

WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF GENERAL SURGERY

TREATMENT OUTCOME OF ADULT SIGMOID VOLVULUS PATIENTS & ASSOCIATED FACTORS IN A FIVE YEARS CROSS SECTIONAL STUDY AT WOLKITE UNIVERSITY COMPRENSIVE SPECIALIZED HOSPITAL,SEPTEMBER 1 2020 TO SEPTEMBER 30 2025 WOLKITE,ETHIOPIA.

BY: DR.MEKONNEN ADMASU (MD, GSR4)

A THESIS REPORT TO BE SUBMITTED TO THE DEPARTMENT OF SURGERY, COLLEGE OF MEDICINE AND HEATLH SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE SPECIALIZATION IN GENERAL SURGERY

Februray, 2026

APROVAL SHEET

We hereby certify that we have read and evaluated this thesis titled" **To assess treatment outcomes and associated factors of adult sigmoid vovulus patients treated at Wolkite university comprehensive specialized hospital**"" prepared under our guidance by **Dr Mekonnen Admasu** We recommend that the thesis shall be submitted as fulfilling the requirements for the award of specialization in general surgery. It has been submitted for examination with my/ our approval as university advisor(s).

Samuel D (Assist prof of Epidemiology)

Public health advisor Signature

Dr Alemnew Maru (General surgeon) 28/2/2026

Clinical advisor Signature

Date

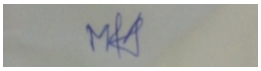
As members of board of examiners of the specialization in general surgery thesis open defense examination, we have read and evaluated this thesis prepared by Dr Mekonnen Admasu and examined the candidate, We, hereby certify that, the thesis is accepted for fulfilling the requirements for the award of certificate of specialization in general surgery.

1. Dr Minewor A/hadi 10/3/2026
   Name of Examiner Signature Date
2. Dr Teshome Genesa (BSc, PhD in RH)
   6/3/2026
   Name of Examiner Signature Date
3. Dr Minewor A/hadi 10/3/2026
   Head, Department of surgery Signature Date
4. _____ _____ _____
   Director, school of graduate studies signature Date
5. _____ _____ _____
   Chief Academic & Research Director, CMHS Signature Date

Declaration

I, the undersigned resident declare that this thesis titled " **To assess treatment outcomes and associated factors of adult sigmoid vovulus patients treated at Wolkite university comprehensive specialized hospital**" is my original work in partial fulfillment of the requirement for the specialization in general surgery.

Name: Dr Mekonnen Admasu

Signature: 

Place of submission: Department of surgery/PG-coordinator office at CMHS.

Date of Submission: 01/03/2026

Table of contents

ACKNOWLEDGEMENTS---------- I
List of Tables ----------II
List of figures ----------III
ABBREVIATIONS & ACRONYMS----------IV
Abstract----------1
INTRODUCTION ----------2
CHAPTER TWO----------6
2. Literature review ----------6
CHAPTER THREE---------- 11
3: OBJECTIVES OF THE STUDY---------- 11
CHAPTER FOUR---------- 12
Methods and Materials---------- 12
CHAPTER FIVE :RESULTS---------- 18
CHAPTER SIX: DISCUSSION ---------- 26
CHAPTER SEVEN---------- 30
CONCLUSION RECOMMENDATION & LIMITATION---------- 30
8 : References---------- 32
9:Annex ---------- 34
Checklist---------- 34

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List of Tables

Table 1 ;Showing Sociodemographic characterstics of patients having sigmoid volvulus were managed at WUCSH ---------- 18

Table 2 ; Showing clinical charactersics of the patient preopratively of sigmoid volvulus managed at WUCSH ---------- 19

Table 3 ;Showing Surgical Emergency procedure done for sigmoid volvulus patients at WUCSH ---------- 20

Table 4 ; Showing intraoperative incidents and findings of patients having sigmoid volvulus managed operatively at WUCSH -------- 20

Table 5 ;Showing post operative course and complications of sigmoid volvulus patients managed at WUCSH ---------- 21

Table 6 .; Measures of association between factors and outcome of patients for sigmoid volvulus at WUCSH ---------- 24

List of figures

Figure 1 .conceptual frame work for factor affecting treatment outcome of sigmoid volvulus ---------- 10

Figure 2 ;showing treatment outcome of patiented treated for sigmoid volvulus at WUCSH during study period ---------- 22

ABBREVIATIONS & ACRONYMS

AIDS: Acquired Immune Deficiency Syndrome

AOR: Adjusted Odds Ratio

BPH: Benign Prostatic Hyperplasia

BUN: Blood Urea Nitrogen

COR:Crude Odds Ratio

DBP: Diastolic Blood Pressure

DCS: Damage Control Surgery

DM: Diabetes Mellitus

ETB = Ethiopian Birr

ERB: Ethical Review Board

F: Female

Hr: Hour

HCT: Hematocrit

HP: Hartmann's Procedure

HTN: Hypertension

LOS: Length of stay

M: Male

MMR: Morbidity and Mortality Report

N: Number

OR: Odds Ratio

PA: Primary Anastomosis

PI: Principal Investigator

PTB: Pulmonary Tuberculosis

RFT: Renal Function Test

RR: Relative Risk

R4 = year 4 Resident

RVI: Retro-viral Infections

SBP: Systolic Blood Pressure

SD: Standard Deviation

SPSS: Statistical Package for Social Science

SV: Sigmoid volvulus

USA: United States Of America

WBC: White Blood Coun

WUCSH: Wolkite university Comprensive specialized hospital

Abstract

Background: Sigmoid volvulus is the commonest cause of large bowel obstruction in many regions of the world. Ethiopia is among the countries where sigmoid volvulus representing a leading cause of intestinal obstruction. Outcome of treatment are influenced by multiple factors. Understanding the treatment outcomes and identifying predictors of poor prognosis are essential for improving surgical decision making ,reducing morbidity & mortality & guiding prevention measures.

Objective: To asses the treatment outcome of adult Sigmoid volvulus patients and associated factors at Wolkite University comprensive specialized Hospital over a five years retrospective cross sectional study from September 1 2020 TO September 30 2025,Central Ethiopia.

Method: A Hospital based cross-sectional study review of surgical records among all adult patients with sigmoid volvulus managed at Wolkite University Comprensive Specialized Hospital during the study period . Data was collected with structured questioner by trained data collectors. The collected data were checked for its completeness and analyzed using Statistical Package for the Social Sciences (SPSS) .

Descriptive and analytic studies was performed. P value ≤ 0.05 with 95% confidence interval (CI) were used to interpret the findings.

Results: Overall, 19.56% of patients had unfavorable outcomes with [CI 12-29.1]. Factors independently associated with unfavorable outcome were age >60 years (AOR = 3.205; 95% CI: 1.340–7.666), delayed presentation (AOR = 5.415; 95% CI: 1.452–20.189), presence of comorbidity(AOR = 4.603; 95% CI: 1.220–17.357) , preoperative peritonitis (AOR = 5.895; 95% CI: 1.412–24.602), intraoperative shock (AOR = 4.774; 95% CI: 1.234–18.466), and gangrenous bowel(AOR = 5.213; 95% CI: 1.193–22.783).

Conclusion & Recommendation;Patients with sigmoid volvulus during our study had experienced significant proportion complications. Advanced age, delayed presentation, comorbidity, preoperative peritonitis, intraoperative shock, and gangrenous bowel were independent predictors of unfavorable outcomes. Strengthening early referral systems, and promoting timely health-seeking behavior especially for high-risk patients are essential to reduce morbidity and mortality associated with sigmoid volvulus

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Sigmoid volvulus (SV) is defined as the axial twisting of the sigmoid colon around its mesenteric pedicle, resulting in luminal obstruction and potential vascular compromise[1]. It represents a surgical emergency that can rapidly progress from simple obstruction to bowel ischemia, gangrene, perforation, generalized peritonitis, and septic shock if not promptly diagnosed and managed. The condition demonstrates marked geographic variability in incidence, with a disproportionately higher burden in low- and middle-income countries compared to high-income settings[2].

Globally, sigmoid volvulus accounts for a relatively small percentage of large bowel obstructions in Western countries, where colorectal malignancy predominates[3]. However, in regions collectively described as the "volvulus belt"—including parts of Africa, the Middle East, South America, and South Asia it constitutes one of the leading causes of intestinal obstruction. Ethiopia lies within this high-incidence zone, and multiple institutional studies have reported sigmoid volvulus as the principal cause of large bowel obstruction and a major contributor to emergency surgical admissions[2,3].

The commonest clinical features are abdominal pain,constipation,and abdominal distension,and diagnosis can be made by clinical and imaging findings[2,3],the imaging finding can differentiate sigmoid volvulus from cecal and transverse colon volvulus and Sigmoid volvulus produces a typical signs of coffea bean appearance or bent inner tube in plain abdominal x ray[3].

Study from California showed that non operative reducton was successful in 78 patients(34%) and 71 patients (31%) treated non operatively ,the mortality rate for those treated nonoperative detorsion was 1.4 % for the remaining 159 patients who under go surgical treatment mortality was 18.9%. Overall mortality was 13.5 % and 36% of surgically treated patients develop significant complications[4].

In Africa, acute large bowel obstruction accounts for a great proportion of morbidity and mortality. Sigmoid volvulus is often associated with a high mortality because it affects elderly patients who may have severe comorbidity conditions[4].

Patients older than 70 years represent a high risk group if subjected to surgical intervention [4]. However, when volvulus necessitates emergency surgery, it also carries a substantial mortality even in relatively young patients [4].The highest mortality usually occurs in cases of resection and primary anastomosis of gangrenous sigmoid colon [4]. Most authors have reported a high mortality of sigmoid volvulus varying between 6% to 64% but this depend on whether there was gangrene, perforation, emergency surgery, toxic, shock post operatively, co morbid conditions and other postoperative complications [4,5].

The management of sigmoid volvulus is often challenging because of its prevalence high in high-risk patients and the associated per operative morbidity and mortality rates, there were many approaches recommended by different researchers [5].Management strategies for sigmoid volvulus depend on bowel viability, patient stability, and available resources. In hemodynamically stable patients with viable bowel and no signs of peritonitis, non-operative decompression using endoscopic detorsion may be attempted, often followed by elective resection to prevent recurrence [6].

However, in many resource-limited settings where endoscopic services are unavailable or patients present late, emergency laparotomy remains the mainstay of treatment. Surgical options include primary resection and anastomosis, Hartmann's procedure, derotation with or without fixation, and occasionally damage control approaches in unstable patients [6]

In Ethiopia, delayed presentation is common due to limited access to healthcare facilities, referral delays, and low community awareness regarding early symptoms of intestinal obstruction. Consequently, a substantial proportion of patients present with advanced disease, increasing the risk of poor outcomes.[6,7] However, the prognosis varies depending on several factors, including time to presentation, type of surgical procedure performed, presence of comorbidities, and intraoperative findings.[6,7]

Despite its prevalence and severity, limited local data are available regarding postoperative outcomes and associated factors following surgery for sigmoid volvulus, particularly in the Southern Nations, Nationalities, and Peoples' Region (SNNPR). This study seeks to evaluate the outcomes of patients who was treated for sigmoid volvulus over a five-years period at Wolkite University Comprensive Specialized Hospital (WUCSH), and identify factors influencing surgical outcomes.

1.2 Statement of the problem

Intestinal obstruction is a common surgical emergency Worldwide. Sigmoid volvulus remains a significant global surgical challenge, with marked geographic variation in incidence and clinical outcomes. While it accounts for a small proportion of large bowel obstruction in high-income countries, it represents one of the leading causes of intestinal obstruction in sub-Saharan Africa, including Ethiopia. Within the so-called "volvulus belt," sigmoid volvulus constitutes a substantial proportion of emergency laparotomies and is associated with considerable morbidity, mortality, and healthcare resource utilization.[1]

Ethiopia is one of the countries where sigmoid volvulus is a major cause of large bowel obstruction (91.9%) [2]. Sigmoid volvulus is not only common but also potentially fatal .Delayed presentation is frequent in Ethiopia due to limited access to health care and low awareness of early symptoms. Many patients reach hospitals after developing complications such as gangrene,peritonitis and sepsis[3].

Even if advances in surgical techniques and perioperative care, treatment outcomes of sigmoid volvulus remain highly variable. Mortality and complication rates are strongly influenced by several factors, including delayed presentation, bowel gangrene, peritonitis, presence of comorbid illnesses, intraoperative hemodynamic instability, and the type of surgical intervention performed. In resource-limited settings, delayed healthcare-seeking behavior, limited access to diagnostic tools, and referral delays further worsen prognosis[3].

Although several Ethiopian institutions have reported mortality rates ranging from low to moderate, complication rates remain substantial, and predictors of unfavorable outcomes consistently include delayed presentation, advanced age, preoperative shock, and gangrenous bowel. However, these findings demonstrate inter-institutional variability, reflecting differences in patient demographics, referral pathways and surgical decision-making. Therefore, extrapolation of findings from other centers may not accurately represent the clinical realities of individual hospitals.

Despite the high incidence and serious complications associated with sigmoid volvulus, there is a noticeable lack of local data regarding postoperative outcomes and the factors that contribute to these outcome.However, in WUCSH, to date, no structured, evidence-based evaluation of the outcomes of sigmoid volvulus has been conducted at this

institution. Without such data, quality improvement initiatives and policy development aimed at reducing morbidity and mortality remain hindered.

This study seeks to address this problem by assessing the outcomes of patients treated for sigmoid volvulus at WUCSH over a Five-years period and by identifying the factors associated with poor surgical outcomes. The findings will provide evidence on the magnitude of favorable and unfavorable outcomes, identify predictors of poor prognosis and serves as a basis for improving surgical management protocols ,strengthening referral systems,and informing policymakers at both hospital and regional levels. Ultimately ,this study will contribute to reducing the high morbidity and mortality associated with sigmoid volvulus in Ethiopia .

1.3 Significance of the study

Understanding the outcomes of sigmoid volvulus at WUCSH is crucial for identifying gaps in care, optimizing surgical decision-making, and improving patient outcomes. This study would show the burden of poor prognosis and its predictors this can alert healthy professionals and policy makers to create strategic approach to tackle the issue and provide evidence to guide clinical protocols and hospital policy. Additionally, it may serve as a foundation for public health education to reduce delays in seeking care and also can serve as baseline for future studies in this area . Therefore, this research is both timely and essential for improving surgical outcomes and informing future interventions at the institutional and regional level.

CHAPTER TWO

2. Literature review

2.1 Global Overview of Sigmoid Volvulus

Sigmoid volvulus (SV) is the torsion of the sigmoid colon around its mesenteric base, leading to obstruction and potential ischemia. It is a well-documented cause of large bowel obstruction, with marked geographical variation. In high-income countries, it accounts for only 1–7% of intestinal obstruction, predominantly affecting elderly and institutionalized patients with comorbidities. By contrast, in developing regions such as Africa, South Asia, and Latin America, it is far more common, accounting for 30–50% of large bowel obstruction cases [1,2].

Dietary habits (high-fiber bulky foods), chronic constipation, stool withholding habit , and anatomical predispositions (long sigmoid with narrow mesentery) are widely recognized risk factors. In developed countries, SV is often associated with advanced age and neurological disease, whereas in low-income countries, patients are typically younger and male-predominant [3].

Retrospective review was done from California showed that, Non operative reduction was successful in 78 (34 percent) patients and was the only treatment received by 71 (31 percent) of them. One hundred fifty-nine (69 percent) patients underwent surgical intervention, 152 (66 percent) as an emergency and 7 (3 percent) electively. Surgical treatment consisted of sigmoidectomy and primary anastomosis in 80 (50 percent) patients, open detorsion and sigmoid plication in 60 (38 percent) patients, and Hartmann's procedure in 19 (12 percent) patients.overall mortality of 13.5 percent. Fifty seven (36 percent) of the surgically treated patients developed significant complications [13]

2.2 Burden of Disease in Africa

In sub-Saharan Africa, SV is one of the most common surgical emergencies. Studies across Ethiopia, Kenya, Uganda, and Nigeria report that SV constitutes 40–70% of large bowel obstructions [4]. A unique characteristic in Africa is the relatively younger age of presentation (30–50 years), with a marked male predominance. Mortality rates remain

high , largely due to late presentation, limited diagnostic tools, and restricted surgical facilities [5].

Studies from Kenya and Uganda have shown that gangrenous bowel is common at laparotomy and is strongly associated with mortality [6]. In Tanzania and Nigeria, delayed hospital arrival beyond 48 hours was linked with significantly worse outcomes. Across Africa, mortality ranges between 6% and 25%, with higher rates in gangrenous cases and those managed by inexperienced surgeons [7].

A Retrospective case series review from Moi Teaching and Referral Hospital (MTRH), Eldoret, Kenya, showed, of 92 patients who underwent emergency resection of sigmoid volvulus, there were 88 males and three females (M/F ratio = 29.3/1). The median age was 50 years (mean age was 47.3 years). The range was 16-86 years. There was only one case of significant co-morbidity (renal failure) and one case reported predisposing or associated risk factors (one case of schizophrenia). Twenty three patients (25%) had adverse outcome (deaths and complications) while 69 patients (75%) had no adverse outcome. Mortality was three cases (3.3%). One patient died of multiple postoperative complications (burst abdomen, colostomy diarrhea and feacal fistula).[8]

2.3 Sigmoid Volvulus in Ethiopia

Ethiopia lies within the so-called “volvulus belt,” with the highest reported incidence worldwide. Several hospital-based reviews indicate that 60–91% of large bowel obstruction cases are due to sigmoid volvulus [8]. Male predominance is striking, and patients often present in middle age. Cultural dietary factors (injera, enset, and kocho), coupled with delayed healthcare seeking, contribute to the heavy burden.Outcomes in Ethiopian hospitals vary depending on surgical intervention and timing.[9]

At Gondar University Hospital, most patients were young males, with 25% presenting with gangrene. Postoperative complications included wound infection, abscess, and sepsis, with a mortality rate of about 2–3% [10]. In Metu Karl Hospital, poor outcomes were significantly associated with female sex, late presentation, and primary resection with anastomosis [11]. Debre Markos Hospital found preoperative shock and peritoneal contamination as independent predictors of poor prognosis [12].

A retrospective cross-sectional study on treatment for acute sigmoid volvulus at Metu Karl Referral Hospital (MKRH), Ethiopia, a total of 131 patients were managed for acute sigmoid volvulus. (82.4%) were men with a male to female ratio of 4.7:1. The hospital prevalence of acute sigmoid volvulus was 27.9%. Majority (42%) of the patients were in the 6th decades of life. The predominant postoperative complication was wound infection in 11(10.7%) patients. Factors associated with unfavorable outcome were female sex, primary resection & end to end anastomosis and presentation of illness more than 24 hrs.[11

The overall mortality rate was 4.5% and the mortality rate related to primary resection and end to end anastomosis was 6.4%. Mortality rate was higher in those patients who had resection and anastomosis for gangrenous bowel compared to those who had viable bowel (19% vs 3%). Generally factors associated with poor outcome were duration of illness, primary resection and anastomosis and being female.[11]

A retrospective cross-sectional study employed in Debre Tabor general hospital North central Ethiopia, revealed that Primary resection and anastomosis was the most common procedure for sigmoid volvulus for 77.4 % and stomas 13.4% . The mortality rate was 6.45% and it had statistical significance with bowel viability and hospital stay. [12]

A retrospective study done at Attat Hospital, central Ethiopia, (32%) of the patients presented with gangrenous bowel while the rest (68%) had viable gut. The operative procedures performed included derotation alone, resection and primary anastomosis or resection and colostomy.There were four deaths among the patients who had resection and primary anastomosis, a mortality rate of 5.5%. The mortality among those who had viable gut was 4 % in comparison with the 9% among those with gangrenous sigmoid colon. There were no deaths among patients who had derotation alone or resection and a colostomy . [13]

Management of SV ranges from nonoperative decompression to definitive surgical intervention. Endoscopic detorsion is widely practiced in developed countries, with initial success rates of 70–90% but high recurrence if not followed by surgery. In resource-limited settings, flexible sigmoidoscopy is often unavailable, making laparotomy the mainstay of treatment [13]. Surgical approaches include;Primary resection with anastomosis (PRA) is common in viable bowel and associated with lower recurrence but

risk of leakage in emergency settings, Hartmann's procedure preferred in unstable patients or those with peritonitis and gangrene. Derotation and fixation procedures simple but associated with high recurrence.Mortality depends on bowel viability and timeliness of surgery. In viable cases, survival exceeds 90%, but in gangrenous bowel, mortality rises to 20–40% [14].

In Ethiopia, most centers report PRA as the dominant approach, but complications such as wound infection, anastomotic leak, and prolonged hospital stay remain common.[15] Ethiopian studies have identified delayed presentation, female sex, shock at admission, and gangrenous bowel as independent predictors of poor outcome [15]. Conversely, early surgery in patients with viable bowel generally results in favorable outcome.

2.4 Conceptual framework

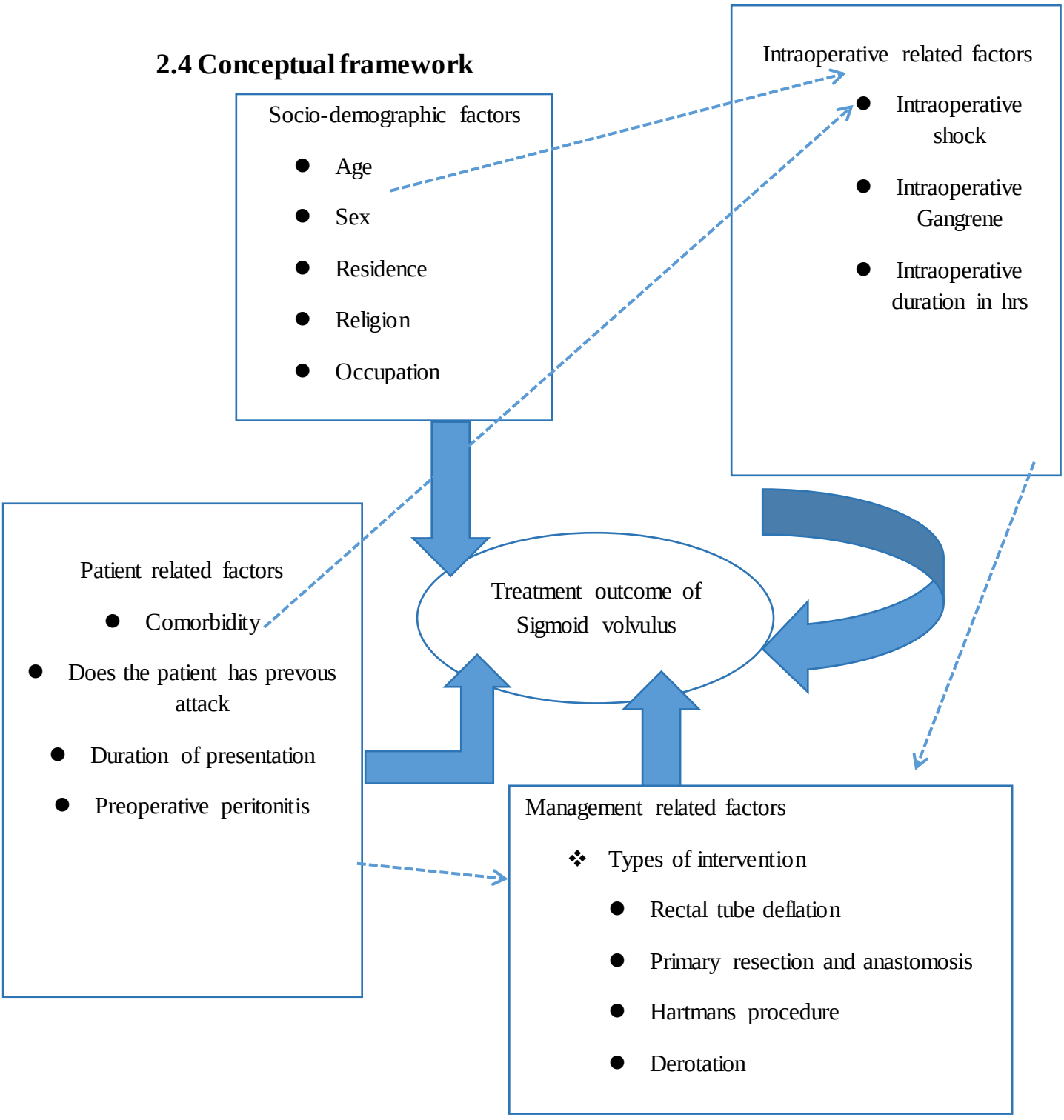


Figure 1.conceptual frame work for factor affecting treatment outcome of sigmoid volvulus

CHAPTER THREE

3: OBJECTIVES OF THE STUDY

3.1 General objective

To assess the treatment outcome of Adult Sigmoid volvulus patients and its associated factors treated at Wolkite University comprensive Specialized Hospital over Five -years retrospective period from September;1 2020 to September 30 2025.

3.2 Specific objectives

- To asses the treatment outcomes of Sigmoid volvulus of adult patients who are treated at WUCSH during September 2020 to September 2025
- To identify factors associated with treatment outcomes of adult Sigmoid volvulus patients who are treated at WUCSH during September 2020 to September 2025.

CHAPTER FOUR

Methods and Materials

4.1. Study Area and period

Wolkite University comprensive specialized Hospital (WUCSH) is found in central region of Ethiopia. The teaching hospital is located in Wolkite town of Gurage Zone located at 158 km south to the capital city, Addis Ababa. The teaching hospital was established in 2018 and serves for about 4 million people in the region. It has a total capacity of 220 inpatient beds in four major departments and other units with a total of 115 physicians, 240 non-physician health professionals and and 156 supportive and technical staff. Every month, in average, 354 surgical patients visit the hospital out of which 82 patients are admitted to the surgical ward.

The study was conducted retrospectively from September 1 , 2020 to September 30, 2025 G.C, at WUCSH, Ethiopia and the data was collected and analyzed during September to November 2025.

4.2. Study Design

A hospital-based retrospective cross-sectional study was implemented.

4.3. Source Population

All adult patients' who had been treated for Sigmoid volvulus at WUCSH between September1 2020 to September 30 2025 G.C.

4.4 Study population

All adult patients' who had been treated for Sigmoid volvulus at WUCSH between September1 2020 to September 30 2025 G.C which fulfill the inclusion criteria.

4.5 Inclusion and exclusion criteria

The adult patients managed for Sigmoid volvulus during the study period was included in the study. Patient charts with incomplete data (information) or patients whose cards were lost was excluded from the study and also elective redundant sigmoid resection was excluded from the study.

4.6 Sample size and Sampling techniques

4.6.1 Sample size

Sample size is calculating by using a single population proportion formula by considering the following assumptions:

$n=z^2 * p(1-p)/d^2$

n = required sample size

z = z – score corresponding to the desired confidence level (i.e. 95% = 1.96)

P = Estimated proportion from previous study done in sowest west Ethiopia metu karl hospital (22.1%)

d= margin of error (5%)

$n=(1.96)^2 * 0.221(1-0.221)/(0.05)^2=3.8416 * 0.195 * 0.805/0.0025=0.603/0.0025$

n=264

The study use all source population because the source population is less than the calculated sample size wich is 92

4.6.2 Sampling techniques

All large bowel obstruction managed for sigmoid volvulus was included . First, operative records from surgical ward, OPD register and major operation registry book in the operation room were reviewed to identify patient who managed for sigmoid volvulus from September 1, 2020 through to September 30, 2025G.C. Next, using card no. of patients, cards were collected from the card room. Finally, based on the inclusion and exclusion criteria of the study cards were selected

4.7 Study variables

4.7.1 Independent variables

- Sociomographicde variabies(Age ,Sex .Residency)
- Duration of illness ,preoperative peritonitis ,Previous attack ,Comorbidity
- Type of surgical interventions (Rectal tube deflation ,Primary resection and anastomosis, Hartmans procedure, Derotation)

  Intraoperative shock,intraoperative gangrene,intraoperative duration in Hrs

4.7.2 Dependent variable

Treatment outcomes (Favorable and unfavorable outcomes)

Operational Definition

Adult Patient: Any individual aged 18 years or older at the time of surgery.[1]

Time to Presentation: The duration from the onset of symptoms to hospital presentation

Delayed Presentation: A presentation to the hospital ≥24 hours after symptom onset.[1]

Surgical site infections: an infection that occurs within 30 days of the index operation.[2]

Mortality: In-hospital death from any cause after surgery for SV during the same admission [3]

Colostomy: is an artificially created communication between colon and abdominal wall.

Operative management: means surgical exploration of the abdomen which is determined by the nature of obstruction.

Procedure done: the main procedure done after laparatomy to relieve the obstruction.

Length of hospital stay: the duration of time from admission to discharge or death of the patient classified as prolonged if it is more than 7 days.[10]

Laparatomy: is a surgical procedure involving an incision through the abdominal wall to gain access in to the abdominal cavity.

Management outcome: the condition of the patient after the procedure that means whether he developed complication or not, discharged alive or died in the Hospital.

Favorable outcome: patients with a clinical diagnosis of sigmoid volvulus who had operatively managed improved, cured &discharged from Hospital & developed no post operative complication. [14]

Unfavorable outcome: Patients with a clinical diagnosis of sigmoid volvulus, who had managed, developed one or more post operative complication or who have died in the intra or post operative period .[14]

- Defined as the presence of any of the following after management for SV:

1. **In-hospital mortality** (death during admission/postoperative period).

2. **Major postoperative complications**, such as:
   a. Anastomotic leak
   b. Intra-abdominal abscess/peritonitis
   c. Deep surgical site infection
   d. Severe sepsis/septic shock
   e. Respiratory complications requiring ICU care
   f. Organ failure

4.9 Data collection process

4.9.1 Data Collection Methods and Instruments

Data were extracted using a structured checklist designed specifically for the study. The checklist were prepared based on previous studies and includes the following sections:socio-demographic characteristics, signs and symptoms, physical findings, procedure done, indication, operative finding, outcomes, complications encountered, and other relevant items related to disease. The structured checklist was documented from each patient card and surgery registration books. The check lists was be prepared in English language.

Data collectors: Two trained data collectors (surgical residents) were recruited and supervised by the principal investigator. Training was given prior to data collection.

4.10 Data quality control

All data was collected using a structured data extraction form. Data collectors were undergo a training before data collection on research ethics, confidentiality, tool usage, and data entry procedures to ensure consistent understanding and application. The data extraction form were prepared in English, and a pre-test was conducted on 5% of the patients from ATAT Hospital before the actual data collection to check its relevance for the extraction of appropriate data. The completeness and consistency of the data was checked on a daily basis during the data collection period.

4.11 Data processing and analysis

Data was cleaned, edited, coded, and entered into SPSS and also analysed by SPSS. Descriptive statistics including frequencies and percentages for categorical variables like poor outcome, and means (±SD) or medians (IQR) for continuous variables.

Associations between independent variables and outcome variable were assessed. Variables with $p<0.25$ in Bivariate analysis were candidates for Multivariate binary Logistic Regression. Statistical significance was considered set at $p<0.05$. Findings was presented in tables and graphs.

4.12 Ethical considerations

All ethical issues were considered as per the guidelines of the World Health Organization (WHO) & culture & religion of study population. Before starting of the data collection process, Wolkite University College of Medical and Health Science Institutional Health Research Ethics Review Committee (IHRERC) were secure ethical clearance. Permissions was taken from the administrative office of Wolkite specialized hospital as well as from the Departmental Heads of Surgery. The study was conducted with maintaining privacy. Patient confidentiality was strictly maintained using anonymous data collection and coding.

4.13 Dissemination of Results

After the results commented by the advisors ,the final report of the study will be presented to Wolkite University management team ,surgical staff and other health professionals through an internal seminar,where key results and recommendations will be discussed for integration into clinical practice.The report will also be shared with the Wolkite university college of medicine and health sciences and research office for future reference. At the regional level ,the result will be communicated to Gurage zone health department and other relevant bodies in SNNPR to support health system planning and policy formation. In addition efforts will be made to publish the findings in peer-reviewed national or international journals. Through these dissemination strategies ,the study aims not only to inform local clinical decision making but also to stimulate further research and policy attention to reduce the burden of sigmoid volvulus.

CHAPTER FIVE :RESULTS

5.1 Demographics characterstics pattern

In WUCSH between September1 2020 upto Septemper 30 2025 a total 98 Sigmoid volvulus cases were registered. Out of this 92 cases were evaluated for this study and 6 cases were excluded by exclusion criteria because of missed cards & incomplete data and the response rate was 93.9% . Majority of the patients come from rural area 62(67.4%) & 30 (32.6%) from urban and also most of them were farmers 66 (71.7 %).

Table 1;Showing Sociodemographic characterstics of patients having sigmoid volvulus were managed at WUCSH

Variables	Categories	Frequency (n=92)	Percentage(%)
Sex	Female	4	4.3
	Male	88	95.7
Age	19-29	4	4.3
	30-49	13	13.2
	40-49	20	21.74
	50-59	34	37.0
	>60	21	22.8
Residence	Urban	30	32.6
	Rural	62	67.4
Religion	Orthodox	46	50.0
	Muslim	29	31.5
	Protestant	17	18.5
Occupation	Farmer	66	71.7
	Merchant	19	20.7

	G Employee	7	7.6

5.2 Clinical characterstics of the Patient

Sixty three (68.5%) of patients presented with in 24 hours of the illness , 29 (31.5%) of patients were presented after 24 hrs of the onset off the illness and 90 (97.8%) patients were diagnosed by clinical and plain abdominal x ray.

Table 2 ; Showing clinical charactersics of the patient preopratively of sigmoid volvulus managed at WUCSH

Variables	Categories	Frequency (n=92)	Percentage
Duration of illness at presentation	< 24 hrs	63	68.5
	> 24 hrs	29	31.5
How was the Pt Diagnosed	Clinically	2	2.2
	By clinical & abdominal X ray	90	97.8
Past same history	Yyes	5	5.4
	No	87	94.6
Comorbidity	NO	60	65.2
	Yes	32	34.8
Preoprative Peritonitis	No	52	56.5
	Yes	40	43.5

5 3 Management Modalities of Sigmoid volvulus

From 92 patients who were diagnosed with Sigmoid volvulus 77(83.7%) patients managed operatively, among the common procedure done were Hartmans procedure were 40(43.5%) .

Table 3;Showing Surgical Emergency procedure done for sigmoid volvulus patients at WUCSH

Variables	Categories	Frequency (N=92)	Percentage(%)
Primary resection & Anastomosis	NO	56	60.9
	Yes	36	39.1
Hartmans procedure	Yes	40	43.5
	No	52	56.5
Laparatomy & Derotation	Yes	1	1.1
	No	91	98.9
Rectal tube deflation	Yes	15	16.3
	NO	77	83.7

5.4 Intraoperative factors

Almost one third of patients develop 36(46.8%) shock intaopratively ,35(45.5%) of patients have gangrenous bowel intraoperatively and the duration of surgery for mos patiens were less than 3 hrs 55(71.5%).

Table 4; Showing intraoperative incidents and findings of patients having sigmoid volvulus managed operatively at WUCSH .

Variables	Categories	Frequency (n=77)	Percentage(%)
Intraoperative shock	No	41	53.2
	Yes	36	46.8
Intraoperative Gangrenous bowel	No	42	54.5
	Yes	35	45.5
Intraoperative Duration in Hrs	< 3Hrs	55	71.5
	> 3hrs	22	28.5

5.5 Treatment outcomes and post op complications

In WUCSH 92 patients were managed for sigmoid volvulus during study period and 18 (19.56%) were had unfavorable outcome. The mortality rate were 3(3.3%). The most common post operative complication were wound site infection 11(14.29%),post op leak were 2(2.6%) , intraabdominal collection 2(2.6%) .For two patients relaparatomy were performed. Almost two third of the patients 67(72.8%) of patients were stayed in hospital less than seven days.

Table 5 ;Showing post operative course and complications of sigmoid volvulus patients managed at WUCSH

Variables	Categories	Frequency (n=77)	Percentage(%)
Post op wound infection	Yes	11	14.29
	No	66	85.71
Post op anastomotic leak	yes	2	2.6
	No	75	97.4
Post op Intraabdominal collection	Yes	2	2.6
	No	75	97.4
Relaparatomy performed	Yes	2	2.6
	No	75	97.4
Mortality	Alive	89	96.7
	Death	3	3.3
Length of hospital stay	< 7 days	67	72.8
	> 7 days	25	27.2

From 92 patients 18 patients (19.56%) had unfavorable outcome .

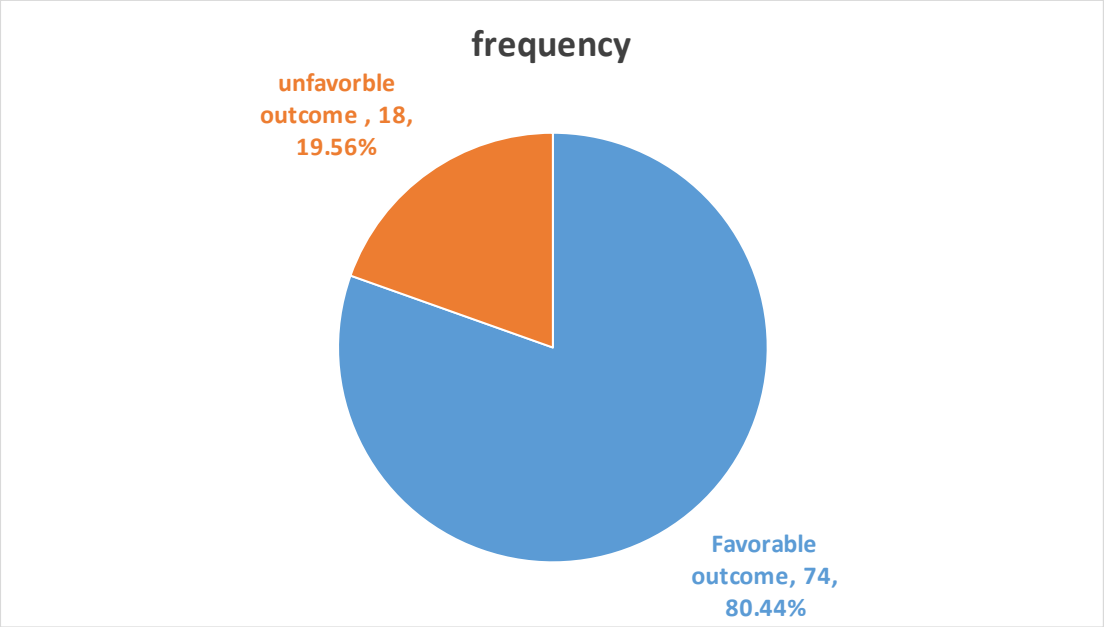


Figure 2;showing treatment outcome of patiented treated for sigmoid volvulus at WUCSH during study period

Factors affecting Management Outcome of sigmoid volvulus

In this study variables like ;Age, religion ,Comorbidity, duration of illness before arrival to Hospital, preoperative peritonitis, type of procedure Primary resection Anastomosis, intra-operative gangrenous bowel ,intraoperative shock, intra operation duration were candidate variables in bivariate analysis ,While Age, Comorbidity,Duration of illness before arrival,Intraoperative bowel gangrene, preoperative peritonitis, and intraoperative shock were identified as statistically significant in multivariate analysis at p-value of <0.05.

Those patients who came after twenty four hours had Five times poor outcome compared to those patients who came before twenty four hours.
(AOR=5.415(1.452,20.189),p=0.012

Those patients whose age was greater than 60 years had three times poor outcome than younger patients (AOR=3.205 (1.340,7.666) p=0.009

Those patients who had comorbidity had four times poor outcome than patient with out comorbidity (AOR=4.603(1.220-17.357) p=0.024.

Those patients having intraoperative shock had five times poor outcome than patients with out intraoperative shock(AOR=4.774(1.234-18.466),,P=0.024.

Those patients having intraoperative gangrene bowel had five times poor outcome than viable bowel(AOR=5.213(1.193-22.783)P=0.028.

Those patients having preoprative peritonitis had six times poor out come than others patient that doesnot have(AOR=5.895(1.412-21.021)P=0.015..

Table 6.; Measures of association between factors and outcome of patients for sigmoid volvulus at WUCSH

Variables	Category	Treatment outcomes		COR(95%C.I)	P-value	AOR(95%C.I)	P-value
		Favorable	Unfavorable				
Age	<30Yrs	3(3.26%)	0	1		1	
	30-39Yrs	14(15.2%)	1(1.09%)	1.183 (.488-4.933)	0.699	1.052 (0.243-11.739)	0.887
	40-49Yrs	18(19.56%)	1(1.09%)	.612 (.005-2.903)	0.235	.952 (0.118-23.299)	0.663
	50-59Yrs	31(33.7%)	3(3.26%)	2.350 (1.927-5.685)	0.142	2.202 (1.086-5.175)	0.148
	> 60 Yrs	8(8.7%)	13(14.13%)	5.676 (2.342-13.759)	0.000	3.205 (1.340-7.666)	0.009
Duration of illness	<_24 Hrs	58(63.04%)	5(5.435%)	1		1	
	> 24 Hrs	16(17.39%)	13(14.13%)	9.425 (2.924-30.383)	0.000	5.415 (1.452-20.189)	0.012
Comorbidity	Yes	19(20.65%)	5(5.435%)	7.526 (2.369-23.907)	0.001	4.603 (1.220-17.357)	0.024
	No	55(59.78%)	13(14.13%)	1		1	
Preop peritonitis	Yes	26(28.26%)	14(15.2%)	6.462 (1.928-22.282)	0.002	5.895 (1.412-21.021)	0.015
	No	48(52.17%)	4(4.35%)	1		1	
IOF shock	Yes	23(29.87%)	15(19.48%)	4.855	0.024	4.774	0.024

				(1.457-16.172)		(1.234-18.466)	
	No	36(46.75%)	3(3.89%)	1		1	
IOF Gangrene	Yes	20(25.97%)	14(18.18%)	5.133 (1.540-17.115)	0.008	5.018 (1.193-22.783)	0.028
	NO	39(50.64%)	4(%.19%)	1		1	

CHAPTER SIX: DISCUSSION

The prevalence of unfavorable outcome in this study was 19.56% (CI 12-29.1) This study assessed factors associated with poor outcomes among individuals treated for sigmoid volvulus at WUCSH between September 1 2020 and September 30 2025. The analysis demonstrated that age, duration of illness (DOI), comorbidity status, intraoperative shock (IOFS), intraoperative findings of gangrene (IOFG), and peritonitis were significantly associated with patient outcomes in both crude and adjusted analyses.

With regard to age distribution, most patients were between 30 and 59 years of age, with the highest proportion observed in the 50–59-year age group (37%). A substantial proportion of patients were also older than 60 years (22.8%). This age pattern is comparable to reports from developing countries, where sigmoid volvulus commonly affects middle-aged and elderly populations. Age-related changes in colonic motility, cumulative exposure to risk factors such as chronic constipation, and increased prevalence of comorbid conditions may contribute to this distribution.[2,3,4]

Age showed a strong and independent association with patient outcome. Older patients were more likely to experience unfavorable outcomes, even after adjustment for potential confounders (AOR = 3.205; 95% CI: 1.340–7.666). This finding is consistent with existing literature, which suggests that advancing age is associated with reduced physiological reserve, This suggests that increasing age is predictor of adverse postoperative events, possibly due to reduced physiological reserve, compromised immunity, and higher vulnerability to surgical stress ,all of which may worsen surgical outcomes in sigmoid volvulus.[4]

Duration of illness prior to presentation was another significant predictor. Patients with prolonged DOI had more than five times higher odds of adverse outcomes after adjustment (AOR = 5.415; 95% CI: 1.452–20.189). Delayed presentation may lead to disease progression, bowel ischemia, or perforation, thereby increasing morbidity and mortality. This emphasizes the importance of early diagnosis and timely surgical intervention.Similar findings were reported in a district hospital study in southwest Ethiopia, where presentation after 24 hrs was associated with a three-fold increased risk of adverse outcome ($p < 0.05$) and higher rates of gangrenous bowel, postoperative complications, and death.[4,5]

Comorbidity was also independently associated with poor outcomes (AOR = 4.603; 95% CI: 1.220–17.357). Patients with pre-existing medical conditions are more vulnerable to perioperative complications and may have limited capacity to withstand surgical stress and postoperative recovery. This aligns with global surgical literature showing that associated chronic conditions negatively impact recovery after emergency laparotomy for bowel obstruction and volvulus. For example, a study from Debre Markos Comprehensive Specialized Hospital identified pre-operative shock and high ASA scores as independent predictors of adverse perioperative outcomes in patients with sigmoid volvulus, reflecting the increased vulnerability of patients with systemic illness or physiologic compromise .[6]

Intraoperative findings significantly influenced outcomes. The presence of intraoperative shock (IOFS) and gangrene (IOFG) were both associated with increased odds of adverse outcomes. Patients with IOFS had nearly five times higher odds of poor outcomes (AOR = 4.774; 95% CI: 1.234–18.466), while those with IOFG had similarly elevated risk (AOR = 5.213; 95% CI: 1.193–22.783). These findings highlight the severity of advanced disease and the critical role of early surgical management before irreversible bowel compromise occurs.[6,7]

Peritonitis was also a significant predictor after adjustment (AOR = 5.895; 95% CI: 1.412–24.602). This may reflect the fact that emergency indications, such as peritonitis or bowel necrosis, are associated with worse outcomes compared to elective or stable patients with viable bowels.[7]

Overall, the surgical profile observed at WUCSH mirrors global patterns where operative strategy is influenced by viability of the bowel, patient comorbidities, and intra-operative findings. Although primary resection and anastomosis remains an effective approach, especially in viable bowel, Hartmann's procedure continues to be a valuable option in unstable patients or those with gangrenous changes.

This study also evaluated the post-operative course and complications of patients managed for sigmoid volvulus at WUCSH during the study period. Overall, the findings demonstrate a relatively favorable post-operative outcome, with low rates of major complications, short hospital stay for most patients, and low mortality.

Post-operative wound infection was the most common complication, occurring in 14.29% of patients. This finding is comparable to reports from other studies in sub-Saharan Africa and other low-resource settings, where surgical site infection remains the most frequent post-operative complication following emergency colorectal surgery. The relatively high rate of wound infection may be attributed to emergency presentation, bowel contamination, delayed presentation, and the presence of gangrenous bowel in some patients. Despite this, the majority of patients (85.71%) did not develop wound infections, suggesting acceptable perioperative infection control practices.[4]

Anastomotic leak was observed in only 2.6% of patients, which is considered low for colorectal surgery, particularly in emergency settings. This low rate may reflect appropriate patient selection for primary anastomosis, meticulous surgical technique, and cautious intraoperative decision-making. Similar low leak rates have been reported in studies where anastomosis was performed in stable patients without gross contamination or severe sepsis.[5]

Post-operative intra-abdominal collection occurred in 2.6% of cases, a rate comparable to those reported in other institutional series. This complication is often related to anastomotic failure or intra-abdominal contamination; however, the low incidence in this study suggests effective intraoperative source control and post-operative monitoring [5,6]

Relaparotomy was required in 2.6% of patients, which is relatively low compared to many reports from emergency sigmoid volvulus surgery. The low relaparotomy rate may be explained by the low incidence of major complications such as anastomotic leak and intra-abdominal sepsis. This finding suggests that most post-operative complications were manageable with conservatively.

The overall mortality rate in this study was 3.3%, which is lower than many reports in the literature where mortality rates range widely, especially in patients presenting late, with gangrenous bowel or significant comorbidities. The relatively low mortality observed in this study may be attributed to timely surgical intervention, effective perioperative care, and appropriate management strategies tailored to disease severity.The Jimma Medical Center retrospective analysis reported high mortality (6.4%) the study demonstrates that both patient-related factors (age, comorbidity,preoprative peritonitis and duration of

illness) and disease-related factors (intraoperative findings and Intraoperative shock) significantly influence outcomes in patients with sigmoid volvulus.

Studies done in Debretabor university showed Mortality rate was 6.45% and higher in gangrenous sigmoid volvulus (14.6 % vs. 2.4%). In Gondar university hospital mortality rate reaches of 3% in elective case and 12.5 % in emergeny cases .(6)

Regarding length of hospital stay, the majority of patients (72.8%) were discharged within 7 days, indicating a favorable post-operative recovery for most cases. Prolonged hospital stay (>7 days) in 27.2% of patients likely reflects the presence of post-operative complications, comorbid conditions, or more severe intraoperative findings such as bowel ischemia or gangrene.

In summary, the post-operative outcomes of sigmoid volvulus patients managed at WUCSH were generally favorable, with low rates of serious complications, short hospital stay for most patients, and low mortality. These findings suggest that with timely intervention and appropriate surgical decision-making, good outcomes can be achieved even in emergency presentations of sigmoid volvulus. Overall, comparison with other Ethiopian studies shows substantial overlap in risk factors. .

CHAPTER SEVEN

CONCLUSION , RECOMMENDATION & LIMITATION

7.1 Conclusion

. Most patients presented within 24 hours of symptom onset; however, a significant proportion presented late, contributing to complications.

The overall treatment outcome was favorable in 80.44% of patients, while 19.56% experienced unfavorable outcomes. The mortality rate was 3.3%, which is relatively low compared to many reports from similar resource-limited settings. The most common postoperative complication was surgical site infection (14.29%), while anastomotic leak and intra-abdominal collection were uncommon (2.6% each)

Multivariable logistic regression analysis identified the following independent predictors of unfavorable outcome:Age greater than 60 years,Delayed presentation (>24 hours),Presence of comorbidity , Preoperative peritonitis , Intraoperative shock & Intraoperative gangrenous bowel.

Patients who presented late, had comorbid conditions, or developed intraoperative shock and gangrene were significantly more likely to experience poor outcomes.In general, timely presentation, early surgical intervention, and careful perioperative management are crucial in improving treatment outcomes of sigmoid volvulus at WUCSH.

7.2 Recommendations

Based on the findings of this study, several recommendations are proposed for different stakeholders. For clinicians and surgeons, early diagnosis and prompt surgical intervention should be prioritized to prevent progression to bowel gangrene and peritonitis. Careful patient selection for primary resection and anastomosis is essential, particularly among elderly patients and those with significant comorbidities. For Wolkite University Comprehensive Specialized Hospital, strengthening emergency surgical services is recommended to reduce delays in intervention. Furthermore, establishing and

implementing standardized management guidelines for sigmoid volvulus would help ensure consistent and evidence-based clinical practice within the institution.

Public health authorities should focus on increasing community awareness regarding the early symptoms of intestinal obstruction to promote timely healthcare-seeking behavior. Strengthening referral systems from rural health centers to higher-level facilities is also essential to reduce treatment delays. Additionally, targeted health education programs should be implemented in rural communities where the burden of sigmoid volvulus appears to be higher.

For future researchers, conducting prospective cohort studies is recommended to better establish causal relationships and identify predictors of poor outcomes. Further research should also explore long-term outcomes and recurrence rates of sigmoid volvulus following different surgical interventions. Multi-center studies are encouraged to improve the generalizability of findings across various healthcare settings.

7.3 Limitations of the Study

Despite its important findings, this study has limitations that should be considered when interpreting the results. First, the retrospective design of the study, based on a chart review, relied heavily on the accuracy and completeness of medical records. As a result, some patient charts were excluded due to missing or incomplete data, which may have introduced information bias. Second, the study was conducted at a single institution, namely Wolkite University Comprehensive Specialized Hospital, which may limit the generalizability of the findings to other healthcare settings with different patient populations, resources, and clinical practices.

Additionally, the relatively small sample size (n = 92) may have reduced the statistical power of the study and affected the precision of the estimated associations. The assessment of outcomes was limited to in-hospital events, and long-term outcomes such as recurrence rates, stoma reversal rates, and long-term morbidity were not evaluated. Finally, some potentially important variables, including nutritional status and socioeconomic status, were not documented in the patient records and therefore could not be included in the analysis, raising the possibility of residual confounding due to unmeasured factors

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9:Annex

Checklist

Wolkite University, college of health sciences and medicine

I**nstruction:** This is to collect data from patient records in WUCSH,

Central region, Ethiopia to assess the management outcome of sigmoid volvulus.

N.B-: Dear data collectors! Please keep the patient privacy and confidentiality during all data collection periods.

1. Card no, _____

I Sociodemographic profile

1. Age

1.19 -29 2. 30-39 3 40-49

4. 50-59 5. ≥60

2. Sex 1. Female 2. Male

3 . Occupation

1. Farmer 3.Government employee

2. Merchant 4.Student 5.other

4. Religion

1. Orthodox 2.Muslim 3. Protestant 4.others

5. Residence 1.Urbanl 2.Rural

II.Clinical characteristics of the patient

6. Duration of the onset of illness in hrs…

1 .≤ 24hrs 2. >24hrs

7. How was the patient diagnosed?

1. Clinically 2. Abdominal x-ray 3. CT-scan 4 both clinical & x ray

Type of procedure done for the patient

8. Rectal tube deflation

1.yes 2.no

9. Resection with primary anastomosis

1. No 2. Yes

10. Resection with Hartman's colostomy

1. yes 2.no

11. Reduction & pexy

1. yes 2 no

12. Laparotomy and derotation

1. Yes 2.no

Type of indication

13. 1. Failed non operative treatment

1.No 2.Yes

14. Signs of peritonitis

1.no 2.yes

15. Type of intraoperative finding Gangrenous bowel

1.no 2.yes

16. Intra operative duration in hrs…….

1. ≤ 3 Hrs 2. Greater than 3 hrs

17 intraoperative shock

1 no 2 yes

18. Any postoperative complication

1 no 2 yes

19. Anastomotic leak

1 NO 1 yes

20. Wound dehiscence

1 No 1 yes

21 Intraabdominal abscess

1 no 2 yes

22 Wound infection.

1 No 2 yes

23 Duration of hospital stays in days.

1. ≤ 7 days 2. >7days

24 treatment outcome

1 favorable 2 unfavorable

25. Outcome on discharge

1. alive 2. Death

26. Re- laparotomy performed

1. yes 2.No.

Past clinical characteristics of the patients

27. Did the patient have the same history?

1. Yes 2. No

28 How many times it occur

1. Once 2.Twice 3.More than two times

29. If the response to Q -1 "Yes", how was the patient treated?

1. Rectal tube deflation

2. Laparotomy and derotation 3 none

30. Any pre -existing comorbidities

0, Yes 1 No