

2022-11-06

Outcomes Of Non-Traumatic Acute Abdomen And Associated Factors In Adult Patients In Tibebe Ghion Specialized Hospital

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF Surgery

Outcomes Of Non-Traumatic Acute Abdomen And Associated Factors In Adult Patients In
Tibebe Ghion Specialized Hospital

A THESIS REPORT SUBMITTED TO THE DEPARTMENT OF SURGERY, COLLEGE
OF MEDICINE AND HEALTH SCIENCES, BAHIR DAR UNIVERSITY, IN THE
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE CERTIFICATE OF
GENERAL SURGERY.

BY DR. Mohammed Yusuf (GENERAL SURGERY RESIDENT IV, BDU

NOVEMBER 2022

BAHIR DAR, ETHIOPIA

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BAHIR DAR UNIVERSITY
COLLEGE OF MEDICINE AND HEALTH SCIENCES
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NOVEMBER 2022

BAHIR DAR, ETHIOPIA

TITLE: OUTCOMES OF NON-TRAUMATIC ACUTE ABDOMEN AND ASSOCIATED
FACTORS IN ADULT PATIENTS IN TIBEBE GHION SPECIALIZED HOSPITAL

DECLARATION

This is to certify that the thesis entitled “Outcomes of Non-Traumatic Acute Abdomen and Associated factors in Adult patients at Tibebe Ghion Specialized Hospital, Bahir Dar, Ethiopia”, submitted for partial fulfillment of the requirements for certificate specialty in General Surgery of Department of Surgery, Bahir Dar University. It is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

Dr. MOHAMMED YUSUF -----


Name of the candidate

Date

Signature

APPROVAL OF THESIS FOR DEFENSE

I hereby certify that I have supervised, read, and evaluated this thesis/dissertation titled “Outcomes of Non-Traumatic Acute Abdomen and Associated factors in Adult patients at Tibebe Ghion Specialized Hospital, Bahir Dar, Ethiopia”, prepared under my guidance. I recommend the thesis be submitted for oral defense.

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ACKNOWLEDGEMENTS

I would like to acknowledge Bahir Dar University College of Medicine and Health Sciences, Department of Surgery for providing me this opportunity to conduct this research.

I would like also to thank my advisors Dr. Mequanint Taye (M.D, Assistant Professor of surgery) and Mr. Eyob Ketema (MPH) for their invaluable guidance and advice in preparation of this research.

Last but not least my gratitude goes to the clinical director, the data collectors, card unit servants, and TGSH staffs for their priceless cooperation.

ABSTRACT

Background: Non-traumatic surgical acute abdomen is an acute onset of abdominal diseases and one of the most commonly encountered surgical emergencies that require urgent surgical intervention. However, there was not much study done about study the outcomes of non-traumatic acute abdomen and associated factors in our hospital.

Objectives: To assess the outcomes of non- traumatic acute abdomen and associated factors in adult patients at TGSH, Bahir Dar, Ethiopia.

Method: A retrospective Hospital based cross sectional study was done and random sampling technique was used ,303 records were examined , pre-tested data extraction checklist was used to collect the data and entered by kobo tool box then exported and analyzed using SPSS version 26 , binary logistic regression model used ,and finally Adjusted Odds Ratio with 95% CI and p value less than 0.005 was considered as statistically significant for the assessment of Outcomes of non-traumatic acute abdomen and associated factors in adult patients at Tibe be Ghion Specialized Hospital, department of surgery, Bahir Dar, from October 28,2022-November 8,2022.

Results: The prevalence of non-traumatic acute abdomen was found to be 90%. Those patients with guarding (AOR=2.976,95% CI = (1.0465,8.467), post operative complication (AOR=0.165 ,95% CI= (0.077,0.353), and temperature ≥ 37.5 (AOR=5.876,95% CI= (1.775,19.450) were significantly associated with outcome of non-traumatic acute abdomen.

Conclusion: Appendicitis was the most common cause of non-traumatic acute Tibebe Ghion Specialized Hospital followed by intestinal obstruction, and peritonitis. In this study we have noticed 88.1% of the patients had favorable outcome which is high and the overall mortality rate was also low (1%) which is acceptable compared to other studies. Participants who had no fever, guarding, and post operative complication had favorable outcome. Pre and post operative management are important to decrease post operative management.

Key words: Acute abdomen, Non-traumatic, Outcome, Tibebe Ghion Specialized Hospital

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LIST OF ABBREVIATIONS/ACRONYMS

AOR	Adjusted Odds Ratio
BDU	Bahir Dar University
COR	Crude Odds Ratio
CI	Confidence Interval
CMHS	College of Medicine and Health Sciences
GSBV	Gangrenous Small Bowel Volvulus
GSV	Gangrenous Sigmoid Volvulus
ETB	Ethiopian birr
IO	Intestinal Obstruction
IV	Intravascular
LBO	Large Bowel Obstruction
MRN	Medical Record Number
NG	Nasogastric
PPUD	Perforated peptic ulcer disease
SBO	Small Bowel Obstruction
SD	Standard Deviation
SPSS	Statistical Package for Social Science
SSI	Surgical Site Infection
SSV	Simple Sigmoid Volvulus
TGSH	Tibebe Ghion Specialized Hospital
WHO	World Health Organization

1. INTRODUCTION

1.1. Background of the Study

Acute abdomen is an acute onset of abdominal disease entities that require immediate surgical intervention in most of the cases and it is common challenging clinical scenario that requires a thorough and expeditious workup to determine the need for operative intervention and to initiate appropriate therapy [1].

A study done at Malawi tertiary referral hospital the overall mortality of patients admitted with non-traumatic acute abdomen was 15% and factors associated with high mortality were peritonitis due to delay presentation of the patient [25].

The management outcome of patients who had abdominal surgery for the diagnosis of non-traumatic acute abdomen from a study done at Goba referral hospital was 94% good outcomes and 6% of the death. From those patients who undergone surgery 31.4% of them developed post operative complication. One third of patients presented with deranged vital signs and 4.9% of them died of multiorgan failure. The most common signs associated with poor outcome were guarding and abdominal tenderness. The commonest post operative complication was wound infection 15.7% followed by sepsis 8% of the cases. The overall case fatality rate was 6% [30].

The mortality rate following emergency surgery was 22% and the overall non favorable outcome 75% according to the study done at Wolaita referral hospital and most of the patients died were operated for bowel obstruction [28].

Based on a study done at Nekemte Referral hospital the overall mortality rate of surgically treated acute abdomen was 3% and the mean hospital stay was 2.2 days and the mean age of expired patients was 53.6 years. Almost all of the patients operated for bowel obstruction contributed to the fatality [34].

Appendicitis is more common in the young whereas biliary disease, bowel obstruction, intestinal ischemia and infarction, and diverticulitis are common in elderly patients [2].

The most common symptoms are abdominal pain and vomiting whereas tenderness and guarding are the most frequent clinical signs. It is common surgical emergency accompanied with high morbidity and mortality if not managed properly [4,5-8].

Lack of health education, improper health care facilities and late presentations are common factors for increased morbidity and mortality. Old age (> 55- yrs.) and duration of illness greater than two days were factors statistically associated with postoperative complication. Emergency procedures generally are associated with increased morbidity and mortality rate in elderly patients (the overall mortality reaches 22%) [3,11].

Abdominal pain (100%), Vomiting (90.3%), abdominal distension (58.3%) and constipation (55.3%) were the commonest symptoms in patients with acute abdomen. Seventy-seven (26.6%) of operated patients had early (in-hospital) postoperative complications [27]. There is also similar study done in Black Lion Hospital whereby 28% of patients developed post operative complications and the overall mortality rate was 15.3%. The mortality rate was very high (25%) in those operated patients who came more than 2 days of illness duration [3].

In Ethiopia, especially in Bahir Dar University College of Medicine and Health Sciences, Bahir Dar, very little is known about the pattern and associated factors of surgically treated non-traumatic acute abdomen and there is no literature that indicates the outcome and its associated factors of patients who are managed operatively for the diagnosis of non-traumatic acute abdomen at Tibebe Ghion Specialized Hospital (TGSH). This study is therefore, aimed at assessing this problem.

Only few studies are conducted in our country and there is no a research paper done on the subject matter in our hospital. Hence, the importance of an accurate data regarding outcomes and associated factors of non-traumatic acute abdomen is indisputable.

Therefore, the aim of this study will be to assess the outcomes of non-traumatic acute abdomen and associated factors in adult patients at Tibebe Ghion Specialized Hospital, Bahir Dar city.

1.2. Statement of problem

Non traumatic acute abdomen is an integral of acute abdomen and is an important public health problem that remains a primary concern to both patients and surgeons. It is

relatively non preventable common global emergency consuming much in terms of surgical cost. It represents up to 54% of general surgical admissions in some Asian countries whereas up to 88.2% total emergency operations in few African countries. Despite of modern surgery is being practiced; the mortality rate following non traumatic acute abdominal surgical emergencies is still high worldwide being the highest at the extremes of age [9, 10, 19].

Lack of health education, improper health care facilities and late presentations are common factors for increased morbidity and mortality. Old age (> 55- yrs.) and duration of illness greater than two days were factors statistically associated with postoperative complication. Emergency procedures generally are associated with increased morbidity and mortality rate in elderly patients (the overall mortality reaches 22%).

The magnitude of non-traumatic surgical acute abdomen is different in different areas due to socioeconomic, demographic factors and diet habit.

In addition to this, the incidence of post-operative complications varies in different regions and setups [8, 16].

The pattern of the disease changes from time to time and needs periodic studies to evaluate the etiological factors and behavior of the disease. Global as well as regional variations in the magnitude of non-traumatic acute surgical abdomen and changes in the disease pattern over the years are well documented in the literature [16, 18-20].

The mortality rate following acute abdominal surgical emergencies is still high. The overall mortality was 4.2% and the rate increased significantly in patients aged >60 years. Emergency procedures generally are associated with increased morbidity and mortality rate in elderly patients (the overall mortality was 22%) [21, 22].

Typhoid ileal perforation still remains a very severe condition in tropical countries. Its incidence ranges from 0.9% to 39%, with a mortality rate, which remains very high. Primarily, the mortality and the morbidity rate do not depend on the surgical technique, but rather on the general status of the patient, the virulence of the salmonella and the duration of disease evolution before surgical treatment. That is why, it is so important to provide adequate pre-operative management associating aggressive resuscitation with antibiotic therapy. In the literature, it is usually advocated that the last 60 cm of the ileum present a high concentration of Peyer's patches whose infection is a source of intestinal perforation [25, 26].

Abdominal pain (100%), Vomiting (90.3%), abdominal distension (58.3%) and constipation (55.3%) were the commonest symptoms in patients with acute abdomen. Seventy-seven (26.6%) of operated patients had early (in-hospital) postoperative complications [27].

Therefore, the aim of this study was to assess the outcomes of non-traumatic acute abdomen and associated factors in adult patients at Tibebe Ghion Specialized Hospital, Bahir Dar city.

1.3. Significance of the study

Conducting this study will determine the common causes, and management outcomes, and its associated factors patients with non-traumatic acute abdomen helps to evaluate our experience and to analyze the magnitude of the problem. It also helps to compare the pattern with other figures and to design appropriate management outline as well as preventive measures. It also helps health professionals to take it as a reference and to study each and specific causes of acute abdomen.

The result may contribute the health management at higher official levels to develop strategies to alleviate this problem. The assessment of patterns and outcomes of non-traumatic acute abdomen and its associated factors in the population is central to any preventive and control program aimed at reducing the burden of those complications.

1.4. OBJECTIVES OF THE STUDY

1.4.1. General objective

➤ To assess outcomes of non-traumatic acute abdomen and associated factors in adult patients at Tibebe Ghion Specialized Hospital.

1.4.2. Specific objectives

- To assess the outcomes of non-traumatic acute abdomen in adult patients at Tibebe Ghion Specialized Hospital.
- To analyze the associated factors of non-traumatic acute abdomen in adult patients at Tibebe Ghion Specialized Hospital.

2. LITERATURE REVIEW

2.1. Outcomes of non-traumatic acute abdomen

Despite modern surgery is being practiced; the mortality rate following non traumatic acute abdominal surgical emergencies is still high worldwide being the highest at the extremes of age [9, 10, 19].

Study conducted on 190 cases at Kamuzu Central Hospital (KCH) in Lilongwe, Malawi, during the calendar year 2008 the overall mortality rate associated with peritonitis was 15%, with the highest mortality rates observed in solid organ rupture (35%), perforated peptic ulcer (33%), primary/idiopathic peritonitis (27%) tubo-ovarian abscess (20%) and small bowel perforation (15%) [24].

The management of patients with abdominal conditions like any other surgical condition needs to be followed by the fewest number of complications possible. In many poor communities worldwide, acute abdominal conditions continue to cause many deaths. The overall morbidity and mortality of patients admitted with acute abdominal pain is, not surprisingly, much higher than for elective surgery. Emergency abdominal surgery is associated with a high mortality estimated at 5% to 25% [35].

A study done at Suhul general Hospital, Ethiopia, after 166 patients underwent emergency abdominal surgeries and the most common cause of acute abdomen was acute appendicitis followed by peritonitis and intestinal obstruction. The overall mortality rate was 4.2% which was observed in patients who presented late and the study also conducted on a total of 277 patients at Tikur Anbessa teaching Hospital the overall mortality was 15.3% which was also observed in patients who presented late [3].

A study done at Attat general Hospital, Ethiopia, there were 192 non traumatic emergency surgical acute abdomens admitted in surgical ward and the overall mortality rate of surgically treated non-traumatic acute abdomen was 9.35% which is lower than the study done in Tikur anbessa specialized hospital (18.6%) and Goba referral hospital 2017 (16%) but higher than the study done in Mekelle and Nekemte referral hospitals which had shown 2.4% and 3.05% mortality rate respectively [31,32]. In this study, 81% of death was secondary to sepsis and 61% in higher extreme age group with mean age of the expired patients (43.5 years). Most of patients who died were managed for generalized

peritonitis following perforated appendix followed by large bowel obstruction and perforated PUD [33].

Eighty two percent of all deaths were those patients who were presented after 2 days of illness before operation (mean 3.6 days) which was similar to the study done in Nekemte referral hospital (66%) and Gondar university hospital. The remaining death was secondary gangrenous small bowel obstruction and appendiceal abscess [32].

The total post operative complication rate was 17% of which the commonest early post op complications were wound infection (5.4 %), sepsis (4.3 %) and pneumonia (2.3 %). About 90.1% were discharged with improvement and 9.35% passed away in the hospital [33].

2.2. Associated factors of non-traumatic acute abdomen

Many factors have been described as responsible for surgical morbidity and mortality of patients who underwent emergency abdominal surgery. These include age of the patient, increased time between the onset of symptoms and the hospital admission, the hospital admission and surgery, nature of operation, hematocrit level, malignant disease with metastasis, presence of peritonitis, a delayed diagnosis, management, complication detection time and postoperative stay [35].

Based on a study done at Nekemte Hospital they noticed emergency surgical operation for non-traumatic acute abdomen particularly for acute appendicitis was found to be the most common surgical emergency operations performed [31].

Non traumatic surgical acute abdomen was more common in rural dwellers and male sex. The common causes of NTAA were acute appendicitis found followed by intestinal obstructions and peritonitis. Most patients were relatively young, in the 2nd and 3rd decades of life. Longer duration of illness before intervention, age and postoperative complications were statistically significant. Over all postoperative complication was high with wound infection and sepsis predominance [30,31,32].

Late presentation of patients before intervention, pre and postoperative complications, peritonitis and gangrenous large bowel obstruction were the commonest cause of patients' bad outcome. The overall mortality found in this study was relatively high compared with some studies in Ethiopia even if it is lower in some areas [32]

2.3. Causes and magnitude of non-traumatic acute abdomen

The magnitude of the disease changes from time to time and needs periodic studies to evaluate the etiological factors and behavior of the disease. Global as well as regional variations in the magnitude of non-traumatic acute surgical abdomen and changes in the disease pattern over the years are well documented in the literature [16, 18-20]. Study done in Sinai Hospital, in Tehran, acute appendicitis was the most common cause of acute abdomen (56.8%). Acute appendicitis was the most common etiology of acute abdomen in 67% of male and 38.8% of female patients and other common causes were 14.4% peritonitis among which 5.7% resulted from PPUD, (3.5%) were perforated appendicitis, 1.4% pancreatitis, 7.2% cholecystitis, and bowel obstruction 7.2% of which 2.2% adhesion and volvulus each, 1.4% incarcerated hernia and only 0.7% case of invagination found [23].

Study done at Nekemte Referral hospital and Black Lion Hospital most common cause of acute abdomen were acute appendicitis (47.4%) and (52%) followed by bowl obstruction (40.0%) and (26%) respectively. The commonest presenting compliant was abdominal pain (90.1%) followed by vomiting (7.8%) [3,31]. In observational studies in Pakistan the most common cause of acute abdomen was acute appendicitis followed by acute pancreatitis and duodenal cancer [31].

A study done in Ghana also reported acute appendicitis followed by typhoid fever with ileal perforation and acute intestinal obstruction as most common causes of acute abdomen [5]. In Ethiopia, four-year retrospective study at Gondar University Hospital, the leading operative diagnoses were SBO (43.4%), appendicitis (34.6%) and LBO (11.5%). Majority of surgically treated acute abdomen patients were from rural areas (58.2%) [25].

2.4. Management of non-traumatic acute abdomen

The management of non-traumatic acute abdomen depends on different factors such as etiology and presentation. Most patients with acute appendicitis can be managed with open or laparoscopic appendectomy. In our set up almost the entire patient's acute appendicitis treated with open appendectomy. Most of the patients diagnosed to have peritonitis presented to emergency department are treated with laparotomy and intra operatively those patients who had gastric and duodenal perforation underwent closure of perforation with Graham's omentoplasty where in a part of omentum is placed over the perforation site and perforation closure is done [29].

2.5. Conceptual frame work

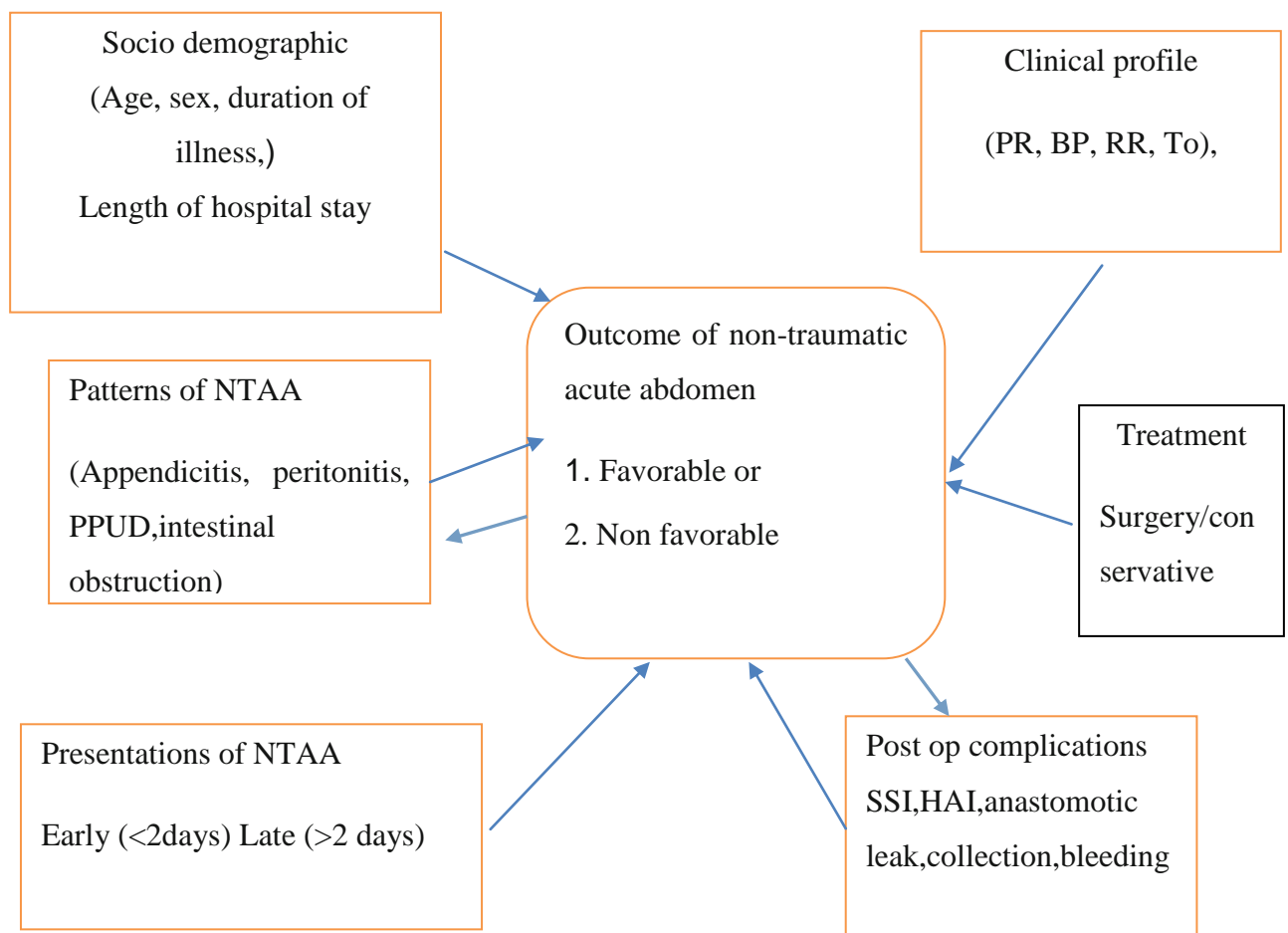


Figure 2: conceptual framework for assessment of outcomes of non-traumatic acute abdomen (NTAA) and associated factors in adult patients admitted to TGSB Bahir Dar, Northwest Ethiopia, 2022 [21,22,25]

3. METHODS AND MATERIALS

3.1. Study Design and period

Hospital based retrospective cross-sectional study was conducted by secondary data review from October 28 ,2022 to November 8, 2021 GC.

3.2. Study setting

This study was conducted at TGSB which is a specialized teaching hospital under Bahir Dar university college health science and medicine, Bahir Dar, Ethiopia. Bahir Dar, city is located at a distant of 505 kilometers in the Northwest direction from Addis Ababa (capital city of Ethiopia). TGSB is a tertiary level hospital established since 2011 E.C and serving about 5 million people and the hospital has 493 beds and surgery wards have 107 beds. It has 7 functional operating room. Currently till this proposal development the hospital has 706 clinical staffs. The emergency OPD has 25 beds and since 2011 nearly 25,000 patients were seen.

3.3. Source population and study population

3.3.1. Source population:

All non-traumatic acute abdomen surgery patients' chart admitted to surgical ward at TGSB was our source population.

3.3.2. Study population:

All patients' chart diagnosed with non-traumatic acute abdomen by history, physical examination or by other investigation modalities and admitted to surgical ward at TGSB from August 1/ 2020 to July 31 /2021.

3.4. INCLUSION AND EXCLUSION CRITERIA

3.4.1. Inclusion criteria

All adult patient's charts/cards whose age is ≥ 16 years old and diagnosed with non-traumatic acute abdomen by history, physical examination or by other investigation modalities at TGSB were included in the study.

3.4.2. Exclusion criteria

All patients' chart/card discharged against medical advice. Patients those with diagnosis of non-traumatic surgical acute abdomen and who were operated out of TGSB and admitted after operation in the hospital.

3.5. SAMPLE SIZE DETERMINATION AND SAMPLING PROCEDURES

The sample size was calculated by using single population proportion formula by taking those patients who had non favorable outcome ($P=25\%$) a study done at Wolaita (28) and considering level of significance ($\alpha = 5\%$), 5% marginal error.

$$n = \frac{(z_{\alpha/2})^2 \cdot pq}{d^2}$$

Where; - n= minimum sample size

$Z_{\alpha/2} = 1.96$ (for 95% of CI)

d = marginal error = (5%)

q=1-p

$$n = \frac{(1.96)^2 \times 0.25 \times (0.75)}{(0.05)^2} = 288.12$$

Considering incomplete charts of 5%, =150X 5% = 7.4 and 288X5% =14.4

Then; total sample=150+7.4 =157.4 and 288+14.4=302.4

All clinical records of adult patients who have been diagnosed to have non traumatic acute abdomen and admitted to TGSH, wards of August 1/2020 to July31/ 2021 GC were used to collect data for achieving the objective of the study. The charts were collected from the card unit and a full coverage survey of one-year records were employed to get minimum required sample size of 303.

3.6. VARIABLES OF THE STUDY

3.6.1. Dependent variables

Outcome of non-traumatic acute abdomen as “favorable or non-favorable”

3.6.2. Independent variables

- Socio demographic characteristics (age of patient, sex), Place of residence, History of previous surgery
- Clinical profile vs. (PR, RR, To)
- Etiology of NTAA (Appendicitis, Intestinal obstruction, cholecystitis, pancreatitis)
- Treatment option (conservative or non-operative or surgical)
- Time of hospital arrival
- Hospital stays
- Procedures Applied

3.7. OPERATIONAL DEFINITIONS

- ✓ Non traumatic acute abdomen patterns operationalized as [28]:
 - Appendicitis-Inflammation of appendix.
 - Intussusceptions-Invagination of one part of bowel lumen in to the other.
 - Peritonitis-Inflammation of peritoneum.

- Intestinal obstruction (IO)-Intestinal obstruction is prevention of passage intestinal contents.
- Non operative management (conservative)-Means management of patients with appendiceal mass, 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 [28].
- Operative Management-Means surgical exploration of the abdomen [28].
- ✓ Non traumatic acute abdomen outcomes operationalized as:
 - **Favorable** - when either operatively managed or conservative treatment with supportive management of patients' chart were documented with a clinical diagnosis of stable vital sign and/or documented as improved at discharge summary sheet and discharged from the hospital [32].
 - **Non-favorable** - Patients with a clinical diagnosis and operatively or conservatively managed for acute abdomen but not improved on discharge (including death, referral, worsened) [32].

3.8. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Structured data extraction checklists will be prepared through reviewing varieties of literatures. The first part of the questionnaire consists of issues related to the personal information of included the age, sex, place of residence. The second part is concerned with causes of non-traumatic acute abdomen, hospital stay, treatment given, procedures applied, complications, outcomes of non-traumatic acute abdomen. The target study populations were first identified from registration books of surgical unit and operation theatre. Then the patients' medical records were retrieved and data was collected using a pre-prepared standard checklist from the chart.

3.9. DATA QUALITY CONTROL MEASURES

The structured data extraction checklists prepared in English version were assessed. During data collection in order to avoid discrepancy, data was collected by the investigator.

Before data analysis we checked the completeness and consistency of each checklist with close supervision. All the collected data was checked & rechecked and necessary correction was made each day.

3.10. DATA PROCESSING, ANALYSIS AND INTERPRETATION

After data was collected by kobo tool box it was coded, entered, and cleaned to SPSS version 26 computer software for descriptive and logistic regression analysis of the data. Descriptive binary and multivariate logistic regression analysis was used. On binary logistic regression analysis, a p value of <0.2 was used as a candidate for multivariate logistic regression analysis. Data was presented by frequency, tables, and figures. Association between dependent and independent variables was checked by using logistic regression model. Crude and adjusted odds ratio was used to know and ascertain any association between the independent and dependent variables. Adjusted Odds Ratio (AOR) with 95% CI and P-value less than 0.05 was considered as statically significant in this study.

3.11. ETHICAL CONSIDERATION

Ethical clearance was obtained from Institutional Review Board (IRB) of Bahir Dar University College of Medicine and Health Sciences. A formal letter was written by medical director that allowed us to collect the data and conduct this study. The data was obtained using structured questionnaire check list filled from the medical record of the patient. The patient chart was kept secured or confidential and the personal identifiers such as name not be extracted. Information was used as aggregated after analysis of whole data. Finally, after the whole process of data collection, the questionnaire will be kept safe throughout the whole process of the research work until the paper will be published.

3.12 PLANS FOR DISSEMINATION OF FINDING

After the whole process of the research work, hard and soft copy of the result of the study will be submitted to Bahir Dar University College of Medicine and Health Sciences, Department of surgery, and send to TGSH. Formal defense of the paper will be considered as one mechanism of dissemination and utilization of the result. Finally, the

research will be published in recognized journal to be available for those who could benefit from the study.

4.RESULTS

4.1. Socio demographic characteristics

During a one-year study period a total of 303 cards were selected for the study.

The mean age of the study participants was 37.58 years with standard deviation (SD) \pm 16.42 years and ranges from 16 and 83 years old. The male to female ratio was 2.2:1

The most common participants were rural dwellers (69.3%) and 96% were followers of Orthodox. The most common and least common seasons of presentation were Belg (41.3%) and Tsedey (4.1%) respectively (Table 1). The mean of duration of illness before admission was 2.46 days and the length of hospital stay was 4.14 days.

Table 1: socio demographic characteristics and clinical features of patients with non-traumatic acute abdomen in TGSB from August 2020 to July 2021

Variables	Category	Frequency	Percentage %
Age	16-29	123	40.6
	30-50	99	32.7
	>50	81	26.7
Sex	Male	207	68.3
	Female	96	31.7
Season of presentation	Bega	63	20.8
	Belg	125	41.3
	Kiremt	102	33.7
	Tsedey	13	4.3
Residency	Rural	210	69.3
	Urban	93	30.7
Religion	Orthodox	291	96
	Muslims	16	4
Clinical signs and symptoms			

Abdominal pain	Yes	301	99.3
	No	2	0.7
Vomiting	Yes	247	81.8
	No	55	18.2
Abdominal distension	Yes	91	30
	No	212	70
Guarding	Yes	69	22.8
	No	234	77.2
Distended abdomen	Yes	91	30
	No	212	70
Duration of illness (in days)	< 2	58	18.8
	>=2	245	80.9
Length of hospital stay (in days)	<=2	98	32.3
	3-5	152	50.2
	>=6	53	17.5
Vital signs			
Pulse rate	<90	234	80.2
	>=90	60	19.8
Temperature	<37.5	251	82.8
	>=37.5	52	17.1

4.2. Patterns and symptoms of non-traumatic acute abdomen among study participants

The most common clinical features were abdominal pain (99%), nausea (98.3%), abdominal tenderness (92.1%), and abdominal distension (30%) (Table 1).

Most of the non-traumatic acute abdomen cases presented after 2 days of illness (80.9%).

Simple acute appendicitis is the commonest type of appendicitis (63.5%) followed by complicated appendicitis ((perforated, gangrenous) (21.6%)), and appendiceal abscess (14.6%). All types of appendicitis were common in young age groups ranging from 16-29 ,60 % of acute appendicitis ,71 % of complicated appendicitis, and 68 % of appendiceal abscess cases occur.

Intestinal obstruction was found to be the second most common cause of non-traumatic acute abdomen in our hospital accounting 20.1% of admitted cases.

Primary volvulus is the commonest cause of SBO which accounted 21(52.5%) of the cases, which is lower than a study done at Wolaita referral hospital [28] (39.8%) adhesion/band 10(25%), and hernia and intussusception account 7(17.5%) and 2(5%) respectively.

Common causes of LBO were sigmoid volvulus 14(63.6%), ileo sigmoid knotting 5(22.7%), and intussusception 3(13.6%).

The most common clinical features of patients with intestinal obstruction were abdominal pain (100%) and vomiting (95%-100%), abdominal distension (100%), abdominal tenderness (67.5%-68.2%). All of primary volvulus were viable and treated with derotation and decompression and other forms were treated with nasogastric tube decompression, herniorrhaphy band release, and resection and anastomosis.

Peritonitis was the third commonest cause of acute abdomen (18.5%). Gangrenous LBO (32.1%) was the most common cause of peritonitis followed by perforated appendicitis (26.8%), perforated PUD, and gangrenous SBO (12.5%). The most common cause of gangrenous LBO was sigmoid volvulus (90%) followed by ileo-sigmoid knotting (10%) (Table 2). The most common presenting signs and symptoms were abdominal pain (100%), vomiting (100%), abdominal tenderness (100%), guarding (98%).

Patients with perforated appendicitis were relatively young age group ranging from 16 to 29, and patients with gangrenous SBO, LBO, and PPUD were common in patients older than 50 years of age. Males were affected commonly than female and patients who had gangrenous SBO from the rural areas and 97.7% of perforated appendicitis and 69.3% PPUD were rural dwellers. Among 7 cases of SBO, 4 cases with gangrenous SBO underwent ileostomy and the remaining 3 treated with resection and anastomosis.

Table 2: Common patterns and causes of non-traumatic acute abdomen in TGSB from August 2020 to July 2021

Patterns of diseases	Types or causes	Frequency	Percentage %
Appendicitis		148	48.8
	Simple appendicitis	94	63.5
	Complicated appendicitis	32	21.6
	Appendiceal abscess	22	14.9
Intestinal obstruction		61	20.1
	Small bowel	22	35.5
	Primary volvulus	21	52.5
	Adhesion\band	10	25.0
	Hernia	7	17.5
	Intussusceptions	2	5
	Large bowel	40	64.5
	Sigmoid volvulus	14	63.6
	Ileo-sigmoid knotting	5	22,7
	Intussusceptions	3	13.6
Peritonitis		56	18.5
	Gangrenous LBO	18	32.1
	Gangrenous SBO	7	12.5
	Perforated PUD	13	23.2
	Others (mesenteric ischemia etc.)	3	5.4
(Cholecystitis, pancreatitis)		38	12.5

4.3 Treatment modality and complications of patients admitted with non-traumatic acute abdomen

Among the participants 90% were treated surgically and the remaining were treated conservatively. There were totally 163 procedures done for all types of appendicitis including peritonitis and appendectomy accounts 77.9% of the cases followed by appendectomy plus abscess drainage 12.9% and appendectomy plus lavage for 9.2 % of the cases admitted to Tibebe Ghion Specialized Hospital.

All patients with Appendicitis were managed surgically and post operative complications such as surgical site infection found in 4 cases (0.1 % of simple appendicitis cases) and in 18.2% of appendiceal abscess and 14.8 % of patients for whom appendectomy plus lavage was done. There were 2 (0.74%) of cases of pneumonia for patients who had peritonitis and lavage was done.

The most common procedure done for peritonitis was laparotomy plus Hartman's colostomy followed by laparotomy plus omental patch for gangrenous LBO and PPUD respectively. All cases of LBO caused by sigmoid volvulus but 4 cases which were managed with rectal tube deflation and ileo-sigmoid knotting were non-viable and Hartman's colostomy was done.

There were 4.5% of LBO cases who had intraabdominal collection and 13.6% had surgical site infection.

Patients with SBO had pneumonia (15%). 77.5% of patients who were treated for SBO stayed in hospital 3 to 5 days and 20% of them stayed for 6 days post operatively. 64% of LBO cases stayed for 3 to 5 days and 36% of them for 6 days post operatively.

The most common post operative complication in gangrenous LBO was pneumonia 3 (23.1%) followed by wound infection 1 (11.1%). There was one patient with wound dehiscence and relaparotomy plus retention suture was applied and two colostomy refashioning was done for colostomy necrosis.

There was one death after laparotomy plus ileostomy done for generalized peritonitis secondary to gangrenous SBO with septic shock. The mortality rate for patients with peritonitis was 3 (5.4%).

Table 3: Post operative complication frequencies of NTAA participants

Post operative complications	Frequency	Percentage
Wound infection	18	5.9
Pneumonia	9	3
Sepsis	2	0.7
Collection	2	0.7
Anastomotic leak	1	0.3

4.4 Magnitude of treatment outcome of patients admitted with non- traumatic acute abdomen

The study revealed that magnitude of favorable treatment outcome of non-traumatic acute abdomen was found to be 267 (88.1%,95% CI:84.2-91.7) and the non-favorable outcome was 36(11.9%,95% CI:8.3-15.8)(Figure 1).

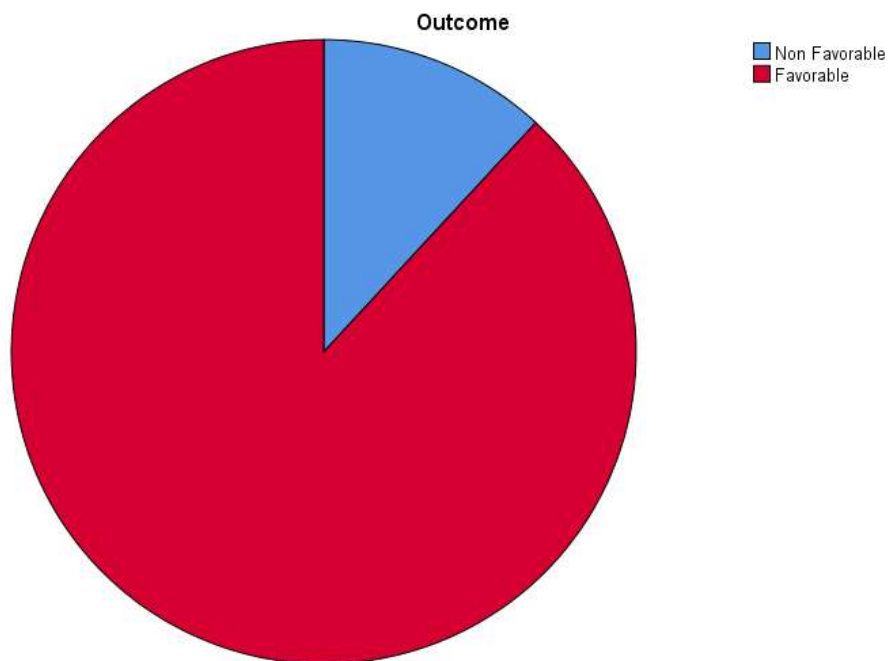


Figure 2: Management outcome of participants of non-traumatic acute abdomen

4.4 Factors Associated with Treatment outcome of non -traumatic acute abdomen

using bivariate analysis, age, abdominal distension, guarding, temperature ≥ 37.5 , distended abdomen, and post operative complications were associated with management outcome and a multivariate logistic regression approach was applied to determine which independent factors best explain and predict management outcome of the patient.

The finding of the study revealed that patients with guarding (AOR=2.976,95% CI= (1.0465,8.467), post operative complication (AOR=0.165 ,95% CI= (0.077,0.353), and temperature ≥ 37.5 (AOR=5.876,95% CI= (1.775,19.450) were significantly associated with outcome of non-traumatic acute abdomen.

Therefore, the odds of patients who had guarding and body temperature ≥ 37.5 were 2.97 times and 5.87 times less likely to be improved compared to patients who had no guarding (AOR=2.976,95% CI= (1.0465,8.467) and normal body temperature (AOR=5.876,95% CI= (1.775,19.450). Those who had post operative complication were 0.16 times less likely to be improved compared to those had no post operative complication (AOR=0.165 ,95% CI= (0.077,0.353)).

As a result, guarding, post operative complications, and temperature ≥ 37.5 , were significantly associated with patients' management outcome.

Table 4: Multivariate analysis showing independent predictors of management outcomes of non-traumatic acute abdomen in TGSJ from August 2020 to July 2021

Variables		Out comes		COR with 95% CI	AOR with 95% CI	P value
		Favorable	Non favorable			
Age	16-29	115	8	1.0	1.0	
	30-50	89	10	4.107(1.691,9.978)	2.038(0.578,7.189)	0.268
	>50	63	18	2.543(1.100,5.877)	3.182(0.862,11.750)	0.082
Abdominal distension	Yes	70	21	3.940(1.924,8.066)	10.742(0.340,339.071)	0.178
	No	197	15			
Distended abdomen	Yes	68	23	5.178(2.486,10.784)	8.303(0.543,127.072)	0.128
	No	199	13			
Guarding	Yes	45	24	9.867(4.590,21.175)	2.976(1.046,8.467)	0.041**
	No	222	12			
Complications	Yes	18	25	0.129(0.064,0.257)	0.165(0.077,0.353)	0.000**
	No	248	9			
Temperature	<37.5	228	24			
	>=37.5	39	12	2.933(1.351,6.324)	5.876(1.775,19.450)	0.004**
NB: ** significant at p < 0.05						

5. Discussion

The most common cause of non-traumatic acute abdomen in our hospital were acute appendicitis (48.8%), intestinal obstruction (20.1%), peritonitis (20.1%) and similar results were seen in Nekemte (34), Attat (32), this may be due to most of the participants were in young age group in 2nd and 3rd decades [2].

In contrast to our result, study done at Gondar University Hospital (25), the leading operative diagnoses were SBO (43.4%), appendicitis (34.6%) and LBO (11.5%) This may be related to diet and socio-economic status of the participants. Majority of surgically treated acute abdomen patients were from rural areas (58.2%).

The total post operative complication rate was 11.2% which is almost lower than a study done at Mekelle ([33) which was 17%. The commonest early post op complications were wound infection (5.9 %), pneumonia (3.3%) and about 89.1% were discharged with improvement and 1% passed away in the hospital, this may be due to poor documentation of post operative complications in our hospital. Post operative complication is one of the most common complications after abdominal surgery because since it is an emergency operation which might be dirty or contaminated that will increase the mortality and morbidity of patients presented with acute abdomen [2].

The overall mortality rate in our hospital was 3 (1%) which is lower than Nekemte referral hospital (3.05%), Mekelle referral hospital (2.4%), Tikur Anbessa teaching Hospital (15.3%), Malawi (23) which had 15% mortality rate. This may be related to the poor handling of cards and documentation of mortalities [31,32].

In this study, 100% of death was secondary to sepsis or septic shock and they were managed for generalized peritonitis following gangrenous small bowel obstruction, mesenteric ischemia, and necrotizing pancreatitis. We found in our study sepsis was one of the post operative complications, which was our independent outcome predictor. Two of them were above 50 years of age, males, and presented after 2 days of illness. Similar studies were done in Attat (32) and it showed 81% of death was secondary to sepsis and managed for generalized peritonitis secondary to perforated appendicitis and gangrenous intestinal obstruction. Even though we did not find any correlation between the duration of illness and mortality, two thirds of participants who died came after 2 days of illness.

The overall favorable outcome was 88.1 % with 95% of CI (84.2-91.7) which is higher than Wolaita (28) which had 75% of favorable outcome. This may be due to under estimation of the mortality since the majority of cases were simple appendicitis.

The overall non favorable outcome was 11.9% 95 % CI (8.6-11.8). Majority of the participants who had appendicitis (94%) and intestinal obstruction (84%) were managed and discharged improved with good outcome, where as 66 % of the participants with peritonitis had favorable outcome.

The finding that we had post operative complication were 0.16 times less likely to be improved compared to those had no post operative complication (AOR=0.165 ,95% CI= (0.077,0.353) and a study done at Attat hospital (32) depicts participants who had post operative complication had 5.6 times less likely to be improved (AOR=5.6, 95% CI= (1.5 ,20.5, P=0.010). The same finding was also found in Tikur Anbessa hospital (3) in which post operative complications had significance effect on the outcome of patients (p<0.0001), it is also seen in Gondar hospital (10) (p<0.0395).

Patients who had temperature ≥ 37.5 had a record of body temperature ≥ 37.5 were 2.97 times less likely to be improved than those who had normal body temperature (AOR=5.876,95% CI= (1.775,19.450), similar finding was also found in Tikur Anbessa hospital study (30) which showed those patients who had record of body temperature ≥ 37.5 had a 7.83 times less likely improvement than (AOR=7.83 ,95% CI= (3.45-1.786). A temperature greater than or equal to 37.5 is defined as fever, and it is accompanied by metabolic and immune system changes. It is significant contributor to clinical presentation and outcome of disease [2].

Participants who had no guarding on physical examination were 5.87 times more likely to be improved than those participants who had guarding (AOR=2.976,95% CI= (1.0465,8.467), similar results also seen at Black lion hospital (30) which showed patients who had guarding were 2.43 times more likely to be improved if they had no guarding (AOR=2.83 95% CI, p<0.001) [36]. This is because guarding is the patient's refusal to be touched his/her abdomen due to peritoneal inflammation and irritation. It is one of the physical finding of patients having local or general peritonitis.

Strength and limitation of the study

This study will have advantage by providing baseline information about non-traumatic acute abdomen magnitude, patterns, and treatment outcome and the limitation of the study is it will not represent the whole study since it is institution-based study and doesn't show the long-term complications.

6. Conclusion and Recommendation

6.1. Conclusion

In this study we have noticed appendicitis was the most common cause of NTAA in adult patients in our hospital and emergency appendectomy was found to be the most common surgical emergency operations performed in TGSH. Non traumatic acute abdomen was more common in rural dwellers and male sex. Most of patients experienced post-operative complications were related with developing peritonitis and complicated appendicitis and majority of the patients had good treatment outcome. Post operative complications, Temperature ≥ 37.5 , and guarding had significant correlations with the management outcome. Even though appendicitis was the most common cause of NTAA in our hospital, gangrenous intestinal obstruction causing peritonitis is deadly and fatal.

6.2 Recommendation

Further research using prospective study design should be warranted as a way to overcome the limitations of secondary data in the current retrospective research that preclude generalization to the whole population.

Awareness should be created to mid and lower-level health professionals on the diagnosis, resuscitation, and post operative management of patients.

Infection prevention in the ward, in the operation theatre, is crucial since wound infection and pneumonia were common post operative complications associated with management outcome, so attention should be given.

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8. Annexes

8.1. ANNEX I: INFORMATION SHEET

Title of the Research Project: assessment of outcomes of non-traumatic acute abdomen and associated factors in adult patients admitted at Tibebe Ghion specialized hospital.

Name of Principal Investigator: Dr. Mohammed Yusuf

Introduction: Greetings! My name is Dr. Mohammed Yusuf I am a student at Bahir Dar University, school of Medicine, department of surgery. As part of certificate of specialty in surgery training, I am undertaking a research Project on assessment of outcomes of non-traumatic acute abdomen and associated factors in adult patients admitted at TGSH.

Purpose of the Research Project: The aim of this study is to assess the outcomes of non-traumatic acute abdomen and associated factors in adult patients at TGSH. The information gained from this research will be used to make recommendations to improve patient care.

Procedure: The data collection was conducted from Tibebe Ghion specialized hospital medical records.

Risk and /or Discomfort: the data was extracted from medical records, so it will not impose any harm on patients.

Benefits: The study has no direct benefit

Confidentiality: During data extraction the patients name was not taken, instead they were identified by their card number in the registration book. All extraction forms collected will be kept confidential and destroyed two years after the end of the project. The information abstracted will be used only for research purpose.

Part III. Physical examination

Sign	Yes---1	N0---2
1. Abdominal tenderness		
2. Guarding		
3. Abdominal distension		
4. visible bowel peristalsis		
5. Rectum empty		
Vital signs; BP..... PR..... RR..... Tem..... At admission		

Part IV. Diagnosis

4.1. Season of presentation?

1. Tseday
2. Bega
3. Belg
4. Kiremt

4.2. What is the diagnosis?

1. Appendicitis
2. Intestinal obstruction
3. Peritonitis
4. Others (intestinal obstruction, pancreatitis, cholecystitis etc)

4.3. If Intestinal Obstruction for Q4.2

1. Large bowel
2. Small bowel

4.4. If large bowel obstruction for Q4.3

1. Sigmoid volvulus
2. Colorectal cancer
3. Ileosigmoid knotting
4. Intussusceptions
5. Others

4.5. If sigmoid volvulus for Q4.4

1. Viable
2. Nonviable

4.6. If colorectal cancer for Q4.4

1. Viable
2. Nonviable

4.7. If Ileosigmoid knotting for Q4.4

1. Viable
2. Nonviable

4.8. If intussusceptions for Q4.4

1. Viable
2. Nonviable

4.9. If Appendicitis for Q4.4

1. Simple appendicitis
2. Complicated appendicitis(perforated,gangrenous,phlegmonous)

3. Periappendiceal abscess

4.10. If small bowel Obstruction,

1. Primary volvulus

2. Adhesion/band

3. Hernia

4. Intussusceptions (ileocolic)

5. Others

4.11. If primary volvulus

1. Viable

2. Nonviable

4.12. If adhesion/band

1. Viable

2. Nonviable

4.13. If hernia

1. Viable

2. Nonviable

4.14. If intussusceptions (ileocolic)

1. Viable

2. Nonviable

4.15. If others

1. Viable

2. Nonviable

4.16. If peritonitis, what is the primary cause?

1. Perforated appendicitis
2. Gangrenous large bowel obstruction
3. Gangrenous small bowel obstruction
4. Perforated PUD
5. Others (mention)

Type of procedure done (write in short)

Part V: What was the complication postoperatively if any?

complication postoperatively if any	Yes---1	N0---2
1. Anastomotic leak		
2. Bleeding		
3. Collection		
4. Pneumonia		
5. Sepsis/ Septic shock		
6. Wound infection		
7. Death		
8. Others (if any, mention)		
PV-1: If yes in Part VII What was done (write in short)		

Part VI. Postoperative hospital Stay (in days)days

Part VI I. Condition of the patient on discharge

Condition of the patient on discharge	Yes---1	N0---2

1. Improved		
2. Worsened /Referred		
3. Dead		