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

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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 outcomes. Even though adverse patient outcomes following gastrointestinal surgery are among the leading causes of morbidity and mortality, in Ethiopia limited studies have been conducted so far on the outcome of gastrointestinal surgery. The aim of this study is to assess the outcome and associated factors of patients who underwent gastrointestinal surgery at Tibebe Ghion specialized hospital, Bahir Dar, Ethiopia

Methods: An 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 a pretested 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 declare as statistically significant.

Results: From a total of 403 patients, 87 (21.6%) developed poor outcomes from 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 to 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. More than one-fifth of patients treated at Tibebe Ghion specialized hospital experienced poor surgical outcomes.

Keywords: Surgical outcome; Gastrointestinal surgery; GI surgery

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Abbreviations: 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

INTRODUCTION

A large number of surgical procedures are performed in the world however surgical safety is a 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 postoperative patient outcome is a measurement for the success of surgical care, and its improvement is a global focus [4].

The world health organization launched the safe surgery saves lives program and created a surgical safety checklist to improve teamwork and consistency of care, resulting in fewer surgical-related complications and deaths. Laparotomies are major operations that necessitate a large incision in the patient's abdomen and a longer recovery period. Exploratory laparotomy, cholecystectomy, appendectomy, hemicolectomy, ileostomy, and gastro-jejunostomy are the most common gastrointestinal surgeries [5,6]. In 2015, the Ethiopian federal ministry of health launched the 'Saving Lives Through Safer Surgery' (SaLTS) Initiative, a multifaceted national surgical plan to improve access to and the quality of surgical care throughout Ethiopia [7].

The global burden of postoperative death shows that 42 million (7.7%) cases died within 30 days of surgery each year, making it the third leading cause of death after ischemic heart disease and stroke, with half of these occurring in low-middle income countries [8,9]. Perioperative complications are a significant health care burden in African countries [10]. Globally, one from six surgical patients experienced a complication before leaving the hospital and patients in Africa were twice as likely to die after surgery when compared to the global average and approximately one in five surgical patients in Africa develops a postoperative complication, and one in ten of these patients were died. Even though the morbidity and mortality of many cases are possibly preventable [11].

The prevalence of unforeseen complications such as Anastomatic leaks and life-threatening infections makes surgery involving the gastrointestinal tract difficult. It leak was found to be the complication having the largest overall impact on 30-day clinical and financial outcomes after elective colon resection and emergency gastrointestinal surgery is a high risk of mortality and postoperative complications [12,13]

In a Danish study of 2904 surgically treated patients for gastrointestinal surgery, 538 (18.5%) cases died within 30 days of surgery [14]. A large number of patients experienced complications following elective upper gastrointestinal surgery and major cancer surgery, with complication rates approaching one in two patients and at least one postoperative complication occurring in 23.2 to 33.5% of the patients [15]. These postoperative complications significantly increased hospital stay and mortality. Perioperative medicine is becoming more widely used to ensure safe and effective patient care throughout the perioperative care pathway in order to improve patient outcomes.

The international surgical outcomes study group shows 16.8% of patients experienced one or more postoperative complications, (0.5%) people died due to surgery, and overall mortality among patients who suffered from complications was 2.8% with its range 2.4% pulmonary embolism to 43.9% cardiac arrest. In an international multicenter cohort study, 12.3% of patients had SSI within 30 days of gastrointestinal surgery, with the incidence of SSI varying between high, middle, and low income countries at 17.8%, 31.4%, and 39.8%, respectively.

According to a study conducted in Europe, Australia, Estonia one or more postoperative problems. 1.4%, 37% and 33.55 of Patients facing complications related with issues stayed in the hospital for an average of 11, days respectively [16]. 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].

Study in Sudan public hospital showed a prevalent that 27.5% of patients develop SSI of this superficial SSI was the most common type of SSIs (82.6%) [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. In Cote d'Ivoire among 161 patients operated for perforated peptic ulcer, 27.5% of patients experienced complications 19.3% were died. According to studies conducted at Tikur Anbessa specialized hospital in Ethiopia, the most common cause of death was intestinal obstruction 23%, followed by perforated PUD 9.8% and infection rates of 25% and 13.5% were associated with intestinal obstruction and peritonitis, respectively. In Tigray, 20.5% of non-traumatic acute abdomen surgical patients had an in-hospital post-operative complication, with an overall mortality rate of 4.2%. Wound infection was the most common post-operative

complication 21.7%. In a prospective cross-sectional study conducted at St. Paul hospital millennium medical college, the majority of patients 87.8% had vertical midline incisions, and 58.5% of them developed wound dehiscence within the first 6-10 days after surgery. 95.2% of them underwent re-laparotomy 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%.

A prospective cohort study in Jimma hospital shows that, 21.1% of patients developed SSIs and 11.6% patients returned to operation room [19]. 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% stayed in the hospital for less than seven days, and 84.8% were improved and discharged.

A study conducted in Estonian tertiary hospitals discovered that age over 70 years old was identified as an independent risk factor for the development of complications. According to an Addis Abeba study, being male and having a higher educational level were all linked to better outcomes. According to a prospective cohort study conducted at Jimma university hospital, being female was about 12 times more likely to result in a poor outcome than being male. According to a study conducted at Attat hospital, residency, age, and gender are all independent predictors of management outcome.

Poor nutritional status between days 3-5 post-operatively was associated with longer post-operative LOS. Comorbid illness, ASA score, previous surgery, wound type, and preoperative hospital stay all are the factors for the development of complications. Time under anesthesia, amount of medicines, hemoglobin, and delayed mobilization were all linked to a 2.2-fold increased risk of 30 days readmission or mortality in a Canadian research. 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. 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. 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 [20].

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.

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. A Study done St. Paul's hospital millennium medical college, patients with relaparatomy and tension suture of abdominal closure during their second operation had poor management outcomes. A study in Nekemt hospital shows that ≥ 7 days length of hospital stay was significantly associated with poor outcome of surgery. 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.

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. Only (57.1%) of surgeries used the world health organization safe surgery checklist.

MATERIALS AND METHODS

Study Design, Area and Period

An institutional-based retrospective cross-sectional study was conducted from January 8 2020 to January 7 2022. The study conducted at Tibebe Ghion specialized hospital that 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% and 50.5% were male and females respectively. Surgery department has 100 surgical beds and equipped with 31 surgeons one gastrointestinal, one hepathobliary, one head and neck, one ENT, two urologic surgeons, one neurosurgeon, two pediatrics surgeon, nineteen general surgeon and sixty nurses.

Source and Study Population

All patients underwent gastrointestinal surgery in Tibebe Ghion specialized hospital considered as source population. Sampled patients underwent gastrointestinal surgery at Tibebe Ghion specialized hospital in the two years period considered as study population.

Eligiblity Criatreria

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.

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.

Variables of the Study

Dependent variable: Outcome of gastro-intestinal surgery.

Independent variables: socio-demographic, clinical characteristics, hospital related characteristics and outcome.

Operational Definitions

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.

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.

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 anastomatic leak and intra-abdominal fluid collection were the complications).

Sample Size Determination and Sampling Procedure

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.

Zα/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).

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

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

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 patent charts were included under the sample until reached to the calculated sample size.

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. 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.

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 TGSH 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.

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 Leme show goodness of Model fitness test was checked. The result was presented in the form of texts, tables and chart.

RESULTS

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
Gender	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

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 TGSH Bahir Dar Ethiopia, 2022 (N=403).

Variables	Categories	Frequency	Percent
Morbidity status (ASA)	ASA I	258	64
	ASA ≥ II	145	36
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 obstruction	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
	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
Types of procedure	Appendectomy	101	25.1
	Res and anastomosis	101	25.1
	Cholecystectomy	98	24.3
	Others***	103	25.6
Duration of illness(days)median(IQR)		3 (38)	

Note: *=perforated peptic ulcer disease, hernia, hemorrhoid, fistulainano **=hepatitis B virus, COVID-19 ***=whiplees procedure, omental patch, hernia repair, hemorhoidectomy, fistulectomy.

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 ± SD		3 ± 2.93	
Post-operative length of hospital stay (days) (mean ± SD		6 ± 6.12	
Post-operative length of hospital stay (days) (mean ± SD		9 ± 7.24	

Duration of surgery(minute) (median IQR)	100 (90)

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 (**Table 4**). 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 re-operated 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 (**Figure 1**).

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 collection	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

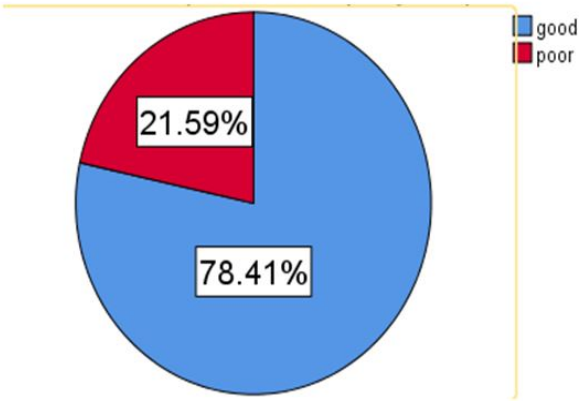

Figure 1: Outcome of patients with gastrointestinal surgery at Tibebe Ghion specialized hospital Bahir Dar Ethiopia, 2022 (N=403).

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-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**).

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			
Gender	Male	59	178	1	1	
	Female	28	138	0.61	0.78 (0.39-1.53)	0.47
Age	18-25	21	80	1	1	
	26-35	16	92	0.66	1.79 (0.31 -2.00)	0.62
	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	3.4	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	ASA I	23	235	1	1	
	≥ ASA II	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 ml	44	276	1	1	
	≥ 500 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	5.7	3.31 (1.54-7.14)	0.002*
WHO SSC utilization	Complete	45	201	1	1	
	No/incomplete	42	115	4.6	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*

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%), in Harer Ethiopia (21.3%) with a meta-analysis in Ethiopia conducted by Atalel, et al. (19.8%), by Dajenah, et al. (20%). This study is lower than studies conducted Gebremedh, et al. at Gondar comprehensive specialized hospital (39.2%), by Hanks, et al. at Tikur Anbessa specialized hospital (30%), by Umugwanezain, et al. (33.1%), by Gianlucain, et al. Italy (32.6%), by Yamashita, et al. in Japan (33%). 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, et al. 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. Nigeria (14.3%), by Mbatha, et al. in South Africa (16.2%). 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 loos, postoperative pain, shorten hospital stay, and minimized scar these all enhances quicker recovery and return to normal daily activities.

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, et al. in Dessie, 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.

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, et al. in Tartu university hospital in Sweden, by Tolstrup, et al. at Herlev hospital in Denmark. 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. 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, by Zerefa, et al. at Dessie referral hospital, by Yu, et al. in china. 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. Co-morbidities also indirectly lengthened hospital stays and raised the risk of malnutrition, health care associated infections and complications. Therefore, patients with comorbidity are more likely to have poorer outcomes.

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, by Ayele, et al. in Dessie, by Tefera, et al. in Jimma Ethiopia. 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.

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. Studies by Abbott, et al.; 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. 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 handed 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.

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.

LIMITATIONS

The results of this study did not show the actual problem in the community since institutional based cross-sectional 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.

ETHICAL CONSIDERATIONS

Ethical clearance was obtained from Bahir Dar university college of medicine and health sciences institutional review board reference number md/15108/24. The permission letter was then submitted to Tibebe Ghion specialized hospital in order for the respective responsible bodies to grant permission. The patient's identity was kept private by not writing it. The extraction of data was carried out in a patent recording and reporting room. Furthermore, confidentiality was ensured throughout the data collection, analysis, and reporting processes.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIAL

The authors declare that all relevant data are within the manuscript and fully available without restriction.

COMPETING INTERESTS

There is no conflict of interest between authors.

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AUTHORS' CONTRIBUTIONS

In their various capacities, authors significantly contributed to this work. All authors participated in conceptualization, proposal development and participated in data collection, statistical analysis, and manuscript write-up. The author(s) read and approved the final manuscript, and final approval of the version to be published, and agree to be accountable for all aspects of the work.

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REFERENCES

1. Weiser TG, Regenbogen SE, Thompson KD, Haynes AB, Lipsitz SR, et al. (2008) An estimation of the global volume of surgery: A modelling strategy based on available data. Lancet. 372(9633):139-144.
2. Meara JG, Leather AJ, Hagander L, Alkire BC, Alonso N, et al. (2015) Global Surgery 2030: Evidence and solutions for achieving health, welfare, and economic development. Lancet. 386(9993):569-624.
3. Ahmad T, Bouwman R, Grigoras I, Aldecoa C, Hofer C, et al. (2016) Global patient outcomes after elective surgery: Prospective cohort study in 27 low-, middle-and high-income countries. Br J Anaesth. 117(5):601-609.
4. Nepogodiev D, Martin J, Biccard B, Makupe A, Bhangu A, et al. (2019) Global burden of postoperative death. Lancet. 393(10170):1-18.
5. Kumar A, KAiSth AS (2018) Treat the patient not the image: Nonoperative management of high grade solid organ injuries in abdominal trauma. J Clin Diagn Res. 12(4):12-15.
6. Oyo-Ita A, Chinnock P, Ikpeme IA (2015) Surgical versus non-surgical management of abdominal injury. Cochrane Database Syst Rev. 11:CD007383.
7. Burssa D, Teshome A, Iverson K, Ahearn O, Ashengo T, et al. (2017) Safe surgery for All: Early lessons from implementing a national government-driven surgical plan in Ethiopia. World J Surg. 41(12):3038-3045.
8. Moonesinghe SR, Mythen MG, Grocott MPW (2011) High-risk surgery: Epidemiology and outcomes. Anesth Analg. 112(4):891-901.
9. Rickard J, Beilman G, Forrester J, Sawyer R, Stephen A, et al. (2020) Surgical infections in low-and middle-income countries: A global assessment of the burden and management needs. Surg Infect. 21(6):478-494.
10. Biccard BM, Madiba TE, Kluyts H-L, Munlemvo DM, Madzimbamuto FD, et al. (2018) Perioperative patient outcomes in the African surgical outcomes study: A 7-day prospective observational cohort study. Lancet. 391(10130):1589-1598.
11. Guyton K, Alverdy JC (2017) The gut microbiota and gastrointestinal surgery. Nat Rev Gastroenterol Hepatol. 14(1):43-54.
12. Scarborough JE, Schumacher J, Kent KC, Heise CP, Greenberg CC (2017) Associations of specific postoperative complications with outcomes after elective colon resection: A procedure-targeted approach toward surgical quality improvement. JAMA Surg. 152(2):e164681-e164686.
13. Vester-Andersen M, Lundstrom LH, Moller M, Waldau T, Rosenberg J, et al. (2014) Mortality and postoperative care pathways after emergency gastrointestinal surgery in 2904 patients: A population-based cohort study. Br J Anaesth. 112(5):860-870.

13. Hanks L, Lin C, Tefera G, Seyoum N (2014) Abdominal surgical emergencies at Tikur Anbessa Specialized Hospital in Ethiopia; a shifting paradigm. East Cent Afr J Surg. 19(1):90-94.
14. Jakobson T, Karjagin J, Vipp L, Padar M, Parik AH, et al. (2014) Postoperative complications and mortality after major gastrointestinal surgery. Medicina. 50(2):111-117.
15. Szakmany T, Ditai J, Kirov M, Protsenko D, Osinaike B, et al. (2017) In-hospital clinical outcomes after upper gastrointestinal surgery: Data from an international observational study. Eur J Surg Oncol. 43(12):2324-2332.
16. Hassan RSEE, Osman SOS, Aabdeen MAS, Mohamed WEA, Hassan RSEE, et al. (2020) Incidence and root causes of surgical site infections after gastrointestinal surgery at a public teaching hospital in Sudan. Patient Saf Surg. 14(1):1-7.
18. Bhangu A, Ademuyiwa AO, Aguilera ML, Alexander P, Al-Saqqa SW, et al. (2018) Surgical site infection after gastrointestinal surgery in high-income, middle-income, and low-income countries: A prospective, international, multicentre cohort study. Lancet Infect Dis. 18(5): 516-525.
19. Teklewold B, Pioth D, Dana T (2020) Magnitude of abdominal wound dehiscence and associated factors of patients who underwent abdominal operation at St. Paul's hospital millennium medical college, Addis Ababa, Ethiopia. Surg Res Pract. 2020:1379738.
20. Misha G, Chelkeba L, Melaku T (2021) Incidence, risk factors and outcomes of surgical site infections among patients admitted to Jimma medical center, South West Ethiopia: Prospective cohort study. Ann Med Surg. 65:102247.