Effect of Abdominal Massage on Enteral Nutrition Tolerance among Patients on Mechanical Ventilation

Ola Ahmed Mohamed Abdel Samad [1], Watanya Kamel Atya[2] and Ashgan Tolba Fathy[3]

(1,2,3) Lecturer of Medical-Surgical Nursing Department, Faculty of Nursing, Benha University, Qalyoubia, Egypt.

Abstract

Background: Providing nutrition to seriously unwell patients in the Intensive Care Unit (ICU) is a crucial and complex aspect of their care. It is believed that abdominal massage will stop the distention, vomiting, and reducing residual gastric volume. **Aim:** To identify the effect of abdominal massage on enteral nutrition tolerance among patients on mechanical ventilation. **Design:** To accomplish the goal of this study, quasi-experimental research design (study and control group) was used. **Setting**: This study was carried out in the critical care unit of Benha University Hospital in Qalyoubia, Egypt. **Subjects**: A purposive sample of 80 patients on mechanical ventilation who were divided into study & control (40 for each one). **Three tools** were used to collect the data, **tool** I: Patients personal and medical data. **Tool II:** Abdominal massage technique. **Tool III**: Enteral nutrition assessment. **Results:** Compared to the control patients, a gastric residual was found at the conclusion of the monitoring days. On the sixth day, only 7.5% of the study group had gastric residual, with a mean volume of 3.1 ml. In contrast, 52.5% of the control group had gastric residual, with a mean volume of 25.6 ml, demonstrating a highly significant difference at p value <0.01. At the end of the fourth and fifth days, distention and defecation showed extremely significant differences between the study and control groups, with p-values of 0.01**. However, there was only a slight difference related to vomiting, with a p-value of <0.05*. **Conclusion:** According to this study, abdominal massage for patients on mechanical ventilation decreased vomiting, abdominal distension, and gastric residual volume. Improve the frequency of defecations as well. **Recommendation:** Provide specialized training about abdominal massage technique to healthcare staff, including nurses and physiotherapists and replication of the study on a larger probability sample from different geographical distribution.

Key words: Abdominal massage, enteral nutrition tolerance, mechanically ventilated patients.

Introduction:

Critical illness, especially in mechanically ventilated patients, leads to a loss of appetite and the inability to consume food orally. Additionally, critical illness is linked to a breakdown of body tissues (catabolism) and frequently disrupts the normal absorption process in the gut **(Kagan et al., 2023).** Moreover, a significant number of critically ill patients have preexisting health conditions, such as malnutrition, which can involve both undernutrition and overnutrition **(Misirlioglu et al., 2023).**

Providing nutrition to seriously sick patients in the intensive care unit is a crucial and complex aspect of their care. Proper nutrition plays a vital role in supporting the body's healing processes and immune function, particularly important for those facing critical illness **(Gunst et al., 2023).** It is recommended to initiate nutrition early, ideally within the first 24 to 48 hours of ICU

admission, to improve patient outcomes **(Shalaby et al., 2023).**

While Mechanical Ventilation (MV) can be life-saving by maintaining gas exchange, it also presents challenges and complications that can significantly impact critically ill patients' recovery. MV can elevate airway and intrathoracic pressure, potentially reducing blood perfusion to systemic and intra-abdominal organs **(Vali et al., 2023).** Consequently, nutrition support becomes essential for mechanically ventilated patients, as they are unable to consume food orally and require specialized care due to their critical condition and increased metabolic demands **(Cederwall et al., 2023).**

Enteral nutrition, the delivery of nutrients directly into the gastrointestinal tract through a feeding tube, is the preferred method of providing nutrition to these patients when feasible **(Zevallos et al., 2022).** Compared to parenteral nutrition (intravenous feeding), enteral nutrition is preferred because it helps preserve gut-associated immunity, maintains the integrity of the gastrointestinal tract, and reduces the risk of infectious complications. This makes it a preferred choice for critically ill patients on MV **(Golami et al., 2022).**

Patient feeding tolerance is measured by their capacity to properly consume and process the prescribed enteral feeding without experiencing any problems or consequences, such as gastrointestinal dysfunction, aspiration, or infection **(Lu et al., 2022).** To assess feeding tolerance, healthcare providers typically consider factors such as Gastric Residual Volume (GRV), the color and appearance of stool, as well as clinical manifestations like vomiting, abdominal distension, and the presence of blood in the stools. Regular monitoring of GRV, stool output, and clinical signs is crucial to evaluate how well a patient is tolerating enteral feeding. Adjustments in the feeding rate can be made based on GRV measurements to prevent complications such as aspiration and abdominal distension **(Yu et al., 2022).**

A therapeutic nursing technique known as abdominal massage increases intestinal peristalsis, decreases abdominal pain, and enhances parasympathetic activity, improving bowel transit time and defecation frequency, and promoting better sleep **(Zhang et al., 2023).** This technique can be beneficial for patients on enteral nutrition, particularly in intensive care units. Abdominal massage has gotten a lot of clinical interest recently as a non-drug technique of reducing enteral food resistance (**Altun Ugras et al., 2022).**

In order to provide nutritional assistance for patients who have lower levels of awareness, intensive care unit nurses are essential. This entails started feeding promptly, ensuring proper feeding administration, monitoring for signs of gastric intolerance, checking the placement of nasogastric tubes, calculating the appropriate caloric intake for each patient, and measuring GRV **(Ahmed et al., 2019).**

Significance of the study

In 32% to 39% of patients receiving enteral nutrition, an accelerated gastric residual volume was noted. Pulmonary aspiration from enteral feeding is one of the riskiest mechanical problems and a major cause of ventilator-related pneumonia (VAP). In intensive care units, aspiration was observed at a rate of 8% to 95% of patients. Massaging the abdomen can reduce gastric distention and excessive residual volume. In the past one year preceding this study according to the records of the statistical

office at Benha University Hospital, the total number of patients on mechanical ventilation were around 189 patients admitted to the ICU **(Statistical Office at Benha University Hospital, Qalyubia Governorate, 2022)**. This study was done to determine the effect of abdominal massage on patients receiving mechanical ventilation's tolerance for enteral nutrition. Evidence suggests that stomach massage will affect constipation, gastric residual extent, and abdominal distention.

Operational Definition: Tolerance to enteral nutrition as evidenced by a decreased frequency of abdominal swollenness, constipation, diarrhea, vomiting, and sporadic gastric remnants.

Aim: This study aimed to identify the effect of abdominal massage on enteral nutrition tolerance among patients on mechanical ventilation.

Research hypothesis: The tolerance of enteral feeding among patients in the study group could be improved after abdominal massage compared to control group.

Method:

Research design: To accomplish the goal of the study, a quasi-experimental research design (study and control group) was used. Establishing a cause-and-effect link between an independent and dependent variable is the goal of a quasi-experimental design. Abdominal massage is the study's independent variable, while enteral nutrition tolerance is its dependent variable.

Setting: The critical care unit of Benha University Hospital in Qalyoubia, Egypt, served as the site for this study. There are 45 beds in the intensive care unit on the second floor of the medical facility for critically sick patients from all around the governorate of Qalyoubia.

Subjects:

Selected by a purposeful sample of 80 patients based on the inclusion criteria of being mechanically ventilated since the first day, both sexes, receiving enteral nutrition continuously for 20 hours, and consenting to take part in the study. Exclusion standards recent abdominal surgery, radiation, gastrointestinal hemorrhage, spinal cord damage, intestine blockage, ileus, and diarrhea are among the exclusion criteria.

Sample size:

Based on the census data of admissions to the critical care unit from the Benha University Hospital Census, 2022, the sample size was calculated using the Epi info statistical tool, with a 90% confidence level and an acceptable margin of error of 5%. 80 patients who matched the inclusion criteria and agreed to take part in the study comprised the whole sample size. They were split into two equal groups (control and study), each with 40 patients. Using basic randomization, the subjects were divided into the study and the control groups as follows: Each participant was given a number, which was written down on a piece of paper, placed in a container, fully mixed, and then gradually drawn out until the required sample was allocated. The researcher took the desired number out of the bag. The study group received the intervention measure, which was the abdominal massage, whereas the control group did not get it.

Data Collection:

The following three tools were used to acquire the data:

Tool I: Patients' personal and medical data.

After reviewing the literature, the researcher created the instrument to gather the data. It had two components.

Part (A): Personal data about the patients is included in gender, marital status, age, degree of education, employment, and place of living.

Part (B): Clinical data about the patients is included data on admission, diagnosis, length of ICU stays, clinical data linked to mechanical ventilation, previous medical history, and current medicines.

Tool II: Abdominal massage technique

After a thorough review of the literature **(Uysal, 2017 & Momenfar, Abdi, Salari, Soroush, Hemmatpour, 2018 and El-Feky & Ali, 2020)**, it was designed by the researcher and revised by specialists. Five steps are included in the rubdown technique at the belly wall. The fundamental massage techniques include superficial effleurage, vibration, petrissage, friction, and deep circular stroking. For six days, the five phases of the stomach rubdown were performed twice daily

Tool III: Enteral Nutrition Assessment Tools:

To assess how belly massage affects patients on mechanical ventilation's tolerance for enteral feeding, it was adapted from **Dehghan et al., 2018.** It had the following five parts:

Part (A) Follow-up form for enteral feeding. This contained information on the pace, kind, and amount of feeding per milliliter, as well as feeding schedules and the kind of feeding tube utilized.

Part (B): Gastric residual volume assessment:

It was utilized to determine the stomach residual volume for the control and study groups before and after the abdominal massage.

Part (C): Abdominal distension: Pre and post administration of the abdominal massage were utilized to measure abdominal distension in the control and study groups. Along with measuring the abdominal circumference, abdominal distension was evaluated by palpating the belly to determine how soft, tight, and hard it was.

Part (D): Vomiting assessment

Three parameters were used to assess vomiting in both the control and study groups: consistency, length, and frequency of episodes (none, once/day, twice/day, and more than twice/day). It was carried out on the first, second, and seventh study days.

V**alidity and reliability:**

Five Medical Surgical Nursing specialists evaluate the tool's validity and the amount of time needed to complete. Jury involved one professor and four assistant professors of medical surgical nursing. Additionally, It was determined that the scale had a good level of reliability with an alpha value of 0.869 after using the Cronbach's alpha coefficient for tool II and tool III to assess the internal consistency dependability.

Pilot Study

To assess the viability of the created tools, a pilot research was conducted on 8 patients, or 10% of the projected sample size. The time required for each individual to complete the questionnaire was also estimated during the pilot. The nurses were included in the pilot research, contributing to the study sample, because the results of the pilot revealed that neither item adjustments nor omissions were made.

Field work:

In preparation phase the researcher finished two weeks (five days in line with week) training program, for abdomen rub down at Benha University Hospital (department of Physiotherapy and

Rehabilitation), to obtain certification in using the abdominal massage method. Further, during the installation phase, the rub down of belly emerges as finished manually and every day through the skilled researcher for 6 days' intervention period.

Patients in the control group did not receive the belly rubdown; instead, they received just routine hospital care for people who are mechanically ventilated and receiving enteral nutrition. All patients in the control group had their stomach diameter and gastric residual quantity (GRV) measured before beginning enteral feeding.

Study group: The participants received a belly rubdown as part of their routine medical center treatment and a nurse intervention that was advised against for enterally fed patients on mechanical breathing. Firstly, the researcher gathered the personal and medical history (first tool). Secondly, after the Researcher was showed of the NG tube placement within the stomach, two 15–20-minute stomach rubdowns are given every day for five to six days. First, the patient was placed on the bed with the head raised 30 to 45 degrees and the patient's knees slightly bent. While the rest of the body was covered, the top anterior iliac protrusion under the chest ribs became visible. The researcher took a function to the right of the affected person's pelvis.

The abdominal wall along the bowel's route received the stomach rubdown. It was performed clockwise over the intestines at the abdominal wall. To lower the risk of aspiration, the rubdown was done 30 minutes before enteral feeding. This sort of massage technique includes 5 steps in clockwise path over the intestines at the stomach wall. The primary level of rubdown begins with effleurage. The second one level of stomach rubdown consists of vibration. Within the 1/three stage, the abdominal pores and skin is elastically deformed with the aid of rubdown. The abdominal pores and pores and the act of handling and kneading skin is similar to handling and kneading bread. Friction is present on level four. This method is completed through using rubbing the stomach from side to side. And the final level includes deep round stroking on the stomach

During the study, distention was assessed by palpation and at the same intervals; measures of abdominal circumference were collected. The occurrence of distention, palpation examination, abdominal girth measurements, and gastric residual volume (GRV) were all recorded for six days, (2d tool).

According to the clinic's standard operating procedure, GRV was monitored in this research every four hours using disposable gloves and 50 ml injectors. After each process, the measured amount was recorded.

Every four hours, abdominal distention checks and measurements of the abdomen circumference were made. These assessments were completed 30 minutes after meals for the control group whereas they were completed 30 minutes after the massage sessions for the intervention group. Palpation was used to gauge abdominal distention.

After 15-20 minutes of gavage feeding in both the study and control groups, the researcher measured the belly circumference using a measuring tape and felt the abdomen for any indications of distention. Before feeding for 15 minutes, the gastric residual volume was measured using an open Ryle tube and drainage bag. Vomiting and feces connected to it were seen and noted, along with the frequency and times each day.

Ethical Considerations

An official permission to collect data and implement the nurse driven protocol will be obtained from the Dean of the Faculty of Nursing, Benha University. The research

approval will be obtained from the Scientific Research and Ethical Committee, Faculty of Nursing, Benha University before starting the study.

Participation in the study was voluntary, and families of patients were informed that their feedback would not impact the care provided to the patients. Allow the option to withdraw from the study at any time. Written consent was not required as the questionnaires did not contain personal identifiers, and this approach was approved by the ethical committee. Oral consent was obtained from the family of patients to participate in the study. The researchers did not exert any pressure or incentives to encourage completion of the questionnaire. Respondents filled in the questionnaire anonymously, and the collected data were treated confidentially and solely used for research purposes.

Statistical analysis:

Data was categorized and sorted, and the outcomes were shown in tables. The data was analyzed using the Statistical Package for the Social Sciences on an appropriate personal computer (SPSS Inc; version 27; IBM Corp., Armonk, NY, USA). The demographic characteristics of the individuals were described using descriptive statistics. For categorical variables, data were reported as frequencies and percentages; for continuous variables, means and standard deviations were used. When examining categorical variables, the Chi-square probability distribution is extremely helpful. To evaluate if there is a significant difference between the means of two groups, a t-test is a sort of inferential statistic that is utilized. P 0.05 and P 0.01 were used to define statistical significance for the findings.

Results:

Table (1): Shows that the mean age of study group is 50.12 + 8.94 years, whereas the control group's is 48.62 + 7.61 years, with no discernible difference at a p value > 0.05. More over half of both the study group (60%) and the control group (55%) were male, with no discernible difference in sex distribution (p value >0.05). In terms of educational attainment, 12.5% of the study group and 15% of the control group held bachelor's degrees, with no discernible difference at p values greater than 0.05.

Table (2): Shows that there was no statistically significant difference between the study group (30%) and the control group (32.5%) in terms of the percentage of patients having a history of chronic illness. Again, there was no significant difference at p value >0.05 when it came to the proportion of patients in both groups who were hospitalized because of respiratory illnesses, which was about 50%. More over a third of the patients in both the experimental group (42.5%) and the control group (40%) had body weights between 80 and 90 KG. Additionally, there was no discernible difference between the two groups' proportions of patients who had never used a mechanical ventilator (92.5% in the research group and 97.5% in the control group) with a p value >0.05.

Figure (1): Portrays that in contrast to the control group, which had a mean bodyweight of 84.618.3 kg, the study group's average bodyweight was 83.419.8 kg, with no discernible difference at a p value >0.05.

Table (3): Demonstrates the stomach residual volumes on the first, second, third, fourth, fifth, and sixth days for both the study and control groups on the second and third days, none of the study group's individuals

had any residual volume, while on the second day, the mean volume for the control group was 2.3 ml, indicating a marginally significant difference with a p value of 0.05. On the third day, the residual amount increased to 6.8 ml with a very significant difference at a p value of 0.01. Only 5% of the trial group still had stomach residue on the fourth day, with a mean amount of 1.5 ml. The control group exhibited stomach residue in 30% of cases, with a mean volume of 13.5 ml, demonstrating a very significant difference.

Table (4): This table shows that, the outcomes for the research and control groups over a number of days. With a highly significant p-value of 0.005, 20% of patients in the study group defecated on day two, compared to 7.5% of patients in the control group. Additionally, with a significant p-value of 0.05*, 2.5% of patients in the trial group reported vomiting as opposed to 10% in the control group. Furthermore, with a p-value of 0.05, a small but significant difference in distention was seen across the groups. With a very significant p-value of 0.002**, 35% of patients in the study group defecated on the third day, compared to just 12.5% of those in the control group. Similarly, 2.5% of research participants reported vomiting, compared to 10% in the control group.

Table (5): This table shows the mean abdomen circumference for the research study and control groups over the course of many days. On the first day, patients in the study group had an average abdominal circumference of 95.3 (11.6) whereas those in the control group had an abdominal circumference of 95.7 (10.23). A p value of >0.05 indicated that there was no difference between the groups. On the second day, the study group's mean abdominal circumference was 95.7 (8.7) whereas the control group's was 95.2 (10.23). At p value >0.05, there was once more no discernible difference between the groups. On the third day, the study group's mean abdominal circumference was 95.5 (10.3) while the control group's was 97.1 (10.23). There was a small but substantial difference between the two.

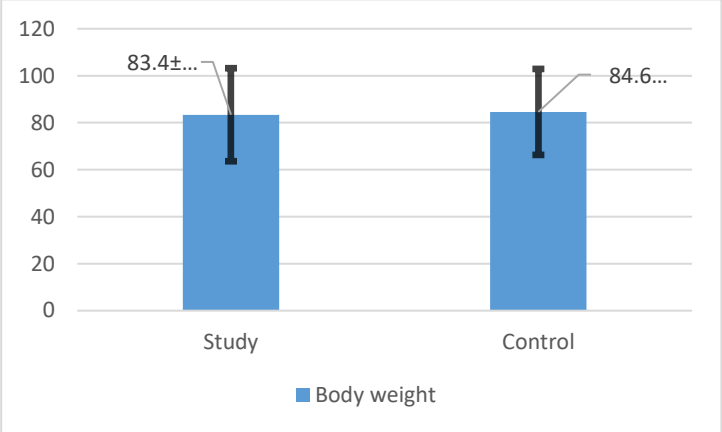
Table (1): Frequency distribution of study and control groups according to their personal characteristics (n=80)

Patient characteristics	Study group 40		Control group 40		Test P value
	N	%	n	%	
Age:					T test
30 - <40	7	17.5	8	20	1.133
40 - <50	13	32.5	12	30	>0.05
50 – <60	15	37.5	17	42.5	
60 or more	5	12.5	3	7.5	
Mean± SD	50.12 ± 8.94		48.62 ± 7.61		
Sex:					Chi-square
Male	24	60	22	55	0.924
Female	16	40	18	45	0.076
Education:					
Not read and write	3	7.5	2	5	Chi-square
Read and write	4	10	5	12.5	1.109
Primary	5	12.5	6	15	0.063
Preparatory	14	35	12	30	
Secondary	9	22.5	9	22.5	
Bachelor	5	12.5	6	15	

*Significant at p ‹0.05. **Highly significant at p ‹0.01. Not significant at p>0.05

Table (2): Frequency distribution of patients according to their clinical data in study and control groups (n=80)

Patient characteristics	Study group 40		Control group 40		Test P value
	N	%	n	%	
Chronic disease:					1.001
Yes	12	30	13	32.5	0.072
No	28	70	27	67.5	
Reason for hospitalization:					
Respiratory disease	22	55	20	50	1.456
Cardiac disease	12	40	13	32.5	0.057
CNS disease	2	5	1	2.5	
Hematological disorder	3	7.5	3	7.5	
Renal disease	1	2.5	2	5	
Body weight:					
60 - <70	5	12.5	7	17.5	1.350
70 - <80	10	25	8	20	0.059
80 – 90	17	42.5	16	40	
>90	8	20	9	22.5	
Mean (SD)	83.4 ±19.8		84.6 ±18.3		
Previous mechanical ventilated:					
Yes	3	7.5	1	2.5	0.620
No	37	92.5	39	97.5	0.830



T test= 1.350. p value 0.059

Figure (1): Mean score level of body weight among patients in study and control groups (n=80)

Table (3): Comparison of Gastric residual of the Patients on the First- and Sixth-Days post connected on mechanical ventilation (n=^0)

		Study N=40		Control N=40		Test P value
		n	%	n	%	
First day	Yes	0	0	0	0	---
	No	40	100	40	100	
	Mean volume	---		--		
Second day	Yes	0	0	6	15	3.690
	No	40	100	34	85	0.021*
	Mean volume	0		2.3 (0.68)		
Third day	Yes	0	0	7	17.5	6.109
	No	40	100	33	82.5	0.008**
	Mean volume	0		6.8 (2.01)		
Fourth day	Yes	2	5	12	30	11.400
	No	38	95	28	70	0.000**
	Mean volume	1.5 (0.13)		13.5 (4.7)		
Fifth day	Yes	2	5	15	37.5	11.782
	No	38	95	25	62.5	0.000**
	Mean volume	1.7 (0.20)		21.2 (7.1)		
Sixth day	Yes	3	7.5	21	52.5	13.444
	No	37	92.5	19	47.5	0.000**
	Mean volume	3.1 (0.72)		25.6 (10.3)		

Table (4): Comparison of Distention, Vomiting and Defecation of the Patients on the First- and Sixth-Days post connected on mechanical ventilation (n=^0)

		Study N=40		Control N=40		Test	P value
		n	%	n	%		
First day	Distention	0	0	0	0	-	-
	Vomiting	2	5	1	2.5	0.876	0.145
	Defecation	4	10	3	7.5	0.772	0.198
Second day	Distention	0	0	3	7.5	2.879	0.041*
	Vomiting	1	2.5	4	10	3.002	0.037*
	Defecation	8	20	3	7.5	6.223	0.005**
Third day	Distention	1	2.5	6	15	5.998	0.006**
	Vomiting	0	0	5	12.5	6.002	0.006**
	Defecation	14	35	5	12.5	8.230	0.002**
Fourth day	Distention	2	5	7	17.5	5.600	0.007**
	Vomiting	1	2.5	4	10	3.170	0.031*
	Defecation	23	57.5	7	17.5	10.246	0.000**
Fifth day	Distention	0	0	8	20	7.802	0.002**
	Vomiting	0	0	3	7.5	2.996	0.032*
	Defecation	29	72.5	6	12	11.777	0.000**
Sixth day	Distention	0	0	9	22.5	8.362	0.001**
	Vomiting	0	0	3	7.5	3.100	0.030*
	Defecation	33	82.5	7	17.5	12.304	0.000**

Table (5): Comparison of abdominal circumference of the Patients on the First- and Sixth-Days post connected on mechanical ventilation (n=^0).

	Study N=40	Control N=40	Test P value
	Mean (SD)	Mean (SD)	
First day	95.3 (11.6)	95.7 (10.23)	0.812 0.093
Second day	95.7 (8.7)	95.2 (10.23)	0.621 0.102
Third day	95.5 (10.3)	97.1 (10.23)	3.444 0.019*
Fourth day	94.2 (8.6)	97.8 (9.9)	5.897 0.009**
Fifth day	95.0 (9.3)	98.2 (11.3)	3.780 0.018*
Sixth day	94.8 (10.1)	99.8 (8.6)	7.990 0.004**

Discussion:

Researchers were diligent in selecting samples that adhered to the predetermined criteria. The research's results showed that there were no changes in age, sex, education level, weight, cause of hospitalization, chronic diagnosis, or history of mechanical ventilation between the study and control groups (p > 0.05). Due to the comparability of the two research groups, it was possible to determine the genuine impact of the intervention used in the study while reducing the impact of individual characteristics. These findings are corroborated by studies by **Ahmed et al. (2021)** whose study about "effect of implementing gastric residual volume protocol on critically ill patient outcomes" where conducted at The general, trauma and anesthesia intensive care unit at Assiut university hospital found that implementing gastric residual volume protocol had a positive effect on critically ill patient outcomes. Also the result in the same line with **El-Feky & Ali (2020)** who studied effect of abdominal massage on gastric residual volume among critically ill patients at Cairo University Hospitals which found appreciable differences in the features and clinical outcomes between the study and control groups.

The results of the current investigation showed that the stomach residual volumes for both the study and control groups over a period of six days after evaluating and interpreting the data that had been gathered and associated gastric residual. The study group had no stomach residual volume on the second or third day, while the control group had a marginally significant difference on the second (p 0.05) and a very significant difference on the third (p 0.01). The study group continuously exhibited smaller stomach residual volumes than the control group on the fourth, fifth, and sixth days, with highly significant differences at p 0.01. These outcomes might be the consequence of abdominal massage since the light pressure and motions encourage food to pass through the digestive tract and stimulate the digestive system.

These findings support the findings of a research by **Momenfar et al. (2018)** who studied the effect of abdominal massage on the gastric residual volume in patients hospitalized in intensive care units that abdominal massage reduces stomach residual volume. Additionally, **Kahraman & Ozdemir (2021)**whose study entitled " the impact of abdominal massage administered to intubated and enterally fed patients on the development of ventilator-associated pneumonia that was performed in a critical care unit of a university hospital in Turkey showed that the patients in the intervention group had less belly circumference and stomach residual capacity. The statistical study determined that this decrease was significant (p 0.05). Furthermore, **Ahmed et al., 2021** claimed that abdominal massage reduces GRV and guards against distention. In addition, **Sharma et al., 2022** who study about effect of abdominal massage on the gastric residual volume in mechanically ventilated patients on nasogastric tube feeding admitted in ICUs of tertiary care hospital in Ludhiana, Punjab in India found that patients on nasogastric tube feeding who had abdominal massage saw a substantial decrease in gastric residual volume.

Based on the characteristics of feces, distention, and vomiting. Our research showed that over several days, the study group had much greater rates of defecation, significantly fewer instances of vomiting, and significantly lower levels of distention than the control group. The research group

continuously shown greater defecation rates and fewer instances of vomiting on the second, third, and fourth days, with a very significant difference. Throughout the monitoring time, the study group also consistently showed noticeably less distention. Additionally, over the course of the observation period, the study group continuously showed greater rates of defecation, lower rates of vomiting, and noticeably less distention than the control group.

Abdominal massage, in the researcher's opinion, can energize the muscles and nerves in the belly, which can improve bowel function. Peristalsis, the wavelike movement of the intestines that helps transport waste through the digestive system and enables regular bowel movements, may be promoted by the little pressure given to the abdomen region.

These outcomes are in line with the findings of a research by **Ilgin and Ozer in 2023** who study the effect of abdominal massage on discharge and ventilator-associated pneumonia in enterally fed patients connected to mechanical ventilation which showed that abdominal massage reduces abdominal distension, boosts fecal frequency, and controls bowel motions and excretion (P .05. Additionally, **Dehghan et al. (2018)** whose study about "Does abdominal massage improve gastrointestinal functions of intensive care patients with an endotracheal tube, in Kerman, Iran " noted that the intervention group's defecation times considerably increased (P =.002). In addition, **Turan & Atabek (2018)** in study entitled "The effect of abdominal massage on constipation and quality of life, in Europe" found that abdominal massage reduced belly distention.

Our study found that the mean abdominal circumference at the fourth day was 94.2 (8.6) in the study group and 97.8 (9.9) in the control group, based on measurements of abdominal circumference. With a p value of 0.01, the difference between the two groups was extremely significant. Finally, on the sixth day, there was a very significant difference in abdominal circumference between the study and control groups, with a p value of 0.01. Based on the findings, it can be concluded that abdominal massage reduced abdominal distention, which in turn caused an increase in abdominal circumference. The research by **Zhang et al., 2023** also study the effect of abdominal massage on enteral nutrition tolerance in patients on mechanical ventilation for Chinese patients which revealed a reduction in abdominal circumference from 84.41 cm to 82.44 cm, supports these findings.

Conclusion:

The tolerance of enteral feeding among patients in the study group improved after abdominal massage compared to control group .the research was conducted diligently, ensuring that the selected samples adhered to the predetermined criteria, resulting in two comparable study groups. When compared to the control group, the study group consistently had smaller stomach residual volumes, with highly significant differences at p 0.01. This demonstrated the effectiveness of the abdominal massage in reducing gastric residual volumes over the observation period.

Moreover, the study group experienced significantly higher rates of defecation and reduced occurrences of vomiting, along with lower levels of distention, compared to the control group over multiple days. The study discovered a very significant difference in abdominal circumference between the study and control

groups on day four, with the study group exhibiting a decreased mean abdominal circumference. This pattern maintained, and on the sixth day, there was a highly significant difference between the two groups, adding evidence to the intervention's success in reducing abdominal circumference.

Recommendations:

1. Encouraged further research to explore the long-term effects of abdominal massage on gastrointestinal outcomes and overall patient well-being. Larger sample sizes and longer follow-up periods could provide more comprehensive insights into the intervention's benefits.
2. Replication of the study on a larger probability sample from different geographical distribution for generalization of the results.
3. Encourage a collaborative approach involving healthcare professionals from various disciplines, including nutritionists, physiotherapists, and intensive care specialists, can enhance the implementation of abdominal massage and its integration into patient care plans.
4. Regular monitoring of gastric residual volumes should be continued, even in patients receiving abdominal massage.
5. Provide specialized training about abdominal massage technique to healthcare staff, including nurses and physiotherapists

References:

Ahmed, H., Hussein Bakr, Z., & Mohamed Naguib, A. (2021). Effect of Abdominal Massage on Gastrointestinal Function among Enterally Fed Critically Ill Patients. Egyptian Journal of Health Care, 12(1), 801-813.

Ahmed, S. H., El-Hakeem, A., Ezzat, E., Mohammed, M. A., & Khalaf, G. S. (2019). Effect of Implementing Gastric Residual Volume Protocol on Critically Ill Patient Outcomes. Assiut Scientific Nursing Journal, 7(18), 170-179.

Altun Ugras, G., Yüksel, S., Isik, M. T., Tasdelen, B., Dogan, H., & Mutluay, O. (2022). Effect of abdominal massage on bowel evacuation in neurosurgical intensive care patients. Nursing in Critical Care, 27(4), 558-566.

Benha University Hospital Statistical Office, (2022). Number of cardiac patients admitted to intensive care unit of open-heart surgery at Benha university hospital.

Cederwall, C. J., Rose, L., Naredi, S., Olausson, S., & Ringdal, M. (2023). Care practices for patients requiring mechanical ventilation more than seven days in Swedish intensive care units: A national survey. Intensive and Critical Care Nursing, 74, 103309.

Çetinkaya, O., Ovayolu, Ö., & Ovayolu, N. (2020). The effect of abdominal massage on enteral complications in geriatric patients. SAGE Open Nursing, 6, 2377960820963772.

Dehghan, M., Mehdipoor, R., & Ahmadinejad, M. (2018). Does abdominal massage improve gastrointestinal functions of intensive care patients with an endotracheal tube: a randomized clinical trial. Complementary therapies in clinical practice, 30, 122-128.

El-Feky, H. A. & Ali, N. (2020). Effect of abdominal massage on gastric residual volume among critically ill patients at Cairo University Hospitals. International Academic Journal of Health, Medicine and Nursing, 2(1), 36-53.

Golami, N., Hanifi, N., & Rashtchi, V. (2022). Comparing the Consequences of Early and Late Gastric Nutrition in Trauma

Patients under Mechanical Ventilation in the Intensive Care Unit: A Prospective Cohort Study. Journal of Military Medicine, 24(6), 1386-1396.

Gunst, J., Casaer, M., Preiser, J., Reignier, J., & Van den Berghe, G. (2023). Toward nutrition improving outcome of critically ill patients: How to interpret recent feeding RCTs?. Critical Care, 27(1), 43.

Ilgin, V. & Özer, N. (2023). The Effect of Abdominal Massage on Discharge and Ventilator-Associated Pneumonia in Enterally Fed Patients Connected to Mechanical Ventilation: A Randomized Controlled Study. Dimensions of Critical Care Nursing, 42(2), 104-114.

Kagan, I., Hellerman-Itzhaki, M., Bendavid, I., Statlender, L., Fishman, G., Wischmeyer, P. & Singer, P. (2023). Controlled enteral nutrition in critical care patients–a randomized clinical trial of a novel management system. Clinical Nutrition.

Kahraman, B., & Ozdemir, L. (2021). The impact of abdominal massage administered to intubated and enterally fed patients on the development of ventilator-associated pneumonia: a randomized controlled study . International journal of nursing studies, 52(2), 519-524

Kosasih, C., Andriani, A., Lestari, A., Sekarjati, F., Iqomatulhaq, H., Audini, J.& Mulyati, T. (2019). Effects of abdominal massage to overcome gastrointestinal dysfunction in patients in intensive care unit: A literature review. Padjadjaran Acute Care Nursing Journal, 1(1).

Lu, X., Jia, D., Wang, R., Yang, Q., Jin, S. S., & Chen, L. (2022). Development of a prediction model for enteral feeding intolerance in intensive care unit patients: A prospective cohort study. World Journal of Gastrointestinal Surgery, 14(12), 1363.

Misirlioglu, M., Yildizdas, D., Ekinci, F., Ozgur Horoz, O., Tumgor, G., Yontem, A. & Yucel, A. (2023). Evaluation of Nutritional Status in Pediatric Intensive Care Unit Patients: The Results of a Multicenter, Prospective Study in Turkey. Frontiers in Pediatrics, 11, 1179721.

Momenfar, F., Abdi, A., Salari, N., Soroush, A., & Hemmatpour, B. (2018). Studying the effect of abdominal massage on the gastric residual volume in patients hospitalized in intensive care units. Journal of intensive care, 6, 1-7.

Shalaby Khalaf Mahran, G., Ismael Abdelhafez, A., Adel Mohamed Ibrahim, B., & Atiaa Tolba, A. (2023). Effect of late defecation on mechanical ventilator weaning in critically ill patients. Egyptian Journal of Health Care, 14(2), 807-821.

Sharma, K., Pal, J., Sharma, M., & Gautam, P. L. (2022). Effect of Abdominal Massage on the Gastric Residual Volume in Mechanically Ventilated Patients on Nasogastric Tube Feeding Admitted in ICUs of Tertiary Care Hospital. International Journal of Nursing Critical Care, 8(2), 23-29.

Turan, N., & Atabek Aştı, T. (2018). The effect of abdominal massage on constipation and quality of life, in Europe. Gastroenterology Nursing, 39(1), 48-59.

Uysal, N., (2017). The effect of abdominal massage administered by caregivers on gastric complications occurring in patients intermittent enteral feeding a randomized controlled trial.10, 75-81.

Vali, M., Paydar, S., Seif, M., Sabetian, G., Abujaber, A., & Ghaem, H. (2023). Prediction prolonged mechanical ventilation in trauma patients of the intensive care unit according to initial medical factors: a machine learning approach. Scientific Reports, 13(1), 5925.

Younis, G., Ahmed, S., & Abo Seada, A. (2023). Effect of Abdominal Massage on the Occurrence of Constipation among Critically Ill Ventilated Patients at Intensive Care Unit. Tanta Scientific Nursing Journal, 28(1), 11-27.

Yu, K., Guo, N., Zhang, D., Xia, Y., Meng, Y., Weng, L., & Du, B. (2022). Prevalence and risk factors of enteral nutrition intolerance in intensive care unit patients: a retrospective study. Chinese Medical Journal, 135(15), 1814-1820.

Zevallos, M., Jara, K., Ramírez, C., & Carreazo, N. (2022). Impact of Early Enteral Nutrition on the Hospital Stay of Pediatric Patients Undergoing Mechanical Ventilation. Journal of Pediatric Intensive Care., 18 (7), 120-189.

Zhang, W., Zhou, W., Kong, Y., Li, Q., Huang, X., Zhao, B. & Qiu, Z. (2023). The effect of abdominal massage on enteral nutrition tolerance in patients on mechanical ventilation: A Randomized Controlled Study. Intensive and Critical Care Nursing, 75, 103371.

تأثير تدليك البطن على تحمل التغذية المعوية عند المرضى على جهاز التنفس الصناعي

علا احمد عبد الصمد -وطنية كامل عطيه- أشجان طلبه فتحى

يعد إطعام المرضى ذوي الحالات الحرجة في وحدة العناية المركزة جانبًا مهمًا ومعقدًا من جوانب رعايتهم تدليك البطن هو تدخل تمريضي علاجي يحفز النشاط السمبثاوي ويؤثر بشكل إيجابي على الجهاز الهضمي من خلال تعزيز التمعج المعوي ، وتقليل انتفاخ البطن ، وتحسين حركه الأمعاء. لذلك هدفت هذه الدراسه إلى التعرف على تأثير تدليك البطن على تحمل التغذية المعوية لدى المرضى على جهاز التنفس الصناعي . وتم تطبيق هذه الدراسه على عينه غرضية من المرضى علي جهاز تنفس الصناعي بالعنايه المركزه وكان عددهم (80) مريض تم تقسيمهم عشوائيا الى (40) مريض مجموعة الدراسة و(40) مريض مجموعه ضابطة بقسم العنايه المركزه بمستشفي بنها الجامعي. واظهرت نتائج هذه الدراسه ان هناك دلاله احصائيه عاليه بين مجموعة الدراسه بعد تدليك البطن والمجموعه الضابطه فيما يتعلق بالبقايا المعديه ومحيط البطن والانتفاخ $p < 0.01$.واستنتجت هذه الدراسه أن تدليك البطن الذي تم إعطاؤه لمرضى التهوية الميكانيكية قلل من حجم المعدة المتبقي وانتفاخ البطن والقيء لدى مجموعة الدراسة مقارنة بالمجموعة الضابطة. وقد اوصت الدراسه على إجراء مزيد من البحث لاستكشاف الآثار طويلة المدى لتدليك البطن على نتائج الجهاز الهضمي ورفاهية المريض بشكل عام .كما اوصت على تكرار عمل ابحاث عن تدليك البطن على عينه اكبر حجما للتعميم النتائج.