MAGNITUDE, CAUSES AND MANAGEMENT OUTCOME OF SMALL BOWEL OBSTRUCTION AT METU KARL REFERRAL HOSPITAL, OROMIA REGION, SOUTH WESTERN ETHIOPIA

BY:

IYASSU AREFAYNE (BSC)

A THESIS TO BE SUBMITTED TO INSTITUTE OF HEALTH AND MEDICAL SCIENCES, JIMMA UNIVERSITY, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER SCIENCE IN INTEGRATED EMERGENCY OBSTETRICS, GYNECOLOGY AND GENERAL SURGERY

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MAGNITUDE, CAUSES AND MANAGEMENT OUTCOME OF SMALL BOWEL OBSTRUCTION AT METU KARL REFERRAL HOSPITAL,OROMIA REGION, SOUTH WESTERN ETHIOPIA ;A SEVEN MONTHS PROSPECTIVE HOSPITAL BASED STUDY.

INVESTIGATOR:

IYASSU AREFAYNE (BSC)

ADVISORS:

DR. DAWIT TEARE (M.D, SURGEON)

MR. DACHASSA BEDADA (BSC, MSC IN BIOSTATISTICS)

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Abstract

***Background**: Small bowel obstruction is defined as any hindrance to the passage of small intestinal contents. It is one of the common causes of surgical emergencies which result high morbidity and mortality globally. The causes of small bowel obstruction vary from region to region, as well as from season to season. Poor clinical judgment is one of the negative factors leading to poor prognosis in case of small bowel obstruction.*

***Objective**: To assess the magnitude, causes and management outcome of small bowel obstruction at Metu Karl referral hospital, from February 2017 to August 2017.*

***Method:** Hospital based prospective, cross sectional study design was conducted at Metu Karl referral hospital, from February 2017 to August 2017. Descriptive and inferential statistics were used. Binary logistic regression analysis was used from inferential statistics.*

***Results:** 81 of small bowel obstruction causes (3:1 Male to female ratio) were analyzed. The age ranges from 1 to 65 years with a mean age of 28.81 and ± SD of 13.5years. The magnitude of small bowel obstruction among intestinal obstruction was 62.3%. The most common cause was small bowel volvulus 40.7% (n=33), followed by adhesion (commonly postoperative adhesion) 14.8% (n=12). Gangrenous bowel has significant statistical association with management outcome (AOR= 4.1, 95% CI: 2.9-8.0, p-value=0.018). Mean hospital stay in this study was 6.2days which ranges from 3-12 days. There were 2.4 %(n=02) deaths among small bowel obstruction.*

***Conclusion and recommendation:** Small bowel volvulus was the leading cause of small bowel obstruction followed by small bowel volvulus. Duration of illness before surgical intervention has significant statistical association with management outcome of patients (AOR=0.01, 95%CI: 0.005-0.619, p-value=0.019). Gangrenous bowel has four times risk of developing unfavorable outcome as compared with patients without gangrenous bowel. Early diagnosis, adequate preoperative resuscitation and proper post-operative care would help to reduce further mortality. This could be achieved by increase public awareness on health seeking behavior. Moreover, health facilities capable of handling patients with small bowel obstruction should be available within the reach of the community.*

***Keywords:** Small bowel obstruction, magnitude, causes, management, Metu, Ethiopia*

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List of abbreviations and acronyms

AOR	Adjusted Odd Ratio
CBC	Complete Blood Count
CI	Confidence Interval
COR	Crude Odd Ratio
E.g.	Example
GUH	Gondar university hospital
Hgb	hemoglobin
IEOS	Integrated Emergency Obstetrics /gynecology and General surgery
IO	Intestinal obstruction
LBO	Large bowel obstruction
LG	logistic regression
Mgt	Management
MKRH	Metu Karl referral hospital
NGT	Naso gastric tube
SBO	Small bowel obstruction
SBV	Small bowel volvulus
SPSS	Statistical Package for Social Sciences
SSI	Surgical site infection

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1. INTRODUCTION

1.1 Background

Small bowel obstruction is one of the most common condition resulting into hospital admission. The clinical features of small bowel obstruction include abdominal pain, vomiting, distention and constipation (1). SBO occurs when the normal flow of small intestinal contents is interrupted. Small bowel volvulus are the most common cause of mechanical SBO, which cause extrinsic compression of the intestine. Hernias cause extrinsic compression and are the third most common cause of SBO. Crohn's disease, and gallstone ileus account for only a small percentage of cases (1, 2).

There are two types of intestinal obstructions which are dynamic and a dynamic. In dynamic intestinal obstruction peristalsis works against the mechanical obstruction, while in a dynamic intestinal obstruction peristalsis may be absent or it may be present in non-propulsive form (2). Mechanical intestinal obstructions, forms important part of pathologies that necessitate emergency surgical interventions globally (2, 3). When normal luminal flow of intestinal contents is interrupted, the intestine proximal to the obstruction begins to dilate as intestinal secretions are prevented from passing distally (4).

The outcome of management of the condition may be a good indicator of how well a country's surgical services are doing. Small bowel obstruction is one of the most common abdominal surgical emergencies. When small bowel obstruction is not relieved in time, the patient may die. Early diagnosis and prompt management are therefore mandatory. Several factors contribute to poor outcomes in the case of small bowel obstruction. Some of these determinants may include poor health seeking behavior, ignorance and poverty. Poor clinical judgment is also one of the negative factors leading to poor prognosis in case of small bowel obstruction (2, 3).

There is a wide geographical variation in the pattern of mechanical intestinal obstruction. The present study, small bowel volvulus ranked the highest in Europe. The most common predisposition to adhesive obstruction is violation of the peritoneal cavity and the majority of our cases followed laparotomy. It is possible that talc or starch of the surgical gloves in routine use in our environment played a role in small bowel volvulus formation in some of our patients (4, 5).

Primary small bowel volvulus is one of the most common cause of small bowel obstruction in parts of Africa .Primary small bowel volvulus was during the rainy seasons (5, 6*).*

Therefore regular research should be done to evaluate these causes and strategy should be made to deal with them. Two reports from Yirgalem and Hosanna, Southern Ethiopia, showed that small intestinal volvulus (SIV) as the most frequent cause of IO [7, 8 and 9]. In GUH magnitude of SBO is 43.3% (9).

1.2 Statement of the problem

Small bowel obstruction is a common and potentially dangerous surgical emergency associated with high morbidity and mortality. It is a global problem consuming much in terms of cost (2, 3). The magnitude and causes of SBO differs internationally and locally [2, 3, and 5]. The situation was considered to be worse in developing countries where health facilities were scarce and health education was limited, that many patients present late to hospitals after trials with local remedies were exhausted (6, 7). This has a number of consequences that depend, in part, upon the site and the degree of obstruction. The pattern of the disease changes from time to time and needs periodic studies to evaluate the causes and magnitude of the disease. The causes of SBO are several and their relative incidence varies in different populations, between countries and has also changed over the decades, Small bowel volvulus and adhesion were globally and locally. Mostly affected group of population are male farmers and its mean age is 34year which resides in the rural area (7).

Analysis based on the specific causes of acute abdomen is of great value for early diagnosis and prompt treatment in clinical practice socioeconomic factors and diet have mostly been incriminated to be responsible for the observed difference. The knowledge of patterns and causes of small bowel obstruction in different parts of the country has significant value in fast diagnosis and timely surgical intervention which result in good outcome of the patient (6, 7).

The purpose of this study is to find out the common causes, magnitude and management outcome as well as to compare the preoperative and intraoperative diagnosis of small bowel obstruction in surgically and conservative treated patients at Metu Karl referral Hospital and so as to highlight the commonest causes of small bowel obstruction in the geographical location of the study area which is suggest measures for treatment of the condition.

2. LITERATURE REVIEW

2.1 Literature review

A better understanding of the Pathophysiology of small bowel obstruction and the use of isotonic fluid resuscitation and antibiotics have greatly reduced the mortality rate for patients with mechanical bowel obstruction. However, patients with a small bowel obstruction still represent some of the most difficult and vexing problems that surgeons face with regard to the correct diagnosis, the optimal timing of therapy. Early in the course of an obstruction, intestinal motility and contractile activity increase in an effort to propel luminal contents pass the obstructing point. The increase in peristalsis that occurs early in the course of bowel obstruction is present both above and below the point of obstruction, thus accounting for the finding of diarrhea that may accompany partial or even complete small bowel obstruction in the early period. Later in the course of obstruction, the intestine becomes fatigued and dilates, with contractions becoming less frequent and less intense. As the bowel dilates, water and electrolytes accumulate both intraluminal and in the bowel wall itself. This massive third-space fluid loss accounts for the dehydration and hypovolemia [3, 4, and 6].

The metabolic effects of fluid loss depend on the site and duration of the obstruction. With a proximal obstruction, dehydration may be accompanied by hypokalemia and metabolic alkalosis associated with increased vomiting whereas distal obstruction of the small bowel may result in large quantities of intestinal fluid into the bowel; however, abnormalities in serum electrolytes are usually less dramatic. Oliguria, azotemia and hemo concentration can accompany the dehydration; followed by Hypotension and shock. Other consequences of bowel obstruction include increased intra-abdominal pressure, decreased venous return, and elevation of the diaphragm, compromising ventilation. These factors can serve to further potentiate the effect of hypovolemic (3).

At least 20% of the patients, who apply to General surgery services complaining from acute abdomen, are thought to have small bowel obstructions. It is rare in the USA and Western Europe while it is common in Pakistan and other tropical countries. It is the leading cause of acute abdomen in several African countries (8).

SBO is one of the commonest abdominal surgical emergencies. When intestinal obstruction is not relieved in time, the patient may die. Early diagnosis and prompt management are therefore mandatory. Several factors contribute to poor outcomes in the case of small bowel obstruction. Some of these determinants may include poor health seeking behavior, ignorance and poverty. Poor clinical judgment is also one of the negative factors leading to poor prognosis in case of intestinal obstruction .It is usually classified as dynamic or mechanical obstruction, in which peristalsis works against an obstructing agent like small bowel volvulus, intussusceptions, inflammatory stricture(8 , 9).

There is a wide geographical variation in the pattern of mechanical intestinal obstruction. The present study, in which small bowel volvulus ranked the highest, underscores the changing pattern in Nigeria (10). The most common predisposition to adhesive obstruction is violation of the peritoneal cavity and the majority of the cases followed laparotomy. The most common risk factor for adhesion abdominal surgery and abdominal trauma. It is possible that talc or starch of the surgical gloves in routine use in our environment played a role in small bowel volvulus formation in some of our patients. Most cases of adhesive obstruction were managed conservatively, but only 15% of cases responded to such treatment one study done in Nigeria (11).

Primary SBV is one of the commonest causes of small bowel obstruction in parts of Africa (commonly East and West Africa). Some authors have reported that its occurrence has some seasonal variations (12). Diagnosis is based only on the intra-operative findings for its clinical presentation is the same as that of other causes of small bowel obstruction (13). It is rare cause of small bowel obstruction in Europe and America .It is associated with ingestion of high-bulk vegetable diets, especially after prolonged interval of fasting. The abrupt transit of a large bulky meal into the proximal jejunum causes the resultant heavier segment of the bowel to migrate into the left lower quadrant because of the absence of resistance in the pelvis. The empty loops of distal jejunum and ileum are therefore forced in a clockwise rotation into the right lower quadrant predisposing to torsion of the mesentery. The typical patient of primary small bowel volvulus is a young adult male, who is muscular, a farmer from a rural area whose diet is mainly cereal and high fiber. Among the predisposing factors to primary small bowel volvulus are the presence of long mobile mesentery and a narrow mesenteric base, which makes the bowel loop susceptible to

twisting. The secondary type of small bowel volvulus has predisposing lesions like anatomic malformations and malrotations, bands and postoperative adhesion (12, 13).

Ascariasis is known to be a cause of intestinal obstruction particularly in children. In one study done in Kenya, about 11.9% of laparotomy was done for Ascaris lumbricoides (14). Ascaris lumbricoides is a worldwide small bowel infestation with particular high magnitude in warm tropical climates, especially in low socio- economic communities with poor hygiene and inadequate sewage disposal. All age groups are affected but clinical manifestation and presentation vary due to the life cycle related pathogenesis. Adult worms reside in the small bowel and are known to cause malnutrition, stunting and mental retardation as well as anemia. In clinical cases the worms congregate and cause bowel obstruction with or without volvulus, bowel necrosis, peritonitis and death may follow if treatment is further delayed or inappropriate. It is still major cause of pediatric surgical complications requiring laparotomy for treatment. High index of suspicion and timely clinical diagnosis in endemic areas are still crucial in reducing the mortality in this surgical complication where modern diagnostic aids are still unavailable or inadequate. There is need for public health activities to control nematode infestation including sanitation and waste disposal, health education and regular deworming in the under-five and school going children (13).

In some study small bowel metastases arising from primary lung cancer occur in over 10%of patients who underwent autopsy. Operative complications but only 27.4% from patients who presented before 48hrs. The overall mortality rate was 9.4%. All patients who died have presented 24hrs after the onset of symptoms. 2.9% patients who died had hernias. 13.5% patients with bowel resection developed post-operative complications. Gangrenous Bowel has influence on post-operative complication and mortality. The most common postoperative complication was wound infection which developed in 57.9 %patients. Anastomosis leakage in 23.7 % and facial dehiscence in 10.5 %.Mortality was low in the Middle Ages while it is high at the two extremes of age (15).

Study has done in Sudan the causes of small bowel obstruction are Strangulated hernias (27.7%), Intestinal small bowel volvulus (21%), Intussusceptions (12%) (16). Magnitude of small bowel obstruction study has done in Tikur anbessa Teaching Hospital which was 52.3 %(15).

2.1 The significance of the Study

Small bowel obstruction is one of the most common surgical emergencies which result in high morbidity and mortality. The cause of small bowel obstruction has been reported to be varies from one geographical area to another and different parts of the same country.

Therefore, the study aimed to identifies the magnitude, causes and management outcome of SBO at Metu Karl referral hospital and the result have significant advantage for health professional in the hospital and other hospital in Ethiopia to understand the magnitude, causes and management outcome of SBO.

Result of this study add epidemiological and clinical information that was serve as an essential input for policy makers to design proper strategies. Besides, the study provide as starting point for further studies in the future

2.2 Conceptual frame work

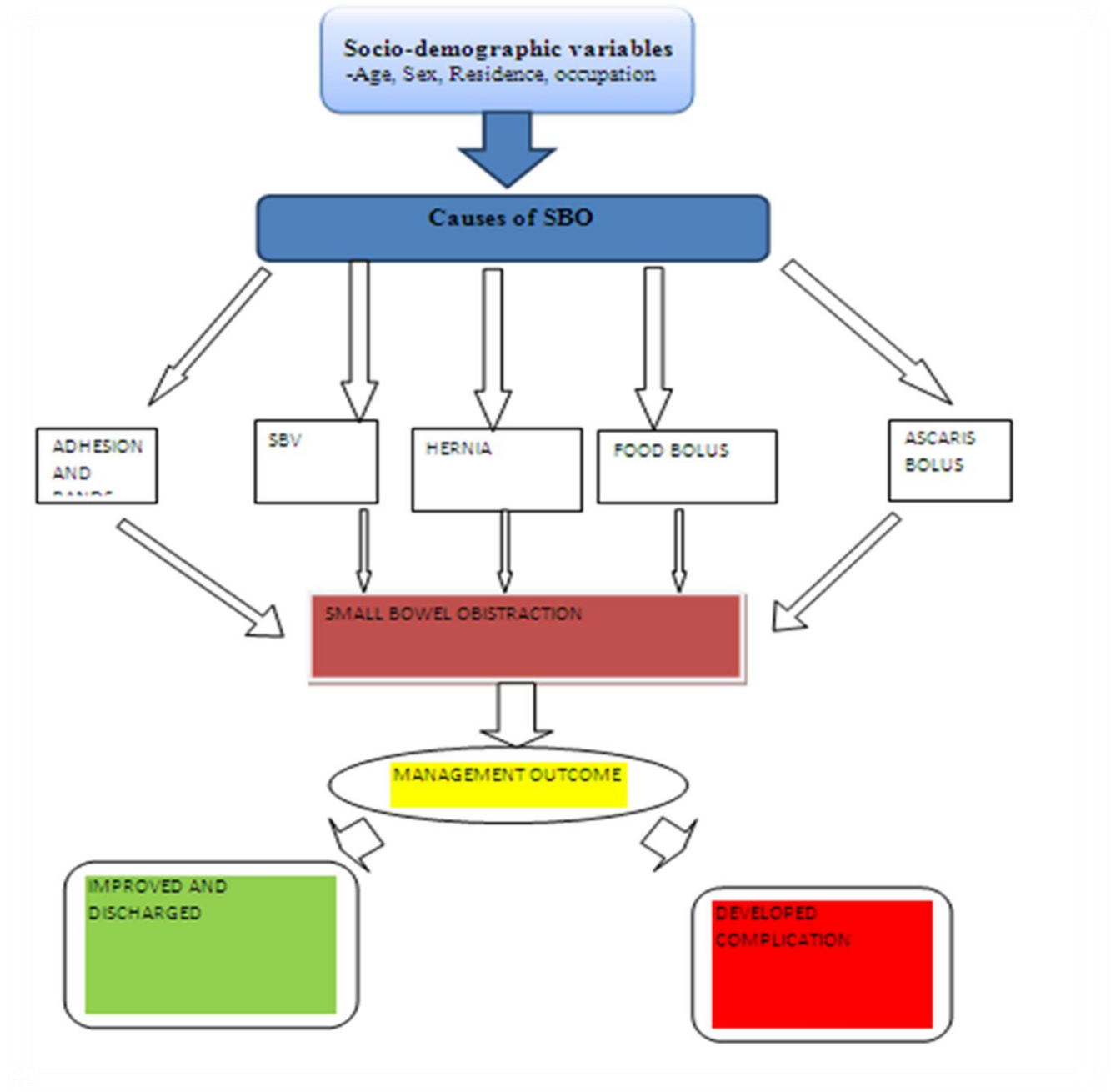

Figure1. Conceptual framework and management outcome of small bowel obstruction in Metu Karl referral hospital from February, 2017–August, 2017

3. OBJECTIVES

3.1 General objective

- The general objective of this study is to assess the magnitude, causes and management outcome of small bowel obstruction at Metu Karl referral hospital, from February 2017 to August 2017.

3.2 Specific objectives

- To determine the magnitude of small bowel obstruction at Metu Karl referral hospital
- To identify common causes of the small bowel obstruction at Metu Karl referral hospital
- To identify type of intraoperative procedure done to relieve associated factors of small bowel obstruction at Metu Karl referral hospital

- To describe management outcome of small bowel obstruction
- To find out the common post operation complications at Metu Karl referral hospital

4. METHODS AND MATERIALS

4.1 Study area and period

This study was conducted at Metu Karl referral hospital which is found 595 km south west from Addis Ababa. It is established by Swedish Missionaries and Ras Teferi in 1932.It provides full health services for the population of Illu Ababora zone and its surroundings estimated to be 1.5 million people. The number of beds in the hospital is 160, which is on Medical, pediatrics, surgical, gynecology and obstetrics ward. Out of this 51 beds are found in surgical ward.

The total number of staff in the hospital is 291. Out of these 160 of them are health professionals including specialists, General practitioners, nurses, Laboratory technician and pharmacists and 131 supporting staffs. The number of health professionals in surgical ward is two surgeons, one IEOS and 13 clinical nurses. This study covers from February 2017 to August 2017.

4.2 Study design

Hospital based prospective, cross sectional study design was conducted.

4.3 Population

4.3.1 Source population:

The source population were all patients admitted to surgical ward with a diagnosis of intestinal obstruction at Metu Karl referral hospital from February 2017 to August 2017.

4.3.2 Study population

All Patients admitted with diagnosis of small bowel obstruction at Metu Karl referral hospital from February 2017 to August 2017.

4.3.3 Inclusion and Exclusion criteria

Inclusion criteria

- patients who were clinically diagnosed as SBO and managed conservatively without operation
- Operated cases of patients for Small bowel obstruction
- Dynamic & a dynamic intestinal obstruction

Exclusion Criteria

- Patients who were referred to other hospital and Self-discharge

4.4 Sample size determination and sampling techniques

All Admitted patients with a diagnosis of SBO from February 2017 to August 2017;among all patients admitted with the diagnosis of intestinal obstruction admitted to surgical ward at MKRH without sampling being used.

4.5 Measurements and study variables

4.5.1 Data Collection instrument

The check list developed by English language for collection of important information such as age, sex, admission diagnosis, intraoperative finding, intraoperative procedure done, duration of presentation, causes of SBO, postoperative complications and management outcome of patients.

4.6 Study variables

4.6.1Dependent variables:

- Management outcome alive(favorable) and dead(unfavorable)

4.6.2 Independent variables:

- Age, Sex ,Residence, Occupation
- Duration of illness

- Diagnosis at admission
- Postoperative diagnosis
- Causes of SBO
- Complication before operation
- History of surgery
- Methods of patient management
- Intraoperative finding and procedure done
- Duration of hospital stay

4.7. Data collection methods

Quantitative, primary type of data and all patients admitted to surgical ward with a diagnosis of small bowel obstruction.

4.7.1 Data collectors and supervisor:

The Principal investigator gave training for data collectors on how to fill the prepared checklist, the importance of data quality and the relevance of the study. Two first degree holder health officers were supervising the daily activity, consistency and completeness of the checklist and was given appropriate support during the data collection process. The Principal Investigator was checking for daily activities of data collectors.

4.7.2Data collection techniques:

Patients admitted to surgical wards of Metu Karl referral hospital with the diagnosis of SBO and treatment; identified from patient's history, physical findings and Operation Theater of Metu Karl referral hospital.

4.7.3 Operational definitions

Acute abdomen: any sudden condition with chief manifestation of pain of recent onset in the abdominal area which may require urgent surgical intervention.

Small bowel obstruction: small bowel obstruction is defined as hindrance to the passage of small intestinal contents.

Dynamic Intestinal obstruction: This term is used to define intestinal obstruction caused by a physical blockage of the intestinal lumen. It is also called as mechanical IO

A dynamic intestinal obstruction: This term is used to define intestinal obstruction caused by a physiological paralysis of the intestinal lumen.

Surgical site infections (SSI): Infections developed at surgical incisions

Superficial SSI: Infection occurs within 30 days after the operation involving only skin or subcutaneous tissue of the incision.

Deep SSI: Infection occurs within 30 days after the operation involving deep soft tissues (e.g., fascial and muscle layers) of the incision.

Wound dehiscence: is facial disruption due to abdominal wall tension overcoming tissue or suture strength, or knot security. It can occur early or late in the postoperative period, and involve a portion of the incision (partial dehiscence) or the entire incision (complete dehiscence).

Rural: is defined as area relating to, or characteristic of the countryside (villages) rather than the town.

Urban: is defined as area defined by (town) faster life style, increasing technology and high population density.

Clinical manifestation: sign and symptom of small bowel obstruction

Anastomosis: the surgical union of two hollow organ. E.g. parts of the intestine, to ensure continuity of the passageway.

Anastomosis leak: refers to leakage through surgical union site.

Intraoperative procedure: The procedure that can be done after laparotomy was done which can be resection & anastomosis, Adhesionlysis etc. depending on the causes of obstruction.

Intraoperative finding: The finding after abdomen is opened which can be gangrenous bowel or viable bowel and etc.

Non operative management: means management of patients with partial bowel obstruction, recurrent adhesive obstruction, or during the early postoperative period with NGT suction, IV fluids and frequent clinical reassessment to rule out bowel strangulation which may need operative management.

Operative management: means surgical exploration of the abdomen which is determined by the nature of obstruction and whose goals are to diagnose and resolve the source of the obstruction, resect any nonviable bowel and minimize the occurrence of an incidental enterotomy.

Outcome of patient: is condition of the patient at discharge from hospital after hospital stays e.g. improved (favorable) and discharge.

4.8 Data processing, analysis, interpretation and presentation

After data collection, it was coded, entered and cleaned using SPSS windows version 20 and analyzed by using descriptive categorical variables; frequency and Percentages. Data presented by frequency tables and figures. Association between dependent and independent variables was checked by using binary and multinomial logistic regression. On binary logistic regression a p-value $\leq$ 0.25 was used as a candidate for multinomial logistic regression analysis. Statistical significant associated at p-value of < 0.05.

4.9 Data quality management

- Before data collection: The prepared checklists in English assessed and commented by research advisors.

- During data collection: In order to avoid the interpersonal variation between data collectors, data was collected by the same data collectors throughout the data collection. Regular daily supervision was done for checking the consistency and completeness of the filled out checklists by the principal investigator. The completed checklists was checked for their completeness and consistency at every step of data collection.
- After data collection: Before starting data analysis completeness rechecked again.

4.10 Ethical consideration

Ethical approval of the research proposal obtained from the ethical review committee of Jimma University. A formal letter written from the department of Integrated Emergency Obstetrics/Gynecology and surgery to the hospital administrator office. The Hospital chief executive officer and medical director permitted to conduct the study. The data was collected from patient's history and physical finding, preoperative and intraoperative findings using structured checklists. The filled checklists will be destroyed, some years after the study has finished. Until that it will kept carefully in the hand of principal investigator.

4.11 Dissemination of results

The result of the study will be presenting to Jimma university community as part of Master's in IEOS result defense; and it will be disseminated to Jimma University College of public health and medical science, department of Integrated Emergency Obstetrics/Gynecology and surgery. The result of the study will be disseminated to the study site and other concerned bodies. Further attempt will be made to publish it on national and international scientific journals.

5. RESULT

5.1 Socio demographic characteristics of patients with small bowel obstruction

130 of patients were admitted with a diagnosis of intestinal obstruction. Among them 81(62.3%) were SBO. The magnitude of small bowel obstruction is 21% among patients with acute abdomen, and 62.3% among patients with a diagnosis of intestinal obstruction. The age ranges from 1 year to 65 years with a mean age of 28.81 and ± SD of 13.5years. Male to female ratio was 3:1. Majority (97.5 %) of patients were from rural area.

Table 1: Socio-demographic characteristics of patients with small bowel obstruction at Metu Karl referral hospital from February, 2017–August, 2017

Variables	Categories	Frequency	Percent
Age	1-15	06	7.4
	16-30	30	37.0
	31-45	42	51.8
	46-65	02	2.46
	≥65	01	1.2
	Total	81	100
Sex	Male	73	90.1
	Female	08	9.87
	Total	81	100
Religion	Orthodox	08	9.9
	Muslim	12	14.8
	Protestant	61	75.3
	Total	81	100
Residence	Rural	79	97.5
	Urban	02	2.46
	Total	81	100
Occupation	Farmer	78	96.3
	Merchant	02	2.4

	Student	01	1.23
	Total	81	100
Average monthly income	<500	76	93.8
	500-1000	04	4.9
	1000-1500	02	2.4
	Total	81	100
Distance from hospital	5-25	22	27.1
	25-55	58	71.6
	60-100	01	1.23
	Total	81	100

Table 2: General condition of the patient on admission at Metu Karl referral hospital from February, 2017–August, 2017

Variables	Categories	Frequency	Percent
Duration of illness in hours before arrival	<24hrs	02	2.4
	24-48 hrs	01	1.23
	>48 hrs	78	96.2
	Total	81	100
Hematocrit of the patient in %	≤30	03	3.7
	>30	78	96.3
	Total	81	100
Patient came with referral	Yes	03	3.7
	No	78	96.3
	Total	81	100
Presenting symptoms	Abdominal pain with vomiting	75	92.5
	Distension with abdominal pain	02	2.4
	Inguinal swelling with abdominal pain	04	4.9
	Total	81	100
Investigations	CBC	81	100
	Plain abdominal film	78	96.2

previous history of abdominal operation	Yes		12	9.23
	No		69	85.18
	Total		81	100
Duration of previous operation	<1month		05	41.6
	1month-1 year		05	41.6
	1 year-5 years		02	16.6
	Total		12	100
Pre-operative diagnosis	Adhesion		12	14.8
	SBV	viable	14	17.2
		Gangrenous	19	23.4
	Incarcerated hernia		05	6.1
	Intussusception		04	4.9
	Ascaris bolus		03	3.7
	Other		24	29.6
	Total		81	100
Physical finding	Normo active bowel sound		18	22.2
	Tachycardia and hypotensive		22	27.1
	Inguinal swelling with abd. pain		05	6.1
	Grossly Distended abdomen and hyperactive bowel sound		20	24.6
	Guarding and rigidity		16	19.7
Per rectal finding	Empty rectum		10	12.3
	Stool in rectum with no blood		65	80.2
	Palpable Ascaris by PR		03	3.7
	Palpable loops of the intestine		03	3.7

Only 02(2.4%) patients came with symptoms less than 24 hours. whereas, 78(96.2%) of them came after 48 hours.

Table 3. Causes of small bowel obstruction and management at Metu Karl referral hospital from February, 2017–August, 2017

Types of intestinal obstruction		frequency	%
Dynamic		81	100
A dynamic		0	0
Total		81	100
What was method of management	By operative	64	79.0
	By conservative	17	20.9
	Total	81	100
Intraoperative finding)	Adhesion	09	14.0
	Small bowel volvulus(viable)	14	21.8
	Gangrenous SBV	19	29.6
	Intussusception	04	6.25
	Ascaris bolus	03	4.6
	hernia	05	7.8
	Ileocecal mass	02	3.1
	Ileosigmoid knotting	02	3.1
	Other	06	9.3
	Total	64	100
Procedure done intraoperative	Resection and anastomosis	19	29.6
	Adhesionlysis	09	14.0
	Derotation	14	21.8
	Laparotomy and reduction	04	6.25

	enterotomy	03	4.6

Table4. Outcome of the patient in Metu Karl referral hospital from February, 2017–August, 2017

Variable	Categories	frequency	Percent
Post-operative complication developed	Yes	04	6.25
	No	60	93.78
	Total	64	100
If question above is yes, what post-operative complication was developed	Surgical site infection(superficial)	01	25
	Fascial dehiscence	01	25
	Anastomotic leakage	02	50
	Total	04	100
When was the complicated detected	4^{th} post op	0	0
	5^{th} -7^{th} post op	03	75
	>7^{th} post op	1	25
Duration of hospital stay of patients with SBO	<3days	14	17.2
	3-5days	42	51.8
	5-7days	19	23.4
	>7days	06	7.4
	Total	81	100
Outcome of the patient	Improved	79	97.5
	died	02	2.4
	Total	81	100

Among 81 small bowel obstruction patients, 4.9 %(n=04) of them developed post-operative complications.

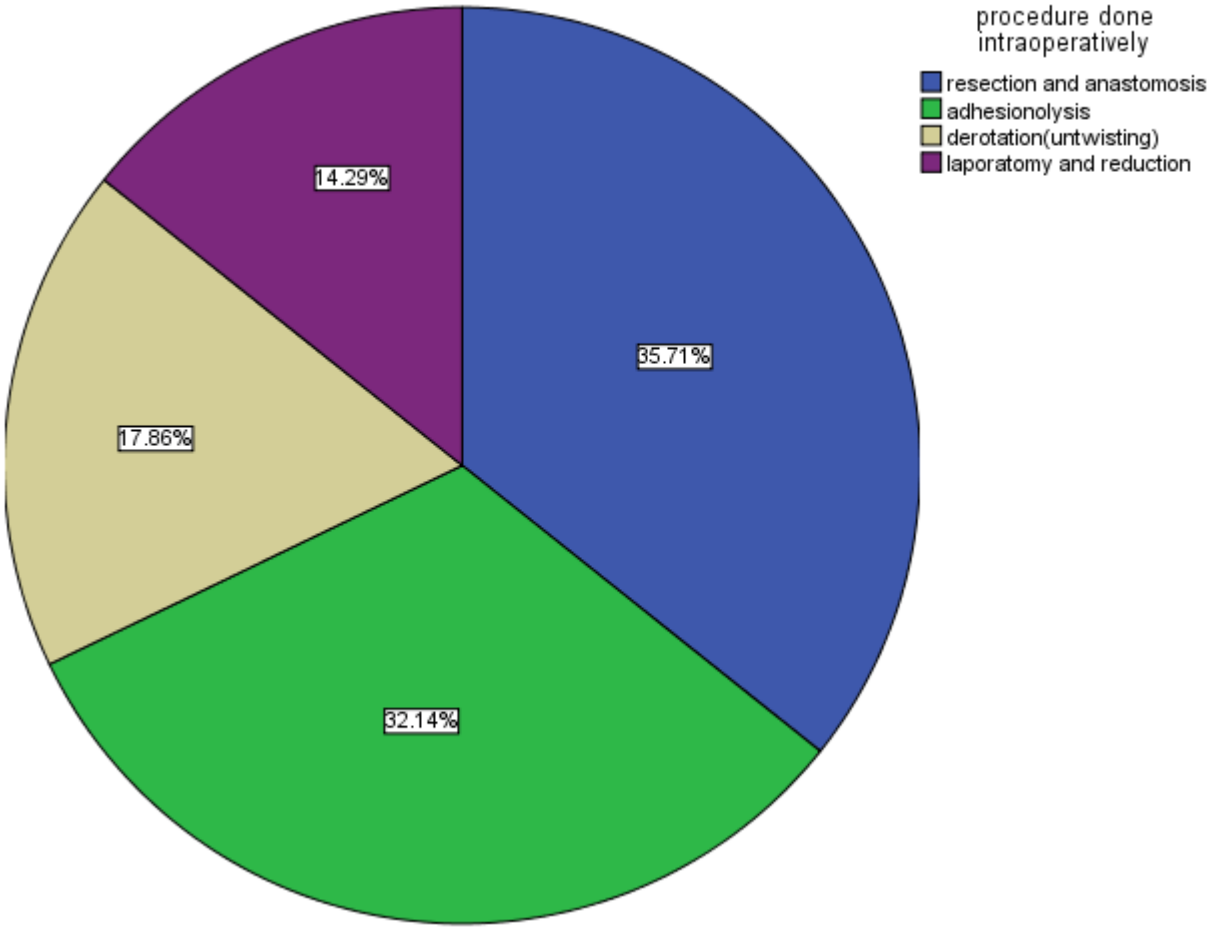

Figure2: procedure done intra operatively at Metu Karl referral hospital from February, 2017–August, 2017.

Bowel resection and anastomosis is the commonest intraoperative procedure done. Gangrenous bowel has significant statistical association with management outcome (AOR=4.1, 95%CI: 2.9-8.0), p-value=0.018).There were 2.4 %(n=02) deaths among small bowel obstruction. Otherwise, the others discharged smoothly. Mean hospital stay in this study was 6.2days which ranges from 3-12days.

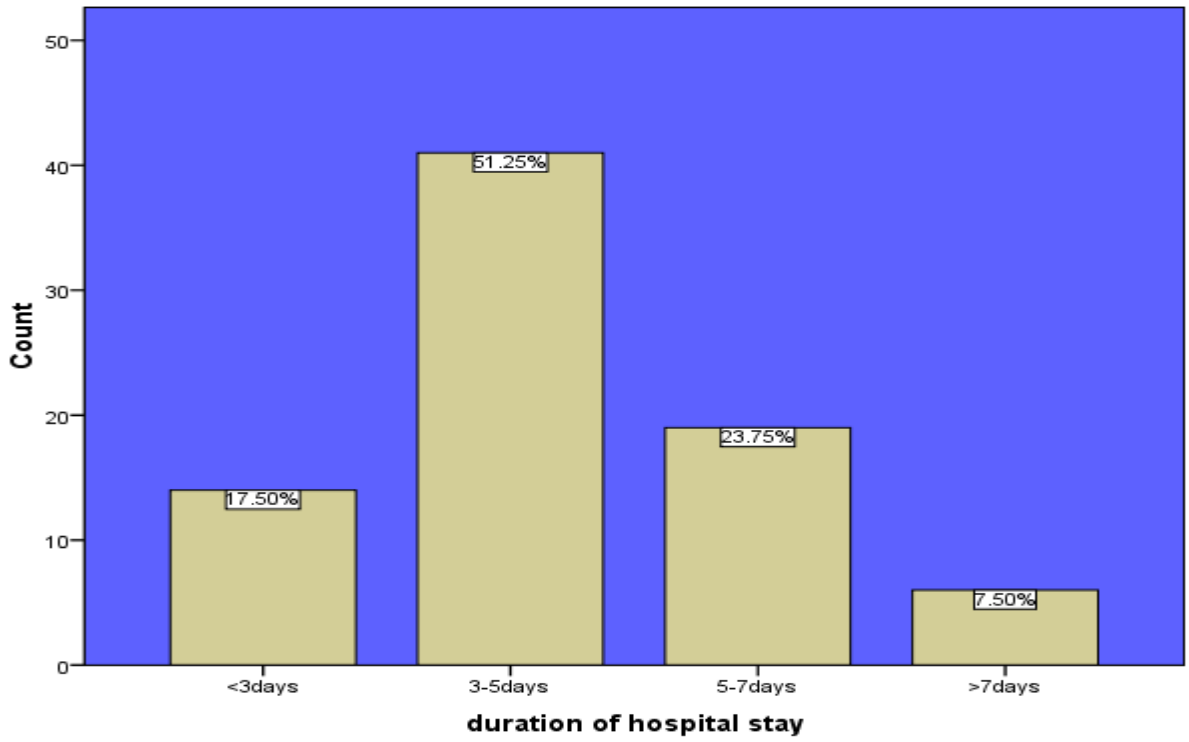

Figure3.duration of hospital stay at Metu Karl referral hospital from February, 2017–August, 2017

Table 5: Age Vs outcome of small bowel obstruction patients at Metu Karl referral hospital from February, 2017–August, 2017

Age	Discharged(improved)	Died	Total
1-15years	06	0	06
16-30years	29	01	30(100%)
31-45years	42	0	42
46-65years	01	01	02(100%)
≥65years	01	0	01
Total	79(97.5%)	02(2.4%)	81(100%)

Table 6: Factors associated (binary) with management outcomes of small bowel obstruction at Metu Karl referral hospital from February, 2017–August, 2017

Variables			Management Outcome		COR of (95%CI)	P-value
			Improved	Dead		
Age	1-15years		06	0	0.202(0.011-21.934	0.651
	16-30years		29	01	4.955(0.005-5.090	0.651
	31-45years		42	0	0.024(0.001-0.719)	0.032**
	46-65years		01	01	2.31(0.99-7.76)	1
	≥65years		01	0	3.57(0.012-8.123)	0.999
Sex	Male		72	01	0.141(0.152-0.926)	0.053**
	Female		07	01	1	
Duration of illness in hours before arrival	<24hrs		02	0	0.000	0.999
	24-48 hrs		01	0	0.021	1
	>48 hrs		76	02	0.470(0.25-0.819)	0.239*
Hematocrit	≤30		1	02	1.709(0.000-2.63)	1
	>30		77	01	0.8(0.1-1.91)	0.999
Pre-operative diagnosis	Adhesion		12	0	1.375(1.07-17.615)	0.0807**
	SBV	viable	14	0	1	
		Gangrenous	17	02	0.013(0.005-0.149)	0.000**

	Incarcerated hernia	05	0	1.723(0.981-1.993)	1.723(0.981-1.993)
	Intussusception	04	0	5.902(0.832-9.96)	5.902(0.832-9.96)
	Ascaris bolus	03	0	2.1(0.99-6.340	0.79
	Other	24	0	1	
Intraoperative finding	Adhesion	09	0	5.77	1
	Small bowel volvulus(viable)	14	0	1.011(0.654-5.912)	0.283
	Gangrenous SBV	17	02	5.770(1.04-8.13)	0.213*
	Intussusception	04	0	5.770(3.13-9.21)	0.999
	Ascaris bolus	03	0	1	
	Hernia	05	0	5.4(2.45-6.2)	0.287
	Ileocecal mass	02	0	1	0.934
	Ileosigmoid knotting	02	0	2.45(2.1-5.78)	0.953
	Other	06	0	2.5(1.1-9.02)	0.564
Procedure done	Resection and anastomosis	17	02	5.47(1.523-57.15)	0.021**
	Adhesionlysis	09	0	0.000	1
	De rotation	14	0	1.173(1.71-4.21)	0.007**
	Laparotomy and reduction	04	0	0.000	1
	enterotomy	03	0	1	
	herniorrhaphy	05	0	2.2(1.8-8.24)	0.945
	Yes	02	02	6.314(4.5-10.092)	0.076**

Post-operative complication Detected	No	60	0	1	
Which complications (postoperative)	Surgical site infection	01	0	1	
	Fascial dehiscence	01	0	0.04(0.01-0.798)	0.012**
	Anastomotic leakage	0	02	1.632(1.1-6.023)	0.012**
Duration of hospital stay	<3 days	14	0	0.407(.084_1.98)	0.46
	3-5 days	41	01	0.061(0.03-0.0.75)	0.031**
	5-7 days	18	01	1	
	>7days	06	0		

Table 7: Factors associated with management outcomes (multinomial logistic regression) of small bowel obstruction at Metu Karl referral hospital from February, 2017–August, 2017

Variables		Management Outcome		COR of (95%CI)	P-value	AOR of (95%CI)	P-value
		Improved	Dead				
Age	1-15year	06	0	0.202(0.011-21.934	0.651		
	16-30year	29	01	4.955(0.005-5.090	0.651		
	31-45year	42	0	0.024(0.001-0.719)	0.032**	2.129(2.09-5.912)	0.072
	46-65year	01	01	2.31(0.99-7.76)	1		
	≥65year	01	0	3.57(0.012-8.123)	0.999		
Sex	Male	72	01	0.141(0.152-0.926)	0.053**	.202(0.106-0.384)	0.075
	Female	07	01	1			
Duration of illness in hours before arrival	≤48hours	03	0	6.1200(2.11-9.012)	0.269		
	>48 hours	76	02	0.470(0.25-0.819)	0.239*	0.01(0.005-0.619)	0.019*

Hematocrit in %	≤ 30		1	02	1.709(0.000 -2.63)	1		
	>30		77	0	0.8(0.1-1.91)	0.999		
Pre-operative diagnosis	Adhesion		12	0	1.375(1.07-17.615)	0.0807**	1.312(0.99-5.921)	0.072
	SBV	viable	14	0	1			
		Gangrenous	17	02	0.013(0.005 -0.149)	0.000**	3.23(1.4-10)	0.068
	Incarcerated hernia		05	0	1.723(0.981 -1.993)	1.723(0.981-1.993)		
	Intussusception		04	0	5.902(0.832 -9.96)	5.902(0.832-9.96)		
	Ascaris bolus		03	0	2.1(0.99-6.340	0.79		
Intraoperative finding	Adhesion		09	0	5.77	1		
	Small bowel volvulus(viable)		14	0	1.011(0.654 -5.912)	0.283		
	Gangrenous SBV		17	02	5.770(1.04-8.13)	0.213*	4.1(2.9-8)	0.018*
	Intussusception		04	0	5.770(3.13-9.21)	0.999		
	Ascaris bolus		03	0	1			
Procedure done	Resection and anastomosis		17	02	5.47(1.523-57.15)	0.021**	4.257(1.072 -9.152)	0.01*
	Adhesionlysis		09	0	0.000	1		

	De rotation	14	0	1.173(1.71-4.21)	0.007**	0.485(1.211-1.915)	0.082
	Laparotomy and reduction	04	0	0.000	1		
	enterotomy	03	0	1.29(1.13-3.26)	0.295		
Post-operative complication Detected	Yes	02	02	6.314(4.5-10.092)	0.076**	0.232(0.2-0.974)	0.023*
	No	60	0	1			
Which complications (postoperative)	Surgical site infection	01	0	1	0.282	1.23(1.23-9.23)	0.001*
	Fascial dehiscence	01	0	0.04(0.01-0.798)	0.012**	3.81(1.82-7.66)	0.001*
	Anastomotic leakage	0	02	1.632(1.1-6.023)	0.012**	0.001(0.01-1.95)	0.654
Duration of hospital stay	≤7 days	73	01	0.407(.084_1.98)	0.235	1	
	>7days	06	01	0.061(0.03-0.0.75)	0.031**	0.996(0.75-0.998)	0.001*

*** Significant at p-value <0.25 *Significant at p-value <0.05*

1 is reference

5.2 Predictors of management outcomes of small bowel obstruction

- Numerous associations (eleven variables) were found to be significant in the bivariate analysis. Therefore, a multinomial logistic regression approach was applied to determine which factors best explained and predict management outcome of patients.
- Four of them were significant in multinomial LR (duration of illness, gangrenous bowel, post-operative complication, duration of hospital stay).

6. DISCUSSION

Small bowel obstruction presents as a frequently encountered emergency in hospitals throughout the world, accounting for a great proportion of emergency room visits (16). This hospital–based study has tried to address magnitude, causes and management outcome of small bowel obstruction at Metu Karl referral hospital. Accordingly, some of the common causes and its management outcome in the hospital were identified with their Magnitude. Small bowel obstruction is a commonly encountered condition of the surgical procedures done for intestinal obstruction in this study. Small bowel volvulus was the leading cause of small bowel obstruction followed by adhesion, hernia and intussusception. High mortality, complication and prolonged hospital stay were observed in patients with obstruction presented 48 hours after the onset of symptoms (1, 2).

Small bowel obstruction is a common surgical problem and accounts for a large percentage of surgical admissions for acute abdominal pain globally. It develops when air and secretions are prevented from passing through gastrointestinal tract as a result of either intrinsic or extrinsic compression (Mechanical obstruction) or (a dynamic obstruction) (2).Small bowel obstruction is more in males than in females. Male to female ratio in this study is 3:1. Most of them were farmers (97.5%) and came from rural area. More or less similar in study done in tertiary care hospital in Larkana and Tikur Anbessa teaching hospital and also Kibogola Hospital, a rural hospital in Rwanda [1, 2, and 3].

From 81 patients, 79 %(n=64) of patients were operated. The magnitude of small bowel obstruction in this study is 62.3%. Whereas, the magnitude at TikurAnbesaTeaching hospital was 52.3% (2).The most common cause of SBO was 40.7% (n=33), followed by adhesion 14.8% (n=12), hernia 6.2 %(n =05) and intussusception 6.1% (n=04). Other wise, 20.9% (n=17) of patients with SBO responded to conservative management. Bowel resection and small bowel volvulus adhesion lysis procedures were 35.7% and 32.1% respectively. This is comparable with study conducted in Rwanda (35.1% resection and anastomosis done (17).

From 64 operated patients 6.2 %(n=04) of them developed post-operative complications. Post-operative complications were Anastomotic leakage 3.1 %(n=02), each fascial dehiscence and surgical site infection accounts 1.5 %(n=1). In this study the result is somewhat less when compare with Mizan Aman hospital and Tikur Anbessa teaching hospital [3, 4 and 5].

In this study SBV also the leading cause; the cause of small bowel obstruction are variable in different parts of the world and the causes are different with seasons [6, 10, and 11].

Duration of illness before surgical intervention has significant statistical association with management outcome of patients (AOR=0.01, 95%CI: 0.005-0.619), p-value=0.019). Gangrenous bowel has significant statistical association with management outcome (AOR=4.1, 95%CI: 2.9-8.0), p-value=0.018). Gangrenous bowel has four times risk of developing unfavorable outcome as compared with patients without gangrenous bowel. But, Patients with viable SBV are less likely to develop unfavorable outcome as compared with patients with gangrenous SBV.

Mean hospital stay in this study was 6.2days which ranges from 3-12days. Length of hospital stay has significant statistical association with management outcome (AOR=0.996 95% CI 0.75-0.998, p-value=0.001). Patients with unfavorable outcome are more likely to stay in hospital for more than 7 days. In Mizan Aman hospital Mean hospital stay was 9.39 days which ranges from minimum of 4days to maximum of 23 days. The median hospital stay was 8 days. The mean hospital stay is less than study done in Gondar university hospital (7).

In this study 2.4 %(n=2) of patients were died. Which is lower from study done at Gondar University hospital (9. 3%) (7). and lower than the study done in Nigeria (11).This difference in mortality rate may be associated patients presented with 48 hours after the onset of symptoms due to lack of awareness about the burden and impacts of the problem.

6.1 Limitation of the Study

- Budget constraints.
- The study was relatively time consuming.

7. CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION:

Small bowel obstruction is a commonly encountered condition of the surgical procedures done in this study.so that, the magnitude of small bowel obstruction is high. Small bowel volvulus is the leading cause of small bowel obstruction followed by adhesion and hernia. High mortality, complication and prolonged hospital stay were observed in patients with SBO presented 48 hours after the onset of symptoms. Duration of illness before surgical intervention has significant statistical association with management outcome of patients.

Bowel resection and anastomosis is the commonest intraoperative procedure done. Gangrenous Bowel should be decreased as much as possible because it is associated with postoperative complication; it has significant statistical association with management outcome. Gangrenous bowel has four times risk of developing unfavorable outcome as compared with patients without gangrenous bowel. The most commonly encountered postoperative complications were anastomotic leakage followed by facial dehiscence.

7.2 RECOMMENDATION:

Health professionals:

Gangrenous Bowel should be decreased as much as possible. Because, it is mostly associated with post-operative complication; this can be achieved by appropriate early diagnosis and intervention before intestine develops gangrene.

Hospital administrators:

This can be achieved by increasing public awareness on small bowel obstruction by giving them health education.

Researchers:

Further research should be conducted in the study area so as to generalize the whole population.

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ANNEX 1: CHECKLISTS

Checklists for data collection on the prospective, cross sectional study of magnitude ,causes and management outcome of small bowel obstruction among patients admitted with intestinal obstruction at Metu Karl referral Hospital.

*CardNo.*_____*Code:*_____

PART I: Socio-demographic characteristics

No.	Categories	
1	Age	1. 1-15 2. 16-30 3. 31-45 4. 46-65 5. ≥65Years
2	Sex	1.Male 2.Female
3	Religion	1.orthodox 2.muslim 3.protestant 4.others(specify)
4	Residence	1.Rural 2.Urban
5		1.Farmer

	Occupation	2.Merchant 3.House wife 4.Student 5.Governmental employer
6	Average monthly income	1.<500 2. 500- 1000 3. 1000-1500 4. >2000
7	Distance from hospital in KM	1. 5-25 2. 25-55 3. 60-100

PART II: General Condition of the patient

No.	Questions	Categories
1.	Duration of illness in hours before arrival	<24hrs
		24-48 hrs
		>48 hrs
		Total
2.	Hematocrit of the patient in %	≤30
		>30
		Total
3.	Patient came with referral	Yes
		No
		Total

4.	Presenting symptoms	Abdominal pain with vomiting	
		Distension with abdominal pain	
		Groin swelling with abdominal pain	
		Total	
5.	Investigations	CBC	
		Plain abdominal film	
6.	previous history of abdominal operation	Yes	
		No	
		Total	
7.	Duration of previous operation	<1month	
		1month-1 year	
		1 year-5 years	
		Total	
8	Pre-operative diagnosis	Small bowel volvulus	
		SBV	viable
			Gangrenous
		Incarcerated hernia	
		Intussusception	
		Ascaris bolus	
		Other	
		Total	
9	Physical finding	Normative bowel sound	
		Tachycardia and hypotensive	
		Inguinal swelling	
		Grossly Distended abdomen and hyperactive bowel sound	
		Guarding and rigidity	
9.1	Per rectal finding	Empty rectum	

		Stool in rectum with no blood
		Palpable Ascaris by PR
		Palpable loops of the intestine

Part III: causes of obstruction and management

No	Question	Category
1	Type of intestinal obstruction	1.Dynamic intestinal obstruction 2.Adynamic intestinal obstruction
2	What was method of patient management?	1.By operation 2.By conservative
3	If managed by operation (laparotomy) what was an Intra operative finding?	1.Small bowel volvulus 2.Small bowel volvulus(viable) 3. Gangrenous SBV 4 Gangrenous SBO(bytraumahx) 5.Intussusception 6. Others(specify)_____
4	If operated what Procedure was done intraoperative?	1.Resection and anastomosis 2.adhsionlysis 3.Derotation(untwisting) 4.Laparatomy &reduction 5.Others(specify)_____

Part IV: Outcome of the patient

No	Question	Category
1	Post op complication developed?	1.Yes 2.No
2	If question above is yes, what postoperative complication was developed?	1.surgical site infection 2.Facial dehiscence 3.Anastomotic leakage 4. pneumonia 5. Others(specify)_____
3	When was the complication detected?	1.<4th post op 2. 5th -7th post op 3. after 7th post op
4	Duration of patient stay in hospital in days	1. <3days 2. 3-5days 3.5- 7days 4. ≥7days
5	Outcome of the patient	1.Improved and discharged (favorable outcome

		2.Died (unfavorable outcome)

DECLARATION

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and provision of required progress reports as per terms and conditions of the college of Public Health & Medical Sciences in effect at the time of grant is forwarded as the result of this application.

Name of the student: Iyassu Arefayne

Date:_____ Signature:_____

APPROVAL OF THE ADVISORS

Name of the first advisor: Dr.Dawit Teare

Date:_____ Signature:_____

Name of the second advisor :Mr. Dachassa Bedada

Date:_____ Signature:_____

APPROVAL OF THE EXAMINERS

3. Name of the first examiner :

Date:_____ Signature:_____

4. Name of the second examiner :

Date:_____ Signature:____