ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCE
DEPARTMENT OF ANESTHESIOLOGY, CRITICAL CARE AND PAIN MEDICINE

INCIDENCE AND ASSOCIATED FACTORS OF CONSTIPATION IN INTENSIVE CARE UNIT AT TIKUR ANBESSA SPECIALIZED HOSPITALS, ADDIS ABABA, ETHIOPIA, 2024

THE THESIS IS TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY, DEPARTMENT OF ANESTHESIOLOGY, CRITICAL CARE AND PAIN MEDICINE FOR THE PARTIAL
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ANESTHESIOLOGY, CRITICAL CARE AND PAIN MEDICINE.

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Addis Ababa, Ethiopia

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ADDIS ABABA UNIVERSITY

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Title of research proposal	Incidence and associated factors of constipation in Intensive care unit at Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia
Duration of research	3 months
Study area	Tikur Anbesa specialized hospital
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I, the undersigned anesthesiology, critical and pain medicine resident, declare that I have submitted my original work titled INCIDENCE AND ASSOCIATED FACTOR OF CONSTIPATION IN ICU PATIENTS AT TIKUR ANBESA SPECIALIZED HOSPITAL ADDIS ABABA, ETHIOPIA PROSPECTIVE OBSERVATIONAL STUDY 2024

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Abbreviation and acronym

ICUs intensive care units

ESPEN European Society for Clinical Nutrition and Metabolism

MV Mechanical ventilation

AOR Adjusted Odd Ratio

COR Crude Odd Ratio

DM Diabetes Mellitus

AHR Adjusted Hazard Risk

Tikur Anbessa specialized hospital

Abstract

Background: -constipation lacks a universally accepted definition in ICU setting leading to varied incidence rate across studies from 5%- 83%. Multiple factors contribute to constipation in critical ill patients including, use of sedatives and opioids, neuromuscular blocking agents, vasopressors along with parental nutrition, inflammatory mediators, electrolyte disorders, inadequate administration of fluids, and lack of fiber in enteral nutrition. These has impacts like abdominal discomfort, decreased duration of enteral feeding and abdominal distension. It has also been associated with feeding intolerance, delirium, prolonged mechanical ventilation, and hospital stay.

Objective: -Assessment of the incidence and associated factors of constipation in Intensive care unit at Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia.

Methods: - Institutional-based prospective observational study design was employed. Sample size was calculated using single proportion formula, then finite population correction formula was applied, resulting a final adjusted sample size of 138 patients. A consecutive sampling technique was employed. Data was collected by residents working at ICU. The collected data is verified, entered, coded and analyzed using SPSS version 25 software. Bi-variate and Multiple regression was applied to identify the determinants of constipation and factors and its association. The significance is declared at p value<0.05

Result A total of 138 ICU patients participated in the study, the majority of participants were within the age group of 36-50 years. Male accounted for 45.7% of the study population while females made up 54.3%.The incidence of constipation was 53%, affecting 73 out of 138 participants. Multivariate logistic regression analysis identified five factors significantly associated with constipation. Age >65 years, ≥7 days stayed in ICU, analgesia use, duration of immobility ≥3 days and metabolic disturbance were significantly associated.

Conclusion and Recommendation, This study revealed that constipation is a common clinical problem among ICU patients. Implementing routine bowel assessments, minimizing opioids use where possible, encouraging early mobilization and managing metabolic abnormalities hypokalemia, hypocalcaemia can be implemented to reduce the burden of constipation and its impact

Key word: - Constipation, Intensive care unit, Tikur Anbessa specialized hospita1

1 Introduction

1.1 Background

Feeding and upper gastrointestinal tract motility function are important in critically ill patients (1-3). However, scant attention has been given to motility disorders of the lower gastrointestinal tract, and constipation. Patients who attended a post-intensive care follow-up clinic have described constipation as a distressing part of intensive care (4). Many observational studies have defined constipation as the failure to pass stool within 72 hours of admission to the ICU

To diagnose constipation, according to Rome criteria, the frequency of the stool movement is less than 3 per week and usually requires manual maneuvers to evacuate stool. Rome criteria are periodically utilized to assess stool in an objective manner. (5).

Defecation is a basic body function, but staff in intensive care units (ICUs) that monitor gastrointestinal functions record features such as volume of gastric aspirate and occurrence of bowel opening rather than its absence (6).

A peristaltic movement of the alimentary canal is a complex process, which is often changed during critical illness and result in constipation. Constipation is an important issue especially in ICU , requiring careful discussion since it has negative effects including prolonging the time of weaning from the mechanical ventilator, which consequently increases the duration of stay in ICU, additionally it involves complications such as distension, nausea, vomiting , increased in bacterial infection rate, high morbidity and mortality. (7)

There are many factors that may contribute to constipation in critically ill patients including ,use of sedatives and opioids, neuromuscular blocking agents, vasopressors along with parental nutrition , inflammatory mediators, electrolytic disorders ,inadequate administration of fluids, and lack of fiber in enteral nutrition .(8).

The incidence of constipation in patients in intensive care units vary widely in literature, between 5% and 83%(9, 10). This can be attributed to lack of a specific definition for the critically ill patient. In its guidelines, the American Gastroenterology Association defines constipation as the frequency of feces evacuation of less than 3 times a week, feeling of incomplete rectal evacuation, hard stool, struggling to pass stools and need to tap for rectal emptying(11).

Constipation is characterized by intervals of 3, 4, or even up to 6 consecutive days without a bowel movement, according to researchers. (12-14).This issue arise from infrequent bowel movements or decreases intestinal motility. However, research on gastrointestinal motility and stool consistency in critically ill patients is limited, as most studies primarily examine delayed defecation. (15,16).The complications constipation can also cause abdominal distension, vomiting, restlessness, failure to wean from mechanical ventilation; rectal tears/fissure associated with the development or exacerbation of hemorrhoids, gut obstruction, perforation and is occasionally associated with fatal Pulmonary embolism.

While abnormalities such as delayed gastric emptying and diarrhea have been extensively studied and are known to significantly affect the prognosis of critically ill patients, constipation has not received the same level of clinical attention (17). In non-ICU settings, constipation is a common condition, affecting between 2% and 27% of individuals (18). Although it is recognized as having a substantial impact on quality of life outside the ICU, it has not been commonly reported in surveys involving ICU patients (19, 20).

The variation in its incidence is due to the absence of a clear definition because there is no consensus on the concept of constipation, and studies have adopted periods without evacuation ranging from 3 to 6 days (21).

Constipation in critically ill patients can result from a variety of contributing factors. Shock, for instance, leads to reduced splanchnic blood flow, which is linked to diminished gastrointestinal motility. Additionally, electrolyte imbalances particularly low potassium (hypokalemia) and

magnesium (hypomagnesemia) levels are known to negatively affect intestinal movement.

Several medications frequently administered in the ICU may also play a role.

Opioids, the most commonly used pain relievers in this setting, are known to suppress gut motility and possess vasodilatory effects that may reduce venous return and potentially impair gastrointestinal perfusion.(22).

Fecal retention can promote the proliferation of gram-negative bacteria within the gastrointestinal tract. This bacterial overgrowth, along with the translocation of microbes and their endotoxins, may contribute to infections and amplify the systemic inflammatory response (23).

1.2 Statement of the problem

The European Society for Clinical Nutrition and Metabolism (ESPEN) defines a critically ill patient as someone experiencing a systemic inflammatory response that leads to organ failure, requiring supportive care for organ function for a minimum of three days(24). Critically ill patients are also marked by a higher risk of infections, extended hospital stays, and elevated mortality rates (25).

In critically ill patients, the function of upper gastrointestinal tract motility is important. However, little attention has been paid to lower gastrointestinal tract motility disorders and problems of failure to defecate (i.e. constipation) in critically ill patients are difficult to be determined. Patients who attended post-intensive care follow up clinic have delineated constipation as a distressing part of intensive care(26).

Moreover, there is a lack of a precise definition for constipation in critically ill patients. Previous studies on constipation among patients in the ICU have employed various duration's to define constipation (e.g., no defecation for 3 days or 6 days) to assess the prognosis of different populations of patients with constipation (with or without mechanical ventilation)(27-30). So, the current study is assessing the Incidence and associated factors of constipation in Intensive care unit at Tikur Anbessa specialized hospitals, Addis Ababa, Ethiopia

Significance of the study

Studying the incidence and associated factors of constipation in intensive Care Units is highly important to manage patients having constipation. So, understanding and addressing this common issue often overlooked and can lead to improved patient outcomes and more efficient healthcare delivery. Proper gastrointestinal function is essential for the overall recovery of critically ill patients. Addressing constipation can lead to better nutrient absorption, reduced discomfort, and faster rehabilitation. Understanding the incidence and associated factors enables healthcare professionals to develop standardized, evidence-based protocols for preventing and treating constipation in ICU settings.

Effective management of constipation can reduce the length of ICU stays by preventing complications that require additional treatments and extended monitoring. Managing constipation effectively improves patient comfort, reduces pain and distress, and maintains dignity, which is particularly important in the vulnerable ICU population. Studies highlight the importance of recognizing and managing constipation, leading to better training programs for healthcare professionals regarding gastrointestinal care in critical settings.

Research findings promote collaboration among different healthcare disciplines to provide comprehensive care. By identifying modifiable risk factors such as medication use, dietary habits, and mobility levels, healthcare providers can implement proactive strategies to reduce the incidence of constipation.

Findings can pave the way for more in-depth research on related topics, such as the efficacy of different treatment modalities or the long-term outcomes of constipation management in ICU patients. Comprehensive data on incidence and associated factors can inform health policy

decisions and lead to the implementation of national guidelines for gastrointestinal care in critical care settings.

1. Literature review

We reviewed several studies on the incidence and associated factors of constipation in ICU patients to better understand its prevalence and risk factor

Observational cross-sectional Study done in Baysal University Faculty of Health Sciences, Bolu, Turkey showed that the constipation frequency was 63.8% in the unit. The early constipation frequency was 18.9%, and the late constipation frequency was 6.8%.

This study aimed to investigate the early, late, and total constipation frequency, related factors, and their effects on the hospitalization day, gastric residual volume, vomiting, distension, and diarrhea, the feeding type, white blood cells, and C-reactive protein levels, and body temperature. Method: Data from this observational cross-sectional study were collected in an anesthesia and intensive care unit of a public hospital in Bolu, Turkey.

The sample included 116 patients who met the criteria of the study. The sample size was determined using power analysis according to the results of a pilot study. The patient information form, daily observation form, and Bristol stool consistency scale were used for collecting the data. Results: The constipation frequency was 63.8% in the unit. The early constipation frequency was 18.9%, and the late constipation frequency was 6.8%.

The frequency of constipation was higher in the intensive care unit, even when the defecation period was considered four days. Receiving mechanical ventilator support, enteral tube feeding,

and diuretics increased the risk of constipation. The levels of white blood cells, C-reactive protein levels, and body temperature between all groups were not statistically significant. ($p>0.05$)

(32,33,34).

A retrospective observational study done in university hospital in Yamaguchi Prefecture, Japan showed that late enteral nutrition, sedatives, and surgery were independent the risk factors for late defecation in critically ill patients. Late defecation was associated with prolonged ICU stay. The study aimed to assess Risk factors for late defecation and its association with the outcomes of critically ill patients:

Methods: A retrospective analysis was conducted on patients who stayed in the intensive care unit (ICU)

for seven or more days between January and December 2011. Participants were categorized into two groups based on the time from ICU admission to their first bowel movement: an early defecation group (<6 days; n = 186) and a late defecation group (≥6 days; n = 96). To evaluate the impact of delayed defecation, changes in clinical parameters from admission to day 7 in the ICU were analyzed. Primary clinical outcomes included ICU mortality, duration of ICU stay, and the length of time patients required mechanical ventilation.

Results: Late enteral nutrition (odds ratio (OR) 3.42; 95 % confidence interval (CI) 1.88-6.22; P < 0.001), sedatives (OR 3.07; 95 % CI 1.71-5.52; P < 0.001), and surgery (OR 1.86; 95 % CI 1.01-3.42; P = 0.047) were the independent risk factors for late defecation. The median (interquartile) changes in body temperature (0.3 [-0.4 to 1.0] vs 0.7 [0.1 to 1.5] °C; P = 0.004), serum C-reactive protein concentration (1.6 [-0.5 to 6.6] vs. 3.5 [0.7 to 8.5] mg/dL; P = 0.035), and Sequential Organ Failure Assessment score (-1 [-2 to 1] vs 0 [-1 to 2]; P = 0.008) between admission and ICU day 7 were significantly greater in the late defecation group than in the early

defecation group. ICU stay was significantly longer in the late defecation group (12 [9 to 19] vs 16 [10 to 23] days; P = 0.021), whereas ICU mortality and the length of mechanical ventilation were similar in both groups.

Late enteral nutrition, sedatives, and surgery were independent the risk factors for late defecation in critically ill patients. Late defecation was associated with prolonged ICU stay.35(36)

A prospective observational study done on in France on constipation in long-term ventilated patients revealed that the 353 patients (58%) passed stools ≥6 days after they were admitted to the intensive care unit ("late" defecation). Patients with early and late defecation had similar general characteristics when admitted to the intensive care unit and had similar logistic organ dysfunction scores on the first day of mechanical ventilation. Several variables were independently associated with a delay in defecation: a Pao_2/Fio_2 ratio of less than 150 mm Hg (adjusted hazard ratio (AHR),1.40; 95% CI: 1.06–1.60; p = .0073), a systolic blood pressure between 70- and 89-mm Hg (AHR 1.48; 95% CI: 1.17–1.79), and systolic blood pressure <68 mm Hg (AHR 1.29; 95% CI: 1.01–1.60). Organ dysfunction scores were significantly higher on the fourth and ninth days of mechanical ventilation in patients with late defecation than in those with early defecation. The crude intensive care unit mortality rate was 18% in patients with early defecation and 30% in patients with late defecation (p < .001). Acquired bacterial infections at any site occurred in 34% of patients with early defecation and 66% of patients with late defecation (p < .001) (37).

In patients with severe trauma, although without adjustment for confounding factors, constipated patients remained longer on mechanical ventilation (MV) (p < 0.001), more days using morphine (p < 0.001), more days under sedation (p < 0.001) and more days using neuromuscular blockade (p < 0.001) (38).

In patients with prolonged MV, the PaO2/FiO2ratio <150 mm Hg (OR = 1.4, CI95%: 1.1, 1.6), the systolic blood pressure between 70 and 89 mm Hg (OR = 1.5, CI95%:1.2, 1.8), and systolic blood pressure <69 mm Hg (OR = 1.3; CI95%: 1.01, 1.6) during the first five days of MV were identified as independent risk factors for delayed evacuation (39).

Prat et al. showed that constipated patients also used more MV (p < 0.001), sedation (p < 0.0001), vasopressors (p = 0.02), enteral nutrition (p < 0.001) and neuromuscular blockade (p =

0.0001)(40). After analyzing the first six days of hospitalization, Van der Spoel et al. showed that patients who had precocious evacuation used less nor adrenaline (1.0g/kg/min vs 3.7g/kg/min, $p < 0.002$), dopamine (2.3 g/kg/min vs 7.7g/kg/min; $p < 0.002$) and morphine (68% vs 83% of the days; $p = 0.008$) (41).

A study done in Oman showed that the prevalence of constipation was determined to be 55.6% (95% CI 52.8–58.4). A prospective study was conducted, including all adult patients admitted to general ICU. Constipation was identified using constipation assessment scale and relevant factors were extracted from the patient's medical records. Among the patients who met the inclusion criteria n-556 the prevalence of constipation was determined to be 55.6 95 CI 52.8-58.4 Patients with constipation were found to be older ($p < 0.01$) and had higher frailty scores ($p < 0.01$). Logistic regression analysis revealed that heart failure (OR= 2.1; 95% CI 1.2–3.7; $p = 0.01$), frailty score (OR 1.4; 95% CI 1.2–1.5; $p < 0.01$), and dihydropyridines calcium channel blockers (OR 1.8; 95% CI 1.2–2.8; $p < 0.01$) were independent risk factors for constipation(42).

In summary the literature's consistently highlights that constipation is a prevalent and clinically significant issue in ICU patients.

2.1 Conceptual framework

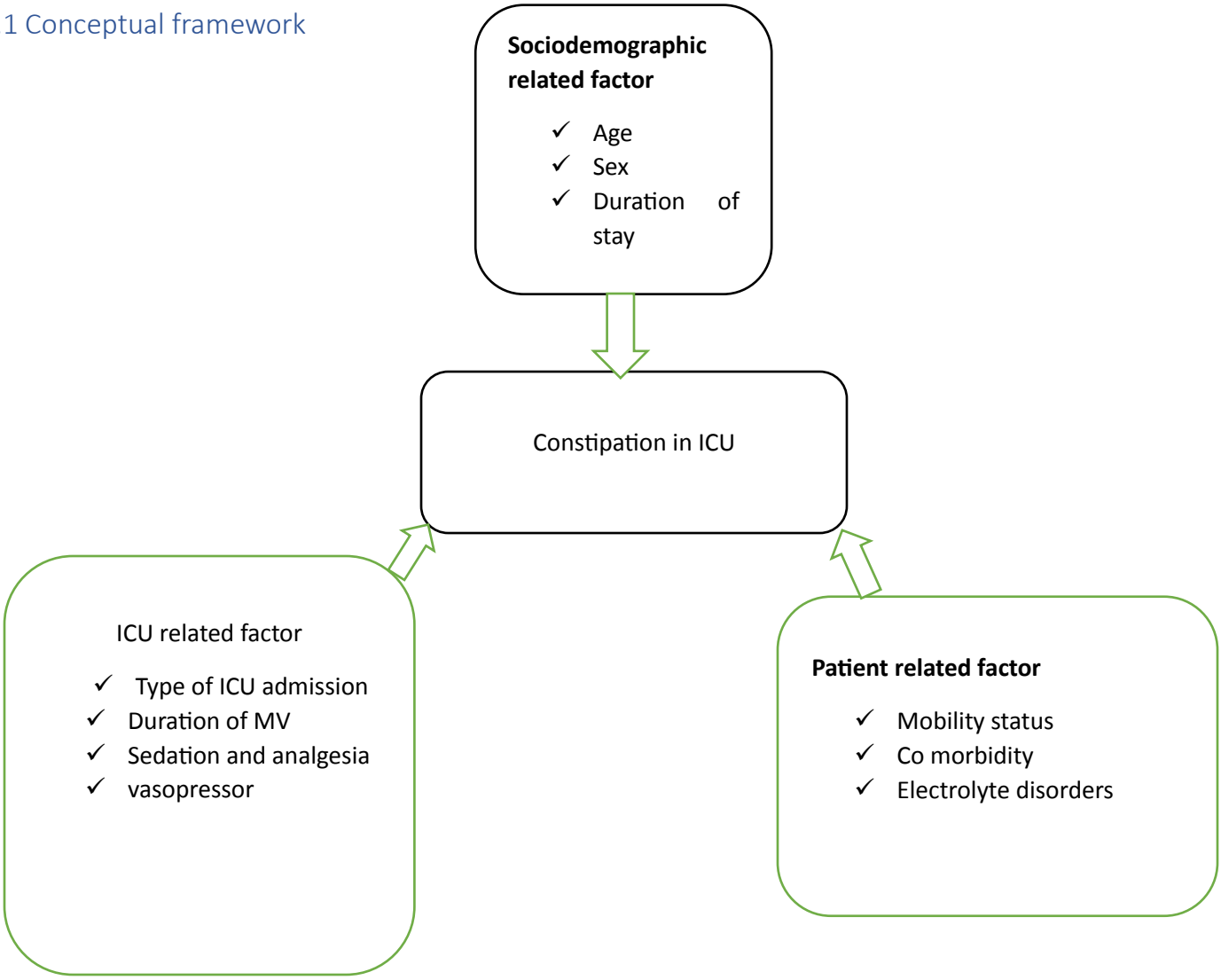


Figure 1. The conceptual framework adopted from the literature

3, OBJECTIVE

3.1 General objective

To assessment of the Incidence and associated factors of constipation in Intensive care unit at Tikur Anbessa specialized hospitals, From November to January 2024/2025

3.2 Specific objective

To determine the Incidence of constipation in Intensive care unit at Tikur Anbessa specialized hospitals. From December to February, 2024/2025

To identify the associated factors of constipation in Intensive care unit at Tikur Anbessa specialized hospitals. From December to February, 2024/2025

4. Methods and Materials

4.1 Study Design and Period

Institutional based prospective observational study was conducted in intensive care unit at TASH, Addis Ababa, Ethiopia from December to February, 2024./2025

4.2 Study Area

The study was conducted in TASH, Addis Ababa, which is the capital city of Ethiopia located at the center of the country with an area 210km2.

The study was done in TASH , which is one of the higher tertiary hospitals in the country.

4.3 source population and study population

4.3.1 Source population

- All patients admitted to the ICU during the study period.

4.3.2 Study population

- All ICU patients age >18 years during the study period at TASH and that full fill the inclusion criteria

4.4 Eligibility criteria

4.4.1 Inclusion criteria

- All patients in ICU age >18 years.
- Greater than 3 days of ICU admission

4.4.2 Exclusion criteria

- ✓ Abdominal surgery in the current admission
- ✓ Presence of stoma
- ✓ Constipation during admission
- ✓ Intraperitonial infection
- ✓ Recent colonoscopy
- ✓ Abdominal trauma
- ✓ Patients with neurological conditions affecting bowel function
- ✓ No meeting inclusion criteria

4.5 Study variables

4.5.1 Dependent variable

- constipation

4.5.2 Independent variables

- ✓ Socio demographic characteristics: Age, sex
- ✓ Comorbid disease
- ✓ Medications , opioids, sedatives, vasopressor
- ✓ Electrolyte disorders
- ✓ Mobility status

4.6 Operational definition

Constipation in ICU: Defined as a patient who experiences one or more of the following

Bowel movement frequency: Less than three bowel movements per week.

Stool consistency: Hard, dry stools (Bristol Stool Chart types 1 or 2).

Abdominal symptoms: Patient complaints of bloating, discomfort, or pain related to bowel movements, or the need for excessive straining to have a bowel movement.

Physical signs: Abdominal distension or a palpable stool mass noted by a physician or nurse

- **Opioid use**: Defined as the administration of opioids in the ICU, based on the presence of opioid orders in the medical record.

Immobility inability of a patient to perform voluntary physical movements including sitting, standing or ambulating due to critical illness, sedation, mechanical ventilation or physical limitation for > 3 consecutive days.

Bristol Stool Stiffness Scale the duration and properties of the stool in the colon were evaluated using the scale developed by Lewis and Heaton (16), along with the changes that were followed after the treatment. The researchers classified the stool on a scale of 1-7, from slow intestinal transit (Type 1) to liquid stool (Type 7). However, no validity and reliability studies are available for the Bristol stool stiffness scale, which is frequently used in the evaluation of constipation in literature

For terminally ill and non-communicative intubated patients, data were obtained through clinical assessment, primarily by observing signs of abdominal distension. Additional information, including the timing of the most recent bowel movement and stool characteristics, was collected from the attending nursing staff.

4.7 Sample Size determination

To determine the sample size, single proportion formula will be used.

$$n = \frac{(Z\alpha/2)2\ p\ (1-p)}{d2}$$

Where: n = desired sample size

z = z value at 95% confidence interval (CI)

p = incidence of constipation in Baysal University Faculty of Health Sciences, Bolu, Turke was 63.8% (35).

d = margin of error

The Z value at 95% CI is 1.96 (from significance level α = 5%). P value 24.7% for the study done in Ethiopia ICU setting health facility and the tolerated margin of error is 5%. Therefore,

$$n = \frac{(1.96)^2\ (0.638)\ (1-0.638)}{(0.05)^2} = 351$$

Adding 10% non-response rate the total sample size calculated to be is 386 participants.

The number of populations present in the study period was less than 10000. Therefore the sample size was done using correction formula of

$$n = \frac{n0}{1 + \frac{n0}{N}}$$

Where n=final sample size

n0=calculated sample size

N=estimated population in the study period

n =386/1+ (386-1)/210 = 138

4.71 sampling technique

A non-probable consecutive sampling technique was employed in this study. All ICU patients who met the inclusion criteria and were admitted during the study period were recruited until the required sample size was achieved. This non probability sampling method was chosen for its practicality in a hospital based setting, allowing the inclusion of every eligible patients

4.8 Data Collection Techniques

The data collection was done by residents working at ICU and they used questioner as data collection tools. The process of data collection was monitored by the principal investigator. During the process the principal investigator also stay close with the data collectors to help when they face get any problem or faces difficulties.

4.9 Data Quality Control

To ensure data quality, the principal investigator trained the nurses on the study objectives, Detailed descriptions about data collection procedures using Google Forms before the Start of data collection. The principal investigator, serving as the supervisor, checked the Completeness and consistency of the collected data throughout the data collection period

4.10 Data analysis and interpretation

The collected data was coded and entered into Epi data 4.6.0.2 and exported to SPSS version 25 statistical software for further analysis. Before starting analysis, re coding was done on some of the variables. All independent variables with the dependent variable was analyzed by using binary logistic regression to identify variables that is the predictive of the dependent variable. Odd ratio, 95% confidence interval and P-value was computed to differentiate the risk factors and to assess the strength of association. Variables with P-value less than 0.25 on binary logistic

regression analysis was subjected to multivariate logistic regression analysis and the cut point to take as statically significant association was P-value less than 0.05.

4.12 Ethical consideration

The study was done after obtaining ethical clearance from Addis Ababa University College of health science department of Anesthesiology Critical and Pain medicine. A formal letter was submitted to adult ICU from the department and permission was assured to keep the confidentiality. Verbal consent was obtained from a family member or ICU patients. Participants family or attendant was informed before starting the data collection about the whole thing the benefit and risks of participating in the study.

5. Result

5.1 Socio demographic characteristics of the study participants

A total of 138 ICU patients were included yielding 100% response rate.Majority of the study participants were in the age group of 36-50 years with mean and SD of 45.16±16.78 respectively. Male participants accounted for 45.7% , while females represent 54.3 % . In terms of ICU stay 63.8% were <7 days and 36.2% remained for 7 days or longer.

Figure 1 Socio demographic characteristics of the study participants

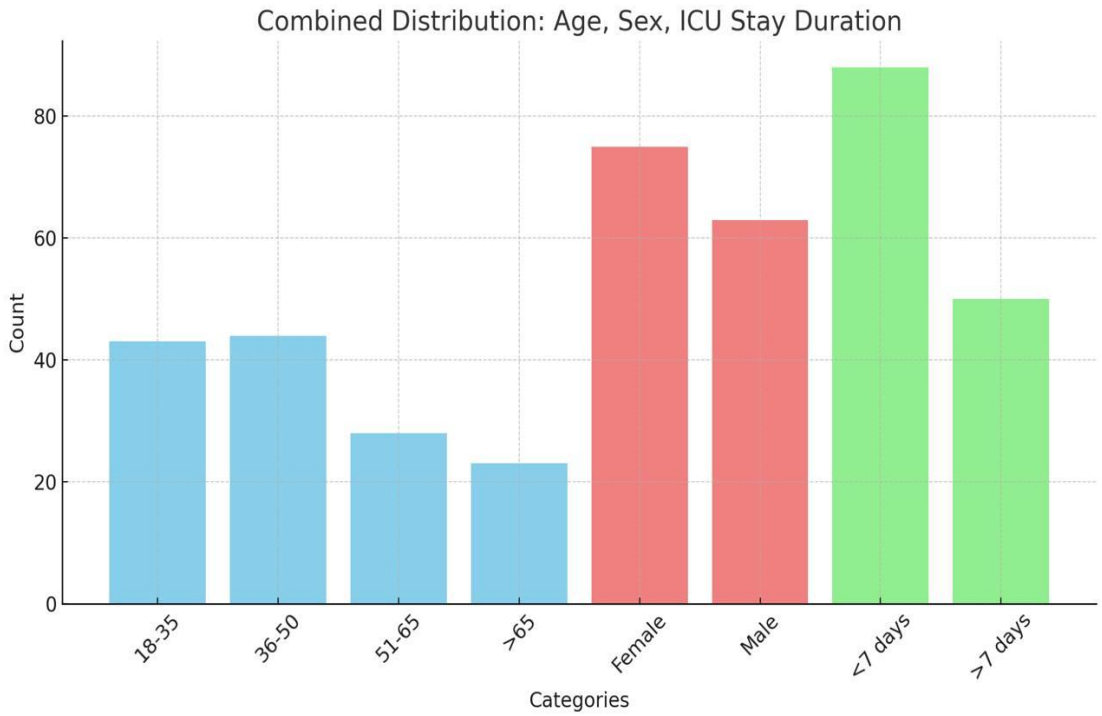


Table 1. Socio demographic characteristics of the study participants among patients in Intensive Care Unit At Tikur Anbessa Specialized Hospitals, Addis Ababa, Ethiopia, 2024/5

Variable	frequancy	Percent
Age in years		
18-35	43	31.2
36-50	44	31.9
51-65	28	20.3
>65	23	16.6
Sex of the study participants		
Female	75	54.3
Male	63	45.7
Duration of ICU stay in days		
<7	88	63.8
≥7	50	36.2

5.2 ICU related Characteristics of the study participants

Out of 138 patients 62.3 % of the cases were admitted to the medical ICU and 37.7% were admitted to surgical ICU. From those 36.2% of patients were on mechanical ventilation. 27.5%

of the cases were used sedation and from those sedation drugs, propofol acounts 71.1%. seventy-two percent of the cases were used analgesia and from those analgesia drug, paracetamol accounts 54.5% followed by morphine 53.5%. Thirteen percent of the cases were used vasopresor and from those vasopressor drugs, 0.1mic of nor-adrenaline accounts 50% of the utilized drug

.figure 2 ICU related Characteristics of the study participants

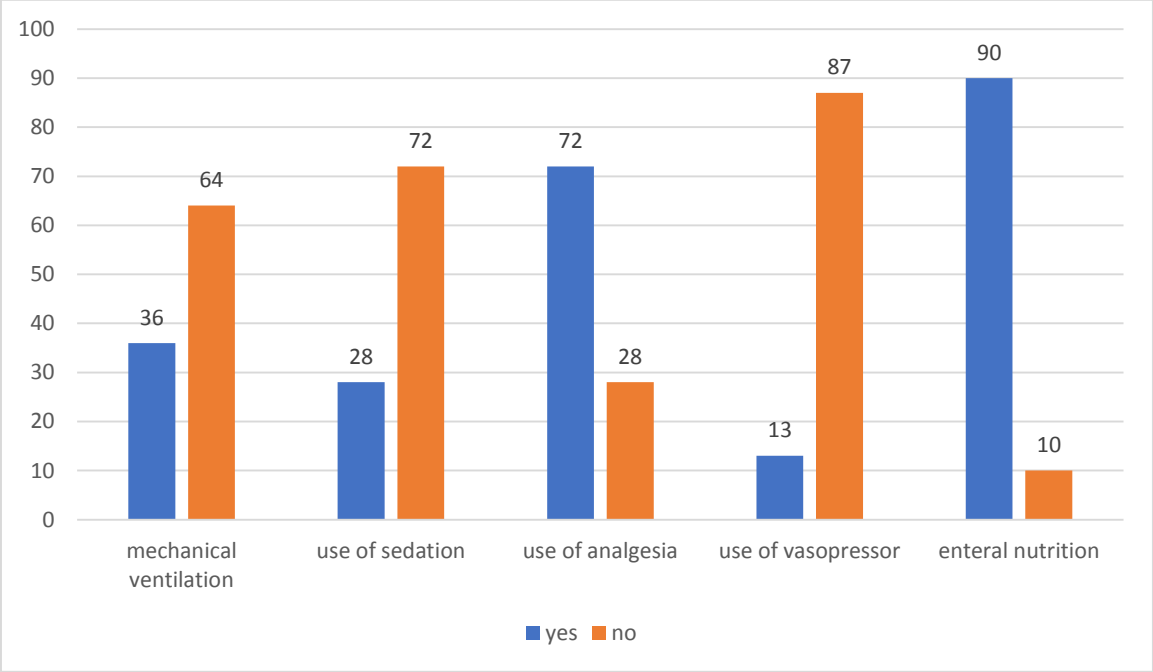


Table 2. Intensive care unit related characteristics of the study participants

Variable	frequancy	Percent
Types of ICU admission		
Medical	86	62.3
Surgical	52	37.7
Mechanical ventilation		
Yes	50	36.2
No	88	63.8
Duration of mechancal ventilation in days		
<3	3	6
3-7	21	42
>7	26	52
Use of sedation		
Yes	38	27.5
No	100	72.5
Types of sedative drugs (n=38)		
Propofol	27	71.1
Ketamine	11	28.9
Diazepam	4	10.5
Ketofol	1	2.6
Use of analgesia		
Yes	99	71.7
No	39	28.3
Types of analgesia drug (n=99)		
Paractamol	54	54.5
Morphine	53	53.5
Diclofenac	5	5.1
Fentalyn	7	7.1
Gabapentine	1	1
Use of vasopressor		
Yes	18	13
No	120	87
Enteral nutrition		
Yes	124	89.9
No	14	10.1

5.3 patient related factor characteristics of the study participants

Nearly all participants 98.6% were immobile during their ICU stay, Co morbid condition were present in 64.5% of the patients. Metabolic disturbance were identified in 30.4% of the participants, with hypokalemia 73.8% being the most frequent abnormality followed by hyponatremia 21.4% and hypocalcaemia 11.9%

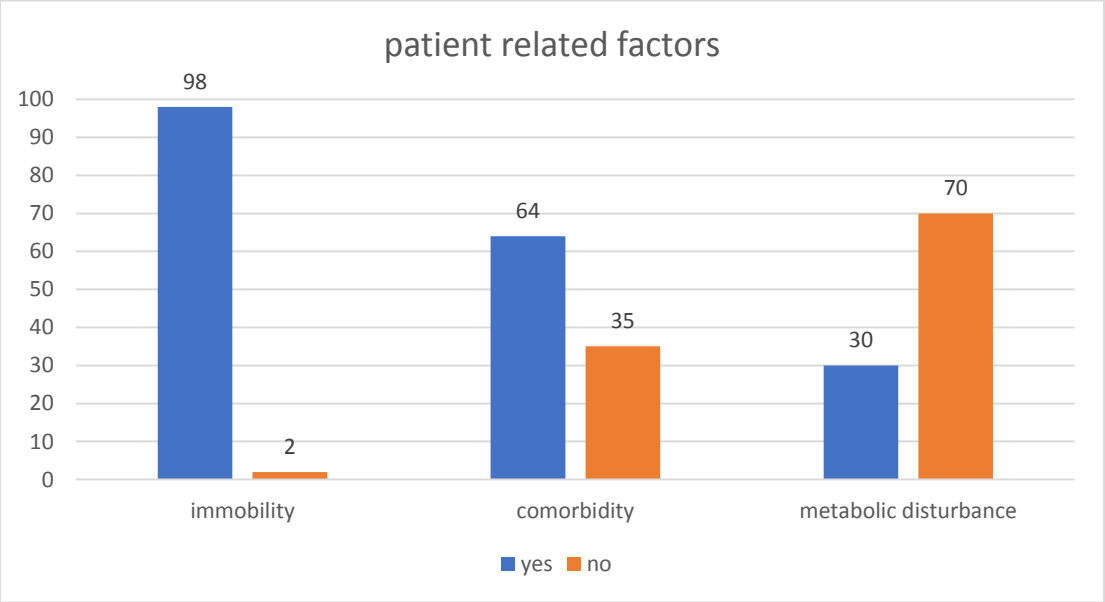


Figure 3 Patient related factor characteristics of the study participants

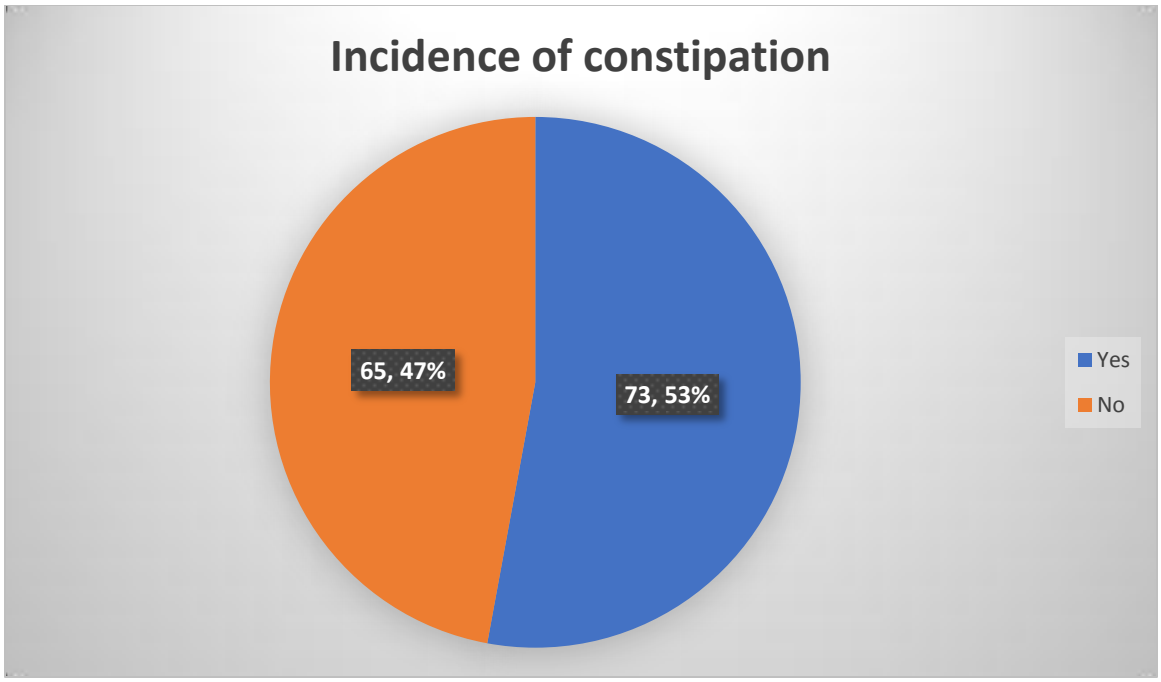
Table 3. Patient related factor characteristics of the study participants

Variable	frequancy	Percent
Immobility		
Yes	136	98.6
No	2	1.4
Duration of immobility in days		
<3	79	57.2
≥3	59	42.8
Comorbidity		
Yes	89	64.5
No	49	35.5
Types of comorbidity (n=89)		
Hypertension	28	31.4
DM	32	35.9
Cardiac disease	27	30.3
RVI	9	10.1
CKD	9	10.1
CLD	4	4.5
Stroke	2	2.2
Spilepsy	3	3.4
Metabolic disturbances		
Yes	42	30.4
No	96	69.6
Types of metabolic disturbance (=42)		
hypokalimia	31	73.8
Hyponatrimia	9	21.4
hypocalcimia	5	11.9
hypernatrimia	2	4.8
hypocortisol	1	2.4
Hypothyroidism	3	7.1

5.4 Constipation related characteristics of the study participants

The finding of this study found that 53% (n=73) had develop constipation.

Figure4.The incidence of constipation among ICU admitted patients in TASH, 22024/5.



Concerning to constipation related characteristics, almost 20% of the cases had no bowel movement and 31.2% of the cases had hard and compacted stool consistency. 48% of the cases had abdominal Discomfort/Distention and from those of having discomfort 69.4% the case had moderate level discomfort. More than six percent of the cases had straining during defecation.

Table 4. Constipation related characteristics of the study participants

Variable	frequency	Percent
Frequency of Bowel Movements		
1–2 times per week	55	39.8
Daily or more frequently	56	40.6
no bowel movement	27	19.6
Stool Consistency		
Soft and formed (Normal)	63	57.2
Hard and compacted	35	31.2
Very hard, dry, or pellet-like	13	11.6
Abdominal Discomfort/Distention		
Yes	72	52.2
no	66	47.8
Degree of abdominal disconfort or distaon (n=72)		

Mild discomfort or bloating	20	27.8
Moderate discomfort/distention	50	69.4
severe discomfort or distention, requiring attention	2	2.8
Straining during defecation		
Yes	9	6.5
no	129	93.5

5.6 The determinant factors of constipation among ICU patients

Age, duration of stay in ICU, Types of ICU admission, MV used, sedation, analgesia, duration of immobility and metabolic disturbance were an association with constipation by bi-variate logistic regression. The multivariate logistic regression revealed that, the odds of age >65 years had 3.8 times increase its constipation compared to those of age 18-30 years (AOR=3.8, 95%CI=1.84, 17.35) and the odds of ≥7 days stayed in ICU were 8.1 times increase its constipation compared to those of waiting in ICU <7 days (AOR=8.1, 95%CI=2.49, 30.26). The odds of analgesia use were 15.1 times increase its constipation compared to its opposite compartment (AOR=15.1, 95%CI=3.18, 70.90) and the odds of duration of immobility ≥3 days had 2.1 times increase its constipation compared to those immobile for 3 days (AOR=2.1, 95%CI=1.12, 6.69). The odds of metabolic disturbance were 12.4 times increase its constipation compared to those of its opposite compartment (AOR=12.4, 95%CI=4.92, 36.82).

Table 2. The bi-variate and multivariate logistic regression of association between independent variable and constipation among ICU patients at TASH, 2024/5.

variable	Constipation		p-value	COR with 95%	p-value	AOR with 95%CI
	yes	No				
Age in years						
18-35	19	24	1		1	
36-50	21	23	0.740	1.2(0.49, 2.68)	0.994	1.0(0.30, 3.32)
61-65	17	11	0.173	1.9(0.74, 5.14)	0.273	2.2(0.54, 8.83)
>65	16	7	0.043	2.9(1.98, 8.44)	0.042	**3.8(1.84, 17.35)**
Duration of ICU stay in days						
<7	38	50	1		1	
≥7	35	15	0.003	3.1(1.47, 6.42)	0.004	**8.1(2.49, 30.26)**

Types of ICU admission						
Medical	39	47	1		1	
surgical	34	18	0.024	2.3(1.12, 4.64)	0.743	1.2(0.41, 3.48)
Mechanical ventilation						
Yes	41	9	0.000	7.9(3.43, 18.51)	0.373	1.9(0.44, 8.63)
no	32	56	1		1	
Use of sedation						
Yes	32	6	0.000	7.7(2.94, 20.02)	0.359	2.1(0.43, 10.29)
no	41	59	1		1	
Use of analgesia						
Yes	66	33	0.000	9.1(3.65, 22.91)	0.001	**15.1(3.18, 70.90)**
No	7	32	1		1	
Duration of immobility in days						
<3	36	43	1		1	
≥3	37	22	0.047	2.0(1.01, 4.00)	0.020	**2.1(1.12, 6.69)**
Metabolic disturbance						
Yes	37	5	0.000	12.3(4.44, 34.24)	0.000	**12.4(4.92, 36.82)**
no	36	60	1		1	

6. Discussion

The finding of this research revealed that the incidence of constipation in ICU was 53%. This finding was in line with the study done in France and Oman (37, 42). This finding was lower than the study done Baysal University Faculty of Health Sciences, Bolu, Turkey (32). This difference could be due to variations in the demographic characteristics of the study populations, lack of specific definition of constipation in critically ill patients.

Some studies might rely on self-reported symptoms from ICU patients or caregivers, which could lead to under reporting or over reporting. Others may use more objective criteria or assessments, leading to different results. Different regions may have varying standards of ICU care, medication availability, and approaches to managing constipation in critically ill patients. This could lead to differing incidence rates in studies conducted in various parts of the world or at different times. Over time, changes in healthcare practices, advances in critical care, and shifts

in the types of ICU patients could result in differences in reported incidence. Newer studies may reflect trends like longer ICU stays and more complex patient needs, contributing to higher incidence rates of constipation.

The odds of age >65 years had 3.8 times increase its constipation compared to those of age 18-30 years (AOR=3.8, 95%CI=1.84, 17.35). This was may be due to older ICU patients are often frailer and more immobile compared to younger patients.

Physical inactivity is a significant contributor to constipation. In the ICU, where patients are often bedridden or have limited mobility, the lack of physical activity can significantly impair bowel function.

The odds of ≥7 days stayed in ICU were 8.1 times increase its constipation compared to those of waiting in ICU <7 days (AOR=8.1, 95%CI=2.49, 30.26). This could be due to reduced gastrointestinal motility due to systemic inflammation, autonomic dysfunction and the effect of medication..

Patients with prolonged ICU course had interruption in feeding and delay in early nutrition due to procedures, hemodynamic instability or intolerance which can exacerbate constipation risk

The odds of analgesia use were 15.1 times increase its constipation compared to its opposite compartment (AOR=15.1, 95%CI=3.18, 70.90). This finding was in line with the study done in Yamaguchi Prefecture, Japan (35). This was may be due to by slowing down the transit of stool in the colon, opioids allow more water to be reabsorbed from the gut lumen back into the body. This results in the stool becoming harder and drier, which makes it more difficult to pass and increases the likelihood of constipation.

The odds of duration of immobility ≥3 days had 2.1 times increase its constipation compared to those immobile for <3 days (AOR=2.1, 95%CI=1.12, 6.69). This was may be due to prolonged periods of immobility are one of the key factors contributing to constipation. The intestines rely on physical movement to help stimulate peristalsis. ICU patients often experience prolonged bed rest due to critical conditions, and when waiting for longer periods, this lack of movement can significantly slow down gastrointestinal motility, leading to constipation.

The odds of metabolic disturbance were 12.4 times increase its constipation compared to those of its opposite compartment (AOR=12.4, 95%CI=4.92, 36.82). this finding was supported with the study done by Prat et al (41). This was may be due to metabolic disturbances, especially in critically ill patients, can lead to delayed gastric emptying. Conditions like hyperglycemia or electrolyte imbalances can affect the motility of the stomach and intestines, leading to a slowing of digestion and constipation

7. Strengths and limitations of the study

The strength of this study is data were collected prospectively which reduced recall bias and allowed for real time assessment of variables which enhances the study's credibility and the Validity of its findings.

We also use Non probable sampling which allow us no eligible patient is missed which is important in small population

On the contrary, the limitations of this study the findings are single center study which may limit to generalize with other ICU setting with different patient profile, protocols and resources

The other limitation is lack of standardized constipation definition which may introduce subjectivity and variability in assessment,

8, Conclusion

In this study a significant level of ICU patients develop constipation. From those having constipation, the major characterization was Abdominal Discomfort/Distention followed by no bowel movement and hard and compacted stool. The determinant factor of constipation was age >65 years (AOR=3.8), ≥7 days stayed in ICU (AOR=8.1), analgesia use (AOR=15.1), duration of immobility ≥3 days (AOR=2.1) and metabolic disturbance (AOR=12.4).

9. Recommendations

Managing and reducing constipation in ICU patients requires a holistic approach, particularly considering the statistically significant. Therefore the recommendation goes to

- Elderly patients may experience delirium in the ICU, which can affect their ability to communicate their discomfort, ensure regular bowel assessments and encourage to report concerns.
- For ICU patients who have been in the unit for an extended period, a proactive bowel management protocol should be implemented.
- Regular, scheduled assessments of bowel function should be part of the ICU routine. Ensuring that stool consistency is monitored frequently can lead to early identification and treatment of constipation.
- Consider using non-opioid analgesics to reduce the risk of constipation. Non-opioid analgesia can be effective, particularly for mild to moderate pain, and can help avoid the constipating effects of opioids.
- Encourage early mobilization, If mobility is severely limited, certain bedside physical therapy devices may help stimulate lower limb activity, which can promote better circulation and bowel function.

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Questionnaire: Incidence and Risk Factors of Constipation in ICU Patients

Study Title: Incidence and Risk Factors of Constipation in ICU Patients

Section 1: Patient Demographics

1. Age

( ) 18–30 years

( ) 31–45 years

( ) 46–65 years

( ) Greater than 65

2. Gender

( ) Male

( ) Female

3 Admission Diagnosis

4. Duration of ICU Stay

o ( ) 4–7 days

o ( ) More than 7 days

Section 2: ICU related Characteristics

5. Type of ICU Admission

o ( ) Medical

o ( ) Surgical

o ( ) Trauma

o ( ) Other (please specify) _____

6. Mechanical Ventilation

o ( ) Yes

o ( ) No

o If yes, for how many days? _____

7. Use of Sedatives

o ( ) Yes

o ( ) No

If yes, please specify the types of drugs used: _____

8. Use of Analgesia

o ( ) Yes

o ( ) No

If yes, please specify the types of drugs used: _____

9. Use of vasopressor

o ( ) Yes

o ( ) No

o If yes, type and dose of vasopressor: _____

10. Enteral Nutrition

o ( ) Yes

o ( ) No

o If yes, specify the type of enteral feeding _____

Section 3 patient related factor

12. Immobility

o ( ) Yes

o ( ) No

o If yes, specify the duration: _____

13. Comorbidities

( ) Diabetes

( ) Heart disease

( ) Chronic kidney disease

( ) Previous gastrointestinal disorders (e.g., IBS, IBD)

( ) Other (please specify): _____

14, Presence of any metabolic disturbances (e.g., electrolyte imbalance, hypothyroidism)

( ) Yes

( ) No

If yes, specify:

Section 4 : Assessment of Constipation

16 Frequency of Bowel Movements

☐ Daily or more frequently

☐ 1–2 times per week

☐ No bowel movements since ICU admission

17. Stool Consistency

☐ Soft and formed (Normal)

☐ Hard and compacted

☐ Very hard, dry, or pellet-like

18. Abdominal Discomfort/Distention

☐ No discomfort or bloating

☐ Mild discomfort or bloating

☐ Moderate discomfort/distention

☐ severe discomfort or distention, requiring attention

19. Straining During Defecation

(If the patient has passed stool, assess the degree of straining.)

☐ No straining

☐ Mild straining

☐ Moderate straining

☐ Severe straining, or unable to pass stool