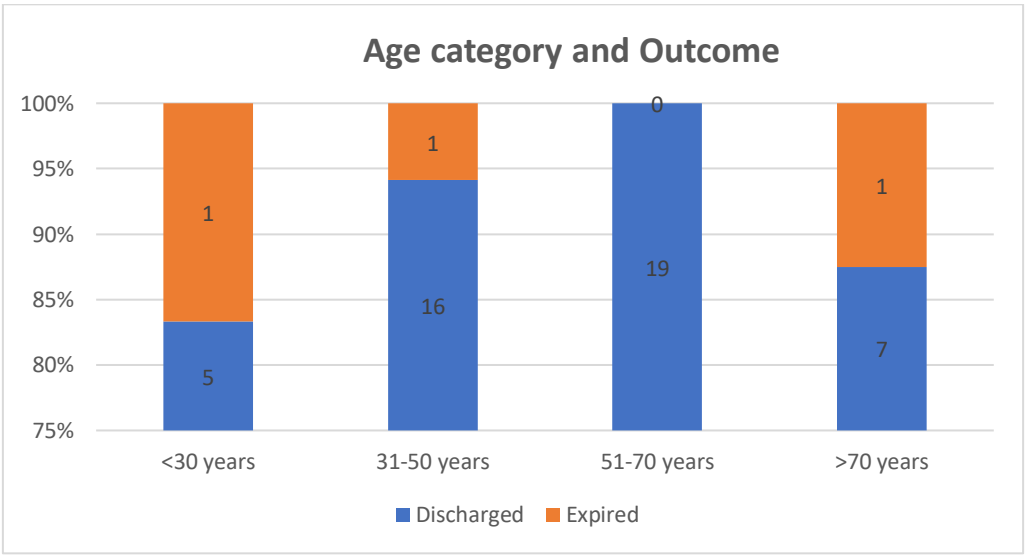
Although around 70% of the study participants reported no additive behaviours, among those participants with SMA thrombosis as etiology behind acute intestinal obstruction, there was a predominance noted among smokers (75%), and similarly Hernia (10%) among alcoholics. However this association is not statistically significant, by chi-square test statistics, with a p-value>0.05.

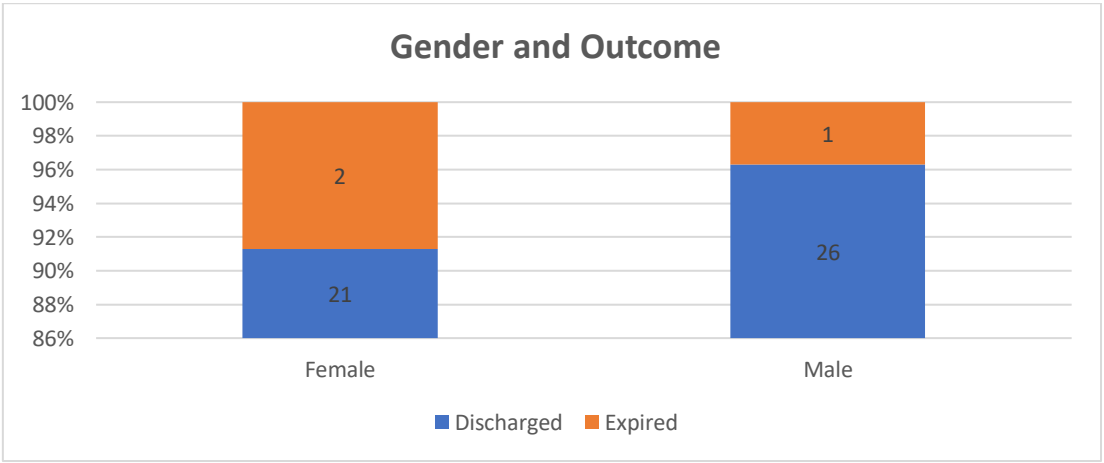
The figure below depict the association between additive behaviour and etiology behind acute intestinal obstruction.



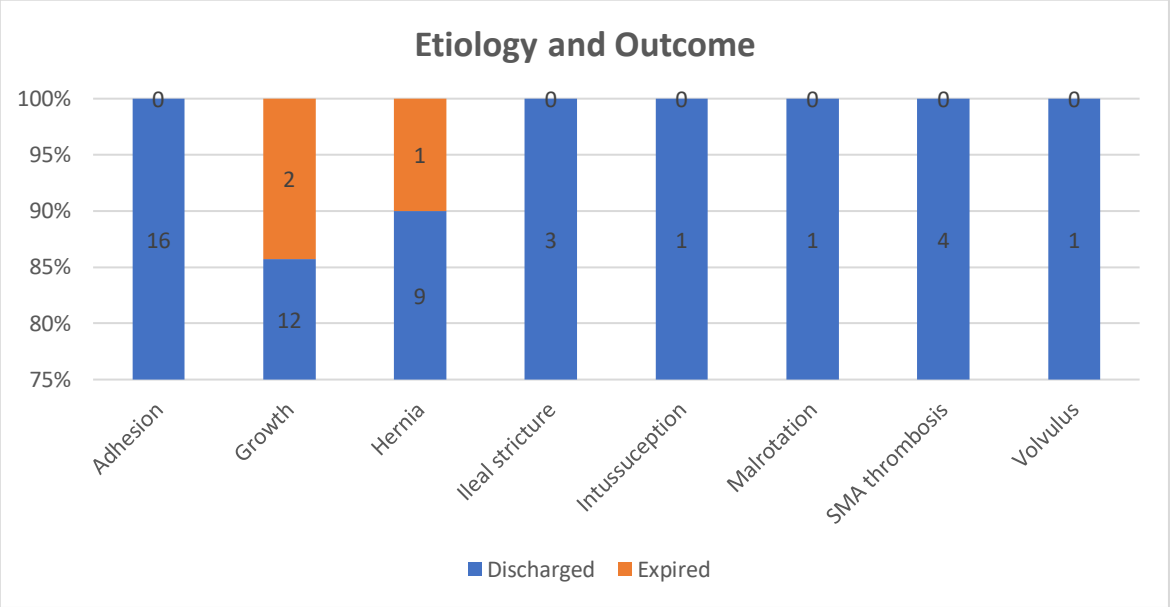
Association between Etiology behind Acute Intestinal Obstruction and Blood parameters

The mean total WBC count was lower (9500 cells/cu.mm) among those participants with intussuception as the primary etiology behind their intestinal obstruction. Similarly, the Hb count was lower in Intussuception (8.9gm/dl). The serum NA+ levels and K+ levels are lower in the study participants who had hernia as their primary etiology for intestinal obstruction**.** However this association is not statistically significant, by ANOVA test statistics, with a p-value>0.05. The figures below depict the association between etiology behind acute intestinal obstruction and blood parameters (Total WBC count, Hb, Platelet count and serum elecrolytes)





Association between Etiology behind Acute Intestinal Obstruction and Outcome



DISCUSSION

This present hospital-based prospective study was conducted at GMK Medical College and Hospital, Salem, over a two-year period to evaluate the clinical patterns, causes, and outcomes of intestinal obstruction. A total of 50 patients aged over 12 years, diagnosed clinically or radiologically with intestinal obstruction, were included. The study systematically assessed demographic variables, presenting features, diagnostic modalities, treatment strategies such as conservative and surgical with patient outcomes.

In our study the mean age observed was 53.68 ± 16.89 years, and majority of them were between 51–70 years (38%). A similar observation was made by Vanathi et al. [62], with higher frequencies in the 51–60-year age group. Mukhopadhyay et al. [70] reported a similar mean age of 55.78 years, with most patients falling in the 40–59 years range. In contrast, studies like Venkata et al. [61] and Kumari et al. [66] observed a relatively younger mean age 32 and 35.85 years respectively.

In our study we reported that there is a male high prevalence observed with (54%), and this observation is consistent with most studies including Deolekar et al. [64] (60%), Sharan et al. [75] (M: F = 1.17:1), and Vanathi et al. [62] (72%). The reason for it may be due to occupational hazards, delayed care-seeking behaviour among males, or higher incidence of inguinal hernias.

Adhesions were the leading cause in this study (32%), which is consistent with most existing literature like Naveen et al. [60] and Sharan et al. [75] both report adhesions as the predominant cause (42%) and Deolekar et al. [64] (37.5%) and Tiwari et al. [63] (33.3%) which confirms the high prevalence of postoperative adhesions.

In our study we observed relatively high frequency of hernias (10%) and malignancies (e.g., rectosigmoid and descending colon growths: 16%), and this also resembles the observations by Vanathi et al. [62] with hernia 30% and malignancy 14% and Praneeth et al. [73] reported hernia among 6.7% and malignancy among 20%. Tesfamichael et al. [65] and Jotham et al. [74], where volvulus and gangrenous bowel were common, whereas volvulus was rare (2%) in our study.

The mean duration of illness was 3.6 ± 1.58 days in our study, correlates well with Tesfamichael et al. [65], where >24-hour delays were significantly linked to complications. The relatively shorter delay in presentation may have contributed to the lower observed complication and mortality rates in our study population. About 42% of the patients in our study had comorbid conditions (HTN, DM), with diabetes showing significant association with adverse outcomes (though not statistically significant). This is in concordance with Tesfamichael et al. [65] and Girma et al. [68]. This highlighted that comorbidities play a significant role in the impact of surgical outcomes and mortality.

The influence of additive behaviour such as smoking, alcohol was less pronounced but still relevant, particularly in SMA thrombosis cases, where 75% were smokers. This finding is noteworthy and partially supported by Rao et al. [72], where alcohol and smoking were prevalent risk factors in obstructed cases. The average WBC count (14,772 ± 5111 cells/cu.mm) in our study is comparable to Tiwari et al. [63], where leucocytosis was an important prognostic marker. Notably, intussusception showed the lowest WBC (9500 cells/cu.mm) and Hb levels (8.9 gm/dl). Electrolyte disturbances (e.g.,

hyponatremia in hernia cases) echo the findings of Girma et al. [68] and Tesfamichael et al. [65], who reported electrolyte imbalance as a contributory factor to postoperative complications and poor outcomes.

The overall mortality in this study was 6%, which is **lower** than reported in Vanathi et al. [62] (14%), Deolekar et al. [64] (14%), and Tiwari et al. [63] (15%). This could be attributed to timely intervention, fewer strangulated/gangrenous bowel cases, and higher proportion of adhesive obstructions which were either less severe or promptly managed. Deaths in the current study occurred predominantly in growth-related and it is similar to the findings of Mukhopadhyay et al. [70] and Rani et al. [71], where malignancies and comorbid states led to higher mortality.

In our study we have not found any significant associations between age, gender, comorbidity, addiction, or aetiology with outcome reached statistical significance in our study, similar non-significant patterns were also documented by Naveen et al. [60] and Bugalia et al. [67]. The association between diabetes and mortality (66.7% of deaths) in our study aligns with Tesfamichael et al. [65] (AOR = 0.05 for comorbidity) and Praneeth et al. [73], underscoring its prognostic importance even if not statistically confirmed in this cohort.

The present study's findings align with the predominant literature in terms of age, gender, aetiology, and clinical outcomes. Adhesions remain the most common aetiology, and malignancies, especially in diabetic patients, are associated with poorer outcomes. Mortality rates are comparable or slightly lower than national averages, highlighting the effectiveness of early diagnosis and prompt surgical intervention in favourable outcomes. However, the statistical insignificance of many associations may be attributed to the relatively small sample size (n=50), necessitating larger multicentric studies for conclusive evidence.

CONCLUSION

This hospital-based observational study on 50 patients with acute intestinal obstruction aimed to delineate clinical patterns, etiological distribution, laboratory profiles, and outcomes, alongside potential associations with demographic and clinical parameters.

The most frequently affected age group was 51–70 years, and there was a slight male predominance. Adhesions emerged as the most common etiology (32%), reflecting trends consistent with prior abdominopelvic surgeries. Growth-related causes accounted for 28%, and hernias for 20%. Despite the diversity in etiology, 94% of the participants had favorable outcomes with appropriate management, while a mortality rate of 6% was noted, primarily linked to neoplastic and hernia-related complications.

No statistically significant associations were found between etiology and variables such as age, gender, comorbidity status, blood parameters, or outcome ($p > 0.05$). However, trends such as higher mortality among diabetics and those with malignant obstruction were observed and clinically relevant. Biochemical markers showed variable trends across etiologies, but without significant predictive value.

In summary, adhesion remains the leading cause of acute intestinal obstruction in this cohort. Prompt diagnosis, individualized intervention (surgical or conservative), and attention to comorbidities contributed to high recovery rates. Continued vigilance is warranted for growth-related obstructions and cases complicated by vascular or metabolic factors. Further studies with larger cohorts and multivariate analysis are recommended to validate predictive markers and optimize management protocols.

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