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RESEARCH ARTICLE

THE EFFECT OF COMPREHENSIVE NURSING INTERVENTION ON THE INCIDENCE OF GASTROINTESTINAL COMPLICATIONS AMONG CRITICALLY ILL PATIENTS WITH INTERMITTENT ENTERAL FEEDING

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Abstract

Background: Comprehensive nursing intervention reduces gastrointestinal complications in critically ill patients with receiving intermittent enteral feeding by providing Comprehensive nursing intervention.

Aim: 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.

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 equal 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: Structured Interview Assessment Sheet 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 revealed that 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), as difference was documented; half of the study group (50.0%) achieved high improvement (>70%), compared to merely 11.3% in the control group.

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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: it can be concluded that implementation of Comprehensive nursing intervention has a statistical significant effective in reducing gastrointestinal complications among critically ill patients receiving intermittent enteral feeding
Recommendation: Develop and implement comprehensive nursing interventions for critically ill patients with receiving intermittent enteral feeding.

Introduction:-

Critically ill patients face a high vulnerability to malnutrition, affecting up to 40% 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; Noitz et al., 2026). 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:-

- 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).

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.

Subject:-

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, and receiving 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 adapted 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 distention 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 24 hours; 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 d activities
2	Moderate	Persistent nausea, occasional vomiting (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: Content validity refers to the degree to which an assessment instrument is relevant to, and representative of the targeted construct it is designed to measure. Face validity is a subjective decision based on the researcher's feelings, thoughts, and intuition about the functioning of the measuring instrument. It is the simplest and least precise method of determining validity which relies entirely on the expertise and familiarity of the assessor concerning the subject matter (Sürücü&Maslakçi, 2020). Validity of the tools was done namely face validity and content validity. Tool was translated into Arabic and tested by a group of five experts specialized in Adult Health Nursing Department, from Capital University 5 assistant professors through an opinionative sheet to measure validity of the tools and the necessary modifications were done accordingly.

Reliability: Cronbach's Alpha was used to determine the internal reliability of the tool.

Tool	Reliability	Validity		Internal Consistency
	Cronbach's Alpha	Self-validity	Content validity	
Gastrointestinal Complications Observation Checklist	0.73	0.85	0.86	Good

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 five phases: preparatory phase, assessment phase and planning phase, implementation phase. And Evaluation phase.

Preparatory Phase:-

- 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. The first 80 eligible patients were randomly selected for inclusion in the study group. Patients were selected only if they met all inclusion criteria and did not meet any of the exclusion criteria. After completing the study group, the subsequent 80 eligible patients who met the same inclusion and exclusion criteria were selected for the control group, resulting in a total sample of 160 patients

According to theoretical framework:-**The study conducted through the following phases:-****▪ Assessment Phase**

- The assessment phase was conducted before implementing the intervention to identify each patient's comfort needs according to Kolcaba's four comfort domains. The physical assessment included evaluating the patient's level of consciousness, vital signs, pain, nausea, vomiting, abdominal distension, bowel sounds, gastric residual volume (GRV), feeding tolerance, and respiratory status. The psychospiritual assessment focused on identifying anxiety. The sociocultural assessment involved evaluating family support. The environmental assessment included identifying factors within the intensive care unit that might influence patient comfort.

Planning Phase:-

- Based on the findings of the comprehensive assessment, an individualized nursing care plan was developed to address the identified comfort needs of each critically ill patient.

Implementation Phase:-

- The comprehensive nursing intervention was implemented before, during, and after intermittent tube feeding. Before feeding, the nurse assessed the patient's clinical condition, monitored vital signs, evaluated abdominal distension, nausea, vomiting, bowel function, and gastric residual volume, and verified the correct placement of the feeding tube using recommended verification methods. The patient was positioned in a semi-Fowler position (30–45°) to reduce the risk of aspiration, and oral care was provided to enhance comfort and maintain oral hygiene.
- During feeding, the enteral formula was administered slowly according to the prescribed regimen using an appropriate feeding device. The nurse continuously monitored the patient for signs of feeding intolerance.
- After feeding, the patient continued to be maintained in a semi-Fowler position for at least 30–60 minutes to reduce aspiration risk. The nurse monitored for post-feeding complications such as aspiration, increased gastric residual volume, vomiting, diarrhea, constipation, abdominal distension,

Evaluation Phase:-

- Following implementation of the comprehensive nursing care intervention, patients were evaluated using the researcher-developed evaluation tool. The effectiveness of the intervention was assessed by measuring the occurrence and severity of feeding-related complications, including gastric residual volume (GRV), vomiting, diarrhea, constipation, and abdominal distension. In addition, patients' pain severity and overall level of comfort were reassessed to determine the extent to which the intervention achieved the intended outcomes of relief, ease, and transcendence as described in Kolcaba's Comfort Theory. The evaluation findings were used to determine the effectiveness of the intervention and to guide any necessary modifications in the nursing care plan.

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.

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). The length of hospital stay for the majority ranged between 10 to 15 days, with no significant statistical differences between the groups.

Table (2) portrays the changes in normal Gastric Residual Volume (GRV) over three days. On the first day, both groups started with comparable normal GRV levels pre-feeding, with normal levels at only 15.0% for the study group and 12.5% for the control group. However, a progressive improvement emerged in the study group by the second and third days. On the third day (pre-feeding), the study group exhibited a remarkable increase in normal GRV reaching 82.5%, whereas the control group remained at a critically low 12.5%.

Table (3) highlights the occurrence (presence) of gastrointestinal complications. For abdominal distention, pre-feeding levels on day one were profoundly high in both groups (90.0% vs. 92.5%). By the third day, the presence of distention dramatically decreased in the study group to 18.75%, while it exacerbated in the control group to 97.5%. Regarding diarrhea monitoring (post 1 hour), it gradually decreased in the study group from 25.0% on day one to only 7.5% on day three. In stark contrast, it increased in the control group reaching 47.5% on day three. A similar pattern was observed in constipation, which dropped to 10.0% in the study group on day three compared to a persistent 67.5% in the control group.

Table (4a, 6b) compare the vomiting scale between both groups. On the first day, the absence of vomiting was reported by 35.0% of the study group and 30.0% of the control group with comparable percentages. Progressively, the study group showed marked improvement; by the third day, 85.0% of the study group had no vomiting episodes. Conversely, the control group experienced worsening symptoms, with only 22.5% being vomiting-free by the third day.

Table (5) summarizes the statistical significance of gastrointestinal complications across the three days of the study. Initially, on the first day, there were no statistically significant differences ($p > 0.05$) between the study and control groups concerning Gastric Residual Volume, abdominal distention, diarrhea, constipation, and vomiting. However, highly significant statistical differences ($p < 0.001$) consistently emerged by the second and third days across all five monitored parameters, reflecting the positive impact of the intervention on the study group compared to the control group over time.

Table (6) 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 (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%		
Length of hospital stay “days”					5.843	0.054
≤10 days	28	35.0	24	30.0		
>10-15 days	51	63.8	48	60.0		
>15-20 days	1	1.3	8	10.0		
Mean±SD	10.82±3.91		11.53±4.91			

Table (2): Number and percentage distribution of the studied patients according to Gastric Residual Volume (GRV) over three days (n=80 of each group).

Gastrointestinal Complications	Study Group (n=80)		Control Group (n=80)	
	Normal		Normal	
Gastric Residual Volume	No.	%	No.	%
1st Day: Pre feeding	12	15.0	10	12.5
1st Day: Post 1 hour	36	45.0	33	41.25
2nd Day: Pre feeding	53	66.3	12	15.0
2nd Day: Post 1 hour	60	75.0	15	18.75
3rd Day: Pre feeding	66	82.5	10	12.5
3rd Day: Post 1 hour	70	87.5	12	15.00

Table (3): Number and percentage distribution of the studied patients according to Abdominal Distention, Diarrhea, and Constipation Monitoring over three days (n=80 of each group).

Gastrointestinal Complications	Study Group (n=80)		Control Group (n=80)	
	Present		Present	
	No.	%	No.	%
1. Abdominal Distention:				
1st Day: Pre feeding	72	90.0	74	92.5
1st Day: Post 1 hour	46	57.5	49	61.25
2nd Day: Pre feeding	32	40.0	76	95.0
2nd Day: Post 1 hour	23	28.8	60	75.00
3rd Day: Pre feeding	15	18.75	78	97.5
3rd Day: Post 1 hour	11	13.8	65	81.25
2. Diarrhea Monitoring:				

1st Day (Post 1 hour)	20	25.0	24	30.00
2nd Day (Post 1 hour)	11	13.8	42	52.50
3rd Day (Post 1 hour)	6	7.5	38	47.50
3. Constipation Monitoring:				
1st Day (Post 1 hour)	24	30.0	21	26.25
2nd Day (Post 1 hour)	16	20.0	40	50.00
3rd Day (Post 1 hour)	8	10.0	54	67.50

Table (4a): Number and percentage distribution of the studied patients according to Vomiting Scale over three days (n=80 of each group).

Vomiting Scale	Control Group					
	None		1 episode		2-5 ep.	
	No.	%	No.	%	No.	%
1st Day	24	30.0	42	52.5	14	17.5
2nd Day	20	25.0	45	56.2	15	18.7
3rd Day	18	22.5	26	32.5	36	45.0

Table (4b): Number and percentage distribution of the studied patients according to Vomiting Scale over three days (n=80 of each group).

Vomiting Scale	Study Group					
	None		1 episode		2-5 ep.	
	No.	%	No.	%	No.	%
1st Day	28	35.0	40	50.0	12	15.0
2nd Day	55	68.8	15	18.8	10	12.5
3rd Day	68	85.0	4	5.0	8	10.0

Table (5): Statistical differences (Chi-Square and P-value) of gastrointestinal complications between the study and control groups over three days.

Gastrointestinal Complications	1st Day		2nd Day		3rd Day	
	x ²	p-value	x ²	p-value	x ²	p-value
1. Gastric Residual Volume						
- Pre feeding	0.211	0.646	43.560	<0.001	78.420	<0.001
- Post 1 hour	0.228	0.633	50.835	<0.001	76.241	<0.001
2. Abdominal Distention						
- Pre feeding	0.314	0.575	54.320	<0.001	104.150	<0.001
- Post 1 hour	0.229	0.632	33.801	<0.001	72.934	<0.001
3. Diarrhea (Post 1 hr)	0.513	0.474	27.241	<0.001	32.618	<0.001
4. Constipation (Post 1 hr)	0.271	0.603	16.254	<0.001	54.852	<0.001
5. Vomiting Scale	0.473	0.789	32.145	<0.001	55.429	<0.001

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

Table (6): 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

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.

The study included 160 p.t.s divided into two groups (80 pts in each) with mean age 48.13 ± 7.22 for study group & 46.63 ± 6.99 for control group. The majority of p.t.s in the control & study group was male, mean length of hospital stay 10.82 ± 3.91 for study group & 11.53 ± 4.91 for control group. 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.

Regarding gastrointestinal complications, concerning gastric residual volume (GRV) over three days, among study group First day 15.0% (pre feeding) & 45.0% (post 1 hour), 66.3% (pre feeding) & 75.0% (post 1 hour) on 2nd day & 82.5% (pre feeding) & 87.5% (post 1 hour) on 3rd day that could may be attributed to the comprehensive nursing intervention which promoted optimal gastrointestinal function and enhanced feeding tolerance. 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.

Regarding abdominal distention, among study group First day 90.0% (pre feeding) & 57.5% (post 1 hour), 40.0% (pre feeding) & 28.8% (post 1 hour) on 2nd day & 18.75% (pre feeding) & 13.8% (post 1 hour) on 3rd day that could be attributed to the comprehensive nursing intervention which promoted optimal gastrointestinal function and enhanced tolerance to enteral feeding. 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.

Regarding diarrhea and Constipation status monitoring among study group (post 1 hour). First day 25.0% (post 1 hour), 13.8% (post 1 hour) on 2nd day & 7.5% (post 1 hour) on 3rd day that could be attributed to the comprehensive nursing intervention which promoted appropriate enteral feeding administration and early detection of gastrointestinal intolerance. Regarding among study group through study days was First day 30.0% (post 1 hour), 20.0% (post 1 hour) on 2nd day & 10.0% (post 1 hour) on 3rd day that could maybe attributed to the comprehensive nursing intervention which improved gastrointestinal motility and feeding tolerance.

"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.

Regarding vomiting scale between both groups, First day 35.0% & 68.8% on 2nd day & 85.0% on 3rd day that could may be attributed to the comprehensive nursing intervention which enhanced patients tolerance to enteral nutrition and minimized vomiting episodes 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. Regarding overall improvement outcomes for the patients, Half of the study group (50.0%) achieved high overall improvement by day 3 compared to nearly one-tenth in the control group ($p < 0.001$)... Weak non-significant positive correlations were found between socio-demographic variables and GI

complications, as complications are primarily driven by severity of illness and nutritional management... (Agreed with Mohamed et al. 2023; disagreed with Shabaan et al. 2021).

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.

Conclusion:-

"In conclusion, the study results indicated that there was a significant effect for the provided Comprehensive Nursing Intervention (NI) for patients, which appeared as a decrease in the incidence of complications among the study group through the phases of the study and appeared in a comparative study with control group through the phases of the study." Regarding the incidence of G.I. complications,"

Recommendation:-

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

1. Develop and implement comprehensive nursing interventions for critically ill patients with receiving intermittent enteral feeding
2. Incorporate comprehensive nursing intervention as a routine component of care for critically ill patients receiving enteral feeding.
3. Future research on a large sample of patients and in other settings is needed

Reference:-

1. Abd El-Hafez, A., Mohamed, W., Daef, E. A., Mehany, M., & Mohammed, M. (2013): Effect of intermittent enteral feeding schedule on the occurrence of gastrointestinal complications and hospital stay among critically ill patients. *Assiut Scientific Nursing Journal*, 1(1), 12-23. doi:10.21608/asnj.2013.57376.
2. Abdelhafez, A. I., & Abdelnaem, M. M. (2019). Effect of abdominal massage on gastrointestinal complications and intra-abdominal pressure of critical-enteral-feed patients: a randomized control trial. *Journal of Health, Medicine and Nursing*, 64(7), 33-41.
3. Adam, S. M., Mohammed, M. A., Abdel-Aziz, M. A., Morsy, K. M., & Abdel Hafez, N. G. E. (2020). Effect of early enteral nutrition guidelines on the occurrence of gastrointestinal complications among acute lung injury patients. *Assiut Scientific Nursing Journal*, 8 (20), 167–180.
4. Alqahtani, J. S., Alahamri, M. D., Alqahtani, A. S., Alamoudi, A. O., Alotaibi, N. Z., Ghazwani, A. A., ... & Al Zahrani, E. (2022). Early mobilization of mechanically ventilated ICU patients in Saudi Arabia: Results of an ICU-wide national survey. *Heart & Lung*, 56, 167-174.

5. Bakr, E. S. H., Bosaeed, B. O., Alkhiri, D. M., Basaqr, R. O., Ahmed, M. A., & Shehata, R. A. (2024). Assessment of Nutritional Status for Intensive Care Patients. *Current Research in Nutrition & Food Science*, 12(3).
6. Banda, K. J., Chu, H., Kang, X. L., Liu, D., Pien, L. C., Jen, H. J., ... & Chou, K. R. (2022). Prevalence of dysphagia and risk of pneumonia and mortality in acute stroke patients: a meta-analysis. *BMC geriatrics*, 22(1), 420.
7. Berger, M. M., & Pichard, C. (2022): When is parenteral nutrition indicated?. *Journal of Intensive Medicine*, 2(1), 22–28. <https://doi.org/10.1016/j.jointm.2021.11.006>.
8. Chandrasekharan, S., Sreedharan, J., & Gopakumar, A. (2019): Statistical issues in small and large samples: Need of optimum upper bound for the sample size. *International Journal of Computational & Theoretical Statistics*, 06(02), 108-118. doi:10.12785/ijcts/060201.
9. Chen, Y., Luo, Y., & Tian, Y. (2025). Analysis of the effect of clustered nursing interventions on enteral nutrition in critically ill stroke patients. *Medicine*, 104(44), e45381.
10. Dudek, S. (2010): *Nutrition Essential for Nursing Practice*. 6th ed. Philadelphia; Lippincott Williams & Wilkins; pp: 366-375.
11. El-Hafez, A., Ismael, A., Mohamed, W. Y., Daef, E. A. M., Mehany, M. M., & Mohammed, M. A. (2013). Effect of intermittent enteral feeding schedule on the occurrence of gastrointestinal complications and hospital stay among critically ill patients. *Assiut Scientific Nursing Journal*, 1(1), 12–23.
12. Fekri, Z., Aghebati, N., Sadeghi, T., & TaghiFarzadfar, M. (2021). The effects of abdominal " I LOV U" massage along with lifestyle training on constipation and distension in the elderly with stroke. *Complementary Therapies in Medicine*, 57, 102665.
13. Hardy, O., Vrbica, K., Duba, J., Slezak, M., Strazevska, E., Agalarev, V., ...& Gal, R. (2025). Intermittent enteral nutrition shortens the time to achieve nutritional goals in critically ill patients. *Scientific Reports*, 15(1), 2242.
14. Hassan, M., Badal, J., Arif, S. F., Nawras, M., Nawaz, A., Aziz, M., ...& Ahmed, Z. (2023). Early vs delayed feeding after endoscopic esophageal variceal ligation: a systematic review and meta-analysis. *Archives of Internal Medicine Research*, 6, 28-34.
15. Jackson, M., & Cairns, T. (2021): Care of the critically ill patient. *Surgery (Oxford)*, 39(1), 29-36. doi: 10.1016/j.mpsur.2020.11.002.
16. Jordan, E. A., & Moore, S. C. (2020): Enteral nutrition in critically ill adults: Literature review of protocols. *Nursing in critical care*, 25(1), 24–30. <https://doi.org/10.1111/nicc.12475>.
17. Kaur, B., Kaur, S., Yaddanapudi, L. N., & Singh, N. V. (2019): Comparison between invasive and noninvasive blood pressure measurements in critically ill patients receiving inotropes. *Blood Pressure Monitoring*, 24(1), 24-29. doi:10.1097/mbp.358.
18. Koontalay, A., Sangsaikaew, A., & Khamrassame, A. (2020). Effect of a clinical nursing practice guideline of enteral nutrition care on the duration of mechanical ventilation for critically ill patients. *Asian nursing research*, 14(1), 17-23.
19. Lee, H. Y., Lee, J. K., Kim, H. J., Ju, D. L., Lee, S. M., & Lee, J. (2022): Continuous versus Intermittent Enteral Tube Feeding for Critically Ill Patients: A Prospective, Randomized Controlled Trial. *Nutrients*, 14(3), 664. <https://doi.org/10.3390/nu14030664>.
20. Mehta, Y., Sunavala, J. D., Zirpe, K., Tyagi, N., Garg, S., Sinha, S., Shankar, B., Chakravarti, S., Sivakumar, M. N., Sahu, S., Rangappa, P., Banerjee, T., Joshi, A., & Kadhe, G. (2018): Practice Guidelines for Nutrition in Critically Ill Patients: A Relook for Indian Scenario. *Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine*, 22(4), 263–273. https://doi.org/10.4103/ijccm.IJCCM_3_18.
21. Mohamed, M. A., Doleman, B., Phillips, B. E., & Williams, J. P. (2025). The effects of protein nutrition on muscle function in critical illness: a systematic review and meta-analysis. *Nutrients*, 17(16), 2613.
22. Mohamed, W. A. E. W., Ali, J. S., Gamal El-Deen, J. A., & Nesnawy, S. (2023). Effect of Proper Enteral Feeding Technique and Abdominal Massage on Selected Gastrointestinal Complications among Stroke Patients. *Minia Scientific Nursing Journal*, 13(1), 45-52.
23. Mohammed, H. A., & Othman, W. N. (2018). Effect of gravity feeding versus bolus feeding technique on gastrointestinal disturbance among stroke patients. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 7(1), 42–48.

24. Ojo, O., Ojo, O. O., Feng, Q., Boateng, J., Wang, X., Brooke, J., & Adegboye, A. R. (2022): The effects of enteral nutrition in critically ill patients with COVID-19: A systematic review and meta-analysis. *Nutrients*, 14(5), 1120. doi:10.3390/nu14051120.
25. Osooli, F., Abbas, S., Farsaei, S., & Adibi, P. (2019): Identifying Critically Ill Patients at Risk of Malnutrition and Underfeeding: A Prospective Study at an Academic Hospital. *Advanced pharmaceutical bulletin*, 9(2), 314–320. <https://doi.org/10.15171/apb.2019.037>.
26. Philadelphia (3rd ed): Lippincott Williams & Wilkins; pp: 1242-1247.
27. Qu, J., Xu, X., Xu, C., Ding, X., Zhang, K., & Hu, L. (2023): The effect of intermittent versus continuous enteral feeding for critically ill patients: A meta-analysis of randomized controlled trials. *Frontiers in Nutrition*, 10. doi:10.3389/fnut.2023.1214774.
28. Saeed Yousef Hassan Gafar, S., El-aziz, A., Mohga Abd El-Aziz, M., & Kandeel, N. A. (2023). The effect of abdominal massage on gastric residual volume among critically ill patients receiving enteral feeding. *Mansoura Nursing Journal*, 10(1), 485-494.
29. Saiz-Vinuesa, M. D., Rodríguez-Moreno, E., Calero-Yáñez, F., Piqueras-Carrión, A. M., Carrilero-López, C., Murcia-Sáez, I., ... & Molina-Alarcón, M. (2025). Safety of intermittent versus continuous enteral nutrition in critically ill patients. *Randomized clinical trial. Enfermería Intensiva* (English ed.), 36(4), 500561.
30. Sedaghat, A., Yahyapoor, F., Dehnavi, Z., Askari, G., Ranjbar, G., HejriZarifi, S., & Fazeli, F. (2021): The prevalence and possible causes of enteral tube feeding intolerance in critically ill patients: A cross-sectional study. *Journal of Research in Medical Sciences*, 26(1), 60. doi: 10.4103/jrms.jrms_689_20.
31. Shabaan, G., Abdelwarith, M., & Diab, M. (2021). Enteral Feeding Protocol to Improve Functional Outcome in Stroke Patients. *Egyptian Journal of Health Care*, 12(1), 735-745.
32. Shi, L., Shao, J., Luo, Y., Liu, G., & OuYang, M. (2024). The incidence and risk factors of gastrointestinal dysfunction during enteral nutrition in mechanically ventilated critically ill patients. *Nursing Open*, 11(11), e2247.
33. Tatsumi, H. (2019): Enteral tolerance in critically ill patients. *Journal of Intensive Care*, 7(1). doi:10.1186/s40560-019-0378-0.
34. Wang, X., Sun, J., Li, Z., Luo, H., Zhao, M., Li, Z., & Li, Q. (2022). Impact of abdominal massage on enteral nutrition complications in adult critically ill patients: a systematic review and meta-analysis. *Complementary therapies in medicine*, 64, 102796.
35. Yang, G., Deng, A., Zheng, B., Li, J., Yu, Y., Ouyang, H., Huang, X., & Chen, H. (2022): Effect of different feeding methods on gastrointestinal function in critical patients (DFM-GFC): study protocol for a randomized controlled trial. *Trials*, 23(1), 882. <https://doi.org/10.1186/s13063-022-06807-7>.
36. Zhang, W., Zhu, N. N., Jiang, H. J., Tao, X. B., Lu, W. H., Shen, H. C., ... & Huo, R. (2021). Prevention of underfeeding during enteral nutrition after gastrectomy in adult patients with gastric cancer: an evidence utilization project. *JBI Evidence Implementation*, 19(2), 198-207.
37. Zhang, X. M., Chen, D., Xie, X. H., Zhang, J. E., Zeng, Y., & Cheng, A. S. (2021). Sarcopenia as a predictor of mortality among the critically ill in an intensive care unit: a systematic review and meta-analysis. *BMC geriatrics*, 21(1), 339.