

The Effect of Abdominal Massage Technique on Gastrointestinal Complications for Critically Ill Patients

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Abstract

Critically ill patients need a nursing practice that can enhance getting all benefits of Enteral feeding and improving the gastrointestinal function. Abdominal massage is a technique used in improving digestive function. **Aim of the Study:** This study was conducted to evaluate the effect of abdominal massage Technique on gastrointestinal complications for critically ill patients. **Design:** A quasi- experimental design was used in this study. **Setting:** the study was conducted at the Intensive care unit in El-Fayoum University Hospital. **Subjects:** A Purposive sample of 60 patients who randomly divided into 2 equal group; Group I, consisted of 30 patients received Abdominal massage Technique protocol (study group) Group II, includes 30 patients received hospital routine care (control group). **Data Collection Tools:** tool of the study consist of Two tools, tool(1) Patient Assessment sheet (2) Modified Gastrointestinal symptoms rating scale (GSRS). **Results:** It was found that the majority (73.3%) of the study group patients have mild gastrointestinal complications after abdominal massage, While more than two third (66.7%) of the control group who not receive the intervention have moderate gastrointestinal complications. It also noted that there was highly statistically significant difference between study and control groups after applying abdominal massage ($X^2 = 15.078$, $P = 0.001^{**}$). **Conclusion** this study concluded that the incidence of gastrointestinal complications such as Abdominal pain, Reflux, diarrhea, abdominal distension and constipation among study group patients decreased compared to control group patients. **Recommendations:** the current study recommended that Abdominal Massage can be applied as a caring procedure in the daily ICU care program. Replication of the study using a large probability sample from different geographic areas.

Key words: Abdominal Massage -Critically Ill Patient - Gastrointestinal complications.

Introduction:

Gastrointestinal tract has many important functions for critically ill patients especially it maintains immunological functions, decreases infection and promotes better survival rate. For those patients, nutritional support is a routine care and should begin immediately after admission and should be maintained to avoid starvation that may increase patient's risk for morbidity and mortality (Momenfar, et al, 2018).

Patient in critical illness stage has many barriers and challenges which keep him away to get all benefits of enteral-feeding and affect his nutritional status, recovery process and hospital days. Most of these barriers are gastrointestinal (GI) complications such as vomiting (by 12.2%), diarrhea, abdominal distention, constipation, and high gastric residual volume (by 32-39%) which can be prohibited by early identifying signs and symptoms of feeding intolerance. It is known that these complications whether are causal or effect can lead to an inability to achieve nutritional target in severely illness patients (Morton & Fontaine, 2016).

Abdominal massage can be defined as a gentle, non-invasive therapeutic technique that doesn't need a lot of hard work, applied on the stomach and pelvic area to relieve gastrointestinal complications. Stomach massage is not only helpful in relieving stress but also improves oxygen circulation through blood in necessary area and body fluid which ensures the body secret enough enzymes for clearing bowel and prevents constipation (Ogunyewo & Afemikhe, 2020).

Abdominal massage presents several benefits for critically ill patients who are always in need for careful and continuous observation to avoid or prevent gastrointestinal complications related enteral feeding by increasing stimulation of blood flow to and from the organs, nerves and muscles in the abdominal region, enhancing hormone

production and accelerate waste removal. Several studies in Egypt, Turkey, Iran, Germany and others suggested and described using the abdominal massage for patients in ICUs as a complementary therapy for improving gastrointestinal outcomes such as "high gastric residual volume, vomiting, abdominal distension and constipation", which it has been shown to be effective, noninvasive and without any side effects on patients. (Fareed & Elsayad, 2017).

Many literatures described abdominal massage as the preferred non-pharmacological nursing intervention for managing and preventing enteral feeding related gastrointestinal complications because it has many advantages such as it is easily and independently applied by nurses and free from side effects. So, this study will be conducted to evaluate the effect of abdominal massage on gastrointestinal function among critically ill patients.

Aim of the Study:

The study aim to evaluate effect of abdominal massage Technique on gastrointestinal complications for critically ill patients.

The aim was fulfilled through:

- 1-Assess of the patient Gastrointestinal complications using Gastrointestinal symptoms rating scale (GSRs).
- 2-Develop abdominal massage protocol based on literature review.
- 3-Implement Abdominal massage Technique for the study group.
- 4-Evaluate the efficacy of the implemented abdominal massage Technique on the incidence of gastrointestinal complications for critically ill patients using gastrointestinal symptoms rating scale (GSRs).

Research Hypothesis:

At the end of the study the incidence of gastrointestinal complications for critically ill

patients who will receive abdominal massage will be less than those patients who don't receive the intervention.

Subjects and Methods:

The study was portrayed under the four main designs as follows:

1. Technical design.
2. Operational design.
3. Administrative design.
4. Statistical design.

1) The technical design:

-It includes research design, setting, subject and tools for data collection.

A) Research design:

A Quasi-experimental research design was used in this study.

B) Setting:

This study was carried out at the intensive care unit (ICU) at El-Fayoum university hospital.

C) Subjects:

A Purposive sample of 60 adult patients who met the inclusion criteria and agree to participate in the study, and then they were divided alternatively into two equal groups (study group exposed to abdominal massage technique and control group exposed to routine hospital care, 30 patients in each).

Sample size was calculated according to a pilot study of the first 6 patients. Assuming that the power =80% and alpha error =0.05 with 1:1 allocation ratio, the determined var 1/ var 0 ratio was 0.375 and the critical F =0.524, 28 patients in each group was satisfactory. To avoid drop out, 30 patients in each group were considered.

Inclusion criteria:

The inclusion criteria of the current study include Adult Patients from both gender >20years old, Patients free from abdominal

massage contraindications and Conscious & semi-conscious patients.

Exclusion criteria:

Exclusion criteria include Intestinal obstruction patients, Patients receiving abdominal radiotherapy for the last 6 months, Immune compromised patients and Patients have recent abdominal surgeries.

D) Tools for data Collection:

Data were collected using the following tools:

Tool (I): Patient Assessment sheet:

This tool was developed by the researcher based on review of relevant recent literatures, **Elpasiony et al, (2017) & Ahmed, et al, (2021)** and it includes patient' age, gender, the level of education, marital status, occupation, smoking, Causes of ICU admission, past medical history, allergic history, and type of feeding.

2) Modified Gastrointestinal symptoms rating scale (GSRS) (standardized scale):

It was adopted from (**Souza , et al ,2016**) and it includes 15 items instrument combined into 5 symptom clusters: Reflux "Heartburn", Abdominal pain, Indigestion "abdominal distension", Diarrhea, and Constipation.

Scoring system:

Likert-type scale 0-5 represents "Mild gastrointestinal problems " 6-10 "Moderate gastrointestinal problems ", the mean of the items 11-15 "severe gastrointestinal problems " , Scoring system completed within an individual scale .

3) Abdominal massage Technique Protocol:

-It was developed by the researcher based on review of relevant literature **Kahrman &ozdemir (2015); jeyaraman,& Lakshmi (2014)**.It includes preparation of practitioner and patient, description of abdominal massage movement, total duration of massage to be applied, frequency and time of massage.

Field Work:

1) at first day of the study, the researcher assessed patients demographic and health data of all patient' age, gender, the level of education, causes of ICU admission, past medical history, and type of feeding". These data collected using (tool I), data collected from the medical records of the patient.

2) All patients in the study assessed for method of feeding (oral, Enteral Parenteral) and amount of feeding per day.

3) Gastrointestinal problems were assessed using (tool II) before application of abdominal massage for study and control group. The researcher assessed patients for presence of (Abdominal pain, Reflux, Indigestion, Diarrhea and constipation). Modified gastrointestinal symptoms rating scale was assessed by assistance of patients.

4) Data collection started and completed within 9 months from February (2020) until the end of October (2020).

5) Data collection was done 5 day/week by the researcher, two times per day at the morning and afternoon shifts.

6) All Patients were randomly assigned to control group or study group, 30 in control group and 30 in study group. The control group received underwent routine care, whereas the intervention group received the developed abdominal massage protocol. Generating random digit for all patients selected for the study according to inclusion and exclusion criteria, then using random starting point and assign even number as control group while odd number assigned as study group.

7) Abdominal massage Technique protocol (for the study group only):

-The practitioner remained standing on the right side of the patients during the massage practice. Before the intervention, the patient assumed in supine position. Head of bed elevation with maintained 30 degree during application of the massage.

-Abdominal massage was administered to the abdominal wall in the direction of bowel track. It was initiated with superficial effleurage

.Then later deep effleurage; petrissage and vibration massage practice with performed.

-The total duration of abdominal massage was 15 minutes.

-Abdominal massage was administered to study group patient twice per day before feeding to decrease risk of regurgitation.

- The subjects in the control group underwent routine care by ICU nurses.

8) Finally for all studied patient (study and control groups); Gastrointestinal problems were assessed using Modified gastrointestinal symptoms rating scale at fifth days to determine the effect of the implemented Abdominal massage protocol on the study groups. The researcher assessed patients for presence of (Abdominal pain, Reflux, Indigestion, Diarrhea and constipation). Modified gastrointestinal symptoms rating scale was assessed by assistance of patients.

Ethical Considerations:

Ethical approval was obtained from the scientific ethical committee of faculty of nursing Helwan University. In addition, written informed consent was obtained from each participant prior to data collection. The participants assured that anonymity and confidentiality would be guaranteed and the right to withdraw from the study at any time. Ethics, values, culture and beliefs were respected, data confidentiality and patient privacy to be considered.

4. Statistical Design:

The collected data were organized, analyzed using appropriate statistical significance tests. The data were collected and coded using the Computer Statistical Package for Social Science (SPSS), version 21, and was also used to do the statistical analysis of data. Data were presented using descriptive statistics in the form of frequencies and percentages. A Chi-square test was used to compare frequencies between study variables..

Results:

A) Characteristics of studied patients:

A total 60 patients were enrolled in the study (30 for each study and control group) with mean age $\bar{X} \pm SD$ (52.40 ± 14.40) for control and study group. also it was noted that 60% of the study group were male, as regarding to an educational level it was found that 53.3% of the control and study groups were illiterate, while 16.6% of the control and study group were higher education, Furthermore, it was found that there was no significant difference between study and control group as regarding their demographic data. As regarding health related data found that (60%) in the control and study group were smokers. As regarding causes of ICU admission, it was found that (23.3%) of the control group have respiratory and neurological problems, While, (30%) of study group have respiratory problem .Regarding method of feeding, it was shown that (56.7%) of the control group receiving feeding by oral method, while, (6.7%) of study group receiving feeding by parenteral method as illustrated in tables (1, 2).

Table (1): Demographic data for studied patients (n=60).

Items	Control (n ₁ =30)		Study (n ₂ =30)		X ²	P value	
	No.	%	No.	%			
Age(year)							
20 - <40 yrs.	6	20.0	7	23.3	0.659	0.719	
40 - < 60 yrs.	12	40.0	14	46.7			
≥ 60 yrs.	12	40.0	9	30.0			
Mean (SD)	52.40 (14.40)						
Gender							
Male	15	50.0	18	60.0	0.606	0.436	
Female	15	50.0	12	40.0			
Marital status							
Single	3	10.0	2	6.7	5.827 ^{FE}	0.131	
Married	14	46.7	23	76.6			
Divorced& widow	13	43.3	5	16.7			
Level of Education							
Illiterate	15	50.0	16	53.3	1.205 ^{FE}	1.000	
Diploma	10	33.4	9	30.0			
Higher-education	4	16.6	5	16.7			
Occupation							
Yes	21	70.0	20	66.7	1.201 ^{FE}	0.777	
No	9	30	10	33.3			

X² Chi square test

^{FE} Expected cell count less than 5. Fisher's exact test was used.

Table (1): Percentage distribution of Health related data for both study and control groups. (N=60).

Items	Control (n ₁ =30)		Study (n ₂ =30)		X ²	P value	
	No.	%	No.	%			
Causes of ICU admission	Respiratory problem	7	23.3	9	30.0	6.0800 ^{FE}	0.244
	Cardiac Problem	5	16.7	0	0.0		
	Renal problem	2	6.7	3	10.0		
	GIT problem	4	13.3	7	23.3		
	Neurological problem	7	23.3	8	26.7		
	Others	5	16.7	3	10.0		
Smoking	Yes	19	63.3	18	60.0	0.071	0.791
	No	11	36.7	12	40.0		
History of Chronic diseases	Diabetes	2	6.7	4	13.3	5.886 ^{FE}	0.442
	Hypertension	11	36.7	13	43.3		
	Cancer	7	23.3	7	23.3		
	None	1	3.3	1	3.3		
	Kidney disease	2	6.7	0	0.0		
	Heart disease	2	6.7	4	13.3		
Previous abdominal surgery	No	21	70.0	24	80.0	0.800	0.371
	Yes	9	30.0	6	20.0		
Length of Stay	1 – 2 days	10	33.3	8	26.7	1.149	0.563
	3 – 4 days	11	36.7	9	30.0		
	≥ 5 days	9	30.0	13	43.3		
Method of feeding	Oral	17	56.7	16	53.3	0.223 ^{FE}	1.000
	Enteral	11	36.7	12	40.0		
	Parenteral	2	6.7	2	6.7		
Type of feeding	Vegetable soup with salt	5	16.7	8	26.7	3.858	0.448
	Vegetable soup and meat	8	26.7	4	13.3		
	Milk and juice	11	36.7	8	26.7		
	Vegetable soap without salt	4	13.3	8	26.7		
	Total Parenteral Nutrition	2	6.7	2	6.7		
Amount of feeding/ml/4hrs	200	11	36.7	13	43.3	0.321	0.852
	300	14	46.7	12	40.0		
	400	5	16.7	5	16.7		

X² Chi square test

^{FE} Expected cell count less than 5. Fisher's Exact test was used.

B) The impact of Abdominal massage technique protocol on the incidence of gastrointestinal problems:

There was no any significant difference between study and control groups before applying abdominal massage.($P = 0.070$) as illustrated in table(3).Regarding to after application of abdominal massage (73.3%)of the study group patients have mild gastrointestinal problems, While 66.7% of the control group who not receive the intervention have moderate gastrointestinal problems. It also noted that there was highly statistically significant difference between study and control groups after applying abdominal massage ($X^2 = 15.078, P = 0.001^{**}$) as illustrated in table(4).

Table 3: Modified Gastrointestinal Symptoms Rating Scale (GSRs) among Studied Subjects before intervention. (n=60).

GSRs (Pre)	Control		Study		X2	P value
	No.	%	No.	%		
Mild	21	70.0	13	43.3	4.712 ^{FE}	0.070
moderate	9	30.0	16	53.4		
Severe	0	0.0	1	3.3		

X² Chi square test

^{FE} Expected cell count less than 5. Fisher’s Exact test was used.

Table 4: Modified Gastrointestinal Symptoms Rating Scale (GSRs) among Studied Subjects after intervention (n=60).

GSRs (Post)	Control		Study		X2	P value
	No.	%	No.	%		
Mild	7	23.3	22	73.3	15.078 ^{FE}	0.001 ^{**}
moderate	20	66.7	7	23.3		
Severe	3	10.0	1	3.3		

X² Chi square test

^{FE} Expected cell count less than 5. Fisher’s Exact test was used.

^{**} Highly statistical significant at $p \leq 0.01$

C) Relation between Socio-demographic Characteristics & Health Data and Modified Gastrointestinal Symptoms Rating Scale (GSRS) among Studied Subjects (n=60) :

There were no statistical significant difference between age, gender, smoking, types of feeding and causes of ICU admission with Modified Gastrointestinal Symptoms Rating Scale (GSRS) for studied patients as illustrated in table (5 , 6) .

Table (5): Relation between Demographic Characteristics and Modified Gastrointestinal Symptoms Rating Scale (GSRS) among Studied Subjects (n=60)

Demographic data	Modified Gastrointestinal Symptoms Rating Scale						X ²	P value
	Mild		Moderate		Sever			
	No.	%	No.	%	No.	%		
Age								
20 - <40 yrs	6	20.7	6	22.2	0	0.0	1.873 _{FE}	0.817
40 - < 60 yrs	12	41.4	11	40.7	1	25.0		
≥ 60 yrs	11	37.9	10	37.0	3	75.0		
Gender								
Male	13	44.8	15	55.6	2	50.0	0.773 _{FE}	0.837
Female	16	55.2	12	44.4	2	50.0		
Marital status								
Single	3	10.3	3	11.1	0	0.0	3.470 _{FE}	0.777
Married	13	44.8	12	44.4	3	75.0		
Divorced	6	20.7	3	11.1	1	25.0		
Widow	7	24.1	9	33.3	0	0.0		
Level of Education								
Illiterate	14	48.3	13	48.1	3	75.0	2.399 _{FE}	0.700
Diploma	10	34.5	10	37.0	0	0.0		
Higher-education	5	17.2	4	14.8	1	25.0		
Occupation								
Yes	22	75.9	19	70.4	1	25.0	3.892 _{FE}	0.119
No	7	24.1	8	29.6	3	75.0		

X² Chi square test

^{FE} Expected cell count less than 5. Fisher's Exact test was used.

(*) Statistically significant at p<0.05

Table (6): Relation between health related data and Modified Gastrointestinal Symptoms Rating Scale (GSRS) among Studied Subjects. (n=60).

Health related data		Modified Gastrointestinal Symptoms Rating Scale						X ²	P value
		Mild		Moderate		Sever			
		No.	%	No.	%	No.	%		
Length of Stay:	1 – 2 days	7	24.2	9	33.3	2	50.0	1.684 ^{FE}	0.850
	3 – 4 days	11	37.9	8	29.6	1	25.0		
	≥ 5 days	11	37.9	10	37.1	1	25.0		
Smoking:	Yes	18	62.1	17	63.0	2	50.0	0.437 ^{FE}	0.925
	No	11	37.9	10	37.0	2	50.0		
Causes of ICU admission:	Respiratory problem	8	27.6	8	29.7	0	0.0	7.748 ^{FE}	0.635
	Cardiac Problem	2	6.9	3	11.1	0	0.0		
	Renal problem	2	6.9	3	11.1	0	0.0		
	GIT problem	7	24.1	3	11.1	1	25.0		
	Neurological problem	7	24.1	5	18.5	3	75.0		
	Others	3	10.4	5	18.5	0	0.0		
Past History; Medical:	Diabetes	3	10.3	3	11.1	0	0.0	9.344 ^{FE}	0.703
	Hypertension	3	10.3	3	11.1	0	0.0		
	Cancer	4	13.8	8	29.6	2	50.0		
	None	2	6.9	0	0.0	0	0.0		
	Kidney disease	0	0.0	2	7.4	0	0.0		
	Heart disease	4	13.8	2	7.4	0	0.0		
	Bronchial asthma	13	44.9	9	33.4	2	50.0		
Method of feeding	Oral	19	65.5	13	48.2	1	25.0	4.995 ^{FE}	0.259
	Enteral	9	31.0	12	44.4	2	50.0		
	Parenteral	1	3.5	2	7.4	1	25.0		
Type of feeding:	Vegetable soup with salt	7	24.1	6	22.2	0	0.0	8.434 ^{FE}	0.328
	Vegetable soup and meat	7	24.1	5	18.5	0	0.0		
	Milk and juice	6	20.7	11	40.8	2	50.0		
	Vegetable soap without salt	8	27.7	3	11.1	1	25.0		
	Total Parenteral Nutrition	1	3.4	2	7.4	1	25.0		
Amount of feeding/ml/4hrs:	200	9	31.1	13	48.2	2	50.0	3.020 ^{FE}	0.544
	300	13	44.8	11	40.7	2	50.0		
	400	7	24.1	3	11.1	0	0.0		

X² Chi square test

^{FE} Expected cell count less than 5. Fisher's Exact test was used.

(*) Statistically significant at p<0.05

Discussion:

Abdominal massage is a gentle, non-invasive treatment that may have relaxing and healing effect for some people, and are used in the treatment of wide variety of health conditions especially those related to the stomach such as indigestion and bloating. Massage therapy can stimulate the parasympathetic activity and induce a more effective gastro-intestinal function by increasing peristalsis, decrease abdominal distension, increase bowel transit time, reduce gastric gas volume, increase frequency of defecation and decrease the frequency of vomiting. Thus, abdominal massage is intended to improve digestive system function (**Daniel, 2018**).

Regarding Demographic data for both study and control groups, the current study showed that more than three quarter of studied patient in both group had age more than forty years old. , as co-morbidity increase with age and increase the risk of ICU admission .these observations could attribute to variety of changes in the upper GIT related to aging process that predispose to GIT Problems, reflux and aspiration. This result consistent with **Ahmed, et al., (2020)** in a study titled "Effect Of Upper Respiratory Care Protocol On The Incidence Of Ventilator-associated Pneumonia for Critically Ill Patients." Who stated that more than two third of studied patient in both group had age more than forty years old.

This finding also contradict with **Ogunyewo & Afemikhe (2020)** in a study titled " Using Abdominal Massage to Reduce Gastric Residual Volume Among Critically Ill Patients by Nurses in a Tertiary Health Institution in Jos Metropolis, Plateau State " who shows that majority, 25 (32.2%) of the respondents were within the age group 30-40 years as the most common cause of hospitalization was trauma..

Related to gender, the present study results showed that, two third of the study group were

males; this could due to the natural of ICU admission as emergency and increase accident among male more than female patient. This finding is consistent with **Momenfar et al., (2018)** in a study titled " Studying the effect of abdominal massage on the gastric residual volume in patients hospitalized in intensive care units "who reported that Among the patients, 60% (36 patients) were male. But this finding contradicted with **Turan& Atabek (2016)** in a study titled" The Effect of Abdominal Massage on Constipation and Quality of Life" who revealed that the majority of the population were female.

Regarding causes of ICU admission, the current study revealed that neurological and respiratory problems were the majority of causes of ICU admission among both group. This may be due to the majority of the patient were elderly and have a complication from chronic disease like hypertension ,diabetes mellitus or hepatic disease who can't follow up for it . This result coincides with **El-Feky & Ali. (2020)** in a study titled " Effect Of Abdominal Massage On Gastric Residual Volume Among Critically Ill Patients At Cairo University Hospitals" who said that acute cerebrovascular stroke (CVS) was the most common diagnosis among half (50%) of both the study and control group.

Concerning smoking, the present study showed that more than two third of studied patient in both group were smoker. This could due to the nature of ICU were general and emergency and patient who were smoker expected to admit to chest ICU more than this ICU. this result consistent with **Diab ,et al.(2021)** in a study titled" Effect of Abdominal Massage on Clinical Outcomes of Enterally Fed Mechanically Ventilated Patients" who revealed that Two third of the sample were smoker.

In relation to amount of feeding; the present study show that the most common amount of feeding among studied group were 300/ml/4hrs.this could due to patient needs .this result consistent with **Diab ,et al.(2021)** in a

study titled "Effect of Abdominal Massage on Clinical Outcomes of Enterally Fed Mechanically Ventilated Patients" who found that the majority of patient take 300ml/2hrs during study.

Regarding distribution of studied groups according to Modified Gastrointestinal Symptoms Rating Scale (GSRS), Regarding Indigestion (abdominal distension); the present study show that more than two third of study group after Application of abdominal massage have Occasional discomfort of short duration of abdominal distention, While less than half of the control group have Frequent and prolonged episodes of abdominal distention after the study. This result consistent with **Wang, Huang, & Jin, (2019)** in a study titled "Effects of abdominal massage on gastrointestinal function in ICU patients: a meta-analysis" who revealed that the abdominal massage helps to relieve abdominal distension, gastric residual, and vomiting.

Regarding **abdominal Pain**; the present study show that more than two third of study group after Application of abdominal massage have Occasional aches and pains interfering with some social activities ,While more than two third of the control group have Prolonged and troublesome aches and pains causing requests for relief and interfering with many social activities after the study. This result consistent with **Lamas, et al, (2012)** in a study titled "Effects of abdominal massage in management of constipation—A randomized controlled trial" who revealed that Abdominal massage decreased severity of gastrointestinal symptoms, especially abdominal pain syndrome, and increased bowel movements.

Regarding **Diarrhea**; the present study show that about one third of study group after Application of abdominal massage have number of defecation three times a day, while more than fifteen of the control group have number of defecation five times a day after the study. This referred to

Massaging your stomach can help to move stool along the inside of your colon. It may help relieve symptoms of tightness, pressure, cramping and bloating. This result consistent with **in Judith & Todd(2021)** study titled "ILU" Self-Massage Technique for Abdominal Discomfort" Who revealed that massage that is useful for both adults and children for bloating, constipation, diarrhea and general abdominal discomfort.

Regarding **Reflux(Heartburn)**; the present study show that about half of study group after Application of abdominal massage have Occasional discomfort of short duration of heart burn ,While about one third of the control group have Frequent episodes of prolonged discomfort of heart burn after the study. This referred to Applying abdominal massage techniques to release the stresses on the diaphragm will treat hiatal hernias and acid reflux very effectively. A relaxed diaphragm will prevent acid reflux by keeping the contents of the stomach where they belong. This result consistent with **Newman, (2019)** in a study titled "Can a massage technique help treat acid reflux?" Who revealed that massaging the connective tissue surrounding the diaphragm could significantly reduce acid reflux for people with Gastroesophageal reflux disease.

Regarding Constipation; the present study show that more than two third of study group after Application of abdominal massage have number of defecation once a day, while about one fifth of the control group have number of defecation every fifth day after the study. This result consistent with **Turan& Atabek (2016)** in a study titled " The Effect of Abdominal Massage on Constipation and Quality of Life "who revealed that the abdominal massage in orthopedic patients, was found to alleviate constipation symptoms and reduce the time to defecation.

Moreover, this result agreed with **Okuyan and Bilgili. (2019)** in a study titled " Effect of abdominal massage on constipation and quality



of life in older adults" who revealed that according to a comparison of the post-intervention constipation status of individuals in the massage and control groups revealed that the massage group's constipation status decreased with a significant difference between the groups. This referred to abdominal massage may stimulate the mechanisms of peristaltic movements and easier food flow through the digestive tract

In relation to **total score of Modified Gastrointestinal Symptoms Rating Scale (GSRS)** among Studied Subjects after intervention, the present study show that about three quarter of the study group patients have mild gastrointestinal problems after abdominal massage, While more than two third of the control group who not receive the intervention have moderate gastrointestinal problems with highly statistically significant difference between two group. This referred to abdominal massage may stimulate the mechanisms of peristaltic movements, change the intra-abdominal pressure, induce mechanical and reflexive effects on the intestines, shortening the food transition time in intestines, increased intestinal movements, and so, easier food flow through the digestive tract.

This result consistent with **Etinkaya, Ovayolu ,Ovayolu (2020)** in study title "The Effect of Abdominal Massage on Enteral Complications in Geriatric Patients" who found that one fifth of intervention group and two fifth of control group have GIT problems also found that majority of the study group and all of the control group have constipation .

Regarding to Relation between Modified Gastrointestinal Symptoms Rating Scale (GSRS) and demographic data for control and study groups, The finding of the current study showed that there were no statistical significant difference between Modified Gastrointestinal Symptoms Rating Scale (GSRS) and Demographic Characteristics (Age, gender education & marital status. This result

Inconsistent with **jeyaraman, R& Lakshmi, R. (2014)**. in study title "A study to assess the effectiveness of abdominal massage with aroma oil (lavender oil) for relieving constipation among bedridden subjects admitted in selected wards at Rajiv Gandhi government general hospital" who shows the association between level of constipation score reduction and their demographic variables. Younger, more educated are reduced more score. **Conclusion:**

The incidence of gastrointestinal problems such as Abdominal pain, Reflux, diarrhea, abdominal distention and constipation among study group patients decreased compared to control group patients. There was a statistical significant difference between study and control group at the fifth day of the study regarding gastrointestinal problems development after implementing of abdominal massage Technique protocol. There was no statistically significant difference between gastrointestinal problems incidence for study and control groups regarding their age, gender and smoking. Finally, abdominal massage Technique was found to decrease severity of gastrointestinal problems, especially problems associated with constipation and pain syndrome. There was also an increase in bowel movements.

Recommendations:

- Abdominal massage could be used as an effective, inexpensive, noninvasive, and safe method in decreasing gastrointestinal problems and aspiration for patients received enteral feeding.
- Incorporate abdominal massage as a routine care for critically ill patients receiving enteral feeding.
- Abdominal massage could be done twice daily for 15 minutes before feeding to decrease risk of regurgitation.
- Educational program for nurses to improve their knowledge and practice regarding abdominal massage application.



- Abdominal massage can be taught to the bedridden clients who are not able to attend the hospital may use self-application.
- Self-abdominal massage can be taught to the clients. Thus they can avoid over the counter drugs and able to do massage in the home itself.
- Replication of the study using a large probability samples acquired from different geographic areas.
- A written updated protocol of abdominal massage supplemented by an illustrative booklet should be available for critically ill patients with nasogastric tube to help them carrying abdominal massage for themselves.

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