ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF ANESTHESIA

INCIDENCE AND PREDICTORS OF POSTOPERATIVE PARALYTIC ILEUS AFTER MAJOR ABDOMINAL SURGERY AT SELECTED GOVERNMENTAL HOSPITALS IN ADDIS ABABA, ETHIOPIA: A LONGITUDINAL STUDY, 2023/24

PRINCIPAL INVESTIGATOR

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TITLE OF THE PROPOSAL:	**Incidence and predictors of post-operative paralytic ileus after major abdominal surgery at selected governmental hospitals in Addis Ababa, Ethiopia, 2023/24: a longitudinal study**
DURATION OF PROJECT:	**February 1 – April 30, 2024**
STUDY AREA	**Minilik II comprehensive specialized hospital, Tikur Anbessa specialized hospital, and Yekatit 12 hospital medical college**
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Declaration

I the undersigned, declare that this research thesis is my original work and I understand that plagiarism will not be tolerated and all directly quoted materials have been appropriately referenced.

Name of principal Investigator: Eden Tegegn Signature _____ Date_____

Submitted to: Department of Anesthesia

Assurance of Investigator

The undersigned agree to accept responsibility for the scientific, ethical, and technical conduct of the research project and for the provision of required progress reports as per the terms and conditions of the research and publications office of the Addis Ababa University.

This thesis work has been submitted for Examination with my approval as an Advisor.

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ACRONYMS/ABBREVIATION

POI	Postoperative paralytic ileus
PI	Paralytic ileus
IV	Intravenous
BMI	Body mass index
ASA	American Society of Anesthesiology
CI	Confidence Interval
AOR	Adjusted Odds Ratio
EBL	Estimated Blood Loss
POD	Post-operative Day
TASH	Tikur Anbessa Specialized Hospital
MIICSH	Menelik II Comprehensive Specialized Hospital
Y12HMC	Yekatit 12 Hospital Medical College
ml	Milliliter
mg	Milligram

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ABSTRACT

Background: Abdominal surgery is one of the most common surgical procedures for patients with various diagnoses. Even though this surgery is widely performed for therapeutic and diagnostic purposes it is not free from complications. Of which postoperative ileus take the lion's share of contribution. Ileus is the functional inhibition of bowel activity. While it usually resolves within 2 to 3 days, if it lasts longer than 3 days, it is considered as postoperative paralytic ileus. This study was conducted to assess the incidence and predictors of post-operative paralytic ileus after major abdominal surgery at selected governmental hospitals in Addis Ababa, Ethiopia.

Objectives: To Assess Incidence and predictors of post-operative paralytic ileus after major abdominal surgery at selected governmental hospitals in Addis Ababa, Ethiopia, from February 1 – April 30, 2024

Method: A hospital-based multi-center longitudinal study was conducted from February 1 – April 30 2024 in major abdominal surgical patients. Once data was collected it was analyzed using Statistical Package for Social Sciences version 26. Binary logistic regression was run. Multivariate logistic regression was performed using factors with $P < 0.2$ in the bivariate analysis and of those $P<0.05$ was taken as independent predictors. The data was expressed as odds ratios and 95% confidence intervals.

Result: A total of 184 patients met the inclusion criteria. The incidence of Postoperative paralytic ileus was 14.1%. The median duration of postoperative paralytic ileus was 5 days. Electrolyte imbalance (AOR=4.154, 95% CI 1.363-12.660), smoking cigarette {AOR=3.729, CI (1.217-11.422), opioid intake (AOR=4.615, 95%CI 1.426—14.940) and total IV fluid intake (AOR=3.974, 95% CI 1.210-13.059) were statistically significant predictors of postoperative ileus.

Conclusion: Postoperative Paralytic Ileus commonly occurs following major abdominal surgeries. The risk of POI is increased in patients with electrolyte imbalance, in patients who take more than 3000ml of IV and >50mg opioid, and in cigarette smokers in selected governmental hospitals in Addis Ababa, Ethiopia.

Key Words: *Post-operative Paralytic ileus, Major Abdominal Surgery*

1. INTRODUCTION

1.1 Background of the study

Worldwide, 312.9 million operations are performed annually, with abdominal surgeries making up roughly 10.4% of the total. It is estimated that between 7% to 15% of patients undergoing abdominal surgeries may experience post-operative complications. The most common POCs associated with abdominal surgeries include surgical site infections, fistulas, anastomotic leak, Iatrogenic injury, paralytic ileus, general peritonitis, Wound dehiscence, and Intestinal obstruction(1).

Post-operative paralytic ileus (POI) is a common complication following abdominal surgery with an incidence ranging from 10%-30%(2). The incidence of paralytic ileus varies across different surgical specialties as stated in patients undergoing laparotomy, thoracic, and orthopedic procedures is approximately 9%, 1.4%, and 1.5%, respectively. On the other hand, laparoscopic surgery and cholecystectomy have a lower risk of paralytic ileus since they have lower bowel traction and manipulations(3).

Paralytic ileus (PI) (adynamic ileus) is a condition in which the digestive tract experiences functional paralysis due to neuromuscular issues within the myenteric (Auerbach's) and submucous (Meissner's) plexus. Unlike mechanical blockages, this condition involves neurogenic factors where the smooth muscle retains its normal electrical slow wave, but fails to trigger action potentials(2).

Abdominal surgery significantly affects the natural movement of the digestive tract due to heightened sympathetic activity and the suppression of regular intestinal contractions. This often leads to PI, where both the small and large intestines experience inhibited propulsive activity. PI, characterized by reduced bowel movement, is a common aftermath of abdominal surgery, generally resolving within 2 to 3 days. However, if this condition persists beyond 3 days post-surgery, it is termed as Prolonged POI (4).

The exact pathophysiology of POI is not completely comprehended, despite numerous researchers proposing complex interconnections involving factors such as the body's stress response to surgery, which triggers neural reflexes in the intestinal area, the activation of gut opioid receptors due to opioid medication, heightened sympathetic nervous system activity, disturbances in electrolyte

levels, and the exacerbation of the condition by excessive fluid accumulation and linked to adrenergic stimulation although blocking adrenoceptors or inhibiting dopamine hasn't proven to be effective in treatment(2).

Signs and Symptoms of POI are characterized by nausea, vomiting, abdominal distension, pain, inability to tolerate an oral diet, and a delay in the return of normal gastrointestinal function with the passage of flatus and stool. A plain upright abdominal X-ray demonstrates enlarged loops of the bowel with multiple levels of fluid, indicating expansion with both fluid and air in the small and often large intestines. In cases where X-ray findings are inconclusive, an abdominal and pelvic CT scan is employed to confirm postoperative ileus diagnosis (5).

The risk factors which are associated with POI include male gender, advanced age, significant blood loss, opioids, especially morphine, high-grade complications, intra-abdominal infection, anastomotic fistula, and the type of surgical approach, with laparoscopy and retroperitoneal approach generally offering a benefit compared to laparotomy. Although less commonly reported, a history of prior laparotomy, the length of the abdominal incision, and emergency surgery, which may lead to significant intestinal edema, have also been identified as potential risk factors(6).

In addition, several factors can negatively impact intestinal motility and potentially lead to POI. These factors include infection, the body's response to surgical stress, physical manipulation of the bowel, delays in nutrition, small feeding, pain, and post-operative complications. Moreover, there is compelling evidence to suggest that excessive fluid intake and opioid usage may play a role in the development of POI. Factors such as maintaining a balanced fluid level during surgery with body weight, poor physical status, and being male have also been linked to an increased risk of experiencing POI(7).

1.2 Statement of the Problem

POI is the most commonly occurring complication after major abdominal surgery. Approximately 10% to 30% of patients who experience abdominal surgery will develop Post Operative Ileus(8).

POI significantly affects patient outcomes. It results in higher morbidity, including issues like nausea, vomiting, increased pain, and delayed oral intake for wound healing and immune support. There's also an increased risk of aspiration and a longer time of immobilization, potentially causing respiratory problems. These consequences of POI result in greater use of healthcare resources,

leading to extended hospital stays. This is because impaired gut motility can be a contributing factor in delaying the discharge of patients after abdominal surgery(9).

Healthcare systems face a significant financial burden due to the increased expenses associated with medical, nursing, dietitian, and laboratory services when dealing with patients with POI. The average cost per patient with POI was notably higher in comparison to patients without POI, amounting to $15,914 versus $8,316. Even though POI patients made up only 24% of the total elective colectomy patients, they contributed to 38% of the total healthcare costs for the entire group(10).

Paralytic ileus can also give rise to other various additional complications. These complications encompass malnutrition, increased bacterial proliferation in the gut, pneumatosis cystoides intestinalis (accumulation of gas in the intestines leading to pneumoperitoneum), and the potential for sepsis caused by the migration of intestinal bacteria into the bloodstream(11).

Numerous clinical interventions have been evaluated in efforts to tackle POI including video-assisted Surgeries (laparoscopy), preoperative epidurals and laxatives, and electronic bowel preparation with all factors that decrease the incidence of ileus. Despite various clinical strategies like early feeding, encouraging patients to ambulate, limiting fluid intake, and using minimally invasive surgical techniques, none of them have proven entirely effective in preventing POI(10).

Another promising intervention suggests that continuous intravenous infusion of lidocaine during the first postoperative day has an impact on the reduction of the duration of paralytic ileus in the colon after abdominal surgery. The mechanism of action is suggested to be Suppression of inhibitory gastrointestinal reflexes by reduction of postoperative peritoneal irritation(12).

Hyperbaric oxygen therapy could potentially prevent POI and offer therapeutic advantages in treating early recurrent adhesive intestinal obstruction that results from surgery to alleviate adhesive intestinal obstruction(13).

The Enhanced Recovery after Surgery group proposed a range of preventive actions to minimize POI. These measures encompass avoiding bowel preparation, shortening preoperative fasting, opting for laparoscopic procedures, not using abdominal drains, restricting IV fluids, and promptly removing the nasogastric tube and bladder catheter(7).

Identification of individuals with increased susceptibility to experience PI before surgery could enable the implementation of specific interventions for this subgroup(14).

From a clinical perspective, there remains a necessity to detect and predict patients who are at risk of developing POI. Consequently, this study aimed to assess the incidence of postoperative PI and predictive factors that increase the likelihood of its occurrence in individuals who have undergone major abdominal surgeries.

1.3 Justification of the Study

Most of the studies done to determine post-operative ileus were in advanced settings with video-assisted Surgeries (laparoscopy), preoperative epidurals and laxatives, and electronic bowel preparation with all factors that decrease the incidence of ileus.

Regardless of the different strategies that have been combatted to prevent the incidence and complications of POI, the problem and its burden are still higher in resource-limited areas which necessitate studies to determine the incidence and predictors of POI in our setting. Conducting this study in our setting with resource constrain area might also provide baseline data.

Furthermore, as far as our search for Evidence from different literatures there is no previous study done in this study area in Ethiopia. And previously done systematic review also recommended setup base studies on ileus(14).

2. LITERATURE REVIEW

Ileus is a frequently encountered medical condition where the natural rhythmic movements of the digestive system become nonfunctional. This happens without any physical blockage, and in most cases, it doesn't necessitate surgical intervention. It is often observed after surgical procedures and is considered an expected bodily reaction to abdominal surgery(15).

A retrospective cohort study was conducted in the United States on a total of 17,876 patients with a procedure of colectomy showed that 3,115 (17.4%) patients had a secondary diagnosis of POI, including paralytic ileus only (n=1,216, 6.8%), digestive system complications only (n=383, 2.1%), and both paralytic ileus and digestive system complications (n=1,516, 8.5%;). The study showed that postoperative ileus occurs in approximately 17% of the colectomy surgeries performed in the hospitals which represents approximately one-sixth of hospital discharges in the United States. The rates of postoperative ileus vary from 4%-75% in studies reported in the literature for abdominal surgeries(9).

Another study conducted in the United States showed that of 27,560 patients who underwent colon resections, 12.7% experienced POI. Those with ileocolonic anastomosis (ICA) had a higher risk (15%) compared to colorectal anastomosis (CRA) patients (11.5%). The study concluded that Prolonged ileus was linked to intra-abdominal infections and anastomotic leakage, while factors like preoperative sepsis, disseminated cancer, and chronic obstructive pulmonary disease increased the risk. In contrast, oral antibiotics, bowel preparation, and laparoscopic surgery reduced the risk(16).

Likewise, a retrospective cohort study which was conducted in 2017 in Moscow, involving 300 patients who had abdominal surgeries, showed that 13% of them developed POI. The study identified several independent risk factors through multivariate logistic regression, including a BMI of ≥26 kg/m² ($p = 0.008$), opioid use ($p = 0.04$), a history of previous abdominal surgery ($p = 0.04$), and the presence of adhesions ($p = 0.03$)(17).

A Retrospective cohort study was conducted in Japan. The result showed that 48 patients (13.5%) from the total of 356 patients developed POI. It was more prevalent in male patients (72.9% vs 51.2%, $P < 0.01$). The study stated that male sex, poor Physical Status, and intraoperative fluid balance were associated with POI development. Patients with a decreased Physical Status often

have extended bed rest. Holte et al. have highlighted that extended bed rest can lead to POI, while fast recovery can mitigate it. Yet, there's no proof suggesting that increased ambulation prevents POI. The reason for POI in patients with poor, Physical Status like those confined to bed, might be linked to minimal food intake and inadequate pain management (since they might struggle to communicate pain), rather than reduced mobility(7).

In contrast, a study conducted by Mao et al. in New Zeeland showed from 325 total surgical patients 27% (88) developed ileus. The result showed that POI significantly increased the median cost of hospital stays by 71%, even when accounting for other factors driving healthcare costs. All hospital departments incurred higher expenses due to increased nursing care, blood tests, laboratory work, radiology, and allied health services for patients with POI (18).

Another prospective cohort study was done in Russia. 300 patients were included with demographic, surgical, and perioperative data. The majority (82.3%) had open surgeries, and postoperative ileus (POI) occurred in 13% or 39 out of 300 patients. Male gender, age under 64, and BMI ≥ 26 kg/m^2 were associated with a higher risk of POI. Moderate and heavy drinking were initially linked to POI but lost significance in multivariate analysis(17).

Another study conducted in Japan which was a prospective cohort study showed that of 841 patients undergoing major abdominal surgery, 8.8% developed POI. Factors independently predicting POI included smoking history, colorectal surgery, and open surgical approach. A predictive nomogram using these factors exhibited good discrimination (concordance index 0.71). Notably, patients with a smoking history undergoing open colorectal surgery had a 19.6% probability of POI. The study stated the importance of these factors in identifying patients at risk for POI after major abdominal surgery(19).

In a systematic review and meta-analysis conducted in Colombia, 42 out of 64 studies were analyzed, involving 29,736 patients (51.84% male, mean age 62). Among them, 2844(9.56%) developed POI. Notable risk factors for POI were male gender, older age, cardiac comorbidities, prior abdominal surgery, laparotomy, and ostomy created(20).

In a retrospective review which was conducted in Australia among 255 patients who had undergone elective colorectal resections the incidence of POI was 19.6 %. Increasing age and increasing drop in pre- to postoperative hemoglobin were identified as independent predictors of POI. Other factors

that show significant associations are mean equivalent daily opiate dose, Procedure type, preoperative creatinine, highest post-operative white cell count, and lowest post-operative sodium although they were not found to be independent predictors on logistic regression(21).

A systematic review conducted in the United States revealed that after elective colorectal surgery, the incidence of POI is between 10% to 30% of patients. The study strongly suggests that using minimally invasive surgical techniques and employing multi-pronged pain management strategies can reduce the likelihood of POI development. However, the use of epidural analgesia does not appear to have a significant impact. The review concluded that certain interventions, such as chewing gum, alvimopan, Transversus Abdominis Plane blocks, and Enhanced Recovery After Surgery protocols, may have a positive effect in reducing POI among specific patient groups undergoing elective colorectal surgery and accelerating the return of bowel function(8).

Abdelrahman, et al. conducted a prospective study on 499 participants in Saudi Arabia and discovered that the incidence rate of POI was 12.4%. The rate was higher in females than males. At the same time, patients who underwent Gastro-Intestinal surgery, and who had emergency surgeries also showed statistically higher incidence. The study showed that BMI>25, Cardiac disease, history of previous surgery, ASA class>3, history of chemotherapy, preoperative hypoalbuminemia, Gastro-Intestinal surgery, emergency surgery and postoperative length of stay more than 72 hours were independent predictive factors for POI(22).

In a cross-sectional study conducted in neighboring Kenya, the incidence of POI in patients who underwent abdominal surgery was found to be 10.7% among a total of 243 patients. The factors that had a positive association with the development of POI were a history of prior abdominal surgery, intestinal surgery, abdominal soiling, and high-grade complications. But the strongest association was found in high-grade complication(23).

Conceptual framework

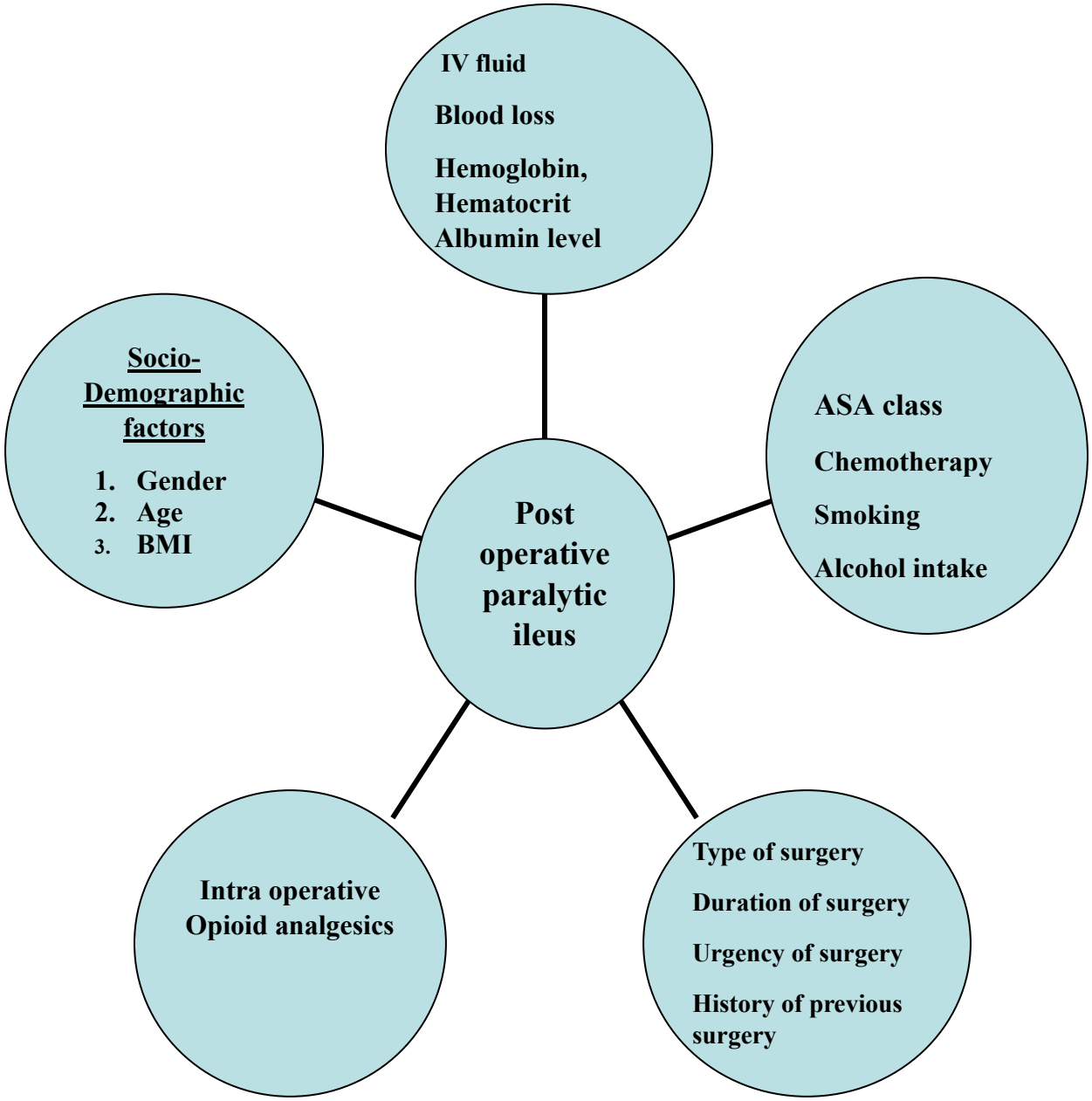

Figure 1. conceptual frame work on showing the factors affecting post operative paralytic ileus

Conceptual frame work (19) (20)

3. OBJECTIVE OF THE STUDY

3.1. General Objective

To Assess the incidence and predictors of postoperative paralytic ileus after major abdominal surgery at selected government hospitals in Addis Ababa, Ethiopia, 2023/24

3.2. Specific Objective

To assess the Incidence of post-operative paralytic ileus after abdominal surgery at selected governmental hospitals

To identify predictors of post-operative paralytic ileus after abdominal surgery at selected government hospitals

To assess the duration of postoperative paralytic ileus among patients who had developed postoperative paralytic ileus at selected government hospitals

4. METHODOLOGY

4.1. Study Area and Period

The study was conducted between February 1 – April 30 2024 GC at selected Governmental Hospitals in Addis Ababa, the capital city of Ethiopia. 13 public and 46 private hospitals are found in Addis Ababa. Three governmental hospitals were selected purposely by their case flow taken from situational analysis for this study. These are Menelik II comprehensive specialized Hospital (MIICSH), Yekatit 12 hospital medical college(Y12HMC), and Tikur Anbessa Specialized Hospital (TASH).

MIICSH is one of the well-known and oldest public hospitals in Addis Ababa. Today the hospital is operated by the Ethiopian Ministry of Health. The hospital surgery department provides all general, thoracic, urological, gynecological, orthopedics, and ophthalmic surgeries, and now 135 beds 8 operation rooms are available, and one Post Anesthesia Care Unit.

TASH is found in Addis Ababa, Ethiopia which is a major referral and teaching hospital in the nation providing comprehensive healthcare services. The hospital has 800 beds, with more than 130 specialists and 50 nonteaching doctors. It offers diagnostic testing and treatment for approximately 370,000–400,000 patients per year.

Y12HMC is a public hospital located in Addis Ababa Ethiopia. It has a capacity of 500 beds and offers a wide range of medical services including general medicine, surgery, pediatrics, obstetrics and gynecology, and more. The hospital has also a specialized department for cancer treatment, cardiac care, and neurology. It is known for its high-quality healthcare service and is a popular choice for both locals and foreigners.

4.2. Study Design

A multi-center longitudinal study was conducted in selected Governmental hospitals in Addis Ababa

4.3. Source and Study Population

4.3.1. Source Population

- All patients who underwent abdominal surgeries at selected governmental hospitals.

4.3.2. Study Population

- All patients who underwent abdominal surgeries at the selected governmental hospitals during the study period

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria:

- Adults age > 18 years old
- Patients who underwent both elective and emergency major abdominal surgery during the study period and who are willing to participate.

4.4.2. Exclusion Criteria:

- Patients who had confirmed anastomotic leak
- Peritonitis or abdominal abscess.
- Known psychiatric disease, Impaired mental state
- Patients who are on mechanical ventilators postoperatively
- Need for a stoma (colostomy or ileostomy)
- Patients who need reoperation during the assessment period

4.5. Sample Size Determination

The sample size was calculated by using a single population proportion formula

$n = Z^2_{1-\alpha/2}P(1-P)/d^2$, where,

n = sample size

$Z^2_{1-\alpha/2}$ = confidence interval

P = estimated proportion

d = desired precision

A previous study done in Kenya shows that the incidence of postoperative paralytic ileus was 10.7%(23).

At a 95% confidence interval, the sample size was found to be 147 considering a 10% non-response rate the total sample size will be 162 study subjects.

From situational analysis, the total number of major abdominal surgeries done at three hospitals was (N =1067) patients. The total number of major abdominal surgeries in the last three months at MIICSH, TASH, and Y12HMC were 216, 545, and 306 respectively. The study populations were taken from each hospital with a proportion allocation formula by dividing the number of surgeries in each hospital by the total number of surgeries at three hospitals multiplied by the sample size (n = 184). So, the final study population that was selected from three hospitals will be 33, 83, and 46 at MIICSH, TASH, and Y12HMC respectively.

Table 1. Proportion allocation

All governmental hospitals in Addis Ababa		
Selected by Case flow		
MIICSH	TASH	Y12HMC
Patients who underwent major abdominal surgeries in the last 3 months		
216	545	306
Proportional allocation		
33	83	46
Total sample size 162		
With Systematic random sampling, 1 patient in every 6 patients who underwent surgery was taken		

4.6 Sampling Technique and Procedure

From situational analysis and registry book of Operating theatre information was taken about patients who underwent abdominal surgery over the past 3 months.

Proportional allocation was applied for respective hospitals after the hospitals were selected by lottery method and the data was collected with a systematic random sampling technique. Out of 345 patients who had major abdominal surgery, 143 patients were excluded from the study because of diagnosis of peritonitis and surgical procedure of laparoscopy and colostomy, 5 patients were not willing to participate in the study, 10 patients were on mechanical ventilator and 3 patients had postoperative delirium and psychiatric illness. So, only 184 patients who underwent major abdominal surgery were found during the study period and all of them were included in the study.

4.7. Variables

4.7.1. Dependent Variables

Post-operative paralytic ileus

4.7.2. Independent Variables

Socio-demographic variables (Age, gender, BMI), ASA class, comorbid diseases, chemotherapy History of Alcohol Abuse, cigarette smoking, Surgical approach, blood loss, perioperative Hemoglobin and Hematocrit, albumin level, electrolyte, duration of surgery, urgency of surgery, fluid management, and opioid usage.

4.8. Data Collection Plan and Instruments

Before data collection, data collectors were selected from the BSc anesthetists, anesthesia residents, and nurses then training was given. The data collection procedures include chart review, patient interview, and prospective observational checklist questionnaire.

The data was collected by 6 selected and trained Anesthesia professionals and professional nurses after getting written informed consent from each patient by using a pretested written questionnaire which include preoperative, intraoperative, and postoperative parts. Data collectors were provided with a one-day training covering the purpose of the study, questionnaire content, and field procedures.

4.9. Data Quality and Control

To ensure the quality of data, a pre-test was conducted for each data collector to familiarize him/herself with the data extraction tool on 5% of the samples not included in the main study. Data was checked for completeness, accuracy, and clarity on the day of collection by the principal investigator. Data clean-up and crosschecking were done before analysis. Supervision was done by the principal investigator.

4.10. Data Analysis

Once data was collected it was analyzed using statistical package software for social science version 26. Categorical data were reported as absolute numbers and analyzed using the chi-square test. Normally distributed data were reported as mean ± standard deviation. Non-normally distributed data were reported as the median Interquartile range.

Binary logistic regression was the analysis model. Bivariate and multivariate logistic regression was used to explore the association between dependent and independent variables. Multivariate logistic regression was performed using factors with $P < 0.2$ in the bivariate analysis. From multivariate logistic regression $P<0.05$ was taken as independent predictors.

The data is expressed as odds ratios and 95% confidence intervals [CIs].

For the data goodness of fit, the Hosmer and Lemeshow tests were done and it was 0.818.

Multicollinearity was checked by Variance Inflation Factor and Tolerance and the results were <10 and >0.1 respectively.

Data was checked for outliers and there was no outlier found. Durbin Watson range Test was done to check the independency of observations and it was between 1.5 and 2.5.

4.11. Operational Definitions

- Postoperative paralytic ileus was defined as failure to pass flatus or stool for more than 3 days postoperatively, (24).
- Intolerance is defined as the presence of nausea and vomiting, abdominal distension on physical examination.

- Time to the first bowel movement: time from the end of surgery until the first passage of flatus recorded.
- Time of the first flatus: time from the end of surgery until the first passage of flatus recorded.
- Major abdominal surgeries are defined as gastrointestinal and colorectal surgeries(4).
- Alcohol dependent: more than 2 bottle drinks per day
- Minimal alcohol intake: less than 2 bottles of drinks per day.

4.12. Ethical Considerations

Before data collection, a Letter of permission and ethical clearance was obtained from AAU College of Health Sciences, Ethical Review Board for TASH, and from Addis Ababa Public Health and Emergency Management Directorate ethical clearance committee for MIICSH and Y12HMC after reviewing the proposal. Then it was given to study area administration.

Confidentiality was maintained at all levels of the study by avoiding identifiers and using medical Identification numbers to identify participants. Information obtained was used only for study purposes and the privacy of every patient's information was confidential. The data was collected by 6 selected and trained Anesthetists and professional nurses after getting written informed consent from each patient. After data collection, it was accessed only by Principal Investigator.

4.13. Result Dissemination Plan

The results of the study will be submitted to TASH Department of Anesthesia. It will be presented to AAU College of Health Science, Department of Anesthesia for the partial fulfillment of the degree of Master of Anesthesia and is expected to be presented at the annual research conference of AAU. Efforts will be made to send to national & international reputable journals for publication.

The findings will further be disseminated to administrative bodies of the hospital and policymakers at the national level through presentations and discussions.

5. RESULT

5.1. Sociodemographic And Behavioral Characteristics of Study Participants

The study comprised a total of 184 patients who underwent major abdominal surgeries. Of those majority were female 105(57.1%) and the mean age was 46.2 ± 15.81 years. The majority of patients had a normal BMI 124(67.4%). More than half of the patients 148(80.4%) had no history of previous abdominal surgery. 154(83.7%) of patients were not alcohol drinker and 139(75.5%) were nonsmoker. 96(52.2%), 71(38.6%) and 17(9.2%) of patients had ASA physical status classification score of 1, 2, and >= 3 respectively.

Table 2. List of Sociodemographic and Behavioral Characteristics of patients who underwent major abdominal surgery at selected hospitals, Feb1 -April 30, 2024

Variables	Frequency	Percentage
Age (in Years)		
18-35	54	29.3
36-55	78	42.4
>=56	52	28.3
Sex		
Male	79	42.9
Female	105	57.1
BMI		
Normal	124	67.4
Underweight	14	7.6
Overweight	46	25
History of Alcohol Intake		
Yes	30	16.3
No	154	83.7
History of Cigarette Smoking		
Yes	45	24.5
No	139	75.5
History of previous abdominal surgery		
Yes	36	19.6
No	148	80.4
ASA		
1	94	51.09
2	71	38.59
>=3	19	10.33

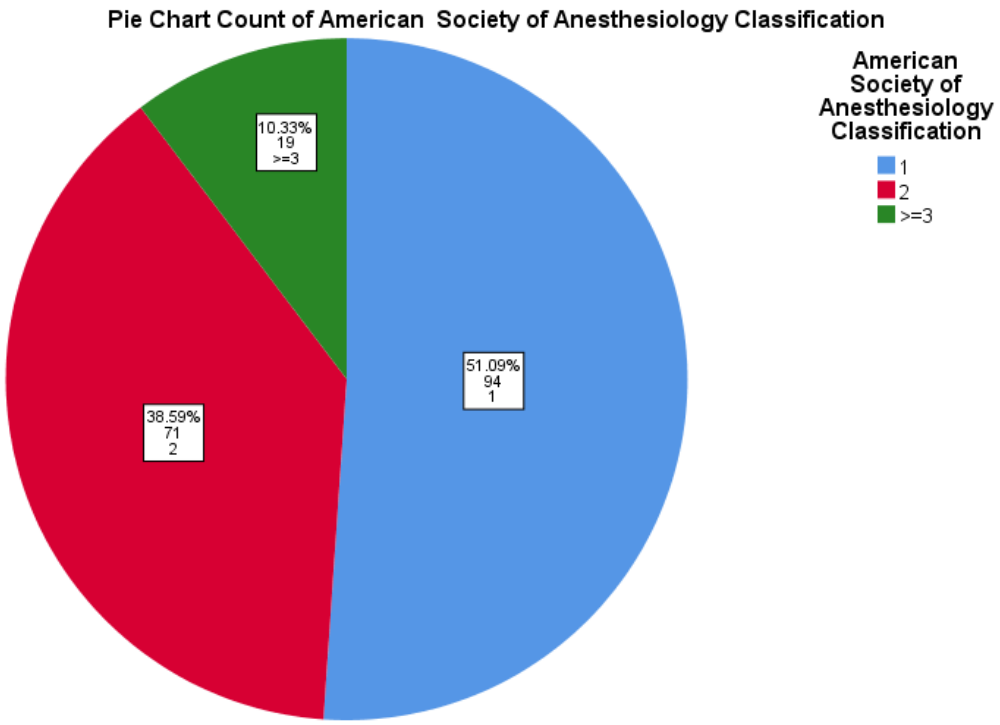

Figure 2. Pie chart on ASA status of the participant before surgery

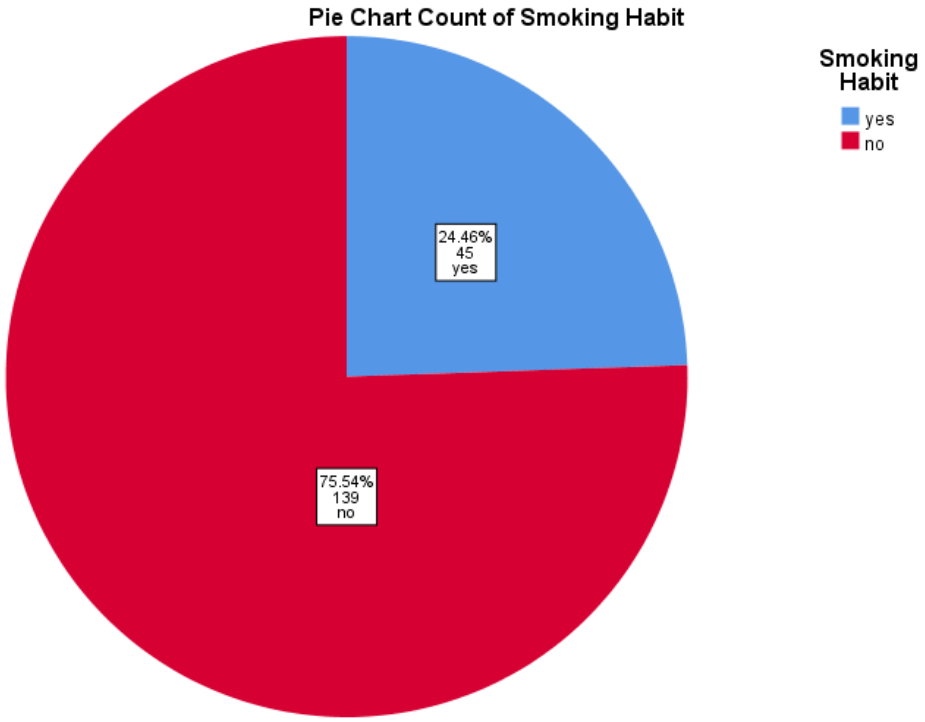

Figure 3 the pie chart on a smoking habit of study participant

5.3. Preoperative Measures for Study Participant

The majority of patients 148(80.4%) had no history of bowel preparation before the surgery. The rest 36% had bowel preparation of which enema consisted of 47.4%, use of castor oil 31.6%, and NPO 21.1%. More than half of the patients 159(86.4%) were not on chemotherapy before the operation.

Table 3. List of Preoperative Measures Taken for patients who underwent major abdominal surgery at selected hospitals, Feb1 -April 30, 2024

Variables	Frequency	Percentage
Preoperative bowel preparation		
Yes	36	19.6%
No	148	80.4
Type of bowel preparation		
Enema	16/36	8.7/19.6%
Castor Oil	14/36	7.6/19.6%
NPO	6/36	3.3/19.6%
Chemotherapy		
Yes	25	13.6
No	159	86.4

5.4. Diagnosis, type, urgency, and duration of surgery

129(70.1%) of patients were scheduled as elective cases. Of those 40(21.7%) patients were diagnosed with cholelithiasis and Bowel resection and gastrectomy was done for 42(22.8%) patients. 47(25.5%) of cases took 3 and above hours. The mean duration of surgery was 2.33 $\pm$ 1.26.

Table 4. List of Diagnosis, type, urgency, and duration of surgery of patients who underwent major abdominal surgery at selected hospitals, Feb1 -April 30, 2024

Variables	Frequency	Percentage
Urgency of surgery		
Emergency and semi-elective	55	29.9
Elective	129	70.1
Diagnosis		
Colorectal and Gastric cancer	34	18.5
Obstruction	38	20.7
Cholelithiasis	40	21.7
Obstructive Jaundice and Cholecystitis	38	20.7
Others	34	18.5
Type of surgery		
Bowel resection and gastrectomy	42	22.8
Common bile duct exploration and others	47	25.5
Laparotomy	42	22.8
Cholecystectomy	53	28.8
Duration of surgery(hour)		
<3	137	74.5
>=3.01	47	25.5
	48	

5.5. Estimated blood loss (EBL), Need of Blood Transfusion and Total Intravenous Fluid (IV)

More than half 102(55.4%) of patients had EBL between 100 and 500 milliliter(ml) and 20(10.9%) had EBL of more than 500 ml. Regarding blood transfusion 24(13%) of patients were transfused a cross-matched blood. 101(54.9%) of patients took a total IV fluid of less than 3000ml.

Table 5. List of Estimated blood loss (EBL), Need of Blood Transfusion, and Total Intravenous Fluid (IV) of patients who underwent major abdominal surgery at selected hospitals, Feb1 -April 30, 2024

Variables	Frequency	Percentage
EBL (in ml)		
<=100	62	33.7
101-500	102	55.4
>=501	20	10.9
Blood transfusion		
Yes	24	13
No	160	87
Total IV fluid		
<=3000	101	54.9
>=3001	83	45.1

5.6. Investigations of participant

Hemoglobin, electrolyte, and albumin levels of the patients were included in the study. 38(20.7%) patients were anemic. Hypoalbuminemia was found in 38(20.7%) patients. Electrolyte abnormality was detected in 47(25.5%) of patients of those 16.3% were hypokalemic.

Table 6. List of Investigations of patients who underwent major abdominal surgery at selected hospitals, Feb1 -April 30, 2024

Variables	Frequency	Percentage
Hemoglobin		
Anemia	38	20.7
	146	79.3
Normal		
Electrolyte abnormality		
Yes	47	25.5%
No	137	74.5
Which electrolyte		
sodium	22/47	9.2/25.5%
potassium	25/47	16.3/25.5%
Albumin level		
Hypoalbuminemia	38	20.7
Normal	146	79.3

5.7. Postoperative Follow-ups

The study showed that 26(14.1%) patients had developed POI.

The minimum time to first flatus was 5 hours (hr.) and the maximum was 192 hours (8 days) with a median duration of 5 days.

During the immediate postoperative period, 19(10.3%) of patients developed nausea and vomiting but none of the patients had a history of abdominal distension. On the first Postoperative Day (POD) 22(12%) of patients had developed nausea and vomiting and 13(7.1%) of patients had abdominal distension. 26(14.1%) of patients had developed nausea and vomiting and 23(12.5%) had abdominal distension on second POD. There were 36(19.6%) patients who had nausea and vomiting and 27(14.7%) patients who had abdominal distension on third POD.

There was a need to insert a Nasogastric tube in 26(14.1%) patients postoperatively. Regional block was done in 88(47.8%) patients. The three days mean pain score was 3.63± 1.84. 37(20.1%) of patients Who took more than 50 mg of opioid (with equivalency dose of morphine). 96(52.2%) of patients took more than 50mg morphine equivalence dose of opioid.

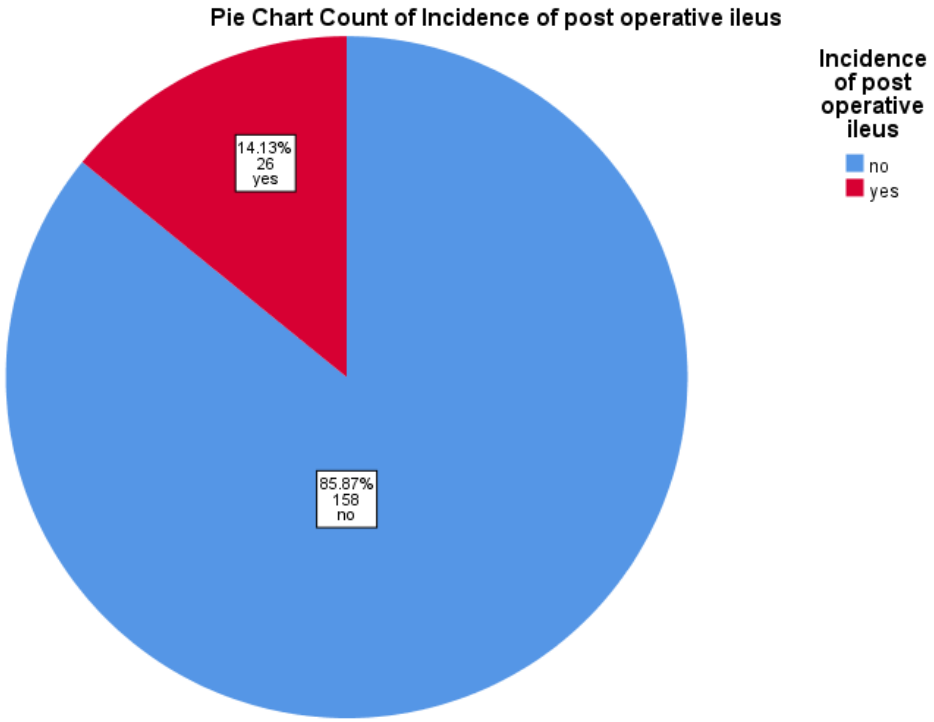

Figure 4. The pie chart on the incidence of postoperative ileus

5.8. Predictors of postoperative paralytic ileus

The bi-variable logistic regression showed that ASA, surgical procedure, chemotherapy, cigarette smoking, electrolyte abnormality, total IV fluid intake, and total opioid intake were associated with POI at a P-value<0.2 and were candidates for multivariable logistic regression.

Smoking cigarettes, total IV fluid intake, electrolyte derangement, and total opioid intake were strong predictors of POI after running into multivariable logistic regression.

Table 7. List of Predictors of postoperative paralytic ileus of patients who underwent major abdominal surgery at selected hospitals, Feb1 -April 30, 2024

Variable	Category	Incidence of POI		Crudes Odds Ratio (95%CI)	AOR (95%CI)	P value
		No (N, %)	Yes (N, %)			
ASA	1	88(55.7)	6(23.1)	1	1	
	2	55(34.8)	16(61.5)	4.267(1.574-11.562)	3.153(0.896-11.094)	0.074
	>=3	9.5(15)	4(15.4)	3.911(0.985-15.524)	2.653(0.393-17.916)	0.317
Smoking habit	Yes	30(19)	15(57.7)	5.818(2.428-13.939)	3.729(1.217-11.422)	0.021
	No	128(81)	11(42.3)	1	1	
Surgical procedure	Bowel resection and gastrectomy	27(17.1)	15(57.7)	9.259(2.461-34.836)	3.916(0.795-19.291)	0.93
	CBD exploration and others*	43(27.2)	4(15.4)	1.55(0.329-7.315)	1.214(0.197-7.491)	0.835
	Laparotomy	38(24.1)	4(15.4)	1.754(0.370-8.309)	1.350(0.244-7.472)	0.731
	Cholecystectomy	50(31.6)	3(11.5)	1	1	
Chemotherapy	Yes	17(10.8)	8(30.8)	3.686(1.393-9.754)	1.459(0.380-5.597)	0.582
	No		18(69.2)	1	1	

		141(89.2)				
Electrolyte derangement	Yes	32(20.3)	15(57.7)	5.369(2.251-12.808)	4.154(1.363-12.660)	0.012
	No	126(79.7)	11(42.3)	1	1	
Total IV fluid	<=3000	93(58.9)	8(30.8)	1	1	
	>=3001	65(41.1)	18(69.2)	3.219(1.32-7.848)	3.974(1.210-13.059)	0.023
Total opioid intake-	<=50mg	89(56.3)	7(26.9)	1	1	
	>=51mg	69(43.7)	19(73.1)	3.501(1.393-8.801)	4.615(1.426-14.940)	0.011

- Hepatectomy, lateral sectionectomy,,adhesion and band release

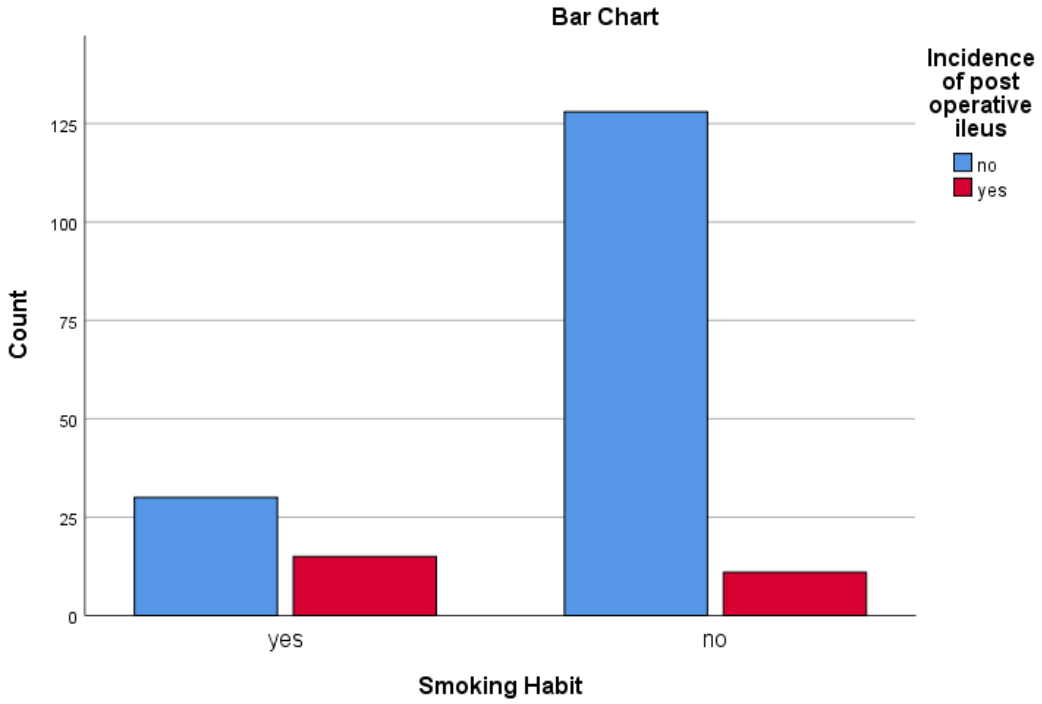

Figure 5. Cross tabulation result of smoking and incidence of POI

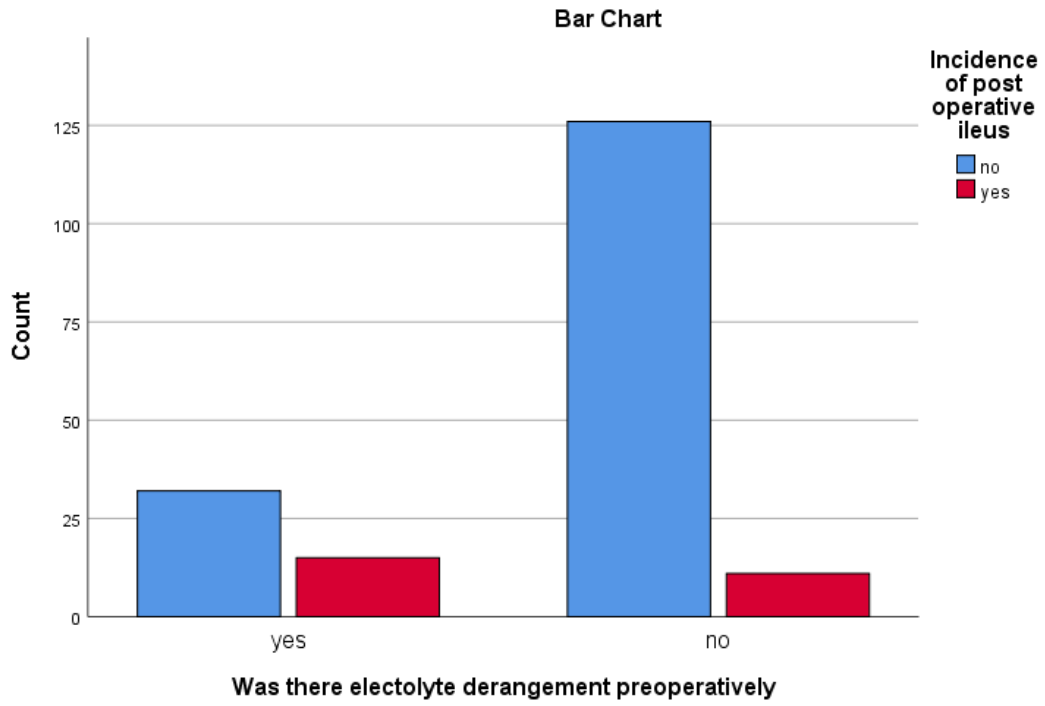

Figure 6. Cross tabulation result of electrolyte derangement and POI

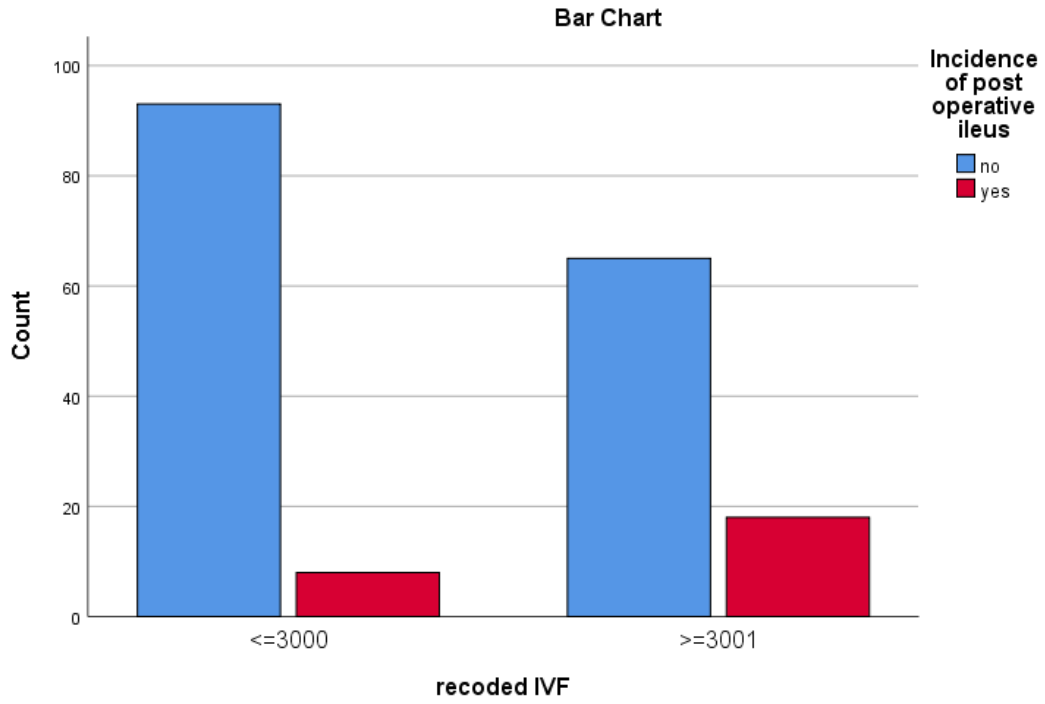

Figure 7. Cross tabulation result of IV fluid and POI

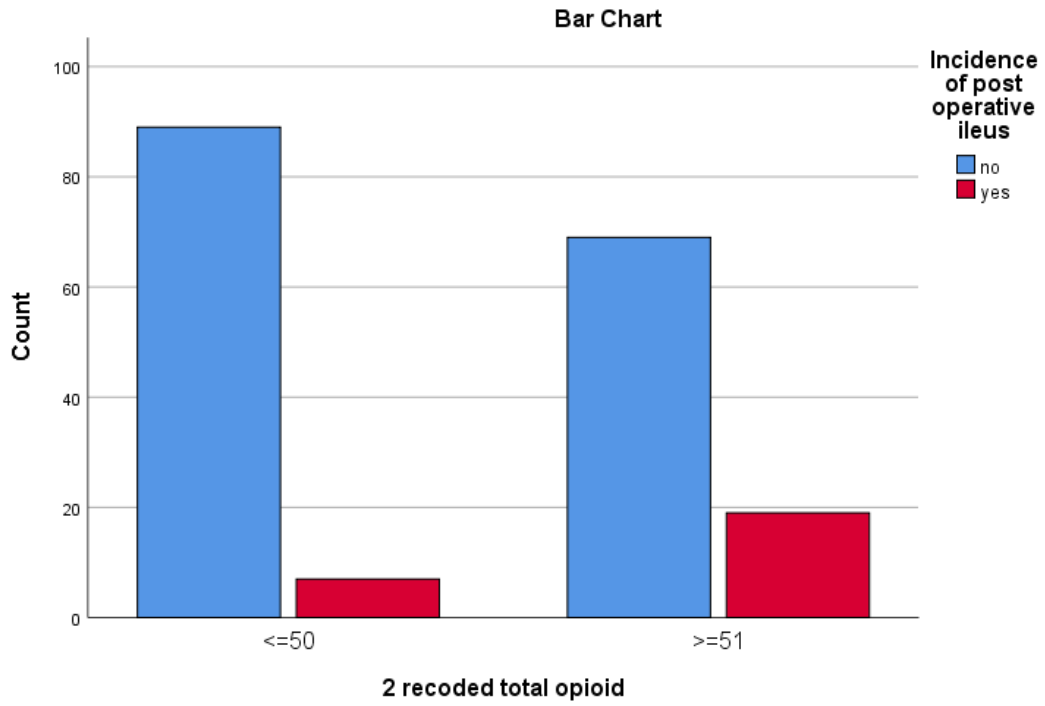

Figure 8.Cross tabulation result of total opioid intake and POI

6. DISCUSSION

In this multicenter study, the incidence and predictors of POI after major abdominal surgeries at 3 selected hospitals were assessed. The incidence of POI after major abdominal surgeries was 14.1%.

The current study was similar to other studies done in the United States which shows that the incidence of POI in major abdominal surgical patients was 14%(25). Similarly, the incidence of POI in this study is comparable with some studies; a study conducted in Japan found that the incidence of POI was 13.5% (7), another study done in Russia found that the incidence of POI was 13%(17). The results are also supported by a study done in Saudi Arabia and the United States where the incidence of POI was 12.4% and 12.7% respectively(22)(26).

However, the incidence was higher when compared to another study done in Japan with an 8.8% incidence of POI (19), and Colombia with incidence of 9.56%(20). Using minimally invasive surgical techniques, employing multi-pronged pain management strategies and the difference in definition for diagnosing POI could be the reason for this difference.
On the other hand, the incidence was lower when compared with the result of the study carried out in New Zeeland the incidence of POI was 27 %(27). A similar study conducted in the United States found the incidence of POI to be 24%(28). The reason for this variation could be explained by a difference in the type of surgery included in the study since patients with colorectal cancer have an increased risk of POI and a difference in sample size.

Our study found 4 independent predictive risk factors for POI which are Smoking cigarettes, total IV fluid intake, electrolyte derangement, and total opioid intake.

Our result showed that Patients with electrolyte derangement are 4.1 times (AOR=4.154, 95% CI 1.363-12.660) more likely to develop POI. Cigarette smokers have a 3.7 {AOR=3.729, CI (1.217-11.422) higher risk of developing POI than patients who are nonsmokers. The odds of having POI were 4.6 times (AOR=4.615, 95% CI 1.426-14.940) higher among patients who had taken a total opioid dose of more than 50 mg than among those who took less than 50mg of total opioid. Patients who took a total IV fluid of more than 3000 ml have 3.9 times (AOR=3.974, CI 1.210-13.059) higher risk of developing POI than patients who took less than 3000ml of total IV fluid.

Smoking history was our independent significant predictor. Our study showed that being a smoker can increase the incidence of POI by 3.7 times. Our study is supported by a study done in Japan Tokyo(19).

This can be explained by the potential effect of smoking on the reduction of arterial blood flow which can negatively affect tissue oxygenation of the gastrointestinal tract. A clear mechanism has not been fully explained yet(29).

Electrolyte imbalance is one of our independent significant predictors. Patients with electrolyte imbalance have 4.1 times more risk of developing POI. A study by Abdelrahman et al. supported this result.

The possible explanation for this could be linked to the signs and symptoms of electrolyte imbalance which includes mental depression, weakness, and muscle paralysis which is noticed in more severe deficits can impair Gastro Intestinal motility and commonly lead to POI, the exact mechanism by which it can cause POI is unknown yet(22).

Our study showed that having POI is high (4.6 times) in patients who took more than 50 mg total dose of opioid (morphine equivalence) when in comparison with patients who took less than 50 mg total dose of opioid. A study done in Canada found a strong association between POI and receiving IV opioids(29). Similarly, another study conducted in Russia also found opioid medications as a significant predictor for POI(17).

The use of opioid analgesics is known to affect the return of normal bowel function after surgery. The mechanism behind this is that impaired movement of the intestines is caused by the activation of peripheral m-opioid receptors which are located in the myenteric plexus. These receptors inhibit the release of acetylcholine and increase the tone of smooth muscles. Dysmotility of the gut due to opioids is believed to be a major factor in the development of postoperative gut dysfunction(30).

Taking more than 3000ml of IV fluid perioperatively is an independent significant predictor of POI. Patients who took IV fluid >3000ml have a higher risk (3.9 times) of developing POI than patients who took <3000ml. A study conducted by Vather et al. showed that IV fluid is a significant risk factor for the development of POI, with a 1.5-fold increase in risk for each liter administered (30). The result of this study is in line with our Study.

This strong association between perioperative fluid delivery and POI could be explained by the impairment of Gastro-Intestinal Tract function. This impairment in contractility and mobility might be caused by either the occurrence of edema on the gut wall or local electrolyte derangement from the perioperative fluid delivery(31)**.**

In our study, the median duration for POI after its clinical diagnosis was 5 days (range 4hr–8 days). In another study done in Saudi Arabia the median duration for POI of 4.5 days(22). Similar to this a study by Vather et al showed that the median duration for POI following its clinical diagnosis was 4 days(21). These results are in line with ours. These may be associated with the usage of the same assessment tool for the diagnosis of POI.

7. STRENGTH AND LIMITATION OF THE STUDY

Strength

The study was multicentered.

As far as our search there is no research conducted on this topic in our country so it can provide baseline information for further Research.

Limitation

The definition of POI is highly variable and is not consistent with one another which can affect the incidence and mean duration of POI

We didn't examine some other predictive factors that have been reported in other studies because they are not routinely done in our setup. Example use of Epidural analgesia.

8. CONCLUSION

POI commonly occurs following major abdominal surgeries with an incidence of 14.1% and with a median duration of 5 days after its clinical diagnosis. The risk of POI is increased in patients with electrolyte imbalance, in patients who take more than 3000ml of Intravenous fluid, in patients who take >50mg opioid, and in cigarette smokers in selected governmental hospitals in Addis Ababa Ethiopia.

These associations shed light on possible predictors that could be modified perioperatively in patients identified as having risk factors for POI. Paying close attention to these predictors may play a crucial role in both preventing and managing POI effectively.

9. RECOMMENDATION

Based on the findings of this study, we forwarded the following recommendations

For the surgical and anesthesia team

- The incidence of POI is high: early assessment is recommended
- Target-specific interventions are recommended among patients with electrolyte imbalance and for smokers
- Protocols for perioperative fluid management and usage of opioid analgesia

For Researchers

- Further studies are recommended by including other variables like epidural analgesia

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11. ANNEXES

ANNEX 1: Information sheet English version

Information sheet

Greetings: Good morning/afternoon!

Hello. My name is----------. I am a data collector for a master's in advanced clinical anesthesia student at Addis Ababa University. The research will be conducted to assess the incidence and predictors of post-operative paralytic ileus after major abdominal surgeries in Tikur Anbesa Specialized Hospital, Minilik II Specialized Comprehensive Hospital, and Yekatit 12 Hospital Medical College. The benefits, procedure, and what is expected from you will be explained in the following sections.

Objective of the study: To assess incidence and predictors of post-operative paralytic ileus after major abdominal surgeries in Tikur Anbesa Specialized Hospital, Minilik II Specialized Comprehensive Hospital, and yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia.

Study procedures: You will be asked a set of questions using a structured questionnaire. The study also involves a face-to-face interview. After signing the consent form, you will then be asked relevant questions and your responses will be written on the questionnaire. The interview will take about 10 minutes a day and may continue up to 3 or more days postoperatively.

The benefit of the study: There will not be any incentives that will be given. But when you participate in this study you will have long and short-term benefits. Short-term benefits are you will discuss your major issues associated with postoperative paralytic ileus. The long-term benefit would be, that the result of the study will be useful to maintain evidence-based care of post-operative ileus and reduce complications related to ileus, furthermore improving quality of surgical outcomes. This could be very beneficiary for the patients and also for the overall community.

Risk (harm) of the study: when you participate in this study it's believed the risks to be rare. You might feel discomfort when talking about your illness and part of your time

will be consumed to answer the questions.

Rights of Participants: You have a full right either to participate or refuse as well as to quit in the middle or at any time you want after you start participating in this study. You can ask any question which is not clear to you.

Protection of privacy during data collection and analysis: Data collectors will be trained and supervised by the principal investigator. Any data with personal information will be handled with confidentiality, and the privacy of subjects respected at all stages of the project. Respondents' privacy will be respected through the informed consent process and the procedures during the data collection. Personal identifiers (including names) will not be recorded. Primary data will be handled only by the researchers. During data analysis, again data will be stored through a password-protected system and data will be analyzed using codes, without personal identifiers.

Data Sharing: During the study only the study Principal Investigators will have access to the study data including consent documents.

If you have any questions about all the things I explained to you now please forward them before we proceed to the next step.

Are you willing to participate in the study?

1- Yes…… (take informed consent)

2- No (I do not want to participate) …… (Thank you)

Annex 2: Information sheet Amharic version

የመረጃ ወረቀት የአማርኛ ቅጂ

የመረጃ ወረቀት

ሰላም

ሀሎ. የኔ ስም ነዉ. በአዲስ አበባ ዩኒቨርሲቲ **የሁለተኛ ዲግሪ የአንስቴዝያ ተማሪ** ዳታ ሰብሳቢ ነኝ። ጥናቱ የሚካሄደው በጥቁር አንበሳ ስፔሻላይዝድ ሆስፒታል፣ ሚኒሊክ II comprehensive ስፔሻላይዝድ ሆስፒታል እና በየካቲት 12 ሆስፒታል ሜዲካል ኮሌጅ ከፍተኛ የሆድ ውስጥ ቀዶ ጥገና ከተደረገ በኋላ የድህረ ቀዶ ጥገና ፓራላይቲክ ኢሊየስ ክስተት እና ተቋሚዎችን ለመገምገም ነው። ጥቅሞቹ, ሂደቶች እና ከእርስዎ የሚጠበቁ ነገሮች በሚቀጥሉት ክፍሎች ይብራራሉ.

የጥናቱ ዓላማ፡- በጥቁር አንበሳ ስፔሻላይዝድ ሆስፒታል፣ ሚኒሊክ II comprehensive ስፔሻላይዝድ ሆስፒታል እና የካቲት 12 ሆስፒታል ሜዲካል ኮሌጅ፣ አዲስ አበባ፣ ከፍተኛ የሆድ ውስጥ ከተደረገ በኋላ የድህረ ቀዶ ጥገና ፓራላይቲክ ኢሊየስ ክስተት እና ተቋሚዎችን ለመገምገም።

የጥናት ሂደቶች፡- የተዋቀረ መጠይቅን በመጠቀም ጥያቄዎች ይጠየቃሉ። ጥናቱ የፊት ለፊት ቃለ መጠይቅንም ያካትታል። የስምምነት ቅጹን ከፈረሙ በኋላ ተዛማጅ ጥያቄዎች ይጠየቃሉ እና ምላሾችዎ በመጠይቁ ላይ ይፃፋሉ። ቃለ መጠይቁ በቀን 10 ደቂቃ ያህል ይወስዳል እና ከቀዶ ጥገና በኋላ እስከ 3 ወይም ከእዛ በላይ ቀናት ድረስ ሊቀጥል ይችላል።

የጥናቱ ጥቅም፡ የሚደረጉ ማበረታቻዎች ክፍያዎች አይኖሩም። ነገር ግን በዚህ ጥናት ውስጥ ሲሳተፉ የረጅም ጊዜ እና የአጭር ጊዜ ጥቅሞችን ያገኛሉ። የአጭር ጊዜ ጥቅማጥቅሞች ከቀዶ ጥገና በኋላ ፓራላይቲክ ኢሊየስ ጋር በተያያዙ ዋና ዋና ጉዳዮችዎ ላይ ይወያያሉ። የረዥም ጊዜ ጥቅሙ የጥናቱ ውጤት ከቀዶ ጥገና በኋላ ላሉት ኢሊየስ በማስረጃ ላይ የተመሰረተ እንክብካቤን እና የተወሳሰቡ ጉዳቶችን ለመቀነስ ጠቃሚ ይሆናል ፣ በተጨማሪም የቀዶ ጥገና ውጤቶችን ጥራት ለማሻሻል ይጥቅማል። ይህ ለታካሚዎች እና ለጠቅላላው ማህበረሰብ በጣም ጠቃሚ ይሆናል.

የጥናቱ ስጋት (ጉዳት)፡ በዚህ ጥናት ውስጥ ሲሳተፉ የከፋ ጉዳት እንደማያመጣዐ ይታመናል። ስለ ህመምዎ ሲናገሩ ምቾት ላይሰማዎት ይችላል እና ለጥያቄዎች መልስ ለመስጠት የተወሰነ ጊዜዎን ያጠፋሉ።

የተሣታፊዎች መብቶች፡ በዚህ ጥናት ውስጥ መሳተፍ ከጀመርክ/ሽ በኋላ ለመሳተፍ ወይም ላለመሳተፍ እንዲሁም በመሃል ወይም በፈለከው/ሽው ጊዜ የማቋረጥ ሙሉ መብት አለህ/ሽ። ለእርስዎ ግልጽ ያልሆነ ማንኛውንም ጥያቄ መጠየቅ ይችላሉ. በመረጃ አሰባሰብ እና ትንተና ወቅት የግላዊነት ጥበቃ፡ መረጃ ሰብሳቢዎች የሰለጠኑ እና የሚቆጣጠሩት በዋናው መርማሪ ነው። ማንኛውም የግል መረጃ በሚስጥር ነው የሚስተናገደው እና የርእሶች ግላዊነት በሁሉም የፕሮጀክቱ ደረጃዎች ይከበራሉ። በመረጃ የተደገፈ የስምምነት ሂደት እና በመረጃ አሰባሰብ ወቅት ባሉት ሂደቶች የተመላሾች ግላዊነት ይከበራል። የግል መለያዎች (ስም ጨምሮ) አይመዘገቡም። ዋናው መረጃ በተመራማሪዎቹ ብቻ የሚስተናገድ ይሆናል። በመረጃ ትንተና ወቅት፣ እንደገና ውሂብ በይለፍ ቃል የተጠበቀ ስርዓት ይከማቻል እና ውሂብ የግል መለያ ኮዶችን በመጠቀም ይተነተናል።

ዳታ መጋራት፡ በጥናቱ ወቅት የጥናቱ ዋና መርማሪዎች ብቻ የስምምነት ሰነዶችን ጨምሮ የጥናት መረጃን ያገኛሉ።

አሁን ስለገለጽኩላችሁ ነገሮች ማንኛውም አይነት ጥያቄ ካሎት ወደሚቀጥለው ደረጃ ከመሄዳችን በፊት yiteyku?

በጥናቱ ለመሳተፍ ፈቃደኛ ነህ/sh?

1- አዎ …… (በመረጃ የተደገፈ ፈቃድ ውሰድ)

2- አይ (መሳተፍ አልፈልግም) …… (አመሰግናለሁ)

Annex 3: Informed consent English version

Greeting

Hello, I am_____.and I am a postgraduate student at Addis Ababa University. For my final thesis, I am examining the research entitled "Incidence and Predictors of post operative paralytic ileus after major abdominal surgeries at selected governmental hospitals in Addis Ababa, Ethiopia".

We will ask you some questions which will take few minutes. We kindly request you to give us your sincere and truthful answer. All the information that you and other patients are going to provide us will remain confidential and you don't need to mention your name. You can refuse to respond to any of the questions and you can interrupt at any point in the interview. Do I have your permission to continue?

1. If yes, continue to the next page 2. If no, skip to the next participant

Informed consent Certified by;

Interviewer: Code _____Name_____ signature_____

Date of interview _____Time started _____Time completed_____

Result of interview:

A. Completed B. Respondent not available C. Refused D. Partially completed

Supervisor (Checked): Name _____Signature _____Date_____

Annex 4: Informed consent Amharic version

ሰላምታ

ሰላም፣ እኔ _____ ነኝ በአዲስ አበባ ዩኒቨርሲቲ የሁለተኛ ዲግሪ የአንስቴዝያ ተማሪነኝ፡፡የመመረቂያ ጽሁፌን “Incidence and Predictors of post operative paralytic ileus after major abdominal surgeries at selected governmental hospitals in Addis Ababa, Ethiopia” በሚል ርዕስ ላይ ጥና ትእያደረኩነው የምርምር ቡድን ውስጥ እየሰራሁ ነው።

የዚህ መጠይቅ አላማ በአዲስ አበባ ከተማ በተመረጡ የመንግስት ሆስፒታሎች ከፍተኛ የሆድ ውስጥ ቀዶ ጥገና ከተደረገ በኋላ የድህረ ቀዶ ጥገና ፓራላይቲክ ኢሊየስ ክስተት እና ትንበያዎች መረጃን ለመሰብሰብ ነው።

ጥቂት ደቂቃዎችን የሚወስዱ አንዳንድ ጥያቄዎችን እንጠይቅዎታለን። እውነተኛ መልስ እንዲሰጡን በትህትና እንጠይቃለን። እርስዎ እና ሌሎች ታካሚዎች ሊሰጡን ያሉት ሁሉም መረጃዎች ሚስጥራዊ እንደሆኑ ይቆያሉ እና ስምዎን መጥቀስ አያስፈልግዎትም። ለማንኛውም ጥያቄዎች ምላሽ ለመስጠት እምቢ ማለት ይችላሉ እና በቃለ መጠይቁ ውስጥ በማንኛውም ጊዜ ማቋረጥ ይችላሉ. ለመቀጠል ፍቃድህ/ሽ አለኝ?

1. አዎ ከሆነ፣ ወደ ቀጣዩ ገጽ 2 ይቀጥሉ። አይደለም ከሆነ፣ ወደ ቀጣዩ ተሳታፊ

በመረጃ የተደገፈ ስምምነት በ;

ጠያቂ፡ ኮድ ___ስም__ ፊርማ_____

የቃለ መጠይቁ ቀን ___የተጀመረበት ጊዜ _____የተጠናቀቀው_____

የቃለ መጠይቁ ውጤት፡-

ሀ. የተጠናቀቀ ለ. ተጠሪ ያልተገኘ ሐ. ያላለቀ መ. በከፊል የተጠናቀቀ

ተቆጣጣሪ ፡ ስም _____ ፊርማ _____ ቀን_____

Annex 5: Questionnaire English version

Questionnaire Prepared for Collection of data on "Incidence and predictors of post-operative paralytic ileus after major abdominal surgery at selected governmental hospitals in Addis Ababa, Ethiopia.2024"

Department of Anesthesia College of Medicine and Health Sciences, Addis Ababa University

Questionnaire identification number_____

Data collection tool

Socio-demographic factors

Ser. Number	Question	Response	Code
101	MRN		
102	Patient age(yrs.)		
103	Sex		
104	Weight (Kg)		
105	Height (Cm)		
106	Body mass Index (kg/Cm2)	Underweight BMI<18 Normal BMI 18-25 Overweight BMI 25-30 Obese BMI 30-35 Morbidly obese >35	
107	ASA status		
108	History of previous abdominal surgery	1, yes 2, no	

Data during the preoperative period ----------

Ser. Number	Question	Response	Code
201	Diagnosis		
202	Urgency of surgery	A, Elective B, Emergency C, Semi elective	
203	Surgical procedure		
204	Type of anesthesia	A. General anesthesia B. Spinal anesthesia	
207	On chemotherapy	A, Yes B, No ----------	

208	Preoperative bowel preparation	A, Yes B, No	
209	If Yes Specify		If no go to number 210
210	Electrolyte Derangement	A, Yes B, No	
211	If yes specify with value		
212	Alcohol intake	A, No B, Minimal C, Dependent	
213	Smoking habit	A, Yes B, No	
215	Preoperative hemoglobin value		
217	Preoperative albumin level		

Data during the intraoperative period

Ser. Number	Questions	Response	Code
301	Duration of surgery from skin incision to closure	min	
302	Duration of Anesthesia from induction to extubation	min	
303	Total amount of intra-op fluid intake	ml	
304	Total amount of blood loss	ml	
305	Need of blood transfusion	a. Yes b. No	
306	Did Complication occur intraoperatively	a. Yes b. No	
307	If yes specify		If no go to number 308
308	Any opioid médications used intraoperatively	1, Yes 2, No	
309	If Yes Specify with dose		If no go to number 401

Data during the postoperative period

Ser. Number	Questions	Response	Code
401	Time to first flatus	hours	
402	Time to first passage of stool	hours	
403	Time to tolerate solid food	hours	
404	Immediate Postoperative pain score (with numerical rating scale)	0 no pain 1-3 mild pain	

		4-6 moderate pain 7-10 severe pain	
405	1st postoperative day pain score	0 no pain 1-3 mild pain 4-6 moderate pain 7-10 severe pain	
406	2nd postoperative day pain score	0 no pain 1-3 mild pain 4-6 moderate pain 7-10 severe pain	
407	3rd postoperative day pain score	0 no pain 1-3 mild pain 4-6 moderate pain 7-10 severe pain	
408	Regional block for postoperative analgesia	1. Yes 2. No	
409	If yes Specify		
410	Incidence of nausea on the immediate post operative period	A, Yes B, No	
411	Incidence of nausea on 1st post-operative day	A, Yes B, No	
412	Incidence of nausea on 2nd postoperative day	A, Yes B, No	
413	Incidence of nausea on 3rd post operative day	A, Yes B, No	
414	Immediate post operative Incidence of vomiting	A, Yes B, No	
415	If yes how many times		
416	Incidence of vomiting on 1st post-operative day	A, Yes B, No	
417	If yes how many times		
418	Incidence of vomiting on 2nd postoperative day	A, Yes B, No	
419	If yes how many times		
420	Incidence of vomiting on 3rd post-operative day	A, Yes B, No	
421	If yes how many times		
422	Was there abdominal distension in Immediate postoperative period	A, Yes B, No	
423	Was there abdominal distension on the first POD	A, Yes B, No	
424	Was there abdominal distension on the second POD	A, Yes B, No	

425	Was there abdominal distension on the third POD	A, Yes B, No	
426	Need for nasogastric tube/replacement	A, Yes B, No	
425	Post-operative opioids used	A, Yes B, No	
426	If Yes Specify with dose		If no go to number 427
427	Incidence of POI	A, No B, Yes	