The Effect of Comprehensive Nursing Intervention on the Incidence of Gastrointestinal Complications among Critically Ill Patients with Intermittent Enteral Feeding .

Abstract:

Background: Comprehensive nursing intervention reduces gastrointestinal complications in critically ill patients receiving intermittent enteral feeding by ensuring careful monitoring, proper positioning, early detection of intolerance, and timely management, leading to improved feeding tolerance and better clinical outcomes.

Aim: The present studyaimed tostudy the effect of comprehensive nursing intervention on the incidence of gastrointestinal complications among critically ill patients with intermittent enteral feeding**.**

Design:A quasi-experimental design was used.

Sitting: The study was conducted at the Electricity Hospital Almaza - Cairo, Egypt.

Sample:A purposive sample of 160 adult patients on intermittent enteral feeding was assigned into two groups: study and control (80 patients each). The study group received comprehensive nursing intervention while the control group received routine care. **Tools**: Two tools of data collection were used:

Tool I consisted of two parts.

Part I: Socio-demographic characteristics of the patients,

Part II: Patients' medical data,

Tool II: Gastrointestinal complications observational checklist.

Results: The study revealedthat on the first day, both groups exhibited predominantly low improvement (<35%) with no significant difference (68.8% vs. 72.5%). As the intervention progressed to the third day (post 1 hour), a stark contrast was documented; half of the study group (50.0%) achieved high improvement (>70%), compared to merely 11.3% in the control group. Conversely, the majority of the control group (56.3%) remained trapped in the low improvement category (<35%), confirming the highly significant positive impact on the study group ($p<0.001$).

Conclusion: Comprehensive nursing intervention was effective in reducing gastrointestinal complications among critically ill patients receiving intermittent enteral feeding. The study group showed significantly better outcomes than the control group ($p < 0.001$).

Recommendation: Develop nd implement an educational training program for nurses on comprehensive nursing interventions for critically ill patients receiving intermittent enteral feeding.

Keywords: Comprehensive nursing intervention, critically ill patients, Gastrointestinal complications, Intermittent enteral feeding

INTRODUCTION

Critically ill patients face a high vulnerability to malnutrition, affecting up to40% of cases. Stress-induced metabolic alterations lead to increased protein catabolism and subsequent loss of lean body mass. This condition elevates the risk of complications, particularly infectious ones, increases wound dehiscence, and negatively influences the stress response. Nutritional support aims to prevent malnutrition and its associated complications (**Yu et al., 2021).**

The intermittent enteral feeding schedule (IEFS) has been associated with a reduced incidence of gastrointestinal complications and more closely resembles normal meal patterns. Feedings of 300 to 400 ml are delivered intermittently four to six times daily over 30 to 60 minutes via slow gravity drip or infusion. Intermittent feeding regimens have been shown to reduce gastrointestinal issues **(Adam et al., 2020).**

For patients receiving enteral nutrition, nursing care is crucial to achieving successful outcomes. Critical care nurses conduct initial and weekly weight measurements, monitor vital signs, track intake and output, review laboratory data, and provide enteral tube care throughout nutritional support therapy. Nurses serve as key liaisons among patients, physicians, and dietitians **(Hafez & Ali, 2022).**

Comprehensive nursing intervention incorporates monitoring, assessment, and clinical strategies designed to prevent or manage gastrointestinal complications. Key measures include proper patient positioning, monitoring gastric residuals, adjusting feeding rates, administering medications to prevent

complications such as aspiration or diarrhea, and delivering education and support **(Wangari et al., 2024).**

Significance of the study:

Gastrointestinal complications are common among critically ill patients receiving enteral feeding, with an incidence ranging from 20% to 50%. The most frequent complications include diarrhea (10%–25%) and feeding intolerance (15%–30%), while vomiting and aspiration occur less often (5%–15%) **(Ojo et al., 2022).** Consequently, nurses play a vital role in reducing these complications by implementing comprehensive nursing strategies, including close monitoring of feeding tolerance and systematic abdominal assessment through auscultation of bowel sounds and palpation for distention, rigidity, and tenderness **(Qu et al., 2023).**

AIM OF THE STUDY

The present study aimed to study the effect of comprehensive nursing intervention on the incidence of gastrointestinal complications among critically ill patients with intermittent enteral feeding through the following objectives:

1- Assess the study of critical ill patients with intermittent enteral feeding for incidence of gastrointestinal complications.

2- Design a comprehensive nursing intervention for critically ill patients with intermittent enteral feeding based on basic assessment and literature review.

3- Implement the comprehensive nursing intervention for critically ill patients with intermittent enteral feeding.

4- Evaluate the effect of the implemented comprehensive nursing intervention for intermittent enteral feeding for critically ill patients on the incidence of gastrointestinal complications.

Research hypothesis:

H0: There will not be an effect for the comprehensive nursing intervention provided on the incidence of gastrointestinal complications among study group compared to the control group.

H1: Gastrointestinal complications among patients who will receive the comprehensive nursing intervention would be fewer than those who do not receive comprehensive nursing intervention.

Research Design: -

A quasi-Experimental research design, which is defined as an experimental design that tests causal hypotheses. The program is viewed as an 'intervention' in which its elements were evaluated and tested to determine how well it

achieves its objectives, as measured by a prespecified set of indicators ***(Cebula, 2018).***

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Research Setting: -

This study was conducted at the Electricity Hospital Almaza - Cairo, Egypt.The Intensive Care Units (ICUs) are composed of 32 beds in four units, divided into: ICU1: 10 beds, ICU2: 9 beds, ICU3: 8 beds, and ICU4: 5 beds. Every bed consists of one monitor, a pulse oximeter, one mechanical ventilator, an I.V. line holder, a crash cart, a doctor's room, and nurses' room.

Study population:

A purposive sample of 160 adult patients on intermittent enteral feeding was assigned in the current study. The first patients were randomly selected for the study group, and then other patients were selected for the control group.

Data collection tools:

Inclusion criteria:

- Patients who have a nasogastric or orogastric tube or gastrostomy for feeding can tolerate enteral feeding, were hemodynamically stable, andreceving intermittent enteral nutrition.

Exclusion criteria:

- Patients with a history of peptic ulcer, gastrointestinal bleeding, prior gastric surgery, chronic related illness (diabetes mellitus, hypertension, and renal failure), and abdominal trauma.

Tools for data collection:

The data was collected through the following tools:

Tool I: Structured Interview Assessment Sheet : This was developed by the researcher based on reviewing the relevant literature and used to assess patients' demographic and medical data, which consisted of two parts:

- **Part I**: Socio-demographic characteristics of patients; it was developed to assess personal characteristics of the patients studied, including patients' age, gender, education, marital status, residence, and occupation.

Part II:. Patients' medical data such as past medical history previous history of enteral feeding, the type of previous enteral feeding, and current medical data such as current diagnosis, complaint during administration, length of hospital stay and type of medication.

Tool II: Tool II. Gastrointestinal complications observational checklist:

This tool was adopted from ***Mohamed et al. (2023)&Abd El-Hafez et al. (2013).*** It was used to assess gastrointestinal complications among critically ill patients who received intermittent enteral feeding and was composed of four parts:

- **Part I: Gastric residual volume (GRV) monitoring:** This part was collected daily before intermittent enteral feeding and after one hour from intermittent enteral feeding. It covered data regarding measuring the baseline of gastric residual volume for patients on intermittent enteral feeding every 4 hours.
- **Part II: Abdominal distention monitoring:** It covered data regarding assessing the baseline of abdominal distention and abdominal circumference. Operationally, "No distension by palpation and percussion" means that the abdomen is soft, moving, and not tense. A distended abdomen means a hard, tender, bloated, and increased abdominal diameter. This part was collected (two times) daily before enteral feeding and after one hour from enteral feeding for patients on intermittent enteral feeding every 4 hours.
- **Part III: Vomiting Assessment Scale:** This part was adopted from ***Mohammed & Othman (2018)***, and it was used to assess the frequency and severity of vomiting. Its scoring system ranged from zero to four. grade (zero) None, grade (1) for one episode per 24 hours, grade (2) for 2 to 5 episodes per 24 hours, grade (3) for ≥ 6 episodes per 24hours; IV fluids, or total parenteral nutrition (TPN), indicated, and grade (4) life-threatening consequences. It covered data regarding assessing the baseline of vomiting episodes. This part was collected daily after one hour from enteral feeding for patients on intermittent enteral feeding every 4 hours.

Scoring system for vomiting assessment scale Table (1)

Grade	Degree	Description
0	None	No nausea or vomiting.
1	Mild	Occasional nausea, no vomiting, no impact on daily activit
2	Moderate	Persistent nausea, occasional vomiting (2–5 episodes/day)
3	Severe	Frequent vomiting (≥6 episodes/day)
4	Life-Threatening	Continuous vomiting, dehydration

- **Part IV: Diarrhea & Constipation monitoring:** It was to assess the baseline of diarrhea and constipation. Patients were considered to have diarrhea when passing three largely watery stools per day (***Dudek, 2010)***. Patients were considered to be constipated if they didn't pass stool for three days ***(Payne-James &Grimble, 2012)***. It was to assess the baseline of diarrhea and

constipation. This part was collected daily after one hour from enteral feeding for patients on intermittent enteral feeding every 4 hours. It included five parameters for constipation: abdominal distension or bloating, less frequent bowel movement, oozing liquid stool, smaller stool size, and inability to pass stool; three parameters for diarrhea: watery, loose, or semi-formed.

Validity and reliability:

The study tools were tested for validity (face and content validity). Face validity aimed to determine whether the tools measured what they were supposed to measure. Content validity was conducted to determine whether the content of the tools covered the aim of the study. It was measured by five experts in critical care nursing to assess the content validity, and modifications needed were made. The experts reviewed the tool for clarity, relevance, accuracy, comprehensiveness, simplicity, and applicability, and necessary modifications were made. Cronbach's Alpha was used to determine the internal reliability of the tool.

II. Operational design

The operational design includes the preparatory phase, pilot study, fieldwork, and ethical considerations.

Preparatory phase:

It included reviewing the current and past, local and international related literature, and theoretical knowledge of various aspects of the study using textbooks, articles, journals, periodicals, magazines, and the internet to modify the tool for data collection. During this phase, the researcher also visited the selected places to get acquainted with the personnel and the study settings.

Pilot Study

A pilot study was carried out on 10 % of the sample to test the applicability, feasibility, and practicality of the tools, and then the necessary modifications were made according to the results of the pilot study. So, the pilot study wasn't included in the study.

Fieldwork:

After attaining the approval to conduct the study, the sample was collected from the Electricity Hospital Almaza, Egypt. It consisted of four phases: preparatory phase, assessment and planning phase, implementation phase. And Evaluation phase

preparatory phase

- During this phase, the researcher reviewed the current, local, and international related literature on various aspects of the study using books, periodicals, journals, magazines, and the Internet. This helped the researcher to be more acquainted with the study and with the process of designing.
- Then, the tools of data collection and supportive materials were devoloped and adopted by the researcher based on reviewing the related recent, national, and international literature and theoretical knowledge of various aspects of the study using books, articles, scientific journals, and the internet to acquire in-depth knowledge about the study. The tools were designed and evaluated for being valid and reliable.
- The actual work of this study started and was completed within six months from the beginning of July to the end of December (2024). Data were collected by the researcher for three days (Sunday, Monday, and Tuesday), per week, in the morning shifts from 8 am to 3 pm at the previously mentioned setting.
- Patients were assigned into two groups: control and study group, each group consisting of 80 patients who had a nasogastric tube,orogastric tube,
- gastrostomy tube for intermittent enteral feeding. The study group included patients who received comprehensive nursing intervention, while the control group included patients who received the routine nursing care related to intermittent enteral feeding only.

▪ Assessment and planning phase:

- Assessment phase:all patients who had a nasogastric, orogastric, gastrostomy tube for intermittent enteral feeding were assessed by the researcher for meeting the inclusion criteria to be enrolled in the

current study. The aim of the study was explained to the patients or their families who agreed to participate in this study before obtaining informed consent.

- The researcher collected the study group data first before control group
- Both study and control group received the routine ICU protocol of intermittent enteral feeding with the type, frequency, and amount of formula. The study group received comprehensive nursing intervention twice daily before administering enteral feeding administerd by researcher for three consectivedays .
- **Gastric residual volume** was assessed by the researcher before enteral feeding administration and before using the GRV measurement checklist.
- **Abdominal distension** was assessed by the researcher before enteral feeding administrationby palpation and using an abdominal circumference measurement checklist. The light and deep palpations were used to assess abdominal distension. The distension was considered present when the abdomen was tense or hard. Abdominal circumference was measured using a soft, flexible measuring tape. Abdominal circumference was used as an indicator of abdominal distension. It was assessed as a baseline at thepre-implementation phase, and the mean scores of abdominal circumferences were compared after implementation of comprehensive nursing intervention.

- **Vomiting** as a gastrointestinal outcome was assessed through its frequency, amount, and consistency. The amount of vomiting was measured in ml using a collecting bag connected to the nasogastric tube. Consistency of vomiting was assessed using an observation technique.
- If there was vomiting, according to the ICU guidelines, the feeding was interrupted, and the tube feeding was opened. The patient was re-fed after showing a positive feeding test.

The occurrence of constipation or diarrhea as a gastrointestinal outcome was assessed through the frequency of defecation. The patient was considered constipated if they passed stool once in more than 3 days;

Implementation phase:

- Gastrointestinal outcomes (gastric residual volume, abdominal distension, vomiting, intra-abdominal pressure, and constipation or diarrhea) were assessed twice daily (8 am and 2 pm) before administering the enteral feeding for five consecutive days for both groups.

- After collecting data from control group, The researcher provided acomprehensive nursing care intervention for the nurses to apply it to patients with intermittent enteral feeding when the researcher was not present.
- Then the researcher collected data from the intervention group.
- The studied patients' socio-demographiccharacteristics, medical data, and enteral feeding-related data were obtained by the researcher from the patients' and patients' medical records using Tool (I) Structured Interview Assessment Sheet. It took about 10-15minutes to be fulfilled for each patient.
- The comprehensive nursing intervention; the gastrointestinal outcomes were assessed by the researcher using the second tool, which is concerned with the assessment of gastrointestinal outcomes. It was considered as baseline data for assessment of gastric residual volume, abdominal distension, vomiting, intra-abdominal pressure, and constipation. It took about 15-25minutes for each patient to be fulfilled.
- The patients received intermittent enteral feeding constantly every four hours and rested with no feeding from 12 am to 6 am. So, the researcher was applied the intermittent enteral feeding comprehensive nursing care

program by himself for all patients when he present for two times (10 am & 2 pm) three days a week (Sunday, Monday, and Tuesday) then the nurses were applied the intermittent enteral feeding comprehensive nursing care program for three times (6 pm, 10 pm & 6 am) so the researcher intend to provide the intermittent enteral feeding comprehensive nursing care program for ICU nurses before collecting the data from study group patientsconstipation or diarrhea severity was assessed.

Comprehensive nursing intervention was applied for the study group only. It took about 20-30 minutes for each patient to be fulfilled. Measurement of gastric residual volume (GRV) was performed by using a 60-mL syringe to aspirate stomach contents through the tube. It had traditionally been used to assess aspiration risk with associated interventions such as slowing or stopping the enteral feeding.

- Gastric residual volume (GRV) in the range of 200–500 mL cause interventions such as slowing or stopping the feeding to reduce risk of aspiration, however, according to recent research, it is not appropriate to stop enteral nutrition for

GRVs less than 500 mL in the absence of other signs of intolerance because of the impact on the patient's overall nutritional status. Additionally, the aspiration of gastric residual volumes can contribute to tube clogging. Followed hospital policy regarding measuring gastric residual volume and implementing interventions to prevent aspiration.

Monitor Residuals: residual volumes weren't checked when the feeding tube location is the small bowel. Gastric emptying may be impaired during critical illness. Shock, trauma, sympathomimetics, and narcotics are examples of causes for impaired GI motility. Return the GRV to the patient to prevent loss of enteral nutrition.

- If> 300 ml, the focus should be placed on improving gastric emptying. The stomach empties into the duodenum towards the right. Right lateral positioning was performed to promote emptying of gastric contents into the duodenum.
- For gastric tube placement only, checked Gastric Residual Volumes (GRV) Q12H until the patient has tolerated the final feeding rate for 24 hours, and then discontinue routine GRV assessments. If the GRV is < 300 ml, return the aspirated GRV to the patient via the feeding tube. Discard the GRV if > 300 ml. GRV PRN was rechecked if indicated based on clinical findings (e.g., abdominal distention, nausea or vomiting, suspected aspiration
- **If the patient vomits or enteral feeding is present/suspected in the tracheal aspirate**: feeds were stopped, notified of the physician and dietitian for instructions, and considered for small bowel feeding tube placement.
- Changed Feeding Tubing, Enteral feeding solution bags, and feeding tube sets used for enteral formulas were changed every 48 hours when a closed system is being used. Changed enteral feeding tube bags and tubing that are used for free water administration Q 24 H. Aseptic water (250- and 500-mL bottles) for free water administration (not tap water)
- Documentation when a new bag has been hung by placing an upright arrow in the enteral feeding intake column on the fluid balance record, and document in the graphic record when tubing changes are made.

Maintain Bowel Routine; Obtain an order to initiate bowel routine when enteral feeding is initiated. Inadequate bowel routine can interfere with feeding and promote inadequate nutrition.

- Delayed feeding is associated with negative patient outcomes. Patients with acute spinal cord injury require regular dose laxatives and suppositories (initially promoting bowel evacuation daily, then every two days while in Critical Care).
- Inadequate bowel routine can contribute to patient discomfort and agitation and can impair ventilation.
- To prevent reflux or vomiting, ensure that the patient is fed sitting upright or at

a minimum of 30-45º angle. If a patient's vomiting or reflux is caused by acute illness, their clinical condition needs to be assessed. Stopping the feed may need to be considered, and if the patient is at risk of dehydration, it may be appropriate to consider hospital admission for intravenous hydration.

- Maintain an accurate record documenting the frequency and volume of vomiting and the surrounding events. Appropriateness of feeding regimen, including method, volume, rate, and concentration of feed. Medications that may cause vomiting or that may reduce vomiting/reflux.

  Abdominal pain or distension caused by constipation, a build-up of gas, or gastrointestinal obstruction. Checked bowel function, minimized any air going into the feeding tube.
- Appropriateness of feeding regimen, including method, volume, rate, fiber content, and concentration of feed. Gut motility agents. Gastric venting. Attach a large (60ml) open-ended syringe to the feeding tube and allow gas to escape and the temperature of the feed.

  Diarrhea was caused by many factors, including infection, medications, rate of feed administration, migration of the feeding tube from the stomach to the small bowel, and poor tolerance to feed.
- Hydration and electrolyte replacement. A temporary change or break in feeding may help alleviate symptoms. Maintain an accurate record of bowel opening frequency and consistency, and surrounding events. A stool culture to identify or rule out an infectious cause. Recent changes to the food. Long-term changes to the feed regimen may improve symptoms (rate, volume, or concentration). Medical history, including any pre-existing bowel disorders.
- Temperature of feed. Tube migration. Medications that cause diarrhea (in particular, antibiotics) or that assist in reducing it. Sorbitol content of medications. Hygiene practices around feed administration. Fecal impaction is causing overflow. Malabsorption, including bile salt malabsorption.

  Constipationis caused by a lack of fluid, a lack of fiber, immobility, or medications. The following should be considered when seeking to improve or investigate further: Regular bowel pattern before constipation. Medical history, including any pre-existing bowel disorders. Medications that may be causing constipation (in particular, analgesics) or that can relieve it. Fiber intake. Fluid intake. Changes in mobility.

Planning phase:

The researcher prepared theoretical and practical educational material about the physical and functional abilities of patients with intermittent interalfeeding , theoretical and practical, and printed it in the form of comperhensive nursing intervention. An individualized plan of care was developed for each patient

based on the findings of the assessment, priorities, goals, and expected outcomes, and a nursing strategy was formulated.

Evaluation phase:

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Evaluation phase:

Each patient in the study and control groups was evaluated two times during the study period using the study tool. The first was the baseline at the beginning of the study. Then, for the evaluation of the effectiveness of the intervention, reassessments were done post-implementation of the comprehensive nursing intervention using the same tool.

Ethical considerations:

The research was obtained from the Scientific Research Ethics Committee in the Faculty of Nursing, Capital University, before starting the study. The researcher clarified the objective of the study to the patients included in the study to gain their confidence and trust. The researcher obtained oral consent from the patients. The researcher assured the maintenance of the anonymity and confidentiality of the subjects' data. The patients were informed that they were allowed to choose to participate or not in the study and that they had the right to withdraw from the study at any time.

III- Administrative design:

After the explanation of the study's aim and objectives, official permission was obtained from the Dean of the nursing faculty and the manager of the Electricity Hospital Almaza. The following departments were asked for cooperation and permission to conduct the study.

Results

Table (1) illustrates the socio-demographic characteristics of the studied patients. It is evident that the highest percentage of patients in both the study (58.8%) and control (52.5%) groups falls within the age category of 50 to 60 years, with no statistically significant difference between the two groups (p=0.183). Males constitute the majority in both groups (65.0% in the study group and 57.5% in the control group). Regarding education, 36.3% of the study group attained a university education compared to 31.3% in the control group. Furthermore, more than half of the patients in both groups are married (52.5% and 67.5%, respectively) and the majority are not

working (62.5% and 70.0%, respectively).

Table (2) demonstrates the past medical history of the patients. The vast majority of both the study (95.0%) and control (90.0%) groups have a history of chronic diseases. Cardiovascular diseases (CVS) are the most prevalent, affecting 32.5% of the study group and 26.3% of the control group, followed by Chronic Obstructive Pulmonary Disease (COPD). Additionally, 78.8% of the study group and 85.0% of the control group had no previous history of enteral feeding.

Table (3) clarifies the present medical history and admission details. Hypoxia was the primary cause of admission for 40.0% of the study group and 48.8% of the control group, followed by Disturbed Level of Consciousness (DCL) at 32.5% for both groups. The most common current diagnoses were CVS issues (32.5% vs. 27.5%) and pneumonia (20.0% vs. 17.5%). Almost all patients received antibiotics (100% in the study group and 97.5% in the control group) along with H2 receptor blockers. The length of hospital stay for the majority ranged between 10 to 15 days, with no significant statistical differences between the groups.

Table (4)reflects the progressive evolution of gastrointestinal complications exclusively within the study group over the three days using Cochran's Q test. The results indicate a highly significant internal improvement across all measured parameters. Normal GRV (post 1 hour) significantly improved from 45.0% on the first day to 87.5% on the third day ($p<0.001$). The presence of abdominal distention significantly declined from 57.5% to 13.8% ($p<0.001$). Furthermore, instances of completely no vomiting increased from 35.0% to 85.0%. Both diarrhea and constipation significantly decreased by the third day, confirming the effectiveness of the applied interventions within this group.

Table (5) summarize the overall improvement outcomes for the patients. On the first day, both groups exhibited predominantly low improvement (<35%) with no significant difference (68.8% vs. 72.5%). As the intervention progressed to the third day (post 1 hour), a stark contrast was documented; half of the study group (50.0%) achieved high improvement (>70%), compared to merely 11.3% in the control group. Conversely, the majority of the control group (56.3%) remained trapped in the low improvement category (<35%), confirming the highly significant positive impact on the study group ($p<0.001$).

Figure (1): summarizes the overall improvement outcomes for the patients. On the first day, both groups exhibited predominantly low improvement (<35%) with no significant difference (68.8% vs. 72.5%). As the intervention progressed to the third day (post 1 hour), a stark contrast was documented; half of the study group (50.0%) achieved high improvement (>70%), compared to merely 11.3% in the control group. Conversely, the majority of the control group (56.3%) remained trapped in the low improvement category (<35%), confirming the highly significant positive impact on the study group ($p<0.001$).

Table (1): Number and percentage distribution of the studied patients according to their socio-demographic data (n=80 of each group).

Socio-demographic characteristics	Study Group *(n=80)*		Control Group *(n=80)*		Chi-square test	p-value
	No.	%	No.	%		
Age:						
20 ≤ 30 years	5	6.3%	8	10.0%	1.044	0.791
30 < 40 years	12	15.0%	13	16.3%		

40 < 50 years	16	20.0%	17	21.3%		
50 ≤ 60 years	47	58.8%	42	52.5%		
Mean±SD	**48.13 ± 7.22**		**46.63 ± 6.99**		**(t= -1.335)**	**0.183**
Gender						
Male	52	65.0%	46	57.5%	0.948	0.330
Female	28	35.0%	34	42.5%		
Education:						
Not read or write	15	18.8%	12	15.0%	1.342	0.719
Read and write	17	21.3%	20	25.0%		
Intermediate education	19	23.8%	23	28.8%		
University education	29	36.3%	25	31.3%		
Marital status:						
Single	3	3.8%	2	2.5%	5.773	0.123
Married	42	52.5%	54	67.5%		
Divorced	1	1.3%	3	3.8%		
Widowed	34	42.5%	21	26.3%		
Residence:						
Rural	38	47.5%	44	55.0%	0.901	0.343
Urban	42	52.5%	36	45.0%		
Occupation:						
Worker	30	37.5%	24	30.0%	1.006	0.316
Not worker	50	62.5%	56	70.0%		

Table (2): Number and percentage distribution of the studied Patients according to their past medical history (n=80 of each group).

Past medical history	**Study Group *(n=80)***		**Control Group *(n=80)***		**Chi-square test**	**p-value**
	No.	**%**	**No.**	**%**		
Chronic diseases						
Yes	76	95.0%	72	90.0%	1.442	0.230

No	4	5.0%	8	10.0%		
If yes mention						
CVS	26	32.5%	21	26.3%	2.404	0.662
COPD	22	27.5%	24	30.0%		
Heart failure	18	22.5%	15	18.8%		
Liver diseases	10	12.5%	12	15.0%		
No	4	5.0%	8	10.0%		
Previous history of enteral feeding						
Yes	17	21.3%	12	15.0%	1.053	0.305
No	63	78.8%	68	85.0%		
If yes, mention the period of enteral feeding	**N=17**		**N=12**			
Mean ± SD (Days)	21.4 ± 5.2		22.1 ± 6.1		(t-test= 0.781)	0.435
The type of previous enteral feeding						
Continuous	1	5.9%	2	16.7%	0.448	0.503
Intermittent	16	94.1%	10	83.3%		

Table (3): Number and percentage distribution of the studied Patients according to their present medical history (n=80 of each group).

Present medical history	**Study Group *(n=80)***		**Control Group *(n=80)***		**Chi-square test**	**p-value**
	No.	**%**	**No.**	**%**		
Cause of admission						
Chest pain	10	12.5%	2	2.5%	8.067	0.089

DCL	26	32.5%	26	32.5%		
Fits	0	0.0%	2	2.5%		
Hepatic coma	12	15.0%	11	13.8%		
Hypoxia	32	40.0%	39	48.8%		
Current diagnosis						
Cerebral hemorrhage	0	0.0%	1	1.3%		
Chest infection	14	17.5%	16	20.0%		
COPD	1	1.3%	3	3.8%		
CVS	26	32.5%	22	27.5%		
Heart failure	11	13.8%	8	10.0%	6.241	0.620
Liver cell failure	6	7.5%	5	6.3%		
Liver cirrhosis	6	7.5%	8	10.0%		
Pneumonia	16	20.0%	14	17.5%		
Sepsis	0	0.0%	3	3.8%		
Types of medications received						
Antibiotic	80	100.0%	78	97.5%	2.025	0.155
H2 receptor blocker	78	97.5%	74	92.5%	1.714	0.190
Sedative	15	18.8%	18	22.5%	0.341	0.559
Anti-emetic	32	40.0%	36	45.0%	0.417	0.518
Anti-diarrheal	14	17.5%	19	23.8%	0.941	0.332
Laxatives	12	15.0%	15	18.8%	0.384	0.535
Length of hospital stay "days"						
≤10 days	28	35.0	24	30.0		
>10-15 days	51	**63.8**	48	**60.0**	5.843	0.054
>15-20 days	1	1.3	8	10.0		
Mean±SD	10.82±3.91		11.53±4.91			

Table (4): Evolution of Gastrointestinal Complications over three days among the Study Group. (n=80 of each group).

Study Group								
Gastrointestinal Complications	**1st Day**		**2nd Day**		**3rd Day**		**(x2)**	**p-value**
	No.	**%**	**No.**	**%**	**No.**	**%**		

Gastric Residual Volume (GRV)								
Normal	36	45.0	60	75.0	70	87.5	31.42	<0.001
Abnormal	44	55.0	20	25.0	10	12.5		
Abdominal Distention								
Present	46	57.5	23	28.8	11	13.8	35.88	<0.001
Not present	34	42.5	57	71.3	69	86.3		
Vomiting Assessment Scale								
None (0)	28	35.0	55	68.8	68	85.0	54.16	<0.001
1 episode per 24 hours	40	50.0	15	18.8	4	5.0		
2 to 5 episodes per 24 hours	12	15.0	10	12.5	8	10.0		
≥6 episodes per 24 hours	0	0.0	0	0.0	0	0.0		
Life-threatening consequences	0	0.0	0	0.0	0	0.0		
Diarrhea Monitoring								
Present	20	25.0	11	13.8	6	7.5	10.55	0.005
Not present	60	75.0	69	86.3	74	92.5		
Constipation Monitoring								
Present	24	30.0	16	20.0	8	10.0	14.82	<0.001
Not present	56	70.0	64	80.0	72	90.0		

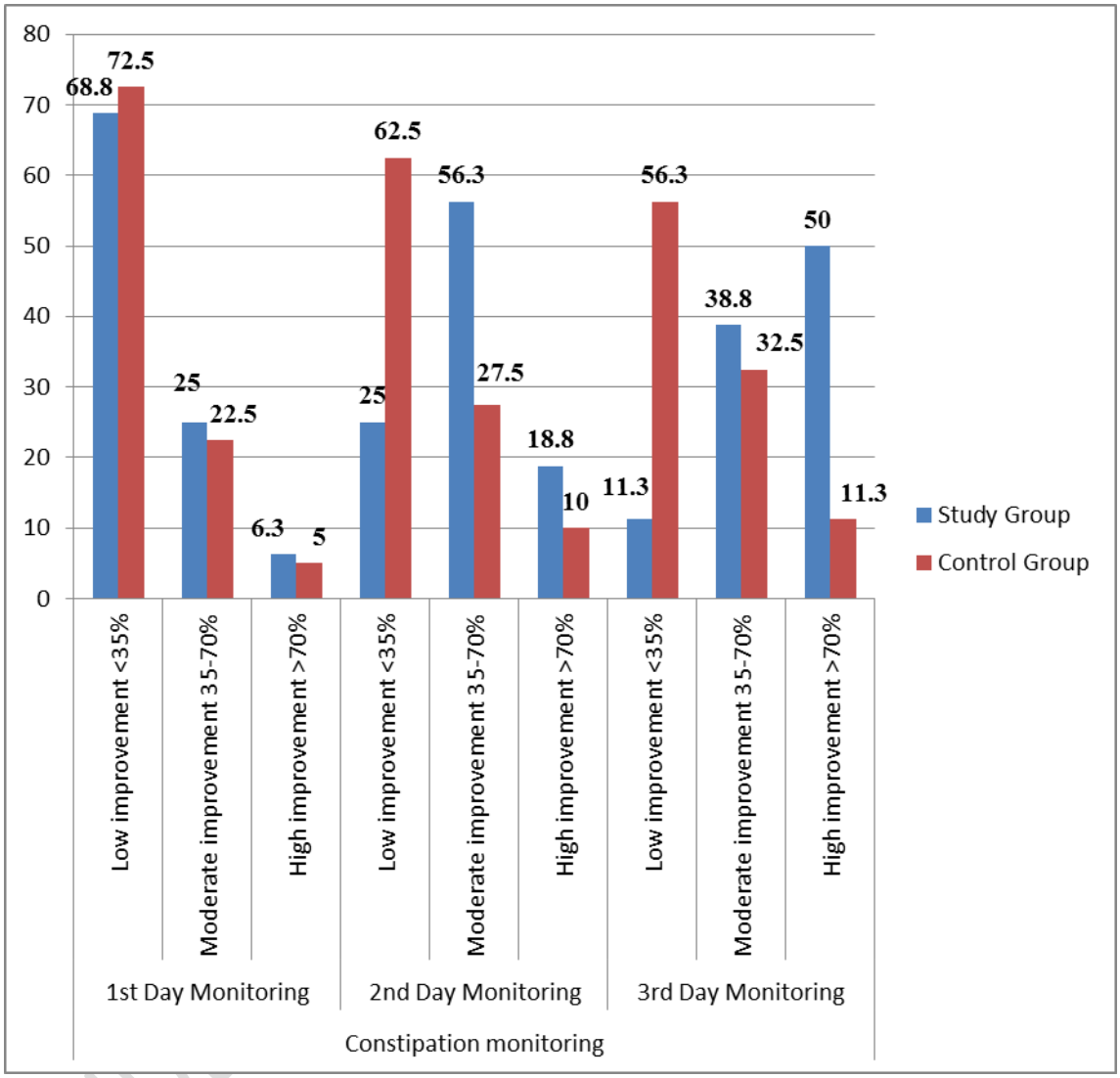
*Using: Cochran's Qtestp-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS*

Table (5): Number and percentage distribution of the studied patients according to their outcome for overall factors for the 3 days post 1 hour (n=80 of each group).

Overall Improvement (Post 1 hour)	**Study Group**		**Control Group**		**Chi-square test(x2)**	**p-value**
	No.	**%**	**No.**	**%**		

1st Day Monitoring						
Low improvement <35%	55	**68.8**	58	**72.5**	0.312	0.856
Moderate improvement 35-70%	20	**25.0**	18	**22.5**		
High improvement >70%	5	**6.3**	4	**5.0**		
2nd Day Monitoring						
Low improvement <35%	20	**25.0**	50	**62.5**	23.450	<0.001
Moderate improvement 35-70%	45	**56.3**	22	**27.5**		
High improvement >70%	15	**18.8**	8	**10.0**		
3rd Day Monitoring						
Low improvement <35%	9	**11.3**	45	**56.3**	44.051	<0.001
Moderate improvement 35-70%	31	**38.8**	26	**32.5**		
High improvement >70%	40	**50.0**	9	**11.3**		

*Using: Chi-square test p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 H*



DISCUSSION

The incidence of gastrointestinal complications among critically ill patients receiving intermittent enteral feeding is relatively common due to the physiological stress of critical illness and impaired gastrointestinal function. The presence of these complications often leads to interruptions in feeding, inadequate caloric intake, and prolonged stays in the ICU, emphasizing the need for continuous monitoring and individualized feeding strategies to ensure safe and effective nutritional support (**Hardy et al. 2025).**

Comprehensive nursing care encompassing thorough patient assessment, individualized feeding plans, strict monitoring of gastric residual volumes, proper

positioning during and after feeding, timely management of symptoms, and adherence to evidence-based feeding protocols helps enhance gastrointestinal tolerance and reduce complications such as vomiting, diarrhea, abdominal distension, and feeding intolerance (**Saiz-Vinuesa et al. 2025).**

Therefore, the present study aims to evaluate the effect of comprehensive nursing intervention on the incidence of gastrointestinal complications among critically ill patients with intermittent enteral feeding.

Regarding the socio-demographic characteristics of patients in the control and study group, Table (1)showed that less than two-thirds and more than half of the studied and control patients are between 58 and 60 years old, with a mean age of 48.13±7.22 and 46.63±6.99. From the researcher's point of view, that may be related to this age distribution is expected among critically ill patients, as the risk of severe illness and organ dysfunction increases with advancing age due to physiological changes, decreased immunity, and the presence of chronic comorbidities. Therefore, the predominance of patients in the late-middle-age to elderly range reflects the typical demographic pattern of critical illness and the higher likelihood of developing conditions that necessitate close monitoring and advanced supportive care.

These findings were supported by **Mohamed et al. (2023),** who stated that the study entitled "Effect of Proper Enteral Feeding Technique and Comprehensive Nursing Intervention on Selected Gastrointestinal Complications among Stroke Patients" reported that the majority of the patients studied were between 51 and 64 years of age. Similarly, this result agreed with **Ding et al. (2022),** who illustrated that, among critically ill patients, the incidence of ischemic stroke increased with advancing age, particularly in those aged 50 to 69 years or older. In contrast, these findings disagreed with those of **Abd El-Hafez et al. (2013),** who stated that the study entitled "Effect of intermittent enteral feeding schedule on the occurrence of gastrointestinal complications and hospital stay among critically ill patients." It was revealed that less than half of the studied patients' ages were between 30 and 40 years.

Regarding gender, more than two-thirds and more than half of the studied and control patients are males. From the researcher's point of view, this finding may be related to the higher exposure of males to risk factors leading to critical illness, such as occupational hazards, trauma, smoking, and chronic diseases. In addition, males are more likely to be admitted to intensive care units due to severe medical and surgical conditions compared with females. Cultural and social factors may also contribute, as males in many communities tend to seek medical care at more advanced stages of illness, increasing the likelihood of critical deterioration and ICU admission.

These findings agreed with **Shi et al. (2024),** who stated that the study entitled "The incidence and risk factors of gastrointestinal dysfunction during enteral nutrition in mechanically ventilated critically ill patients" reported that more than two-thirds of the studied patients were male. Similarly, these findings were in the same line with **Chen et al. (2025),** who stated that the study entitled "Analysis of the

effect of clustered nursing interventions on enteral nutrition in critically ill stroke patients" Revealed that more than two-thirds of the studied patients were male.

As regards education, less than two-fifths of the studied and control patients have a university or intermediate education. At the same time, more than half and more than two-thirds of them are married. From the researcher's point of view, this may be related to the fact that individuals with lower educational levels often have limited health literacy, which can negatively affect disease prevention, early detection, and adherence to medical advice, thereby increasing the risk of disease progression and critical illness. In addition, married individuals may represent a larger proportion of ICU admissions because marriage is more common in middle and older age groups, which are more vulnerable to chronic illnesses and severe health conditions requiring intensive care and enteral feeding. Social and family responsibilities may also contribute to delayed health-seeking behavior, leading to more advanced disease states at the time of hospital admission.

These findings agreed with those of **Mohamed et al. (2023),** who stated that the study entitled "Effect of Proper Enteral Feeding Technique and Comprehensive Nursing Intervention on Selected Gastrointestinal Complications among Stroke Patients" reported that more than two-fifths of the studied patients had moderate education. Conversely, these findings disagreed with **Chen et al. (2025),** who stated that the study entitled "Effect of comprehensive nursing intervention on gastrointestinal complications and intra-abdominal pressure of critical-enteral-feed patients" Revealed that more than two-thirds of the studied patients were illiterate.

Regarding residence, more than half of the studied and control patients live in urban areas, while the other half live in rural areas. From the researcher's point of view, this may be related to differences in access to healthcare services and referral patterns between urban and rural areas. Patients living in urban areas may have better access to tertiary hospitals and intensive care units, resulting in a higher representation among critically ill patients who receive intermittent enteral feeding. Conversely, patients from rural areas may experience delays in seeking care, limited availability of specialized health services, and challenges in transportation, which can contribute to disease progression and critical illness by the time of hospital admission.

These findings align with those of **Adam et al. (2020),** who stated that the study entitled "Effect of early enteral nutrition guidelines on the occurrence of gastrointestinal complications among acute lung injury patients" reported that more than half of the studied patients had a moderate level of education. Conversely, these findings were incongruent with **Fekri et al. (2021),** who stated that the study entitled "The effects of abdominal' I LOV U' massage along with lifestyle training on constipation and distension in the elderly with stroke" found that more than two-thirds of the studied patients lived in rural areas.

Regarding occupation, the current study revealed that more than two-thirds of the patients in both the study and control groups are not working. From the researcher's point of view, this may be related to the high severity of illness and functional

limitations among critically ill patients, which often result in unemployment or inability to maintain regular work. Many patients admitted to intensive care units are older adults, retirees, or individuals with chronic diseases that limit their physical capacity and employability. This result was in agreement with **Mohamed et al. (2023),** who reported that approximately half of their studied participants were housewives or unemployed, reflecting the impact of health status on occupational engagement.

Regarding past medical history, Table (2) revealed that almost all of the studied patients have chronic diseases, compared to the majority in the control group. Among the studied group, more than one third have cardiovascular system CVS diseases, while more than one fifth of the control group have liver diseases. Additionally, the majority of the studied patients and the control patients have no history of enteral feeding. Regarding the duration of enteral feeding, the majority of the studied group and the control group had no period of enteral feeding, whereas more than one-fifth and less than one-fifth had intermittent enteral feeding, respectively.

From the researcher's perspective, the high prevalence of chronic illnesses among critically ill patients may be attributed to the role of chronic diseases in predisposing individuals to acute deterioration and subsequent ICU admission. Cardiovascular system diseases, which were more prevalent in the studied group, are often associated with hemodynamic instability, impaired tissue perfusion, and increased metabolic demands, thereby necessitating closer monitoring and enhanced nutritional support. In contrast, the predominance of liver diseases in the control group may reflect differing underlying medical conditions that influence nutritional status and tolerance to enteral feeding. These findings are in agreement with **Shi et al. (2024),** who reported that most patients had chronic hypertension, but differ from those of **Wang et al. (2022),** who found a higher prevalence of neurological diseases among their study population.

Regarding present medical history, the current studyclarified that hypoxia was the cause of admission for nearly two-fifths of the studied group and less than half of the control group. Regarding current diagnoses, more than one-third of the studied patients were diagnosed with cerebrovascular stroke (CVS) diseases, while more than one-fifth of the control group had chest infections. In terms of medications received, nearly all patients in both groups were administered with antibiotics. Concerning the length of hospital stay, more than two-thirds of the studied group and nearly two-thirds of the control group remained hospitalized for more than 10 to 15 days.

From the researcher's point of view, these findings may be explained by the severity and complexity of conditions among critically ill patients admitted to intensive care units. Hypoxia, a leading cause of admission, reflects the presence of life-threatening respiratory or neurological compromise requiring immediate intensive management in both groups. The higher prevalence of cerebrovascular stroke in the studied group may be related to acute neurological impairment that affects consciousness, swallowing, and respiratory function, thereby increasing the need for close monitoring and enteral nutritional support.

The current study demonstrated that most of the studied patients were post-stroke, which is consistent with previous research. **Mohamed et al. (2021)** documented that more than two-thirds of their studied population had suffered a stroke. These similarities may reflect the high burden of stroke-related admissions in acute care settings and the associated complications requiring specialized nursing care. Likewise, **Banda et al. (2022)** reported comparable findings, indicating that the majority of patients in their study on dysphagia and the risk of pneumonia and mortality were post-stroke.

Regarding gastrointestinal complications, concerning gastric residual volume (GRV) over three days, the results of the current study revealed that on the first day, both groups showed comparable abnormal GRV levels pre-feeding, with normal levels at a few for the study group and the control group . However, a significant improvement emerged in the study group in the second and third days. On the third day (pre-feeding), the study group exhibited a remarkable increase in normal GRV reaching the majority, whereas the control group remained at a critically low, revealing a highly significant statistical difference.

The findings of the current study were in agreement with **He et al. (2026)**, in a study entitled "Interruptions of enteral nutrition in intensive care units: mechanisms, clinical impacts, and precision nursing interventions" reported that precision nursing interventions, including regular assessment of gastrointestinal tolerance and prompt management of enteral feeding complications, improved feeding tolerance and reduced enteral nutrition interruptions in critically ill patients. Likewise, **Wang et al. (2026)** in a study entitled "Risk of gastrointestinal intolerance and complications associated with homemade versus commercial enteral nutrition in critically ill patients" found that standardized enteral nutrition practices with close nursing monitoring reduced gastrointestinal intolerance and abnormal gastric residual volume (GRV), supporting the significant improvement in normal GRV observed among the study group.

In contrast, the findings of the current study disagreed with **Feng et al. (2023)**, in a study entitled "Advances in management strategies for enteral nutrition-related gastric retention in adult patients with nasogastric tubes" concluded that routine GRV monitoring did not significantly improve major clinical outcomes and was not necessary for all patients receiving enteral nutrition. The difference may be explained by the comprehensive nursing intervention implemented in the current study, which extended beyond routine GRV monitoring alone.

From the researchers' point of view, the improvement in normal gastric residual volume (GRV) among the study group was attributed to the comprehensive nursing intervention rather than routine GRV monitoring alone. The integrated evidence-based enteral feeding practices likely improved gastrointestinal tolerance, enhanced gastric emptying, and reduced feeding-related complications, leading to better GRV outcomes than those observed in the control group.

Regarding abdominal distention, the results of the current study revealed that pre-feeding levels on day one was profoundly high in both, most groups . By the

third day, distention dramatically decreased in the study group to less than a fifth, while it exacerbated in the control group to almost all . The findings of the current study were consistent with **Hrdy et al. (2025)**,in a study entitled "Intermittent enteral nutrition shortens the time to achieve nutritional goals in critically ill patients" who reported that optimized enteral nutrition strategies improved feeding tolerance and reduced gastrointestinal complications in critically ill patients, facilitating earlier achievement of nutritional goals. The reduction in abdominal distention observed in the study group supports their findings that evidence-based enteral feeding practices enhance gastrointestinal function. Also, the present findings were in agreement with **Shi et al. (2026)**,in a study entitled" Comparison of the effects of different models of nutrient supply on nutritional status and clinical outcomes in ICU patients" whose systematic review and network meta-analysis demonstrated that appropriate nutrient delivery models were associated with better gastrointestinal tolerance and fewer feeding-related complications, including abdominal distention, among ICU patients.

In contrast, the findings of the current study disagreed with **Jenkins et al. (2026),** in a study entitled" Investigating the prevalence, predictors and outcomes associated with enteral feeding intolerance in critically ill adults" who, in a retrospective cohort study of critically ill adults, reported that enteral feeding intolerance remained common despite routine enteral nutrition management and was associated with adverse clinical outcomes and identified several patient-related factors as predictors of feeding intolerance, suggesting that gastrointestinal complications are multifactorial and may not be prevented by standard enteral feeding practices alone.

From the researchers' point of view, the marked reduction in abdominal distention among the study group was attributed to the comprehensive nursing intervention, which promoted optimal gastrointestinal function and enhanced tolerance to enteral feeding. The intervention enabled early identification and management of feeding-related problems, thereby minimizing gastrointestinal complications and improving patients' tolerance compared with those receiving routine care.

Regarding diarrhea monitoring(post 1 hour),the results of the current study revealed that it gradually decreased in the study group from one quarter on day one to more than tenth on day three. In stark contrast, it increased in the control group reaching less than half on day three . A similar pattern was observed in constipation, which dropped to one tenth in the study group on day three compared to a persistent more than two thirds in the control group.

The findings of the current study were consistent with **Hegazy et al. (2026)**, in a study entitled "Enteral Nutrition Guidelines Improve Critically Ill Patients' Outcomes" reported that implementing evidence-based enteral nutrition guidelines significantly improved gastrointestinal outcomes among critically ill patients, including reducing the incidence of diarrhea and constipation. The authors attributed these improvements to standardized enteral feeding practices and continuous nursing assessment, which enhanced patients' tolerance to enteral nutrition.

Similarly. The present findings were also in agreement with **Bourgault et al. (2026)**, in a study entitled ""Enteral Feeding Intolerance in Adult Patients Receiving Mechanical Ventilation" who concluded that comprehensive nursing management of enteral feeding intolerance, including early identification and prompt management of gastrointestinal symptoms, reduced feeding-related complications such as diarrhea and constipation and improved enteral feeding tolerance in mechanically ventilated adult patients.

On the other hand, the findings of the current study disagreed with **Jenkins et al. (2026)**, in a study entitled "Investigating the prevalence, predictors and outcomes associated with enteral feeding intolerance in critically ill adults" found that enteral feeding intolerance, including diarrhea and constipation, remained prevalent among critically ill adults despite routine enteral nutrition management. They also suggested that patient-related clinical factors were stronger predictors of gastrointestinal complications than enteral feeding practices alone.

From the researchers' point of view, the reduction in diarrhea and constipation among the study group was attributed to the comprehensive nursing intervention, which promoted appropriate enteral feeding administration, early detection of gastrointestinal intolerance, and timely management of feeding-related complications. These evidence-based nursing practices likely improved gastrointestinal motility and feeding tolerance, resulting in fewer gastrointestinal complications than in the control group.

Regardingvomiting scale between both groups, the results of the current study revealed that on the first day, the absence of vomiting was reported by one third of the study group and half of the control group with no significant difference. Progressively, the study group showed highly significant improvement; by the third day, the majority of the study group had no vomiting episodes, while only one third of the control group were vomiting-free .

These findings were supported by **Liao et al. (2025)**,in a study entitled "Machine learning-based predictive model for enteral nutrition-associated diarrhea in ICU patients and its nursing applications" revealed that evidence-based nursing strategies for managing enteral nutrition-related gastrointestinal complications improved feeding tolerance and reduced adverse gastrointestinal events. The authors emphasized that early identification of patients at risk and timely nursing interventions contributed to better enteral nutrition outcomes, supporting the reduction in vomiting observed among the study group. In contrast, the findings of the current study disagreed with **Jenkins et al. (2026)**, who reported that enteral feeding intolerance, including vomiting, remained common among critically ill adults despite routine enteral nutrition management and was largely influenced by patient-related clinical factors rather than standard feeding practices alone.

From the researchers' point of view, the significant reduction in vomiting among the study group was likely the result of consistent implementation of the comprehensive nursing intervention. Adherence to evidence-based enteral feeding practices, continuous patient monitoring, and prompt corrective actions enhanced

patients' tolerance to enteral nutrition, thereby minimizing vomiting episodes compared with the control group.

Regardingoverall improvement outcomes for the patients, the results of the current study revealed that on the first day, both groups exhibited predominantly low improvement with no significant difference . As the intervention progressed to the third day (post 1 hour), a stark contrast was documented; half of the study group achieved high improvement), compared to nearly one tenth in the control group. Conversely, more than half of the control group remained trapped in the low improvement category, confirming the highly significant positive impact on the study group .

These findings were in the same line with **Nguyen et al. (2024)**, in a study entitled "Characteristics and feeding intolerance in critically ill adult patients receiving peptide-based enteral nutrition: " reported that improved enteral nutrition tolerance was associated with better nutritional delivery and favorable clinical outcomes among critically ill adults receiving peptide-based enteral nutrition. Likewise, **Shaw (2026)** in a study entitled "Nutrition in Gastrointestinal Disease" emphasized that evidence-based nutritional support and comprehensive nursing management play a vital role in improving gastrointestinal function, reducing enteral feeding complications, and accelerating patient recovery. Similarly, **Hegazy et al. (2026)** found that implementing enteral nutrition guidelines significantly improved patients' clinical outcomes and reduced gastrointestinal complications, supporting the marked overall improvement observed among the study group.

In contrast, the findings of the current study disagreed with **Jenkins et al. (2026)**, who found that enteral feeding intolerance remained highly prevalent and was associated with delayed recovery and poorer clinical outcomes despite routine nutritional management. Similarly, **Feng et al. (2023)** concluded that routine gastric residual volume monitoring did not significantly improve overall clinical outcomes, including length of ICU stay or mortality, suggesting that standard enteral feeding practices alone may have limited impact on patient recovery.

From the researchers' point of view, these findings contrast with the current study, in which patients who received comprehensive nursing intervention demonstrated substantially greater overall improvement than those receiving routine care. The substantial overall improvement observed among the study group was attributed to the comprehensive nursing intervention, which ensured consistent application of evidence-based enteral feeding practices, early detection and management of feeding intolerance, and continuous patient monitoring. These integrated nursing measures enhanced nutritional delivery, reduced gastrointestinal complications, and promoted faster clinical recovery compared with routine care.

Regarding correlation, the current study revealed weak positive correlation coefficients were observed for some variables, such as education with abdominal distention monitoring, residence with abdominal distention monitoring , residence with vomiting assessment scale , and occupation with diarrhea , these relationships did not reach statistical significance.

From the researcher's perspective, these weak correlations may reflect random variation resulting from the relatively small sample size in the control group rather than true associations. Furthermore, gastrointestinal complications among critically ill patients are more likely to be influenced by clinical factors, such as disease severity, underlying medical conditions, medications, and nutritional management, than by patients' socio-demographic characteristics. Therefore, socio-demographic variables alone appear to have a limited role in predicting these gastrointestinal outcomes.

These results were consistent with those reported by **Mohamed et al. (2023)**, who found that patients' socio-demographic characteristics had no significant influence on the occurrence of gastrointestinal complications among critically ill patients receiving enteral nutrition. Similarly, **Banda et al. (2022)** reported that variables such as age, gender, educational level, and occupation were not significantly associated with feeding-related gastrointestinal disturbances, indicating that demographic factors played a limited role in predicting gastrointestinal outcomes.

In contrast, **Shabaan et al. (2021)** found that certain patient characteristics were significantly associated with gastrointestinal complications during enteral feeding. They reported variations in gastric residual volume, vomiting, diarrhea, and abdominal distention among different patient groups, suggesting that individual patient factors contributed to feeding tolerance. This discrepancy might have been attributed to differences in study settings, sample characteristics, participants' clinical conditions, and methods used to assess gastrointestinal complications.

Conclusion

In light of the current study results, it can be concluded that on the first day, both groups exhibited low improvement with no significant difference. As the intervention progressed to the third day (post 1 hour), a stark contrast was documented; half of the study group achieved high improvement , compared to merely in the control group. Conversely, the majority of the control group remained trapped in the low improvement category, confirming the highly significant positive impact on the study group . There was a statistically significant positive correlation between gastric residual volume (GRV), abdominal distention monitoring, vomiting assessment scale, diarrhea, constipation monitoring, and the studied patients' socio-demographic data.

Recommendation

Based on the findings of the present study, the following recommendations are suggested:

1. Develop an educational training program for nurses on comprehensive nursing intervention.
2. Incorporate comprehensive nursing intervention as a routine component of care for

critically ill patients receiving enteral feeding.

3. Conduct regular competency assessments for nurses to evaluate their skills in administering enteral feeding, monitoring gastrointestinal tolerance, and recognizing early complications.
4. Future research on a large sample of patients and in other settings is needed

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