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Treatment Outcome and Associated Factors of Patients Underwent Gastrointestinal Surgery at Tibebe-Ghion Specialized Hospital: A Restrospective Cross-Sectional Study

Worknesh, Baye

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BAHIR DAR UNIVERSITY
COLLEGE OF MEDICINE AND HEALTH SCIENCES
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF ADULT HEALTH NURSING
TREATMENT OUTCOME AND ASSOCIATED FACTORS OF
PATIENTS UNDERWENT GASTROINTESTINAL SURGERY
AT TIBEBE-GHION SPECIALIZED HOSPITAL: A
RESTROSPECTIVE CROSS-SECTIONAL STUDY
BY: WORKNESH BAYE (BSc.N)

**A THESIS SUBMITTED TO DEPARTMENT OF ADULT
HEALTH NURSING, SCHOOL OF HEALTH SCIENCES,
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OCTOBER, 2022
BAHIR DAR, ETHIOPIA

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INVSTIGATOR: WORKNESH BAYE

PHONE: 0978204545

EMAIL: workneshbaye1@gmail.com

ADVISORS:

1. DR ASHAGRE MOLLA (BSc, MSc, PhD, Associate Professor)

PHONE: 090139640

EMAIL: ashagremolla@yahoo.com

2. MR. ALEMESHET YIRGA (BSc, MSc, Assistant Professor)

PHONE: 0918065664

EMAIL: alemyirga25@gmail.com

OCTOBER, 2022

BAHIRDAR, ETHIOPIA

APPROVAL SHEET

BAHIRDAR UNIVERSITY COLLEGE MEDICINE AND HEALTH SCIENCES
SCHOOL OF HEALTH SCIENCES DEPARTMENT OF ADULT HEALTH
NURSING APPROVAL SHEET

Name of student

Signature

Date

Wondwosen Baye

[Signature]

21/02/2025

Name of Examiners

Signature

Date

Hilkeyesu G

[Signature]

22/02/2025

HBrick B

HB

22/02/2025

Name of Dept. Head

Signature

Date

Hilkeyesu G

[Signature]

23/03/2025



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Abstract

Background: Surgery is an important public health intervention and occurs at a tremendous volume worldwide from the most resource rich to the most resource limited settings. This volume of surgery needs a great effort to improve the safety and availability of surgical services that will be summed-up with good patient outcome. Even though adverse patient outcomes following gastrointestinal surgery is among the leading causes of morbidity and mortality, in Ethiopia limited studies have been conducted so far on the outcome of gastrointestinal surgery.

Objective: To assess the outcome and associated factors of patients underwent gastro-intestinal surgery at Tibebe Ghion specialized Hospital, Bahir Dar, Ethiopia 2022.

Methods: Institution-based retrospective cross-sectional study was conducted on records of patients treated at Tibebe Ghion specialized Hospital from January 8, 2020 to January 7, 2022. Secondary data were collected by using Pre-tested checklist from the patient charts. Data were entered into the Epi data version 4.6 and exported to SPSS version 25 for further analyses. A binary logistic regression model was used to identify the associated factors. Variables with P-value < 0.25 in the bivariable analysis was a candidate for multivariable analysis and P-value < 0.05 in the multivariable analysis was used to declared as statistically significant.

Results: From a total of 403 patients, 87 (21.6%) developed poor outcome of gastrointestinal surgery. Rural residency (AOR=3.21), morbidity status greater than or equal to ASAII (AOR=0.32), comorbid illness (AOR=3.67), post-operative length hospital of stay greater than or equal seven days (AOR=4.27), WHO surgical safety checklist utilization (AOR=3.14) and length of operating time (AOR=3.31) were significantly associated with poor outcome of GI surgery.

Conclusion and recommendations: More than one-fifth of patients treated at Tibebe Ghion Specialized Hospital, experienced poor surgical outcome. Shortening hospital stays, effectively managing patients with comorbidities, and increasing awareness for rural populations can reduce the problem.

Key words: Surgical outcome, gastrointestinal surgery, Tibebe Ghion Specialized Hospital, Ethiopia

ABBREVIATIONS AND ACRONYMS

AIDS.....	Acquired Immune Deficiency Syndrome
AOR.....	Adjusted odds ratio
ASA.....	American Society of Anesthesiologist
CI.....	Confidence Interval
COR.....	Crude Odds ratio
GIS.....	Gastrointestinal Surgery
HIV.....	Human Immunodeficiency virus
LMICs.....	Low- and Middle-Income Countries
SBO.....	Small Bowel Obstruction
SD.....	Standard Deviation
SPSS.....	Statistical Package for the social sciences
TGSH.....	Tibebe Ghion Specialized Hospital
TSH.....	Tikur Anbessa Specialized Hospital
SaLTS.....	Saving Lives through Safer Surgery
SSI.....	Surgical Site Infection
SSSI.....	Superficial surgical Site Infection
WHO.....	World Health Organization

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1. INTRODUCTION

1.1 Background

Large number of surgical procedures are performed in the world (1). But Surgical safety is major global public-health concern due to the high death and complication rates of major operations (1). In addition to reducing premature death and disability, the provision of safe surgical and anesthesia care when necessary also increases welfare, freedoms and economic productivity, promoting long-term growth but poor patient outcomes are frequent following surgery (2, 3). According to the Lancet Commission on Global Surgery, 313 million surgical procedures are conducted annually but little is known regarding surgical quality worldwide(4). Postoperative patient outcome is a measurement for the success of surgical care, and its improvement is a global focus (4).

The World Health Organization initiated the Safe Surgery Saves Lives program and designed a surgical safety checklist to enhance teamwork and consistency of care that lower surgical-related complications and mortality. In 2007, the World Health Organization (WHO) began the Safe Surgery Saves Lives campaign to promote surgical care safety around the globe. Laparotomies are comparatively major operations that require a large incision on the patient's abdomen and longer recovery time. In laparoscopic surgeries, the incision made is significantly smaller. The most common gastrointestinal surgeries includes; exploratory laparotomy (diagnostic purposes and aims to find out the source of trauma or bleeding that affects the abdominal organs), cholecystectomy, appendectomy, hemicolectomy, Ileostomy and Gastro-jejunostomy(5, 6). The Ethiopian Federal Ministry of Health began the 'Saving Lives through Safer Surgery' (SaLTS) Initiative, and multipronged national surgical plan to improve access to and quality of surgical care throughout Ethiopia in 2015 (7).

1.2 Statement of the Problem

Surgical morbidity is a major public health concern around the world(8). A study on the global burden of postoperative death showed that 4.2 million (7.7%) of cases died within 30 days of surgery per year globally making it the third greatest contributor to deaths, after ischemic heart disease and stroke and half of these occur in low-middle income countries (LMICs)(4). In comparison to high-income nations, the burden of surgical infections in low- and middle-income countries (LMICs) is poorly defined (9). Although there is a need to improve surgical treatment access in African countries, perioperative complications are a substantial health-care burden(10). Globally, one from six surgical patients experienced a complication before leaving the hospital (3). Patients in Africa were twice as likely to die after surgery when compared to the global average. Approximately one in five surgical patients in Africa develops a postoperative complication, and one in ten of these patients were died (10). Even though the morbidity and mortality of many cases are possibly preventable, In Africa there are few studies that describe surgical outcomes (11).

The prevalence of unforeseen complications such as anastomotic leaks and life-threatening infections makes surgery involving the gastrointestinal tract difficult. The removal of diseased intestinal segments causes significant catabolic stress and may necessitate sophisticated reconstructive surgery to maintain the digestive tract's functional continuity. Preoperative intestinal antisepsis is used to prevent infection-related problems since gastrointestinal surgery involves a breach of an epithelial barrier colonized by microorganisms (12).Anastomotic leak was found to be the complication having the largest overall impact on 30-day clinical and financial outcomes after elective colon resection(13). Emergency major gastrointestinal surgery has a high risk of mortality and postoperative complications (14, 15).

A Study conducted in Denmark from 1994 surgically treated patients for gastrointestinal surgery, a total of 538 (18.5%) cases died within 30 days of surgery (14). A large number of patients developed complications after elective in-patient upper gastrointestinal surgery. Patients undergoing major cancer surgery were at particular risk with complication rates approaching one in two patients. At least one postoperative

complication occurred in 23.2 to 33.5% of the patients. These postoperative complications significantly increase the hospital stay and mortality (16-18).

Failure to allocate surgical patients to the appropriate level of care before and after surgery may contribute to the high postoperative mortality. So, preoperative risk identification with effective management of complications and appropriate organization of postoperative care will improve outcome (14, 16). To improve patient outcomes, the concept of perioperative medicine is being adopted more widely to ensure safe and effective patient care throughout the perioperative care pathway(17).

Therefore, since surgical safety is a National plan of Ethiopia and gastrointestinal surgery are major cause of morbidity and mortality in our country, it is important to studying about outcome of gastrointestinal surgery to decrease morbidity, mortality and length of hospital stay.

1.3 Significance of the study

This study is important to provide crucial information about the outcome and associated factors of gastrointestinal surgery at TGSH. The finding of this study will help to identify the characteristics of patients who underwent gastrointestinal surgeries in terms of socio-demographic, clinical characteristics, and outcomes of surgery. This in turn may help the health care providers to give safe surgical care so that patients recover from their illness quicker. The findings of this study will be used as inputs for program implementers at national as well as regional levels to improve the outcome of surgery. This study might also alert health care providers to use their maximum potential and investing on the identified factors affecting patient outcome. It is important for local administrative to train the perioperative team and forming quality improvement committees that ensure the quality of surgical care and improve patient outcome in the hospital. It will bet also used as an input for other researchers.

2. LITERATURE REVIEW

2.1 Surgical outcome

The International Surgical Outcomes Study group shows 16.8% of patients experienced one or more postoperative complications and (0.5 %) people died as a result of major surgery. The overall mortality among patients who suffered from complications was 2.8%. Complication-related mortality ranged from 2.4 % in the case of pulmonary embolism to 43.9 % in the case of cardiac arrest(3). According to An international multicenter cohort study, 12.3% patients had SSI within 30 days after gastrointestinal surgery. The incidence of SSI varied from 17.8%, 31.4% and 39.8% between high, middle, and low income countries respectively (19) . According to a study conducted in Europe, 30 people died as a result of one or more postoperative problems. 1.4 % of Patients facing complications related with issues stayed in the hospital for an average of 11 (6–18) days. Infectious problems were the most common, affecting 17.2%. After surgery,15.3% patients were admitted to critical care, of whom 49.1% developed complications and 4.3 % died (17). In Australia, the median post-operative length of stay (LOS) was 8.0 days, 37% of participants developed at least one complication post-operatively and 24% were readmitted within 30-days of discharge(20).

A study in Estonia tertiary hospital shows that, 33.5 percent of patients experienced at least one postoperative complication, while 15% experienced two or more. Delirium was the most common complication, occurring in 12.8 %t of patients. Among infectious complications, Pneumonia accounting 6.1%, intra-abdominal infection and wound infection both are accounting 4.2 % were the most prevalent consequences. Septic shock also developed in 4.1 % of the patients(16).Study in Sudan public hospital shows that Surgical site infections (SSIs) are a prevalent type of healthcare-associated illness that are linked to longer hospital stays, higher costs, and a reduction in the potential benefits of surgical interventions.27.5 % of patients develop SSI of this superficial SSI was the most common type of SSIs (82.6%) (11, 18). In sub Saharan Africa, there were a high percentage of poor patient outcomes due to intestinal obstruction associated with the morbidity and mortality of 33.6% as well as a 30.4% of prolonged hospital stay (21). In

Cote d'Ivoire among 161 patients operated for Perforated peptic ulcer, 36 (27.5%) of patients experienced complications and 31 (19.3%) were died (22). Regarding studies in Ethiopia, a study conducted at Tikur Anbessa Specialized Hospital showed that Intestinal obstruction (23%) and perforated PUD (9.8%) were the most common cause of death. intestinal obstruction and peritonitis were associated with an infection rate of 25% and 13.5% respectively (17). In Tigray, thirty four (20.5%) of cases from a total of 166 non traumatic acute abdomen surgical patients had in-hospital post-operative complication with the overall mortality rate of 7(4.2%). Of which wound infection 21(12.7%) was the commonest post-operative complications (23). In a prospective cross sectional study done at St. Paul Hospital Millennium Medical College, majority of patients (87.8%) had vertical midline incision and 24 (58.5%) of them developed wound dehiscence within 6–10th postoperative days. 39 (95.2%) of them underwent relaparotomy to manage this complication. 9.7% of patients died after the management of the second operation, and the overall magnitude of abdominal wound dehiscence in the study was 0.99% (21). A prospective cohort study in Jimma Hospital shows that, 21.1% of patients developed SSIs and 11.6% patients returned to operation room (22).

A study in Nekemt Hospital shows ,a total of 26.5 % of operated cases experienced a postoperative complication, with SSI being the most prevalent (49.2%), 61.6 percent stayed in the hospital for less than seven days, and 84.8 % were improved and discharged (23).According to the study conducted at Attat Hospital , the overall postoperative complication rate was 17%,of which wound infection, sepsis and pneumonia (5.4) %,(4.3) %, (2.3) % were the most common early postoperative problems respectively. 90.1 % of patients were discharged healthy, while 9.35 % died in the hospital(24). A study in Debre Markos Hospital on the outcomes of acute appendicitis surgery revealed that 26.6% developed unfavorable outcomes and the most common complications were wound infection, pneumonia, intraperitoneal fluid collection and death(25).

2.2 Associated factors of gastrointestinal surgery

2.2.1 Socio-demographic factors

A study in Estonia tertiary hospitals, revealed that, age above 70 years was identified as independent risk factors for development of complications (16). According to a study conducted in Addis Ababa, being male and having a better educational level were all linked to outcome(26). According to a prospective cohort study in Jimma university Hospital, being female was about 12 times more likely to have poor outcome as compared to male(27). A study conducted at Attat Hospital show that Residency, age and sex were all independent predictors of management outcome(24).

2.2.2 Clinical related factors

Poor nutritional status between days 3–5 post-operatively was associated with longer post-operative LOS(28). Comorbid illness, ASA score, previous surgery, wound type, and preoperative hospital stay all are the factors for the development of complications (16, 28-31). Time under anesthesia, amount of medicines, hemoglobin, and delayed mobilization were all linked to a 2.2-fold increased risk of 30-day readmission or mortality in a Canadian research(32, 33).

The findings in Sudan revealed that the management outcome among patients undergoing surgery in the gastrointestinal tract was linked to malignant illnesses, intra-operation blood loss, intra-operative hypotension, and a long operative duration(18). Study done at St. Paul Hospital Millennium Medical College, Addis Ababa show that Patients who were operated for an emergency condition, patients with a concomitant illness and Patients having vertical midline incision were affected by wound dehiscence (21). A prospective cohort study in Jimma Hospital shows that, duration of illness before surgical intervention, contaminated-wound, emergency surgery, longer duration of operation and comorbidity were major predictors of management outcome (27, 34, 35).

2.2.3 Hospital related factors

According to study on Global patient outcomes after elective surgery ,a total of 9.7% patients were admitted to a critical care unit as routine immediately after surgery, of whom 50.4% developed complication, with 2.4% deaths while 16.4% of patients were admitted to a critical care unit to treat complications, of whom 9.7% died. But 28.0% patients who died were not admitted to critical care at any stage during their hospital stay, either immediately following surgery or for the treatment of complications(3).

A study in Estonia tertiary hospitals revealed that 85.5 % of patients were admitted to the ICU for postoperative care and they were transferred to the surgical ward after an average ICU stay of 4.4 days(16).A Study done St. Paul's Hospital Millennium Medical College, patients with relaparotomy and tension suture of abdominal closure during their second operation had poor management outcomes(21) . A study in Nekemt Hospital shows that ≥ 7 days length of hospital stay was significantly associated with poor outcome of surgery (21, 23, 35, 36). According to an international observational study among non-cardiac surgery patients in different hospitals of the world, implementation of the checklist was associated with concomitant reductions in the rates of death and complications. After introduction of the checklist, the rate of any complication decreased from 11.0% to 7.0 % and the total in-hospital rate of death decreased from 1.5% to 0.8%. The overall rates of surgical-site infection and unplanned reoperation also declined significantly (3).

Based on a single-center cohort study in china, WHO SSC reduces postoperative complications, including surgical-site infection, mortality, and lengths of hospital stay. The WHO SSC is a simple and inexpensive tool for helping patients with gastrointestinal cancers to improve their postoperative clinical outcomes. The morbidity and in-hospital death rates were 16.43 % vs 14.33 %, 0.46% vs 0.18 % before and after SSC implementation respectively. The post-implementation group's median postoperative hospital stay was shorter than the pre-implementation groups (45). Only (57.1%) of surgeries used the World Health Organization Safe Surgery Checklist (11).

3. Conceptual framework

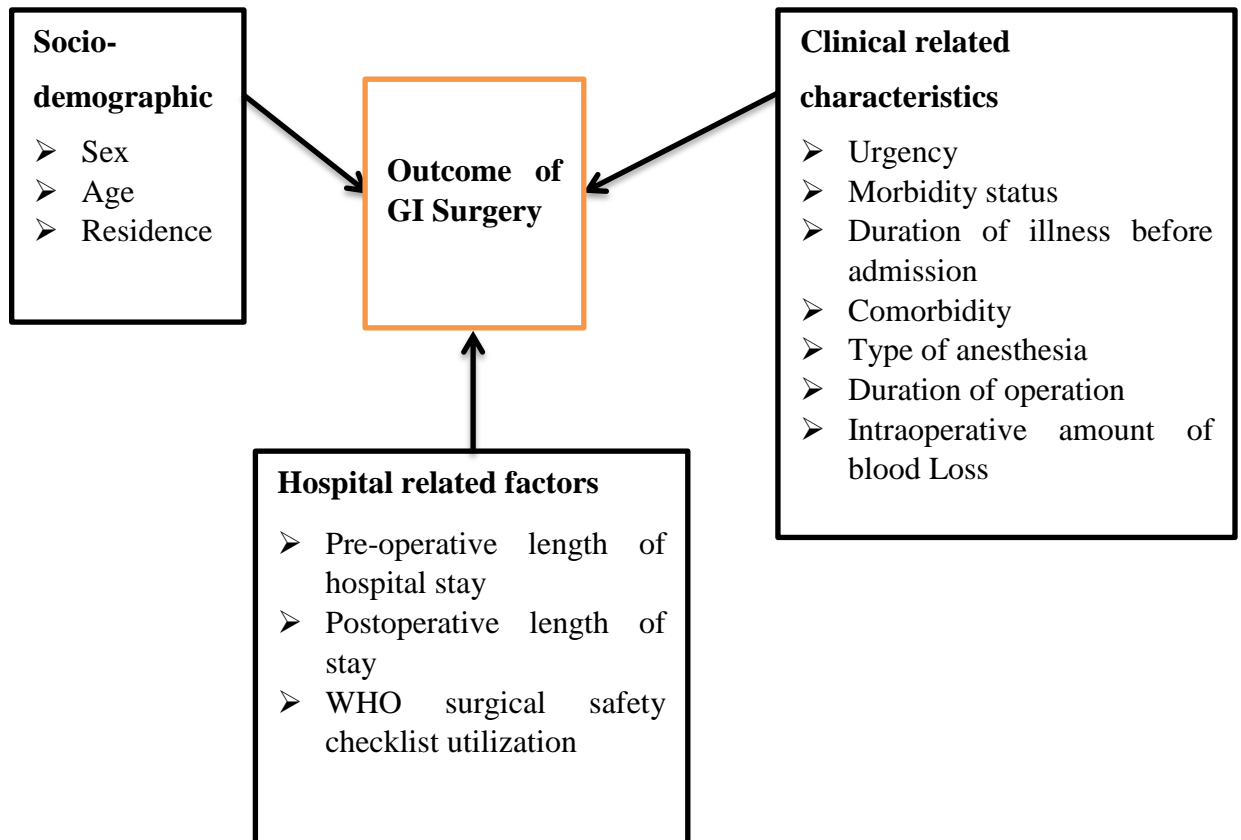


Figure 1: Conceptual framework adapted from different literature (27, 37, 38)

4. OBJECTIVES

4.1. General Objective

To assess outcome and associated factors of patients underwent gastro-intestinal surgery in Tibebe Ghion Specialized Hospital, Bahir Dar, Ethiopia 2022

4.2 Specific Objectives

- To determine outcome of patients underwent gastro-intestinal surgery at Tibebe Ghion Specialized Hospital, Bahir Dar, Ethiopia 2022
- To identify factors affecting the treatment outcome of patients underwent gastro-intestinal surgery at Tibebe Ghion Specialized Hospital, Bahir Dar, Ethiopia 2022

5. METHODS AND MATERIALS

5.1 Study area and Period

The study was conducted at Tibebe Ghion Specialized Hospital (TGSH) from January 8 2020 to January 7 2022. TGSH is located in the capital city of Amhara regional state, Bahir Dar and 565 Km far from the capital city of Ethiopia, Addis Ababa. TGSH was established in 2019 and by the year 2021, it served for the total population of 389,177; of which 49.5% & 50.5% were male and females respectively. Surgery department has 100 surgical beds and equipped with 31 surgeons; one Gastrointestinal, one hepatobiliary, one head and neck, one ENT, two urologic surgeons, one neurosurgeon, two pediatrics surgeon, nineteen general surgeon and sixty nurses.

5.2 .Study design

An institutional-based retrospective cross-sectional study was conducted

5.3 .Population

5.3.1. Source Population

All patients underwent gastrointestinal surgery in Tibebe Ghion Specialized Hospital.

5.3.2. Study population

Sampled patients underwent gastrointestinal surgery at Tibebe Ghion Specialized Hospital in the two years period.

5.3.3. Study Unit

Patients underwent gastrointestinal surgery who randomly selected.

5.4 .Inclusion and exclusion criteria

5.4.1. Inclusion criteria

All patient records with the age of 18 years and above whom had a gastro-intestinal surgery in the study period included under the study.

5.4.2 .Exclusion criteria

Patient charts observed during the pretest, as well as charts of patients transferred from other hospitals following their first operation, were excluded from the study.

5.5. Variables of the Study

5.5.1. Dependent variable

- Outcome of gastro-intestinal surgery

5.5.2. Independent variables

- ✓ Sex
- ✓ Age
- ✓ Residence
- ✓ Urgency
- ✓ ASA Morbidity status
- ✓ Duration of illness
- ✓ Duration of procedure
- ✓ Comorbid diseases
- ✓ Intraoperative blood loss
- ✓ Safe surgery checklist utilization
- ✓ Preoperative length of hospital stay
- ✓ Postoperative length of stay

5.6. Operational definitions and definitions of terms

Gastrointestinal surgery: a surgical procedure on parts of the body that are involved in digestion from esophagus to anus including the accessory organs the liver, gallbladder, and pancreas(39).

Wound dehiscence-Is facial disruption due to abdominal wall tension, overcoming tissue or suture strength, or knot security.

Surgical site infection: is an infection that occurs in surgical patients at the incision site within 30 days after surgery if there is no implant or within one year if there is an implant(40).

Poor outcome of GIS: If the patients developed at least one complication and/or died in the hospital

Good outcome of GIS: patients discharged alive without the development of any complication. (Surgical site infection, Shock, Dehiscence, Hospital acquired pneumonia; Anastomotic leak and intra-abdominal fluid collection were the complications)

Reoperation: If the patient experience surgery more than once for the same disease condition.

Postoperative complication: is considered to be any deviation from the normal postoperative course that prolonging the length of hospital stay and requiring supplementary care(41).

Preoperative stay: is the time from date of admission to the date of surgery

Post-operative stay: is the time from date of surgery until the patient discharged from the hospital

Surgical safety checklist: Surgical safety checklist is made up of nineteen check points that will be used in three stages: prior to the induction of anesthesia, before any skin

incision, and at the end of surgery and it is **complete** if all the 19 items were assessed (ticked) but **incomplete** if one or more items are not assessed.

Nursing care plan done: If the patient record contains from assessment to implementation phase.

5.7 . Sample size determination and sampling procedure

5.7.1. Sample size determination

The sample size was determined by using single population proportion formulas by considering 95% confidence level, 5 % marginal error and 50% the proportion of GIS was used since there is no previous study found.

Where; n=desired sample size

$Z_{\alpha/2}$ = the value of standard score at 95% confidence level (1.96),

P= proportion of GIS outcome (0.5)

d= marginal error= 5% (0.05)

$$n = \frac{(Z_{\alpha/2})^2 Pq}{d^2} = \frac{(1.96)^2 (0.5)(1-0.5)}{(0.05)^2} = \frac{(3.8416)(0.25)}{(0.0025)} = 384$$

Then by adding 10% to compensate for non-response ($384 \times 10\% = 38$). Finally, the adjusted sample size was $384 + 38 = 422$

5.7.2. Sampling technique and procedure

Tibebe Ghion Specialized Hospital was selected purposively and simple random sampling technique was used to select patient charts. The medical record numbers of patients with gastro-intestinal surgery in the two years period were listed from the registration of operating room and by using lottery method; patient charts were included under the sample until reached to the calculated sample size.

5.8. Data collection tools and methods

Data were collected by chart review retrospectively using structured pre-tested checklist from the patients' chart. The English language version checklist was used that adapted from previous studies (27, 37, 38). The checklist contains socio-demographic, clinical characteristics and hospital related factors. The data was collected by trained Three BSc Nurses and supervised by one MSc personal in public health and the principal investigator.

5.9 . Data quality control

In order to assure the quality of data, the following measures were taken. The checklist is adapted from the previous study. Before the actual data collection, the checklist was pretested in 5% of sample size at TGSB and the checklist was modified and edited based on the findings. The three data collectors and the supervisor were trained for one day about the objective and contents of the checklist. During data collection, the supervisor and the principal investigator were checked the completeness and consistency of the data on daily basis.

5.10. Data Processing and Analysis

The collected data was coded, entered into EPI data 4.6 and exported to statistical package for the social sciences (SPSS) version 25 software packages for further analysis. Descriptive statistics was used to summarize the data in the form of frequency, mean, median and standard deviation (SD).

Binary logistic regression analysis was carried out to identify the association between the outcome variable and independent variables.

Variables with P-value <0.25 in bi-variable logistic regression was used as a candidate for multivariable logistic regression and those variables with p-value <0.05 was considered statistically significant. Adjusted odds ratio (AOR) with 95% confidence intervals (CI) was used. Hosmer and Lemeshow goodness of Model fitness test was checked. The result was presented in the form of texts, tables and chart

5.11 . Ethical Considerations

Ethical clearance was obtained from Bahir Dar University College of Medicine and Health Sciences Institutional Review Board reference number md/15108/24. Then the permission letter was submitted to Tibebe Ghion Specialized hospital to get permission from the respective responsible bodies. Confidentiality was assured by avoiding writing the patient's name .The data extraction was conducted in a patent recording and reporting room. Moreover, confidentiality was secured during data collecting, analyzing and reporting.

6. RESULTS

6.1 . Socio-demographic characteristics of study participants

In this study, 403 patients participated with a response rate of 95.5%. Of those, 237(58.8%) were males and the rest 166 (41.2%) were females. The median age of the patients was 35 years with IQR of 23 and ranged from 18 - 80 years. Majority of patients, 228 (56.6%) were urban residents [Table-1].

Table 1-Socio-demographic characteristics of participants with GIS at TGSH Bahir Dar Ethiopia, 2022 (N=403).

Variables	Categories	Frequency	Percent
Sex	Male	237	58.8
	Female	166	41.2
Age in years	18 – 25	101	25.1
	26 – 35	108	26.8
	36 – 48	95	23.6
	≥49	99	24.6
Residence	Urban	228	56.6
	Rural	175	43.4

6.2. Clinical related characteristics

Among 403 patients, 192(47.6%) were admitted with emergency condition and the rest were elective. During the study period, 53 (13.2%) of the participants had at least one comorbid illness whereas 350 (86.8%) patients had no comorbidity. Majority of the procedures, 362 (89.8 %) were performed under general anesthesia [Table-2].

Table 2-Clinical related characteristics of patients with GI surgery at TGSB Bahir Dar Ethiopia, 2022 (N=403)

Variables	Categories	Frequency	Percent
Morbidity status(ASA)	ASAI	258	64.0
	ASA \geq II	145	36.0
Urgency of surgery	Emergency	192	47.6
	Elective	211	52.4
Types of diagnosis	Appendicitis	101	25.1
	Gallstone disease	98	24.3
	Cancer	38	9.4
	Trauma	39	9.7
	Intestinal	59	14.6
	Others*	68	16.8
Comorbid illness	Yes	50	12.4
	No	323	87.6
Types of Comorbidity	Hypertension	18	4.5
	Asthma	12	3.0
	Diabetes mellitus	10	2.5
	HIV/AIDS	3	0.7
	Heart disease	1	0.2
	≥ 2 comorbid	5	1.2
	Others**	2	0.5
Type of anesthesia	General	361	89.6
	Spinal	42	10.4
Intraoperative amount of blood loss (ml)	<500	320	79.4
	≥ 500	83	20.4
Duration of surgery (minute)	<100 min	126	31.3
	≥ 100 min	137	34.0
Types of procedure	Appendectomy	101	25.1
	Res&Anastomosis	101	25.1
	Cholecystectomy	98	24.3
	Others***	103	25.6
Duration of illness(Days)median(IQR)		3(38)	

Not:*=perforated peptic ulcer disease, Hernia, Hemorrhoid, Fistulainano **=Hepatitis B virus, Covid19 ***=Whiplees procedure, Omental patch, Hernia repair, Hemorrhoidectomy, Fistulotomy

6.3. Hospital related characteristics

The overall mean stay of patients was 9 ± 7.24 days with the range of 56 days. They averagely stayed in the hospital for 3 days before and 6 days after surgery. The median duration of operation was 100 minutes with IQR of 90 minutes and ranged with 776 (25-801) minutes. Most (97.2%) of surgical procedures used WHO surgical safety checklist. Of which 246 (62.7%) were complete whereas the rest (37.2%) missed at least one item. For majority (62%) of the participants, nursing care plan was done while the rest (38%) didn't get nursing care plan during their hospital stay (Table -3).

Table 3-Hospital related characteristics of patients with GI surgery at TGSH Bahir Dar Ethiopia, 2022 (N=403)

Variables	Categories	Frequency	Percent
WHO surgical safety checklist use	Yes	392	97.2
	No	11	2.7
Completeness of the SSC	Complete	246	62.7
	Incomplete	146	37.2
Nursing care plan done	Yes	250	62
	No	153	38
Preoperative length of hospital stay (days)(mean \pm SD		3 \pm 2.93	
Post-operative length of hospital stay(days)(mean \pm SD		6 \pm 6.12	
Post-operative length of hospital stay(days))(mean \pm SD		9 \pm 7.24	
Duration of surgery(minute)(median IQR)		100(90)	

6.4. Management outcome of GI Surgery

Among 403 patients with GI surgery, 87 patients were developed poor outcome. As a result, the proportion of poor outcome of GI surgery at TGSH was (21.6 % (95% CI, 17.7-25.9). Of which 16.1% were developed two or more post-operative complication while the rest developed only one type. Among 87 who developed poor outcome, surgical site infection 30 (34.4%), Hospital acquired pneumonia (19.5) and shock (12.6) were the most common type of poor management outcome. From the total 403 patients, 30(8.4%) of them experienced reoperation. Of whom 7 patients reoperated two or more times. The overall mortality rate in this study was 4% while 95.8 of patients were discharged from the hospital with improvement.

Table 4- Surgical outcome of gastrointestinal patients at TGSH Bahir Dar Ethiopia, 2022 (N=403)

Variables	Categories	Frequency	Percent
Complication	Yes	87	21.6
	No	316	78.4
Types of complication	SSI	30	7.4
	HAP	17	4.2
	Shock	11	2.7
	Dehiscence	8	2
	Anastomotic leakage and	7	1.7
	More than one type	14	3.5
Reoperation	No	373	92.6
	Once	23	5.7
	Two or more	7	1.7
Outcome	Poor	87	21.6
	Good	316	78.4
Condition of patient at discharge	Improved	386	95.8
	Died	16	4
	Referred	1	0.5

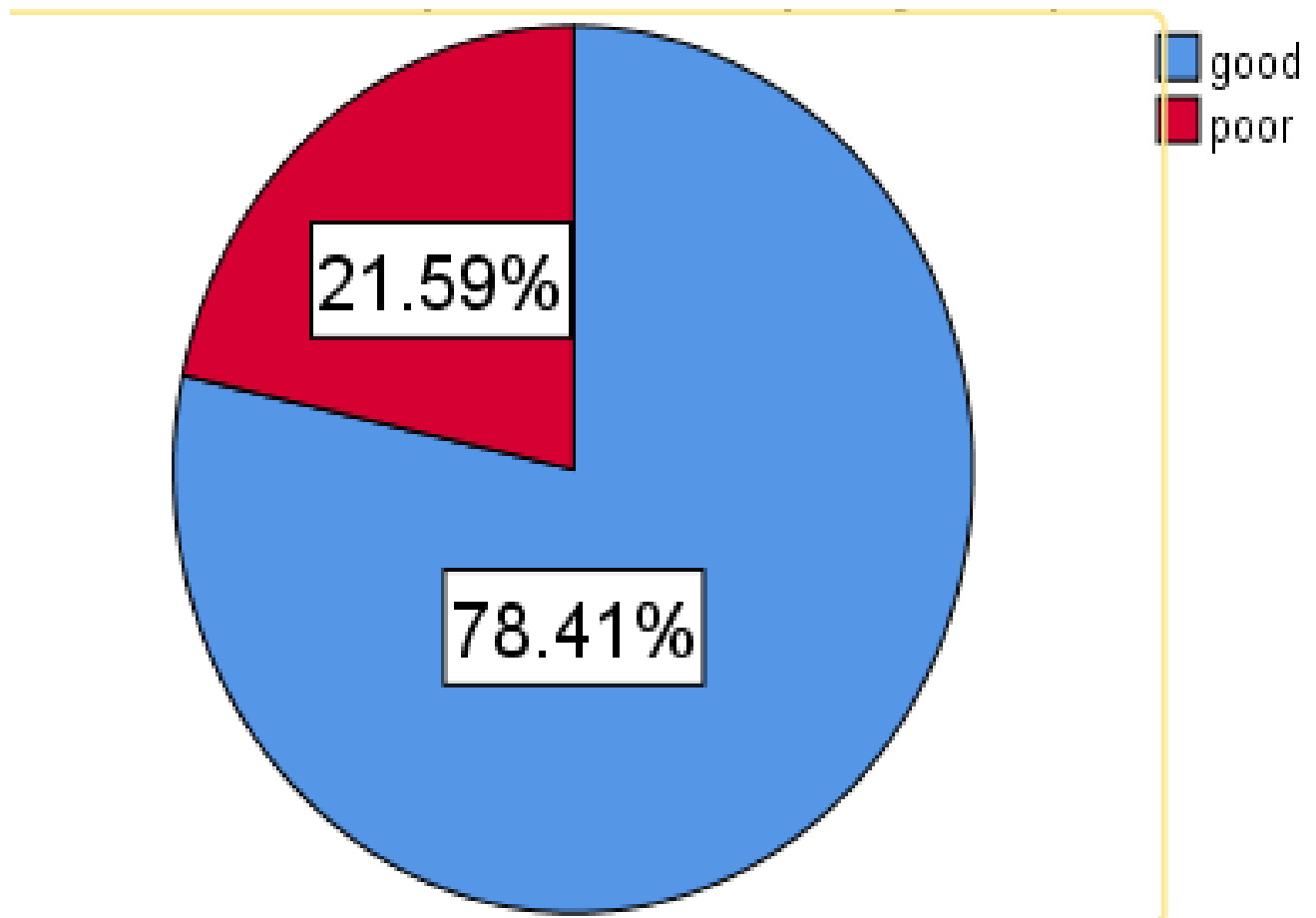


Figure 2-outcome of patients with gastrointestinal surgery at Tibebe Ghion Specialized Hospital Bahir Dar Ethiopia, 2022 (N=403)

6.5. Associated factors with treatment outcome

A binary logistic regression was done to identify the association between poor outcome of GI surgery and independent variables. In the bivariable analysis there were 12 variables candidate for multi variable analysis ($p\text{-value} < 0.25$). Finally, in the multiple logistic regression analysis, Residency, morbidity status of the patient greater than or equal to ASA II, presence of comorbid illness, postoperative length of stay ≥ 7 days WHO surgical safety checklist utilization and length of operative time were significantly associated with poor outcome of GI surgery.

Table 5-.Bi-variable and Multi-variable logistic regression analysis for associated factors of GIS at Tibebe Ghion Specialized Hospital Bahir Dar Ethiopia, 2022 (N=403).

Variables	Categories	GI surgery		COR	AOR (95% CI)	P-value
		Poor	Good			
Sex	Male	59	178	1	1	
	Female	28	138	0.61	0.78(0.39-1.53)	0.470
Age	18 – 25	21	80	1	1	
	26-35	16	92	0.66	1.79 (0.31 -2.00)	0.620
	36-48	19	76	0.95	0.67(0.25-1.77)	0.418
	≥ 49	31	68	1.74	0.48(0.19-1.25)	0.133
Residence	Urban	29	199	1	1	
	Rural	58	117	3.40	3.21 (1.67-6.16)	0.000*
Urgency	Emergency	53	143	1.99	1.23 (0.48-3.12)	0.67
	Elective	34	173	1	1	
Morbidity status	ASAI	23	235	1	1	
	\geq ASAI	64	81	8.07	0.32(0.15-0.68)	0.003*
Duration of illness(days)	<3	52	149	1	1	
	≥ 3	35	164	0.61	0.61(0.24-1.53)	0.293
Comorbidity	Yes	24	26	5.18	3.67(1.56-8.62)	0.003*
	No	61	292	1	1	
Amount of blood loss	$<500\text{ml}$	44	276	1	1	
	$\geq 500\text{ml}$	43	40	6.74	1.22(0.56-2.64)	0.619
Type of anesthesia	General	82	279	2.18	1.04(0.28-3.79)	0.956
	Spinal	5	37	1	1	
Duration of surgery(min)	<100 minute	18	189	1	1	
	≥ 100 minute	69	127	5.70	3.31(1.54-7.14)	0.002*
WHO SSC utilization	Complete	45	201	1	1	
	No/incomplete	42	115	4.60	3.14(1.62-6.07)	0.001*
Post-op.stay	<7	37	273	1	1	
	≥ 7	50	43	8.58	4.27(2.11-8.63)	0.000*

Note: 1-Reference category, AOR – adjusted odds ratio, COR – crude odds ratio, CI- confidence interval, * –significantly associated variables

7. DISCUSSION

The main purpose of the current study was to assess the outcome and associated factors of gastrointestinal surgery at Tibebe Ghion Specialized Hospital. According to our study, the proportion of poor management outcome of GI surgery in TGSH was 21.6%. This indicates that one from five patients experienced poor surgical outcome. This finding is in line with studies in Tigray (20.5%) (23), in Harer Ethiopia (21.3%) (53) with a meta-analysis in Ethiopia conducted by Atalel and Tesfahan (19.8%) (42), by Dajenah et al in Yemen (20%) (43). This study is lower than studies conducted Gebremedhn et al at Gondar Comprehensive Specialized Hospital (39.2%) (44), by Hanks et al at Tikur Anbessa Specialized Hospital (30%) (15), by Umugwaneza in Ruanda (33.1%) (45), by Gianluca in Italy (32.6%) (46), by Yamashita et al in Japan (33%) (47). The possible explanation may be due to the difference in study design, level of health care setting and patient clinical characteristics. Prospective observational study design was conducted at Gondar which helps to easily catch up the potential source of data inaccuracy and increases the quality of data than chart review. Being Tikur Anbessa Specialized Hospital is a latest hospital, there is a great probability of coming more complicated and critically ill patients come to the hospital by referral system from different institutions of the country. On the other hand the study participants of both Gondar & Tikur Anbessa hospitals were patients only with emergency clinical feature and elderly patients (≥ 60 yrs) in Ruanda, Italy and Japan than ours which we also included electives. So emergency is by itself a life threatening condition together with old age increases the risk of patients to develop poor outcome of surgery. On the other hand our finding is higher than studies conducted by Ayandipo et al in Nigeria (14.3%) (48), by Mbatha et al in South Africa (16.2%) (49). The possible reason might be related to surgical approach and quality of care. Both Nigeria and South Africa have better quality of care and used Laparoscopic surgery than ours. Because laparoscopic surgery reduced amount intraoperative blood loss, postoperative pain, shorten hospital stay, and minimized scar these all enhances quicker recovery and return to normal daily activities (50).

Patients who come from rural area were three times more likely to develop poor outcome of gastro intestinal surgery as compared with those who live in urban. This study is comparable with study conducted by Ayele in Dessie (51), the possible explanation were awareness difference, lack of money and late presentation. Rural patients are more likely to be poorer, to have lower levels of education, more likely to travel a long distance for care than urban patients. It is believed that patients who came from the rural area could have low awareness about the importance of getting health service earlier. People in remote areas might be faced to make a long trip to get health facilities due to problems related to the distance, unreliable transportation and accessibility of health facilities (52).

Patients with morbidity status greater than or equal to ASAII were more risk to develop poor outcome of GI surgery by 68% as compared to ASA I. This study is similar with a study conducted by Gebre in Tartu university hospital in Sweden (16), by Tolstrup et al At Herlev hospital in Denmark (53). The possible reason may be due to the ASA Physical status classification is an important tool to predict the risks of patients undergoing surgery that requires anesthesia in light of any potential underlying systemic diseases that the patient may have. It is a method of determining surgical risk before operation. The range of the ASA physical status scale is 1 to 6 in order of increasing risk and patients classified by American society of anesthesiologist morbidity status greater than or equal to ASA II are those who severely ill and having different health problems. Individuals with higher ASA physical status classes experienced more complications or death than patients with lower ASA physical classes following surgery (54-56).

Patients who had comorbid illness were four times more likely to develop poor outcome of GI surgery than those who had not. This finding is supported with a study conducted at University of Gondar Comprehensive Specialized Hospital (37), by Zerefa et al at Dessie referral hospital (57), by Yu J et al in china (58). The possible explanation might be due to comorbidity is associated with people who have poor social support, high levels of socio-economic deprivation, and mental health disorders. In addition, patients with a comorbid disease are often associated with a decline in functional reserves and experience more drug-related toxicities. Comorbidities also indirectly lengthened hospital stays and raised

the risk of malnutrition, health care associated infections and complications. Therefore, patients with comorbidities are more likely to have poorer outcomes (59-61).

The current study showed that patient who stayed in the hospital for longer than seven days were four times more likely to develop poor outcome of gastrointestinal surgery as compared to those who stayed less than seven days. This study supported by studies conducted by Simachew et al in Debre Markos (62), by Ayele in Dessie (51), by Tefera et al in Jimma Ethiopia (27). The possible explanation might be due to prolonged length of stay prevent patients from leaving the hospital sooner, increasing the risk of health care associated infection as well as hospital expenses. It also negatively affect the patients' economy and social support system these all might be lead psychosocial distress and challenging the patient's ability to afford hospital costs to receive appropriate level of care. So, reducing hospital length of stay is a key strategy for upgrading healthcare utilization and better outcome (63).

No or incomplete assessment of WHO surgical safety checklist was three times more risk for poor outcomes of gastrointestinal surgery than completely assessed. The possible reason was that the WHO Surgical Safety Checklist helps in ensuring that surgical teams consistently adhere to essential safety procedures and so reduces the most frequent and preventable risks affecting the lives and health of surgical patients. It directs verbal team-based interactions to ensure that each patient receives appropriate standards of care (64-66). Studies by Abbott et al and Haynes et al indicated that the use of surgical safety checklist helps patients to have better postoperative outcomes. It decreased both the rates of death and postoperative complications at the same time (67, 68).

Patients who under take surgical intervention for longer than one hundred minutes were three times more likely to develop poor outcome of gastrointestinal surgery as compared to patients who completed their operation shorter than one hundred minutes. As studies indicated, duration of the procedure is a risk factor for the short- and long-term outcomes of patients. Complications are more likely to occur when an operation lasts longer than expected (69-74).

8. LIMITATIONS

The results of this study didn't show the actual problem in the community since institutional based crosssectional study design was used. It was difficult to measure some important variables like income, family size nutritional status, educational, and occupational status of patients, because the data was collected by chart review, as a result the variables not included in the chart.

9.CONCLUSION AND RECOMENDATIONS

9.1 Conclusion

Nearly one-fifth of the patients who surgically treated for gastrointestinal disease at Tibebe Ghion Specialized Hospital experienced poor surgical outcome. Residency, ASA morbidity status, comorbid illness, postoperative length of stay, WHO surgical safety checklist utilization and length of operative time were determinant factors for poor outcome of gastrointestinal surgery.

9.2 Recommendations

Health care providers shall appropriately utilize the WHO surgical safety checklist, better to strengthen their risk assessment technique and provide individualized patient care (pre and postoperatively).It is also better to improve their surgical skills that can be completed procedures faster and shortening postoperative length of hospital stay this all enhance early recovery, and improving patient outcomes.

Hospital managers: Better to work hard on capacity building that enhance quality of care

Researchers: Further qualitative and longitudinal studies are needed to explore the state of poor surgical outcome.

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ANNEX I: ENGLISH VERSION CHECKLIST

Instruction: Answer the questions blow by writing in the blank space or ticking the box

I SOCIODEMOGRAPHIC DATA		
S.N O	VARIABLES	RESPONSE
101	Age	In years.....
102	Sex	<input type="checkbox"/> Female <input type="checkbox"/> Male
103	Residency	<input type="checkbox"/> Urban <input type="checkbox"/> Rural
II.CLINICAL CHARACTERISTICS		
201	What was the patients main Diagnosis	-----
202	Duration of illness before admission (days)	-----
203	Was the patient had a comorbidity	<input type="checkbox"/> YES <input type="checkbox"/> No
204	If the answer for Q203 is yes, which comorbidity(Can choose more than one)	<input type="checkbox"/> Chronic obstructive disease <input type="checkbox"/> Asthma <input type="checkbox"/> Hypertension <input type="checkbox"/> Diabetes Mellitus <input type="checkbox"/> Kidney Disease <input type="checkbox"/> HIV/AIDS <input type="checkbox"/> Others (specify).....
205	Was surgery is trauma Related?	<input type="checkbox"/> YES <input type="checkbox"/> No
206	Urgency of surgery	<input type="checkbox"/> Emergency <input type="checkbox"/> Elective
207	Surgery done for oncologic reason	<input type="checkbox"/> Yes <input type="checkbox"/> No
208	Duration of surgery in hours	-----
209	Intraoperative amount of blood loss in milliliter	-----
210	Type of Anesthesia used for this operation	<input type="checkbox"/> General anesthesia <input type="checkbox"/> Regional
211	What type of procedure was performed?	-----

III Hospital related		
301	Preoperative length of hospital stay	In days.....
302	Postoperative length of hospital stay	In days.....
303	Total length of hospital stay	In days.....
304	Was Nursing care plan done	<input type="checkbox"/> Yes <input type="checkbox"/> No
305	Did the safe surgery checklist is completed	<input type="checkbox"/> Yes <input type="checkbox"/> No
306	If yes is it complet	
IV OUTCOME		
401	Did the patient develop any complication?	<input type="checkbox"/> Yes <input type="checkbox"/> No
402	If the answer for Q no 401 is yes, which complication?	<input type="checkbox"/> Surgical site infection <input type="checkbox"/> Shock <input type="checkbox"/> Dehiscence <input type="checkbox"/> Hospital acquired pneumonia <input type="checkbox"/> Anastomotic leak and intra-abdominal fluid collection
403	Did a patient reoperated to manage complication	<input type="checkbox"/> Yes <input type="checkbox"/> No
404	If yes how many times	-----
405	What was the final condition of the patient	<input type="checkbox"/> Improved and discharged <input type="checkbox"/> Died in the hospital <input type="checkbox"/> Referred to higher <input type="checkbox"/> Others (specify).....

STATEMENT OF DECLARATION

I signed below; declare and affirm that this thesis is my own work. I have followed all ethical Principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through Citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis. This thesis is submitted in partial fulfillment of the requirement for master's degree from Bahirdar University in adult health nursing. The thesis is deposited in Bahirdar University Digital Library and is made available to local, national and international scientific community. I declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

Principal investigator

Name: WORKNESH BAYE (BSC)

Signature: _____

Date: _____

Advisor

Name:

Signature: _____

Date _____

Advisor

Name:

Signature: _____

Date _____