Pattern and management outcome of intestinal obstruction among operatively managed adults in Attat Catholic Hospital, Gurage Zone, Southern nations and nationalities regional state, Ethiopia.

BY

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Abstract

Background: Intestinal obstruction is a common and potentially dangerous surgical emergency with high morbidity and mortality universally if managed inappropriately. It is essential to distinguish between its various types even though; its pattern and incidence varies from country to country as well as from area to area within a country. Several factors contribute to poor management outcomes in the case of intestinal obstruction.

Objective: The objective of this study is to determine the prevalence, common causes and management outcome as well as to compare the preoperative and postoperative diagnosis of intestinal obstruction in operatively treated adult patients at Attat Catholic Hospital from January 2011-December 2013.

Method: A three year Hospital based retrospective study design of data collection method was conducted in Attat Catholic Hospital to collect a total of three hundred two (302) cases applying a single proportion formula of sample size determination. The data were collected and checked for its completeness and coded, entered into SPSS version 16.0. Data were analyzed and presented using frequency distributions and logistic regression. On binary logistic regression analysis a p-value $\leq$ 0.25 was used as a reference to be a candidate for multivariate logistic regression analysis. P-Value<0.05 at 95% confidence interval (CI) was considered as statistically significant.

Result: - A total records 302 adult cases of intestinal obstruction were observed, of which 229 (75.83%) were males and 73(24.17%) were females.

The prevalence of intestinal obstruction was 21.56% of all acute abdomens and 5.42% of total surgical admissions. The commonest site of obstruction was small bowel 205(67.88%), of which small bowel volvulus was the leading 78(38.05%) followed by intussusception 55(26.83%) and adhesions 30(14.63%) whereas Large bowel was second with 97(32.12%) cases due to primarily sigmoid volvulus 61(62.89%) followed far by colonic tumors 11(11.34%).

All cases were managed operatively by untwisting volvulus, anastomosis and laparotomy accounting 91(30.13%), 82(27.15%) and 60(19.87%) respectively and 64 (21.19%) of them developed post operative complications mainly surgical site infections (SSI) 31(48.44%). About 285 (94.37%) of the cases were discharged after smooth post operation time or improved from their complications while 17(5.63%) passed away in the hospital on their post operative time.

Conclusion: - Generally, acute intestinal obstruction remains a major cause of mortality in our environment. Small bowel volvulus is geographically the leading cause and Untwisting (derotation) of volvulus was the most performed intraoperative procedure of intestinal obstruction.

Viability of intraoperative finding and duration of presenting illness before surgical intervention has significant association statistically with management outcome of patients.

Recommendations: As shown in the report, majority of the patients that ended up in complications and deaths were those who presented and managed late with their bowel found to be gangrenous for which primary bowel resection and anastomosis has been underwent to relieve the obstruction. And should be alleviated by: incrasing public awareness, improving knowldg of health professionals and reducing intraoperative anastomosis.

Key words:-Intestinal obstruction, prevalence, anastomosis, management outcome.

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List of Acronyms and abbreviations

ACH	Attat Catholic Hospital
AOR	Adjusted Odd Ratio
BLH	Black Line Hospital
CBC	Complete Blood Count
CI	Confidence Interval
COR	Crude Odd Ratio
GUH	Gondar University Hospital
IEOS	Integrated Emergency Obstetrics, Gynecology and General surgery
IO	Intestinal Obstruction
LAP	Lymph adenopathy
LBO	Large Bowel Obstruction
MRN	Medical Record Number
NGT	Naso Gastric Tube
PPUD	Perforated Peptic Ulcer Disease
SGV	Sigmoid Volvulus
SBO	Small Bowel Obstruction
SBV	Small Bowel Volvulus
SSI	Surgical Site Incision
SPSS	Statistical Package for the Social Sciences
TAH	Tikur Anbessa Hospital
Us	Ultrasound
V/S	Vital Signs

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CHAPTER ONE

1.1 Introduction

Intestinal obstruction (IO) is defined as failure of bowel contents to propel aboraly from one part of the gut to the next as a result of intrinsic or extrinsic compression on some part of the gut. It is a common cause of emergency surgical problems. The incidence of IO varies in different countries where it is rare in the USA and Western Europe while it is the most common cause of acute abdomen in certain parts of Latin America, Asia- India, Iran and Afghanistan and it has been the leading cause of acute abdomen in Sub-Saharan countries but still acute appendicitis is the most frequent cause of acute abdomen even in the developed world. The causes of intestinal obstruction are several and their relative incidence varies in different populations, between countries and has also changed over the decades. Several factors are described to be responsible for these differences. Socioeconomic factors and diet have mostly been incriminated to be responsible for the observed difference [2, 3, and 10].

The site of Intestinal obstruction can be at large bowel or small bowel. Small bowel obstruction is the most common site of obstruction in most of the cases. About 80% of bowel obstructions occur in the small intestine; the other 20% occur in the large intestine (24). Classically there are four cardinal features of IO, i.e. Colicky abdominal pain, distension, vomiting and constipation, but the prominence of each of these is affected by the site and type of obstruction (27, 28).

The leading causes of intestinal obstruction in Africans have mostly been hernia and volvulus whereas adhesions are most frequent in the developed world. There are, however, some African studies which are pointing to the change in these established patterns [11, 12, and 13].

According to the reports available in Northern and Central Ethiopia, sigmoid volvulus was the leading cause of large intestinal Obstruction. Two reports from Yirgalem and Hosanna, Southern Ethiopia, showed that small intestinal volvulus (SBV) as the most frequent cause of intestinal obstruction [1,2,5,and 6]. But no researches have been done previously regarding intestinal obstruction in Attat Hospital.

1.2 Statement of the problem

Intestinal obstruction is one of the commonest abdominal surgical emergencies. When intestinal obstruction is not relieved in time, the patient may die hence; early diagnosis and prompt management are mandatory. Intestinal obstruction is a global problem consuming much in terms of surgical services even in Eastern Europe and North America(35) but it is the leading cause of acute abdomen especially for countries found in the 'volvulus belt' regions including Africa, India, Iran, Russia and Brazil. As part of Sub- Saharan Africa country, intestinal obstruction is a common surgical emergency and a significant health problem in Ethiopia [1, 11, 18,].

Irrespective of etiology or acuteness of onset, in dynamic (mechanical) obstruction the proximal bowel dilates and develops an altered motility while below the obstruction the bowel exhibits normal peristalsis and absorption until it becomes empty, at which point it contracts and becomes immobile. Initially, proximal peristalsis is increased to overcome the obstruction, in direct proportion to the distance of the obstruction. If the obstruction is not relieved, the bowel begins to dilate, causing a reduction in peristaltic strength, ultimately resulting in flaccidity and paralysis. This is a protective phenomenon to prevent vascular damage secondary to increased intraluminal pressure. The distension proximal to an obstruction is produced by excessive gases and fluids (25).

According to the recent available literatures in Ethiopia; sigmoid volvulus was reported to be the commonest cause of emergency admissions with intestinal obstruction in Gondar University hospital (7) whereas small intestinal obstruction mainly due to small intestinal volvulus ranked the first based on a retrospective analysis undertaken on acute abdomen patients surgically managed at Yirgalem Hospital. Analysis based on the specific causes of acute abdomen is of great value for early diagnosis and prompt treatment in clinical practice (6).

The commonest symptoms of intestinal obstruction and the outcome of emergency laparotomy may be affected by different factors such as cause of obstruction, duration of illness, age, presence of peritonitis, hematocrit level and complication detection time. The knowledge of causes, presentations and management outcomes of intestinal obstruction in different areas within a country is very important.

Having the knowledge of most frequent causes and presenting symptoms of intestinal obstruction in adult patients is very important to diagnosis early and planning for better treatment. Abdominal X-ray film and ultrasonography has advantage in the diagnosis of intestinal obstruction. Computed tomography has a sensitivity of 1% for high-grade and 48% for low-grade obstruction and has the additional benefit of defining the cause and level of obstruction in many patients. Despite the above mentioned facts, clinical judgment regarding the presence or absence of strangulation greatly influences the need of urgent surgery and prognosis of patients especially in a rural set up where advanced imaging modalities are either not available or are available in limited number of cases.

Charles V. Mann has given, the classical clinical advice that **'sun should not both rise and set'** on a case of unrelieved intestinal obstruction, unless there are positive reason for delay. Surgeons have studied these problems in detail from so many years, but it remains an enigma still today. Many facts of this potentially lethal condition have remained obscure even to this date. Its etiology and clinical features are diverse, and depend upon factors like age of patient, site of obstruction, severity of obstruction, time lag between development of the condition and treatment, and lastly on treatment pattern instituted (8)

The plan of treatment is dependent on diagnosis and patients condition at admission. Knowing the common complications of intestinal obstruction and its outcome is important for care of the patients and prevention of complications (6). Except few studies, in north and central Ethiopia [1, 16], no report is available in Attat Hospital regarding the spectrum of prevalence and management outcomes of intestinal obstruction in adults despite the condition is common cause of surgical admissions.

The purpose of this study is to find out the common causes, prevalence and management outcome as well as to compare the preoperative and postoperative diagnosis of intestinal obstruction in surgically treated adult patients in Attat Catholic Hospital and so as to highlight the commonest causes of intestinal obstruction in the geographical location of the study area which will suggest measures for prevention and treatment of the condition and the result will be compared with other studies in the country, Sub Saharan Africa and also the developed world.

1.3 Significance of the Study

Currently, intestinal obstruction is a major public problem of acute abdomen cases in our country but there was no information relating intestinal obstruction in the set up yet. Hence; this study will fill the existing gap.

Consequently, the findings of this study will provide the hospital, and Nongovernmental Organization (NGOs) with relevant information about the pattern, magnitude, associated risk factors for intestinal obstruction for future planning of appropriate strategies and also can be used by program implementers as an input towards improving quality of management of IO and with their ultimate goal of reducing case mortality.

Moreover; the outcome of this study will also add epidemiological and clinical information in the set up.

CHAPTER TWO: LITERATURE REVIEW

2.1 Prevalence of intestinal obstruction

Intestinal obstruction continues to remain a challenge to surgeons despite advances in field of medicine, pathophysiology, surgical technique and conservative management and accounts for a large percentage of surgical admissions for acute abdominal pain all over the world.
Universally, intestinal obstruction varies from country to country or regions interms of its prevalence, causes and management outcomes depending on ethnicity, age group, dietary habits, and geographic location, among other factors as well as living condition of the community (7).
At a large teaching hospital in Boston, Massachusetts (USA), a total of 536 adults presenting to the emergency department with acute, non-trauma-related abdominal pain comprised 308 men (57%) and 228 women (43%), with intestinal obstruction accounting 10.6% of all acute abdomen admissions (35) which is a very low report in relative to the observed prevalence in this study . And also a five year retrospective study in Ruanda shows that 105 patients were operated for intestinal obstruction during the study period. There were 76 males (72.4%) and 29 females (27.6%) and the M: F ratio was 2.6:1 while 82 patients (78.1%) presented more than 24 hours after the onset of the symptoms. The average duration of symptoms was 3.5 days (6).

Of 3717 patients admitted over a 3 year period (May 2005-April 2008), acute intestinal obstruction was diagnosed in 367 patients (9.87%) in eastern India. Acute intestinal obstruction was seen to affect mostly males (75.2%) than females (24.8%). The most common occurrence was in the age group 20-60 years (64.03%), followed by the group >60 years (26.7%), while the least common occurrence was in the age group <20 years (9.26%). The mean age of patients was 41.27 years while the median age was 44 years (9).

Similarly, a retrospective study at Gonder University Hospital shows that small bowel obstruction (43.4%), acute appendicitis (34.6%) and large bowel obstruction (11.5%) were the commonest three indications for non traumatic emergency abdominal surgeries respectively (4) and the frequency of occurrence of obstructed bowel is 62 per year in Black Lion Hospital (5) where as it is 101 per year in this study area.

There is a slightly higher prevalence of intestinal obstruction in women due to the fact that obstetric, gynecologic, and other pelvic surgical procedures are important etiologies for the development of postoperative adhesions (31).

About 80% of intestinal obstructions occur in the small intestine; the other 20% occur in the colon. Colorectal cancer is responsible for 60–70% of all large bowel obstructions, while diverticulitis and volvulus account for the majority of the remaining 30% (30).

Nowadays at least 20% of the patients, who apply to General surgery services complaining from acute abdomen, are thought to have intestinal obstructions (30).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 (24, 29) but majority of cases present late.

2.2 Causes of intestinal obstruction

Patients with a bowel obstruction still represent some of the most difficult and vexing problems that surgeons face with regard to reaching the correct diagnosis and identifying the most possible causes that will help for anticipation of appropriate intervention.

Globally, it is believed that about 80% of bowel obstructions occur in the small intestine almost uniformly; the other 20% occur in the colon. But their causes vary from area to area [1].

A study done in Nigeria on 76 cases of intestinal obstruction shows that the commonest causes of obstruction in adult patients were strangulated hernia and adhesive bands while in pediatric age group it was intussusceptions and male to female ratio of 2:1 while major complaints were abdominal pain (90%), distension (85%), vomiting (71.2%) and constipation (65%) [17, 21].

According to a study done in Eastern India on 3717 patients admitted for acute abdomen, 376(9.87%) patients were diagnosed as intestinal obstruction with its common causes were strangulated hernia (36%), malignancy (17%), adhesions (16%), intestinal TB (14%), volvulus (6%) and intussusceptions (2%)[18]. And another study done in Rwanda on 105 patients showed that inguinal hernias, intussusceptions and adhesions were the leading causes of intestinal obstruction, respectively [11].

The result of a one year retrospective review on acute bowel obstruction again in northern Ruanda also showed a male to female ratio of 2.2:1. The duration of symptoms ranged from 1 to 14 days with a mean of 4 days. The commonest causes of obstruction were Hernias, Adhesions, Volvulus and Intussusception. Of the 23 patients with volvulus, 17 involved sigmoid colon, but other presentations of Volvulus were also seen; Ileosigmoid knotting, caecal volvulus, volvulus neonatorum, and small bowel volvulus [20].

Two hundred and thirty five patients were operated on for intestinal obstruction during the four year retrospective study period in Hosanna hospital, Southern Ethiopia, of whom 41.7% cases had Small Intestinal Volvulus followed by sigmoid volvulus (13.6%), postoperative adhesions(11.5%) and intussusceptions(8.5%). The male to female ratio was8.8:1. The age ranged from 16 to 65 years with a mean of 34.1. The peak age of occurrence was between 20 and 40 years which constituted 63% of the patients [1, 3, and 5].

Adhesions are the major causes of SBO in the western world which is thought to be the cause of around 30-41% of all intestinal obstruction**.** For small-bowel obstruction, the proportion rises to 65-75%;of these, only 3% are thought to be caused by congenital Omental bands, formed by abnormal adhesion of the peritoneal folds during embryogenesis (24, 25).

Based on a study done in Pakistan, out of 171 patients operated for dynamic intestinal obstruction, tuberculosis was found in 70 (41%) patients making it the most common cause followed by adhesions in 56 (33%) and obstructed inguinal hernia in 21 (12%) patients. Other less common causes of intestinal obstruction reported in this study included intussusception, colorectal cancer, volvulus, and pelvic abscess [15].

On another study done on patterns of small bowel obstruction in Pakistan shows different causes leading to small bowel obstruction. In this study; the commonest cause was adhesions and bands, tuberculosis was the second common cause and hernia was the 3rd common cause of intestinal obstruction. Postoperative complications were recorded in 21 cases i.e. 39.9%, in which the common complications were wound infection, chest infection, and leakage of anastomosis. This study concluded that the pattern of causes of small bowel obstruction vary from country to country with adhesions and bands being common in that setup (32)

On one study in Iran, thousand-hundred and seventy-two (1172) patients with diagnosis of intestinal obstruction were included in study and two-hundred records were diagnosed as large bowel obstructions (16.5%) and 80% were male (volvulus: 84%, cancer: 60%). Their age range was 16-105 years, (mean=48 years).

Volvulus occurred in 152 (76%) patients (sigmoid, 87%; cecum, 9%; transverse colon, 2.5% and Splenic flexure, 1.3%). Colon cancer was diagnosed in 30 patients (15%); and the other causes were adhesion, 3.5%; hernia, 1.5%; fecal impaction, 2%; TB, 1% and ileosigmoid knot, 1%) compromising the remained 9% of cases. In conclusion, this study shows sigmoid volvulus was the most common cause of colonic obstruction in south of Iran and male predominance was seen in both volvulus and cancer groups (31)

A retrospective analysis was undertaken on 229 cases of acute surgical abdomen surgically managed at Yirgalem hospital from January to December 1997 shows Small intestinal obstruction ranked the first and it was mainly due to small intestinal volvulus. Acute appendicitis was the second in the rank and large intestinal obstruction was the third and it was mainly due to sigmoid volvulus (6) which is highly consistent with this study but sigmoid volvulus is 2nd in this set up. Typhoid perforation, primary peritonitis, perforated gastro duodenal ulcer, abdominal tuberculosis and empyema of the gallbladder in that order were the other observed causes of acute surgical abdomen (6).

Two reports from Yirgalem and Hosanna, Southern Ethiopia, showed that small bowel volvulus (SBV) as the most frequent causes of IO (21, 38).One study conducted in TAH showed that acute abdomen was mostly caused by small intestinal obstruction (52.3%) and large bowel obstruction i n 46.7% (12, 37). The most causes of small intestinal obstruction according to this report were small bowel volvulus (60%), adhesion (20%), and obstructed hernia (12%) Ileo-colic intussusception and tumor (5, 33).

Two hundred and thirty five patients were operated for IO during the four year retrospective study period in Hosanna hospital, Southern Ethiopia, of whom 41.7% cases had SBV followed by sigmoid volvulus (13.6%), postoperative adhesions(11.5%) and intussusceptions(8.5%)(38). The male to female ratio was8.8:1(12). The age ranged from 16 to 65 years with a mean of 34.1. The peak age of occurrence was between 20 and 40 years which constituted 63% of the patients (34).

2.3 Surgical procedures and management outcome of intestinal obstruction

A better understanding of the pathophysiology of bowel obstruction and the use of isotonic fluid resuscitation, intestinal tube decompression, and antibiotics have greatly reduced the mortality rate for patients with mechanical bowel obstruction. Ultimate clinical decisions regarding the management of these patients dictate a thorough history and workup and a heightened awareness of potential complications (10).

On study done at Gondar university hospital; a total of 4,978 surgical operations were performed in four years study period (from the beginning of September 1998 to the end of August, 2002). Of these 1179 (23.7%) were laparotomies for both elective and emergency cases. Emergency laparotomies for non-traumatic acute abdomen were 511 (43.3% of all laparotomies and 10.3% of all surgeries). The leading operative diagnoses were small bowel obstruction (SBO), appendicitis and large bowel obstruction (LBO). All patients (100%) had abdominal pain, 266 (90.3%) had vomiting, 162(55.9%) had constipation, 169 (58.3%) had abdominal distension. The median duration of illness was 72 hours with 75%of the patients presented with 5 days (120 hours) complaint. Ninety nine of the patients (34.1%) had longer than 72 hours duration of presenting complaint, 35 (35.1%) of which developed postoperative complication. One hundred thirty seven (47.2%) of the patients came to hospital earlier than 72 hours, and only 21(15.2%) of them developed postoperative complications. (1)

A study done in Italy for the sigmoid volvulus: surgical timing and mortality for different clinical types, on 23 patients showed that mortality rate was 44% and it concerned only the patients who had clinical signs and symptoms of peritonitis and that were treated with a sigmoid resection (57%). Mortality of patients affected by sigmoid volvulus is related to the disease stage, prompt surgical timing, functional status of the patient and his collaboration with the clinicians in the pre-operative decision making process. Mortality is higher in both obstructed patients with generalized peritonitis [15].Study conducted in Nigeria on seventy six cases of IO showed that 32% had bowel resection and anastomosis for strangulation. There were 3 deaths in the adhesive obstruction group; 2 preoperatively from late presentation complicated by acute renal failure and septic shock, while the third death resulted from postoperative septic shock.

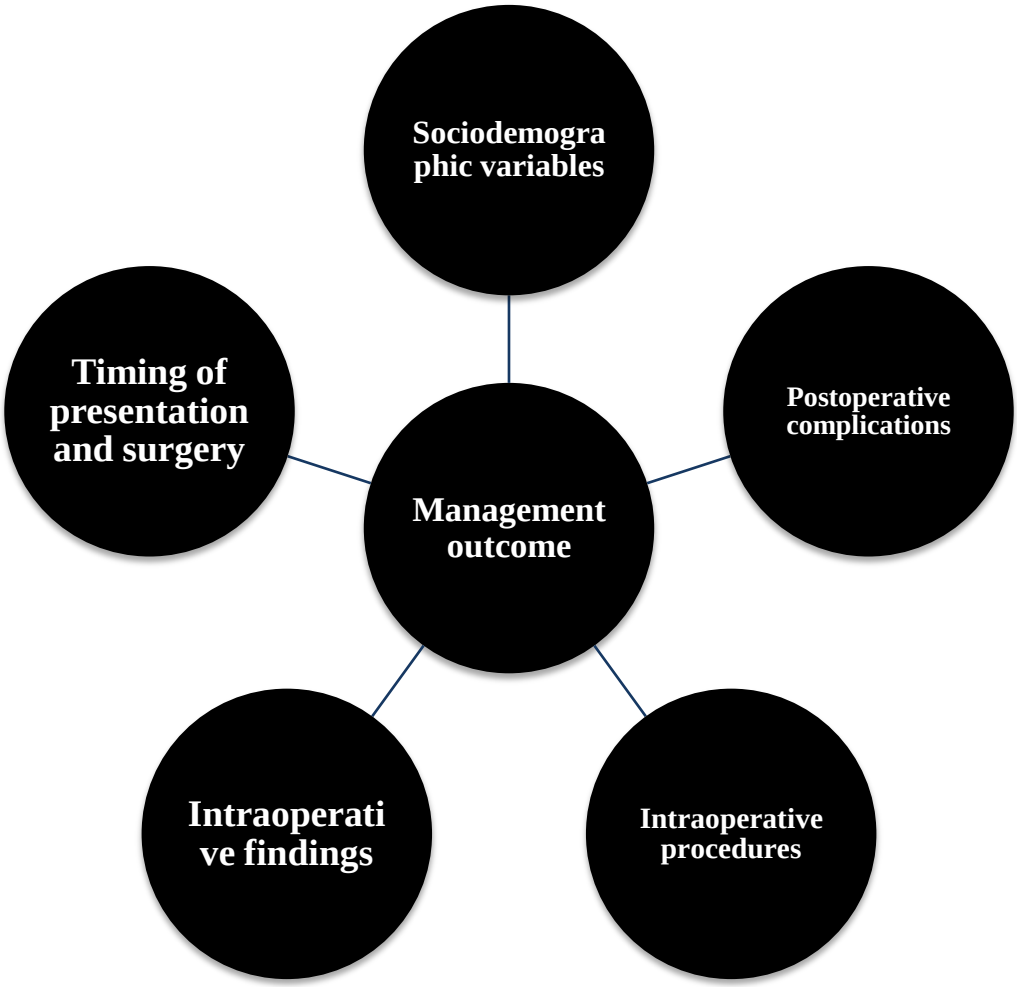
All the patients with sigmoid volvulus were operated on; of 5 patients who had resection and primary anastomosis, the only morbidity was a case of minor wound infection. One of the 2 patients treated with resection and colostomy developed a pelvic abscess. One patient died from an anastomotic leak after surgery for compound strangulating volvulus (17).

Of the eleven patients with obstructed hernia, 7 required emergency operations while 3 others were electively repaired following spontaneous reduction. The remaining patient died before surgery from acute renal failure. The overall mortality rate was 14%. The operative mortality of 11% included 7 cases of strangulating obstruction, 3 of advanced colorectal carcinomas and 1 of simple obstruction. The remaining deaths occurred before surgery from complications in patients presenting late with neglected obstruction [17].

One study done in TAH shows 25 males and 15 females were operated for intestinal obstruction. Seven out of the 33 patients with small bowel obstruction had died giving a mortality rate of 21.2%.The most common postoperative complication were sepsis, wound infection, anastomotic leak, intra-abdominal abscess and hypo-proteinaemia (5).

2.4 Conceptual frame work

In this conceptual framework, the mainly associated risk factors are identified at four levels: Sociodemographic variables (age, sex, and residency), timing of presentation and surgery, causes of intestinal obstruction and intraoperative procedures.



CHAPTER THREE: OBJECTIVES

3.1 General objective

- The objective of this study is to assess the prevalence, common causes and management outcome as well as to compare preoperative and postoperative diagnosis of intestinal obstruction among operatively treated 302 adult patients at Attat Catholic Hospital from January 2011-December 2013.

3.2 Specific objectives

1. To determine the prevalence of intestinal obstruction.
2. To assess the common causes and performed intraoperative procedures
3. To compare the diagnosis accuracy between preoperative and post operative time.
4. To assess the management outcome and associated risk factors of intestinal obstruction.

CHAPTER FOUR: METHOD AND MATERIALS

4.1 Study area and period

This study was be conducted at Attat Catholic Hospital (ACH) which is found 175 km southwest of Addis Ababa and is 410 km far from the regional capital, Awassa. The Hospital was established in 1961 E.C with a religious mission.

Its catchment's population is 800,000 mainly centered for Cheha Woreda of Gurage Zone, Southern Nations, and Nationalities Regional state.

This study was conducted from 25th October, 2013-30th July, 2014

4.2 Study design

A Hospital based retrospective study was conducted.

4.3 Population

4.3.1 Source population

The source population was all adult patients admitted to surgical ward for acute abdomen at Attat Catholic Hospital in the intended period.

4.3.2 Study population

The study population was a total of 302 adult patients managed operatively managed for intestinal obstruction at Attat Catholic Hospital from January, 2011-December 30, 2013.

4.3.3 Inclusion & Exclusion Criteria

4.3.3.1. Inclusion criteria

- All charts of adult patients, who are managed surgically for acute abdomen at ACH from January, 2011-December, 2013, were included in the study.

4.3.3.2 Inclusion criteria

- Patients with age s less than fifteen years.and
- Patients with incomplete records to fill all variables were excluded from the study because the diagnosis may not be exact.

4.4 Sample size determination

The sample size was determined by using single population formula as stated below. A prevalence of intestinal obstruction of 27% was used from a research conducted in 2009 at Black Lion Hospital as a reference population (5).

Hence; taking 95% confidence interval and ±5% marginal error, sample size (n) was determined using the following statistical formula.

$$n = \frac{(Z_{1-\alpha/2})^2 p\,(1-p)}{d^2}$$

Where, P= prevalence rate known so P=27 %%(0.27)

n= sample size

Z= 95% confidence interval

d= bond on sampling error tolerated between the sample and population=±5%

α=critical value at 95% confidence interval of certainty (1.96)

Thus, totally **302** adult patients managed surgically from January, 2011- December, 2013 were sampled.

4.5 Sampling method

All adult patients managed operatively for acute abdomen from January, 2011-December, 2013 were included provided that an inclusion criterion was fulfilled to achieve the intended sample size in the given duration.

4.6 Data collection tools and technique

The data for this study were collected using pre-tested questionnaire check list which have socio-demographic variables, diagnosis, intraoperative procedure and outcome of intestinal obstruction. The check lists are prepared in English version adopted from similar studies conducted in Ethiopia (1, 5).

4.7 Data collectors and techniques

The data were collected from patient record cards, registration books and operation room logs available in the hospital by check list questionnaires using trained data collectors then their charts were retrieved from card office.

Finally documents from patient cards were entered in to a structured format by trained professionals.

4.8 Study variables

4.8.1 Dependent variable:

- Pattern of intestinal obstruction
- Management outcome

4.8.2 Independent variables:

- Sociodemographic characteristics-Age, Sex and Residence
- Duration of illness
- Intraoperative finding
- Intraoperative Procedure done
- Postoperative complications

4.9 Data analysis

The collected data were checked for its completeness, entered using SPSS version 16.0 database programs for analysis after edition. Descriptive statistics were used describe the study sample.

Data analysis and association between variables were done to assess the relative effect of determinants. Association between dependent and independent variables was checked using binary and multivariate logistic regression. On binary logistic regression a p-value $\leq$ 0.25 was used as a candidate for multivariate logistic regression analysis. Statistical significant association was tested at a P-value of < 0.05.

4.10 Ethical consideration

Ethical clearance and permission letter was obtained from Ethical committee of Jimma University College of public health and medical science post graduate research program and letter of cooperation was sent to the institution from JU Administrative office.

4.11 Data quality management

To assure the quality of the data, data collectors and supervisors were trained and a regular supervision and follow up was made by Supervisors. In addition regular checkup for completeness and consistency of the data was also made on daily basis.

4.12 Operational Definitions

1. **Anastomosis*:*-**the surgical union of two hollow organs, e.g. parts of the intestine, to ensure continuity of the passageway and anastomosis leak refers to leakage through surgical union site.
2. **Fascial dehiscence:** is fascial disruption due to abdominal wall tension overcoming tissue or suture strength, or knot security.
3. **Hematoma and seroma:** post operative accumulation of blood and serum in side surgical wounds respectively.
4. **Intraoperative procedure:** The procedure that can be done after laparotomy was done which can be resection & anastomosis or colostomy or etc depending on the causes& intraoperative finding of obstruction.
5. **Intraoperative finding:** The finding after abdomen is opened which can be gangrenous bowel or viable bowel and etc.
6. **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.
7. **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.
    a. **Good outcome: -**favorable final outcome of patient after management like discharge after improvement with or without any complication.
    b. **Bad outcome: -** unfavorable (death) outcome following surgical management in the intraoperative or postoperative time.

8. **Pattern:** causes, intraoperative findings, performed procedures
9. **Postoperative pneumonia:** suspected in a patient with clinical findings of infection including fever, cough or purulent sputum in the post operative period.
10. **Procedure done:** the main procedure done after laparotomy to relieve the obstruction.
11. **Surgical site infections (SSI):** Infection following surgical incisions and classified as [18]
    a. **Superficial Incisional SSI:** Infection occurs within 30 days after the operation and involves only skin or subcutaneous tissue of the incision.
    b. **Deep Incisional SSI:** Infection occurs within 30 days after the operation and infection involves deep soft tissues (e.g., fascial and muscle layers) of the incision.

4.13 Dissemination Plan of the Study Findings

The result of the study will be presented to Jimma University community as part of thesis defense and it will be disseminated to Jimma University, College of public health and medical science, Coordinator of Integrated Emergency Obstetrics/Gynecology and Surgery (IEOS) and to the targeted health facility.

CHAPTER FIVE: RESULTS

5.1 General characteristics of study population

A sampled total of 302 patients were managed surgically for obstructed bowel out of 1401 acute abdomen and 5577 total surgical admissions in Attat Catholic Hospital during the study period from January, 2011-December, 2013.

5.2 Socio demographic characteristics

Patients' age ranges between 15-75 years of age with a mean of 30.95 years (SD±15.20). Of which 229 (75.83%) were males while 73 (24.17) were females. About 217(71.85%) and 85(28.15%) of patients were rural and urban residents respectively.

Table 1: Socio-demographic characteristics of operatively managed adult patients of intestinal obstruction in Attat Catholic Hospital from January, 2011-December, 2013.

Variables	Labels	Frequency	Percent (%)
Age	15-24	33	10.93
	25-34	94	31.12
	35-44	78	25.83
	45-54	65	21.52
	>55	32	10.60
Sex	Male	229	75.83
	Female	73	24.17
Residency	Rural	217	71.85
	Urban	85	28.15
Total		302	100

5.3 Prevalence and etiological spectrum of intestinal obstruction

Intestinal obstruction is the second most prevalent 302 (21.56%) non-traumatic cause of acute abdomen in the study area next to acute appendicitis 694 (52.14%) and accounts 5.42% of the total surgical admissions.

Among the total cases, 205 (67.88%) were managed for small intestinal obstruction secondary to small bowel volvulus, intussusception and adhesion accounting of 78 (38.05%), 55(26.83%) and 30 (14.63%) respectively.

And the rest 97 (32.12%) of cases were managed for large bowel obstruction primarily due to sigmoid volvulus 61 (62.89%) followed by colonic tumors 11 (11.34%).

Table 2: Prevalence and etiological spectrum of intestinal obstruction in Attat Catholic Hospital from 2011-2013.

Major causes	Frequency	Percent	Causes	Frequency	Percent
Small bowel obstruction	205	67.88	Small bowel volvulus	78	38.05
			Intussusception	55	26.83
			Adhesions and bands	30	14.63
			Hernias	11	5.37
			Others	31	15.12
Large bowel obstruction	97	32.12	Sigmoid Volvulus	61	62.89
			Colonic tumors	11	11.34
			Others	25	25.77
Total				302	100

5. 4 Intraoperative findings and procedures

Viable bowel was the dominant intraoperative finding 231(76.49%) while 71 (23.51%) of the intraoperative bowel findings were gangrenous.

And untwisting the volvulus (derotation) with 91 (30.13%) has frequently been performed to resolve the obstruction; resection & anastomosis 82 (27.15%) and laparotomy 60 (19.87%) were the second and third common practiced intraoperative procedures.

Table 3: Pattern of intraoperative findings and performed procedures of intestinal obstruction in Attat Hospital from January, 2011-December, 2013.

Variables	Characteristics	Classification	Frequency	Percent (%)
Intraoperative Findings	SBV	Viable	42	13.91
		Gangrenous	36	11.92
	SGV	Viable	37	12.25
		Gangrenous	24	7.95
	Adhesions and bands		35	11.59
	Intussusceptions		55	18.21
	Others*		73	24.17
	Total		302	100
Intraoperative Procedures	Derotation		91	30.13
	Anastomosis		82	27.15
	Laparotomy and reduction		60	19.87
	Adhensionolysis		27	8.94
	Others**		42	13.91
	Total		302	100

*Others-colonic Ca, Iliosigmoidal knotting, hernia, intestinal TB, crohn's disease

**Others-biopsy, herniorrhaphy

5.5 Management outcome and complications of intestinal obstruction

Among the 302 surgically managed adult cases of intestinal obstruction, 285 (94.37%) had good outcome having been discharged alive uncomplicated or improved where as 17 (5.63%). However; 64 (21.19%) of them developed post operative complications with surgical site (wound) infection, anastomotic leak and hematoma/seroma were 31 (48. 44%), 9 (14.06%) and 7 (10.94%) respectively the prevalent complications.

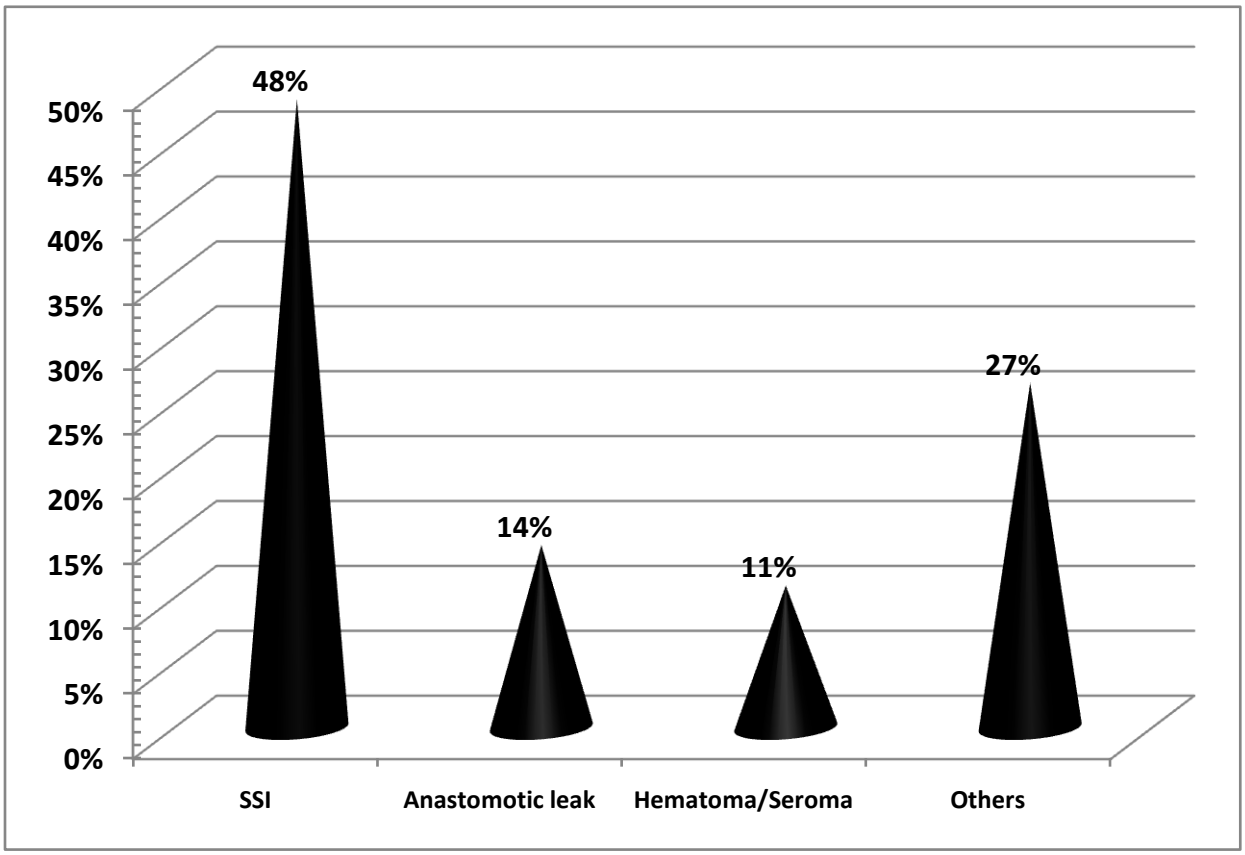


Figure 1: Types of complications developed in the postoperative course of patients operatively managed at Attat hospital from January, 2011-December, 2013.

Males were the predominant causes of intestinal obstruction comprising of 229 (75.83%) cases but they were 0.2 times less likely to have bad outcome when compared with females 73 (24.17) which is statistically associated with management outcome (AOR=0.12, 95% CI: 0.28-0.99, P-value=0.049).

Patients were being discharged as early as 3 days of admission and were given care for a maximum of 21 days with average(mean) hospital stay of 6.49 days(SD±2.38) and majority 190 (62.91%) of cases discharged <7 days .

And 17 (5.63%) of the total patients had bad outcome (died) while the rest 285 (94.37%) were discharged alive either improved from their complications or without complications.

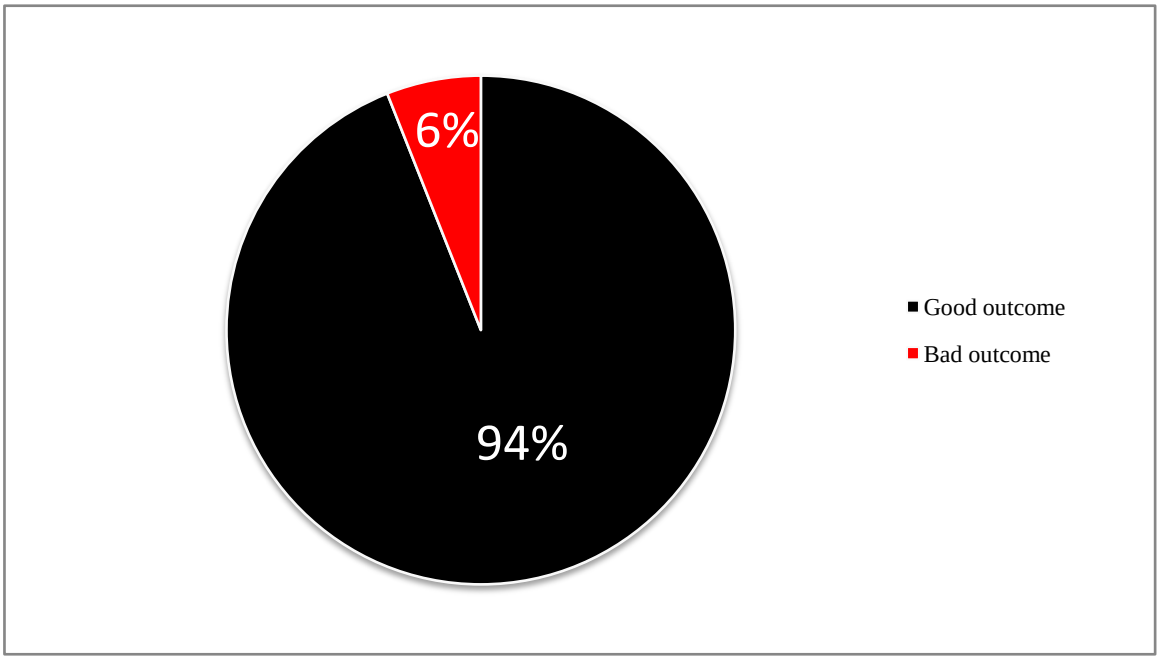


Figure 2: Management outcomes among operatively managed patients of intestinal obstruction at Attat hospital from January, 2011-December, 2013.

5.6 Predictors of management outcome of intestinal obstruction

To identify the factors associated with management outcome of intestinal obstruction, binary logistic regression was performed on dichotomous dependent variables. Therefore; variables with P-value of ≤0.25 (C I≥75%) like, Age, sex, complications, duration of presentation and surgery as well as intraoperative findings & procedures were selected as candidates and entered multivariate logistic regression analysis at preliminary bivariate analysis unlike residence.

Then from this analysis, age of patients has statistically significant association with management outcome (AOR=0.16, 95%CI: 0.001-0.797, P-value=<0.038). Those patients whose ages ≤40 years were 0.16 times less likely to have bad management outcome when compared with patients older than 40 years of age.

Sex also has significant association statistically with management outcome (AOR=0.17, 95% CI: 0.28-0.988, P- value=0.049), showing that males were 0.17 times less likely to develop unfavorable management outcome in relative to the outcome of females.

Duration of presentation to hospital after illness and to surgery is a determinant factor for management outcome that is found to have statistically significant association (AOR=7.392, 95%CI: 1.03-53.06, P-value=0.047). This implies that patients who had early admission and surgery within 24 hours had 7.39 times more chance of having good outcome when compared with those come and operated delayed after 24 hours of illness.

Intraoperative findings either bowel was found to be viable or gangrenous has significantly associated to their respective management outcome (AOR=0.031, 95% CI: 0.002-0.513, P-value=0.015) that signifies those patients with viable intraoperative findings were 5.14 times less likely to end up with bad management outcome because it is highly decisive to the fate of their procedure.

Intraoperative types of procedures performed those whom anastomosis for or other laparotomy have significant statistical association with their subsequent management (AOR=0.001, 95% CI: 0.037-3.090, P-value=0.001). Those patients who had other laparotomy in their intraoperative procedure were 11.07 times less likely to have had bad management outcome in relative to those who had been done anastomosis.

Postoperative complications have always a negative results having significant association to management outcome(AOR=0.134, 95% CI: 0.04-0.049, P- value=0.024) showing those who hadn't post operative complications were at 0.14 times less risk to have bad management outcome when compared with those who had post operative complications.

Table 4: Association of associated variables with management of intestinal obstruction cases managed operatively in Attat hospital from January, 2011-Dcember, 2013.

Variables	Labels	Management outcome		COR (95% CI)	P-value	AOR (95% CI)	P-value
		Good	bad				
Age	≤ 40 years	182	5	8.8(2.99, 25.98)	<0.001*	0.16(0.00, 0.797)	0.038*
	>40years	103	12	1		1	
Sex	Male	220	9	1.78(1.26, 2.52)	0.048*	0.17(0.28, 0.988)	0.049*
	Female	65	8	1		1	
Residency	Rural	204	13	3.08(0.69, 13.78)	0.341***		
	Urban	81	4	1			
Duration of presentation	≥24 hours	160	3	3.82(1.22, 12.01)	0.122**	7.392(1.03, 53.06)	0.047*
	>24 hours	125	14	1		1	
Intraoperative findings	Viable bowel	224	6	5.14(1.88, 14.05)	0.001*	0.031(0.002, 0.513)	0.015*
	Gangrenous bowel	60	11	1		1	
Intraoperative procedures	laparotomy	217	3	11.07(1.36, 19.97)	0.025*	0.001(0.037, 3.090)	0.001*
	Anastomosis	68	14	1		1	
Postoperative complications	No	225	11	0.14(0.04, 0.54)	0.001*	0.134(0.04-0.46)	0.024*
	Yes	58	6	1		1	

**Significant at p-value≤0.05 ** Significant at p-value≤0.25 ***not Significant at p-value≤0.25 1 is reference*

CHAPTER SIX

6.1 Discussion

It is clear from this study that intestinal obstruction was prevalent, 21.6% cases of acute abdomen and 5.42% of total surgical admissions that is consistent with the study conducted in BLH and India (5, 28) for which males were the highly affected group constituting 229 (75.83%) with age of patients ranged from 15-75 years of age and mean age 30.95(SD±15.20). Most of the affected populations accounting 217 (71.85%) were rural residents with R: U 2.6:1 ratio.

Almost more than half , 163 (53.97%) of patients arrived at hospital within 24 hours of onset of symptoms while the rest had been presented late after 24 hours of onset of their symptoms which is inconsistent with similar studies conducted in Africa [3, 12, 17, 22] whose reports showed that majority of cases presented late after 24 hours. This can be explained by the difference of the community's health seeking behavior and accessibility. And duration of presentation to hospital and surgey has significantly associated with management outcome (AOR=7.39, 95% CI: 1.03-53.06, P –value=0.047) which means those who presented within 24 hours to hospital and surgery have 7.39 times less probability of bad management outcome when compared with those come late after 24 hours.

Several factors could be explained attributable to this delay like- Poverty, poor health seeking behavior, shortage of accessibility, poor infrastructure and lack of transportation as some of the most important ones. Late presentation in case of intestinal obstruction accounts for disastrous outcomes, notably high rate of complications, long hospital stay and high mortality rates [11].

Based on this study, there was a disparity in preoperative diagnosis accuracy that 57 (18.87%) of patients were misdiagnosed when compared with the intraoperative finding interms of site of obstruction, showing 39 of them assessed as LBO but found to be SBO which can incur the patient to poor management outcome due to possible inappropriate preoperative preparation and management. This might be explained primarily due to inappropriate history taking and physical examination to reach an exact final decision.

According to the study, the primary cause of intestinal obstruction was small bowel obstruction 205 (67.88%) mainly due to small bowel volvulus 78(35.05%), intussusception 55 (26.83%), adhesion and bands 30 (14.63%), hernia 11 (5.37%) and others 31 (15.12%) inconsistent with a researches conducted in Uganda and other African countries whose results revealing-Adhesions, hernia, volvulus and intussusception were the leading causes of bowel obstruction respectively (38) may be due to the absence and poor surgical service in the area.

The second site of IO in Attat Hospital was known to LBO accounting 97 (32.12%) with sigmoid volvulus 61(62.89%) and colonic tumors 11 (11.34%) the leading causes which is in contrary with a study done in Black Lion Hospital reporting, small bowel and large bowel obstruction accounts 52.3% and 46.7% respectively(5). And another study conducted in Saudi Arabia shows feacal impaction (7.1%), colonic cancer (3.6%) and sigmoid volvulus in 5.3 % (18). Socioeconomic factors and dietary habit be responsible for the observed difference.

As of this study, 230 (76.16%) of the total intraoperative findings was viable bowel and 72 (23.14%) was gangrenous bowel which was found to be statistically significant with unfavorable management outcomes (AOR=0.031, 95% CI: 0.002, 0.513, P-value=0.015) suggesting that patients with gangrenous bowel have more chance of developing unfavorable outcome as compared with patients having viable bowel.

And primary bowel resection and anastomosis 82 (27.15%) was the second common intraoperative procedure next to derotation (untwisting volvulus) 91 (30.13%) while laparotomy 60 (19.87%) and Adhesionolysis 27 (8.94%) respectively were the third and fourth common intraoperative procedures.

Bowel resection and anastomosis was found to have significant statistical association with unfavorable management as compared to other laparotomy procedures (AOR= 0.001, 95% CI: 0.037, 3.090, P –value=<0.001)

Complication was seen to be statistically associated with management outcome thus; those whodidn’t develop a complication in their postoprative time have 0.13 times less chance of having bad outcome in rlative to those who develop postoperative complication.

In this study, complication has been observed on 64 (21.19%) of the total patientshaving: surgical site (wound) infections 31 (48.44%), anastomotic leak 9 (14.06%), hematoma/seroma 7 (10.94%) and others 17 (26.56%), the commonly encoutered ones while 238 (78.80%) of them had been discharged having smooth post operative course which indicates a lower rate in rlative to similar study results done Gonder and Yirgalem hospitals as well as other African countries(1 2, 20). This might be due to the difference of intraoperative findings and procedures performed.

According to this study, the length of hospital stay varies from th minimum 3 days to the maximum 21 days with the average duration 6.31 days (SD ±2.35). And th mortality rate of Attat Catholic Hospital based on the study was 5.63% almost lower than other researches done in BLH 21.2% and Nigeria 14 %.(13, 18).

This difference in mortality rate may be associated with late duration of patients' illness to hospital due to lack of awareness about the burden and impacts of the problem. The reason for lower mortality rate in this study could because of performing surgery as quick as possible after admission to prevent likely complications and mortality.

6.2 Strengths and Limitations of the study

The strength of this study is that it is comparably inexpensive and easy to conduct like any retrospective study allowing assessing of readily available data and most importantly to propose a hypothesis that would be ascertained prospectively. Probably adequate number of sampled population was determined to increase representiveness of the population.

However; incomplete documentation of charts like unrecording and misrecording as well as presence of limited similar studies in Ethiopia that adequate comparison could have been done, were limitations of the study.

The study also excluded charts of patients that were managed by any means of non-surgical intervention.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

In conclusion, the prevalence of acute intestinal obstruction in Attat hospital is 21.6% of all operatively managed acute abdomen cases and Small bowel volvulus is geographically the leading cause followed by sigmoid volvulus and intussusceptions.

Duration of illness, intraoperative findings, intraoperative procedures and postoperative complications were found to the most associated risk factors that matters the management outcome of intestinal obstruction.

The mortality rate of this study is fairly acceptable in relative to other studies, despite there is no universally set common standard mortality rate.

It is apparent from this report that increased efforts to provide adequate preoperative management, high quality surgical expertise along with sound clinical judgment and early surgery when needed will greatly matter to have good patients' outcome.

7.2 Recommendations

As shown in the report, majority of the patients that ended up in complications and moribund were those who presnted and managed late with their bowel found to gangrenous for which primary bowel resection and anastomosis has been underwent to relieve the morbid scenario.

Therefore this circumstance can be alleviated by:

- Increasing public awareness on manifestations of the disease and improving the knowledge of mid and low level health professionals on detection and management as well as importance of early referal higher center.
- Primary bowel resection and anastomosis should be decreasd by shifting it to colostomy as an alternative method to have enough time for bowel preparation to prvent th3 lthal complication of anastomotic leak.

Record keeping in the hospital must be improved because some hand writings were not readable and some charts were lost.

Prospective studies should also be done further in the hospital, and in fact the hospital should design mortality reduction strategies due to the limitation of secondary data project this study to the whole population.

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ANNEX

Research questionnaire checklist for data collection on retrospective study of pattern and outcome of intestinal obstruction managed surgically at Attat Catholic Hospital, Gurage Zone, southern nations and nationalities regional state, Ethiopia.

PART I-Socio demographic characteristics

1. Age_____
2. Sex:
    A. Male
    B. Female
3. Address:
    A. Rural
    B. Urban

PART II-Clinical features, findings, causes and management

4. Duration of presenting symptoms (in hours) ----------
5. Possible preoperative diagnosis (cause) of IO:
    1. SBO
    2. LBO
    3. Hernia
    4. Adhesion and bands
    5. Intussusception
    6. Others, specify_____
6. Intraoperative findings (definitive diagnosis)
    1. Small bowel volvulus (viable)
    2. Small bowel volvulus (gangrenous)
    3. Sigmoid volvulus (viable)
    4. Sigmoid volvulus (gangrenous)
    5. Adhesions and Bands
    6. Intussusception
    7. Others

9. Procedure type done during Intraoperative management
    1. Untwisting the volvulus
    2. Anastomosis: type, specify----------
    3. Stoma (Colostomy) specify----------
    4. Laparotomy
    5. Adhesionolysis
    6. Others (specify) _____
10. What was the postoperative cause of IO?
    A. Small bowel obstruction
    B. Large bowel obstruction
11. Is there any preoperative and postoperative diagnosis discrepancy?
    A. Yes
    B. No
12. If yes, what was the supposed diagnosis?
    A. Small bowel obstruction
    B. Large bowel obstruction

PART **III- Post operative conditions**

13. Any post operative complication developed?
    A. Yes
    B. No
14. Type of post operative complication, if manifested
    A. Hematoma/serosa 1) yes 2) no
    B. Incisional SSI: (1) superficial (2) deep
    C. Facial dehiscence (Anastomotic leak) 1) yes 2) no
    D. Pneumonia/Atelectasis 1) yes 2) no
    E. Others, specify_____
15. Management outcome/Condition at discharge
    A. Discharged alive without complication
    B. Discharged alive with at least one complication
    C. Died in the hospital
16. Length of Hospital Stay (in days) _____

DECLARATION

I, the undersigned final year IEOS student, declare that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name: **Hagos w/giorgis**

Signature: _____

Name of the institution: **Jimma University**

Date of submission: 08/12/2006 E.C [15/08/2014 G.C]

This thesis has been submitted as a final result with my approval as a University Advisor:

Name of first advisor Signature

Dr. Beyene Wondafrash (MD, MPH, Assistant professor) _____

Name of second advisor

Mr. Mubarek Abera (BSc, MSc) _____