EFFECT OF ABDOMINAL MASSAGE ON GASTRIC RESIDUAL VOLUME AMONG CRITICALLY ILL PATIENTS AT CAIRO UNIVERSITY HOSPITALS

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ABSTRACT

Background: Prevention and management of food intolerance in critically ill patients receiving enteral nutrition represent important nursing consideration. These require utilizing techniques and methods for increasing the rate of gastric emptying, and so enhancing tolerance to this nutritional support modality. Among these methods is abdominal massage which has been proved to improve various digestive functions through its direct effect on gastric residual (an important determinant of enteral feeding tolerance). However few studies have been conducted in critical care units and in some studies, contradictory findings have been recorded. **Aim of the study:** to investigate the effect of 15- minute abdominal massage on aspirated the gastric residual volume (GRV) in critically ill patients in three consecutive days. A quasi experimental **research design** was adopted in this study. **A purposive sample** consisting of 60 adult critically ill patients divided into two matched and equal groups (study and control) was recruited. The intervention (abdominal massage) was provided for the studied group three times per day for 15 minutes, over a period of three consecutive days. The aspirated gastric residual volume was measured before abdominal massage and 3 hour after the massage each assessment time. **Results:** the present study revealed reduction in the mean GRV among the studied group in the second as compared to the first assessment time all over the three days, with significant statistical differences between the two assessment times (before and after feeding) in the first and second assessment days ($t = 19.17 \pm 18.76$ & 9.33 ± 10.8; and $t = 11.5 \pm 8.82$ & 5.17 ± 6.36 respectively at $p \leq 0.05$). The mean GRV decreased in the third day's second assessment as compared to the first assessment ($t = 3.67 \pm 6.55$ & $t = 4.43 \pm 7.02$ respectively at $p \leq 0.437$) with no significant difference. Concerning, the control group, their mean second assessment GRV increased as compared to the first one in the first and second days (28.5 ± 13.96 & 32.33 ± 11.98 and 33.17 ± 14.05 &37.5 ± 13.8, at $p \leq 0.005$ respectively); in the third day, the mean second assessment GRV reduced as compared to the first assessment (30.17 ± 13.9 & 25.33 ± 7.8, at $p \leq 0.005$ respectively). Comparisons between the study and control groups mean GRV showed high significant statistical differences in the three assessment days. **Conclusion** Application of a 15 minutes abdominal massage is a successful nursing intervention. It showed significant reduction GRV in adult critically ill patients receiving enteral nutrition. **Recommendations:** Abdominal massage must be incorporated in nursing management of critically ill patients receiving enteral nutrition.

Key Words: *abdominal massage, enteral nutrition, gastric residual volume, nursing management*

INTRODUCTION

One of the key elements in the management of critically ill patients is nutritional support. It is a medical treatment as well as a part of nursing care. Timely and adequate nutritional support play an

important role in improving patient's recovery, reducing physiological stress, increasing the immunity capacity and reducing or eliminating malnutrition. More specifically, Enteral nutrition (EN) is the preferred route of nutritional support in patients who are incapable of volitional intake (Uysal, Eşer, & Akpinar, 2012). When administered considering the feeding guidelines, it becomes a proactive therapeutic strategy. It helps to maintain peristalsis, improve blood supply, and strengthen the immune system. So, it may reduce disease severity, diminish complications, decrease intensive care unit (ICU) length of stay, and favorably impact patients' outcomes (Ros, McNeill, & Bennet, 2009, In Momenfar, Abdi, Salari, Soroush and Hemmatpour, 2018).

Enteral nutrition (EN) as any other nutritional support modality requires close monitoring for adequacy and tolerance to minimize complications (Siobal, and Baltz, 2013). Gastric intolerance and delayed gastric emptying are among the most important digestive complications (Montejo, et al., 2010, In Momenfar, Abdi, Salar, Soroush and Hemmatpour, 2018). It refers to high gastric residual volume (GRV), diarrhea, vomiting, and abdominal distension. It leads to interruption in feeding, and so increased risk of malnutrition (Barker, Gout, & Crowe, 2011). Therefore, patients' assessment, close monitoring and diagnosis are essential for early diagnosis (Mosquera et al. 2016, Nguyen, 2014, and Uysal, Eşer, & Akpinar, 2012).

The most commonly used way for evaluating gastric intolerance is GRV monitoring (Montejo et al.; Moreira & McQuiggan, Johnson, In Uysal, Eşer & Akpinar, 2012). Bedside GRV is suggested to be assessed during the first 24 hours, and measured every 6 hours after inserting the nasogastric (NG) tube (Deane, Chapman, Fraser, Bryant, Burgstad & Nguyen, In Momenfar, Abdi, Salar, Soroush & Hemmatpour, 2018). Monitoring of GRV is essential due to its expected role in the prevention of pulmonary aspiration (Guo, 2015). According to the guidelines, if the GRV is more than 250 cc, the nurse should report the physician for carrying out additional diagnostic investigations . As a result, the patient will not receive a meal in that session (Wilson, Madisi, Bassily-Marcus, Oropello, Kohli-Seth, 2016). As illustrated by Uysal, Eşer, & Akpinar, (2012), In Momenfar, Abdi, Salar, Soroush and Hemmatpour, (2018), 10 to 63% of NG tube fed patients had gastric intolerance, which resulted in nearly 43–64% of these patients to receive their daily required caloric requirements, so it potentiates the risk of malnutrition-related complications (McClave, etal., 2016).

Different methods have been proposed for preventing and treating food intolerance and accelerating the rate of gastric emptying, of theses is abdominal massage. It is utilized to manage complications following immobility and reducing food intolerance (Kahraman & Ozdemir, 2015). Abdominal massage (with stimulated peristaltic movements of digestive system), was found to alter intra-abdominal pressure; induce mechanical and reflexive effects on the intestines; reduce the transit time of nutrition in the intestines; increase the number of intestinal movements; and lead to easier food movement along the gastrointestinal tract; so prevent complications (McClave, etal., 2016). Therefore, the present study was conducted to examine the effect of abdominal massage on GRV among adult critically ill patients.

SIGNIFICANCE OF THE STUDY

The success in enteral nutrition depends on the role responsibility of the nurse in carefully assessing, planning feeding requirement, providing feeding safely and efficiently, monitoring patients' response carefully, and preventing complications. Therefore, early assessment, diagnosis and management of patients for delayed gastric emptying or intolerance are important nursing responsibilities (Uysal, Eşer & Akpinar, 2012). The critical care nurse must have the ability of adopting the feasible methods / techniques that enable monitoring patients' response and tolerance to nutritional support. The most commonly used method and one of the most important indicators of gastric intolerance is measurement of GRV which is still implemented as a routine measure in-spite of being not recommended in the new guidelines (McClave, etal., 2016, and Rezae, Kadivarian, Abdi, Rezae, Karimpou, & Rezae, 2018). As well, further studies were recommended to reach a definite conclusion on this intervention (Mohammadpour, Sajjadi , Maghami, & Soltani, 2018).

Patients receiving enteral feeding require nursing interventions directed towards assessing the feeding rate, slowing down high GRV level, and interrupting or terminating the feeding however, it was noticed that critical care nurses' role was concerned only with administration of feeding. As well, nursing care was noticed to lack assessing tube placement, and checking the effectiveness of nutritional support on patients' nutritional status and recovery. Therefore, this study is expected to direct the attention toward critical care nurses' role in assessing, provision, monitoring response and tolerance to enteral nutrition. Findings of this study are expected to provide base line data about the effectiveness of abdominal among adult critically ill patients' gastric residual volume, which indirectly reflect patients' nutritional status.

AIM OF THE STUDY

The aim of this study was to examine the effect of a 15-minutes abdominal massage on aspirated gastric residual volume among adult critically ill patients, at selected intensive care units, affiliated to Cairo University Hospitals.

RESEARCH HYPOTHESIS

H_0: Adult critically patients who will receive a 15 minutes abdominal massage will have significant lower mean gastric residual volume as compared to those in the control group who will not.

SUBJECTS AND METHOD

Research Design

A quasi experimental research design was adopted in this study to examine the effect of abdominal massage on gastric residual volume in adult critically ill Patients. This design is one type of experimental design that is very similar to the true experimental design except in missing one criterion "manipulation, randomization, or control (Terry, 2014). In this study the researchers ensured control (of the intervening variables) and manipulation (the abdominal massage).

Setting

The current research study was carried out at selected intensive care units affiliated to Cairo University Hospitals.

Sample

A purposive sample consisting of 60 adult patients (divided into two equal and matched groups, 30 patients for each) who were admitted to the selected ICUs over a period of seven (7) months was included in current study.

Inclusion Criteria

Patients who have NG tube in place, Glasgow coma scale of more than or equal 8 scores, didn't undergo abdominal surgeries.

Exclusion Criteria

Patients receiving prokinetic medications (to avoid interfering with the massage effects); with hepatic impairment; and abdominal aortic aneurysm, malignancy and undergoing radiotherapy were excluded from this study.

Data collection Tools

One instrument was created and utilized by the researchers for data collection. It was divided into two parts:

Part 1: Patients' demographic characteristics and medical data - such as patients' age, gender, past medical history, medical diagnosis, date of admission and duration of ICU stay.

Part 2: Gastric residual volume (GRV) monitoring - it covered data regarding base line GRV, and 3 hour after feeding and performing a 15-minutes abdominal massage three times per day) for three consecutive days.

Tools Validity

Content validity of the developed tool was reviewed by a panel of three experts in critical care and emergency nursing specialty.

Ethical Consideration

Participation in this study was entirely voluntary. Each patient /relative has the right to accept or refuse participation in the study. Informed consents were obtained after explanation of the aim and nature of the study to the study subjects or their next of kin. Anonymity and confidentiality were assured through coding the data. Every patient had the right to leave the study at any time. Subjects were reassured that this data will be utilized only for the aim of research and will not be reused in another research without allowance.

Procedure

Data of the present study were collected over a period of 7 months, starting from May - December 2019. The researchers carried out extensive literature review, prepared data collection tool and tested its validity. Then, approvals to carry-out the study were obtained from the administrative authorities at Cairo University Hospitals, and the selected Critical Care Units. Once official agreements were obtained, the researchers visited the selected units to enroll patients who met the inclusion criteria, and obtained their agreements to participate in the study. The researchers carried out the intervention (abdominal massage) for the entire study group at first to avoid the effect of intervening variables, and ensure accurate data collection. After obtaining the desired patients' number, the researchers enrolled the control group. Patients who agreed to participate in the study were interviewed individually to explain the nature and purpose of the current study. Then written consents were obtained, and actual implementation of the study was done. Then assessment of the abdomen for distention was done by percussion over the abdomen (the normal percussion sound in abdomen is tympany and in cases of distention, the percussion sound is resonance). After inspection and percussion, palpation of the abdomen was done to exclude peritonitis, ascitis, abdominal masses, and organomegally (such as hepatosplenomegally), and so excluded these cases from the study.

Once confirming that the involved patients met the inclusion criteria, the researchers obtained demographic characteristics and medical data. Involved patients were placed in supine position with the head-of-bed angle elevated at 30° - 45°; the researchers assessed the placement of nasogastric tube by injecting 20 ml of air and auscultating the epigastric region using a stethoscope; then assessed the residual volume by withdrawing the gastric contents slowly with a 50-ml syringe. When the stomach contents were no longer aspirated, the researchers withdrew again the gastric content to ensure that the stomach was empty and recorded any aspirated gastric contents. Later, the researchers performed abdominal massage utilizing techniques such as:

1 - Gliding or Effleurage (Figure 1): was carried out through applying more and long sliding and sweeping strokes with the help of forearms, relatively slow and smooth strokes used for spreading oil (paraffin oil). It was repeated several times to induce relaxation of abdominal muscles.

Figure 1: Gliding or Effleurage, available at https//study.com> Types of strokes in Massage

2 - Vibration (Figure 2): was carried out to release the tension in the patients' abdominal muscles. Gradual oscillatory actions alternating between slow to rapid movements were exerted to shake and vibrate the abdominal wall.

Figure 2: Vibration, adapted from Therapeutic Body Concepts, (2020), Edmonton, Canada

3 - Kneading or Petrisage (Figure 3): was performed through squeezing, lifting, and rolling skin and muscle tissues of the abdomen in a kneading fashion to reach deeper tissues with firm pressure for the purpose of stretching muscles and creating deep relaxation. Kneading helps to stimulate the nerve endings, get rid of impure substances in the muscles, increase circulation and promote cell repair.

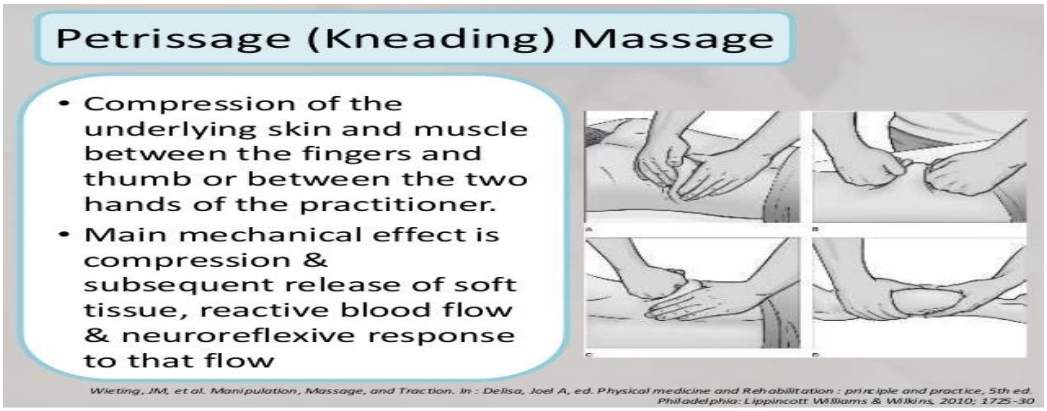


Figure 3: Kneading, Adapted from: Wieting, JM, et al Manipulation, Massage, and Traction. In: Delisa, Joel, A.E.D., (2010). Physical Medicine & Rehabilitation Principle; Philadelphia Lippincott Williams &Wilkins; 1725-30

4 - Friction (Figure 4): This technique was done by rubbing back and forth. It creates heat, warming up muscles in the abdomen to be treated for deep massage technique.

Figure 4: Friction; available at https//study.com> Types of strokes in Massage

5 - Tappotment or stroking (Figure 5): the researchers performed alternating gentle, quick, and striking, manipulations such as tapping, cupping, hacking and chopping, and pounding movements all over the abdomen. This technique is usually used as the last technique in the massage session.

Figure 5: Tappotment or stroking; available at https//study.com> Types of strokes in Massage

After performing the abdominal massage at 8 am, the researchers administered the nasogastric tube feeding formula at 8:15 am. Then the patients were left in semi-fowler's position until 11.00 pm. Then abdominal massage was done again at 11 am for 15 minutes. Then, gastric residual volume was assessed by withdrawing the gastric contents slowly. If the aspirated residual

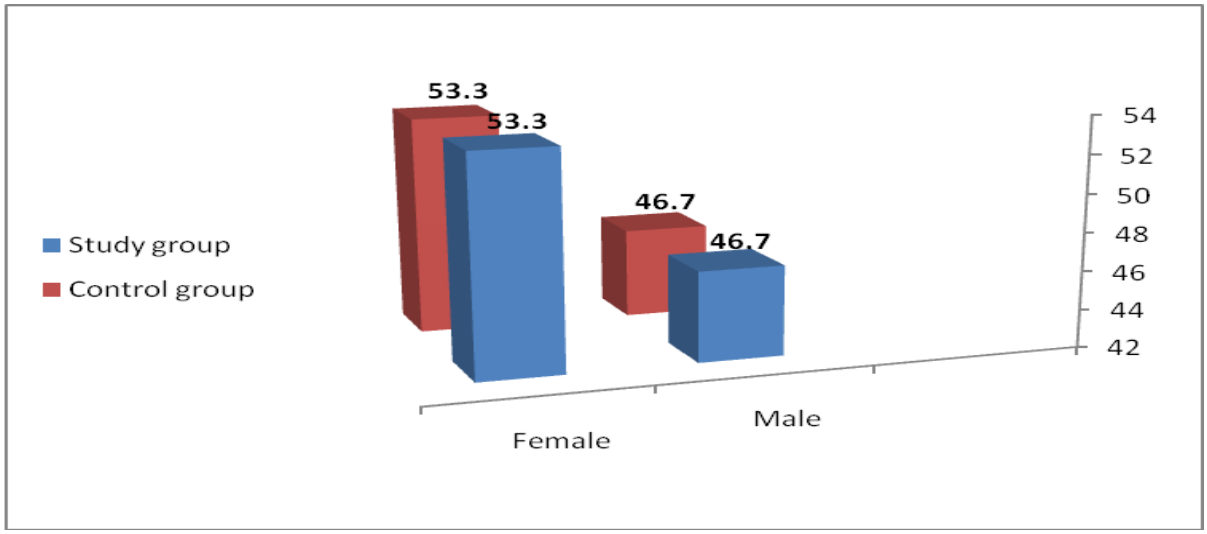
volume was 100-200 ml, the researchers returned it back to the stomach and recorded the incident. The same procedures were repeated three times per day for three consecutive days, and obtained data were recorded.

Once the researchers achieved the accepted study group number, the researchers enrolled the control group. To make sure of homogeneity of the sample matching was done according to age group, gender, diagnosis, and body mass index**.** The researchers carried out the same procedure steps that were done for the study group except for performing the abdominal massage. Assessment of the abdomen was done for distention, and patients were placed in supine position with the head-of-bed angle elevated at 30°-45°. The researchers checked placement of the nasogastric tube, then, the residual volume was assessed before nasogastric tube feeding by withdrawing the gastric contents slowly. Then, the researchers administered the nasogastric tube feeding formula at 8 am. After 3 hours (at 11am) assessment of the residual volume was done. If the aspirated residual volume was 100-200 the researchers returned it back to the stomach again and recorded the incident. Then the researchers administered the tube feeding formulas. This intervention was carried out for three times daily for three consecutive days starting from 8 am to 6 pm.

Statistical Analysis

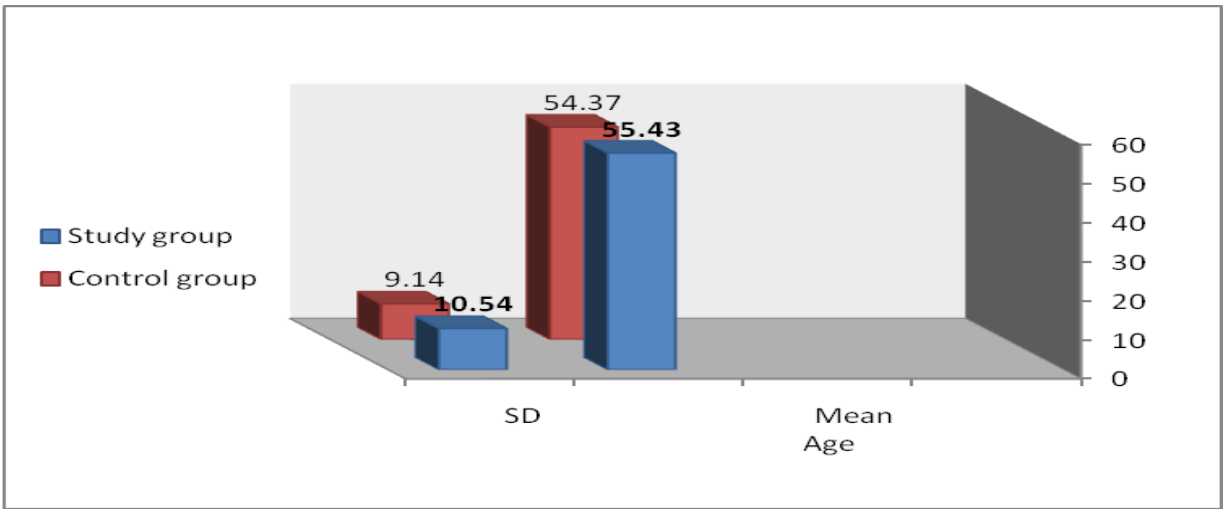
Obtained data were tabulated and analyzed using statistical package for the social science (SPSS) program, version 20. Descriptive, as well as inferential statistics, were used to analyze data pertinent to the current study. Level of significance was set at $p \leq 0.05$.

RESEARCH RESULTS



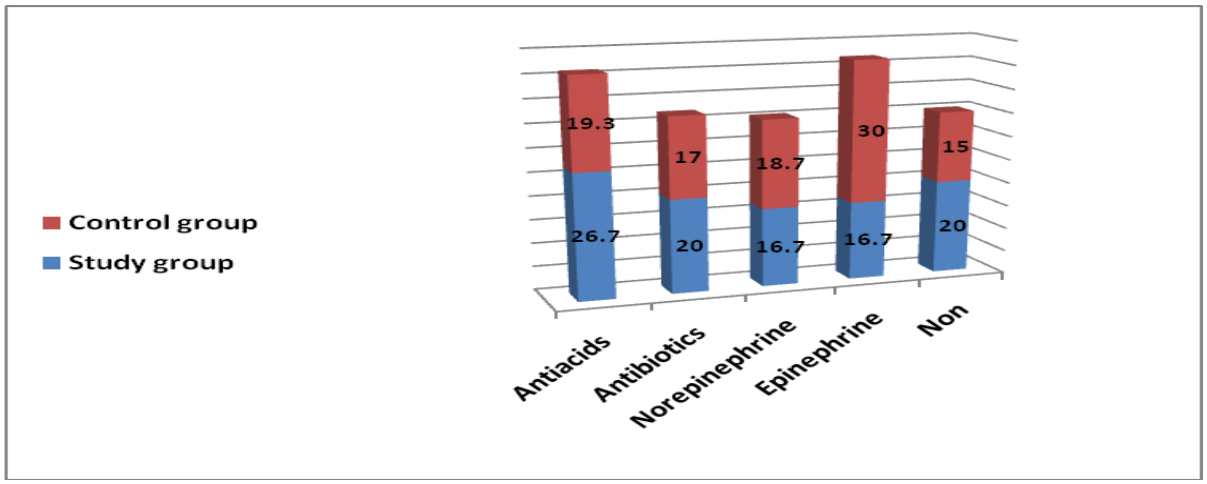
Chi square value = 0.113, p≤ 0.117 NS (No significant difference)

Figure 1: Comparison between the Study and Control Groups ad Regards Gender, (N=30)



t = 0.419, P≤0.487 NS (No significant difference)

Figure 2: Comparison between the Study and Control Groups ad Regards Mean Age, (N=30)



Chi square value = 25.6, p ≤ 0.17 (NS)

Figure 3: Current medications of both the Study and Control Groups, (N=30)

Figure 1 shows that females represented more than half (53.3%) of both the studied and control groups, while males represented approximately the other half (46.7%). As shown from figure (2), the mean age of the studied sample was 55.43 ± SD=10.54, and the mean age of the control group was 54.37 ±SD=9.14. No significant statistical differences were found between the studied and control groups regarding gender and age. Epinephrine, norepinephrine, and antibiotics were the common prescribed drugs for both the study and control groups in percentages of 16.7 & 30%; 16,7% & 18.7; and 20% & 17% respectively. No significant statistical difference was found between the two groups regarding medications (figure 3).

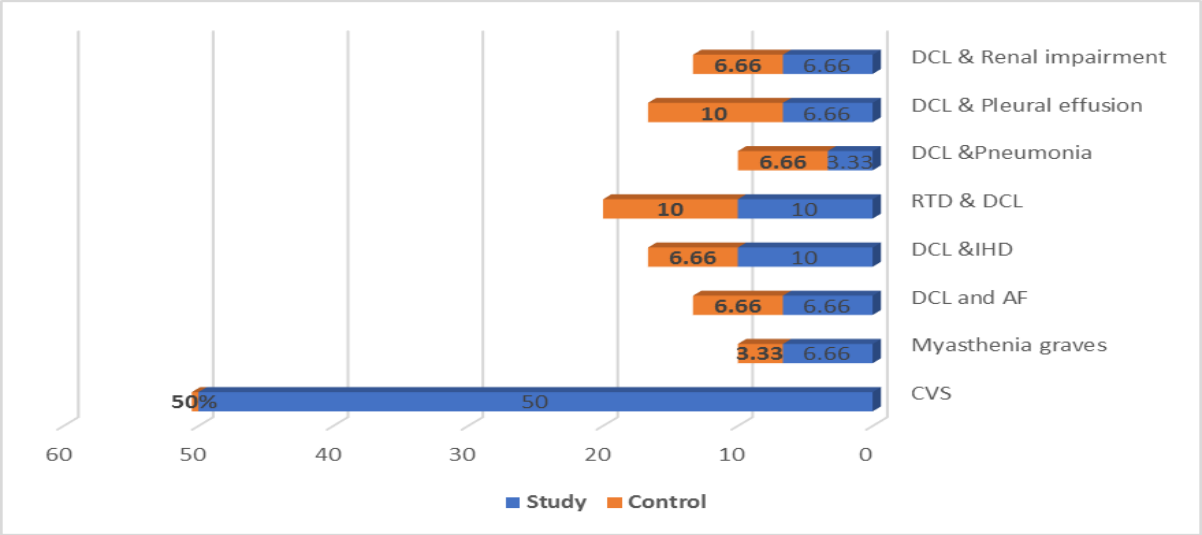


Figure 4: Percentage Distribution of both the Study and Control Groups as Regards Medical Diagnosis, (N= 30)

Figure 4 shows that acute cerebrovascular stroke (CVS) was the most common diagnosis among half (50%) of both the study and control group, with no significant statistical difference between the two groups regarding diagnosis (Chi square: 6.22, p $\leq$ 0.40).

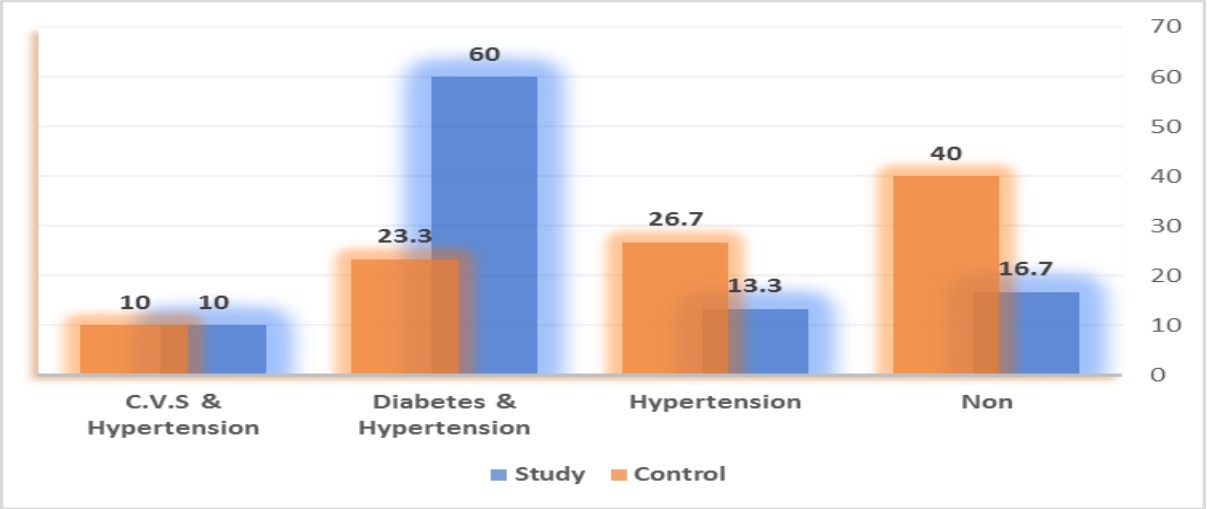


Figure 5: Percentage Distribution of both the Study and Control Groups as Regards Co-morbidity Diseases (N= 30)

Figure 5 shows that, diabetes was the most common co-morbidity disease among 60% of the studied sample, and hypertension was common among more than one quarter (26.7%) of the control group**.** No significant statistical difference was found between the two groups regarding co-morbidity diseases (Chi square: 10.56, p $\leq$ 0.307).

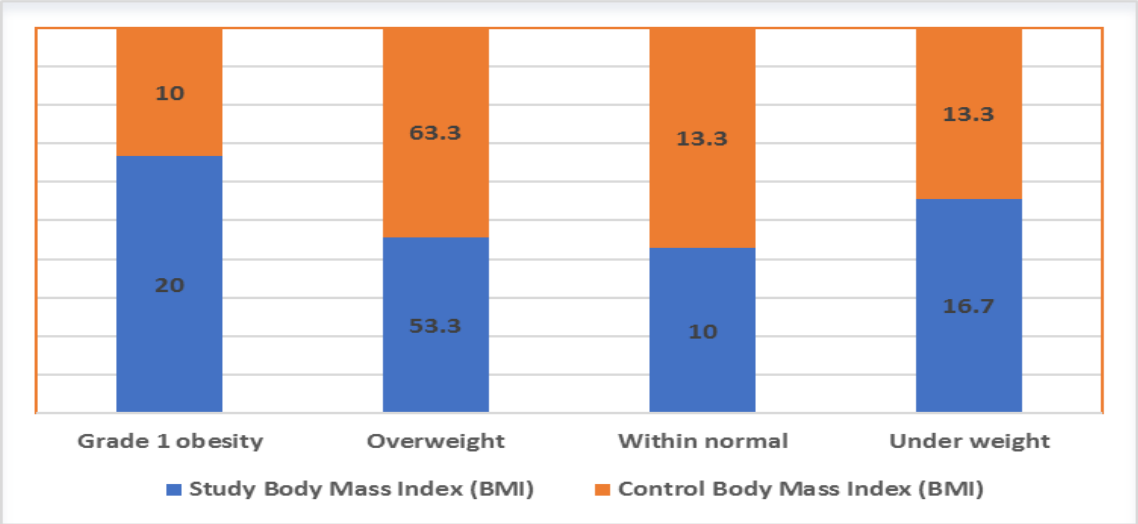


Figure 6: Percentage Distribution of both the Study and Control Groups as Body Mass Index

Figure 6 shows that, over weight was dominant among more than half of both the study and control groups in percentages of 53.3 and 63.3, with a mean BMI of 26.1±5.27, and 26.87± 5.19 respectively with no significant statistical difference between two groups regarding BMI (t = 0.56, P≤ 0.79).

Table 1: Comparison between the Study and Control Group as regards Mean Gastric Residual Volume in Different Assessment Times, in Three Consecutive Assessment Days (N= 30)

Frequency	Study X±SD	Control X±SD	t-test	Significance
Day one				
	19.17±18.76	28.5±13.96	11.18	0.00**
Before feeding	9.33± 10.8	32.33±11.98	15.81	0.00 **
Three hours after feeding				
t / P	2.49/ 0.017*	11.17/0.00 **		
Day two				
	11.5±8.82	33.17±14.05	12.93	0.00**
Before feeding	5.17±6.36	37.5±13.8	14.86	0.00 **
Three hours after feeding				
t / P	3.189 /0.002**	14.86/ 0.00 **		
Day three				
Before feeding	4.43±7.02	30.17±13.9	11.86	0.00**
Three hours after feeding	3.67±6.55	25.33±7.8	17.88	0.00**
t & P	0.437 /0.664 NS	17.88/ 0.00**		

NS: No significant difference ** : High significant statistical difference

Table 1 shows reduction in the mean gastric residual volume of the studied group in the second assessment time as compared to the first assessment all over the three days of assessment, with significant statistical differences between the two assessment times in the first and second assessment days (t = 19.17±18.76 & 9.33± 10.8; and t = 11.5±8.82 & 5.17±6.36 respectively at p≤0.05). As well, the mean GRV decreased in the third day's second assessment as compared to the first assessment however, this reduction didn't reach the level of significance (t =3.67±6.55 & t =4.43±7.02 respectively at p≤ 0.437).

As regards the control group, the mean second assessment's GRV increased as compared to the mean first assessment in the first and second days (28.5±13.96 & 32.33±11.98 and 33.17±14.05 & 37.5±13.8, at p≤ 0.005 respectively). However, the mean second assessment reduced significantly as compared to the first assessment in the third day (30.17±13.9 & 25.33±7.8, at p≤0.005 respectively). Comparison between the study and control groups showed high significant statistical differences in the three assessment days.

Table 2: One Way ANOVA for Comparison of Mean GRV among both the Study and Control Groups in Three Consecutive Assessment Days

Assessment times	Study	Control
Before abdominal massage		
Day (1)	19.17 ±18.76	28.5±13.96
Day (2)	11.5 ±8.82	33.17±14.05
Day (3)	4.43±7.02	30.17±13.9
F/ P	10.202 / 0.00**	0.646/ 0.53 (NS)
After abdominal massage		
Day (1)	9.33± 10.8	32.33±11.98
Day (2)	5.17±6.36	37.5±13.8
Day (3)	3.67±6.55	25.33±7.8
F/ P	9.64 / 0.00**	7.63 / 0.001**

NS: No significant difference **: High significant statistical difference

Table 2 shows high significant statistical difference in the mean gastric residual volumes in the three days' first and second assessment times (F =10.202 and 9.64, p≤ 0.00 respectively). No significant statistical difference was found in the control group's three days' first assessment times (F=0.646/ P≤ 0.53), however, a significant statistical difference was found in the mean gastric residual volume in the three days' second assessments (F =7.63 p≤ 0.00).

Table 3 shows no correlation between age, body mass index and gastric residual volume among the studied sample in different assessment times in three consecutive days.

Table 3: Correlation between the Studied Group's age, BMI, and Gastric Residual Volume in Different Assessment Times, at Three Consecutive Days

Variables		Age	BMI	GRV day1 8 am	day1 11 am	day2 8 am	day2 11 am	Day3 8 am
BMI	**r**	-.122						
	p	0.522						
GRV-	**r**	.060	.086					
Day (1) 8 am	**p**	0.752	0.650					
GRV	**r**	.304	-.002	.733				
Day (1): 11 am	**p**	0.103	0.992	0.000				
GRV	**r**	-.198	-.044	.128	-.098			
Day (2): 8 am	**p**	0.294	0.817	0.502	0.608			
GRV	**r**	.081	-.134	.319	.390	.088		
Day (2): 11 am	**p**	0.670	0.480	0.086	0.033	0.646		
GRV	**r**	.157	-.299	.320	.313	.126	.106	
Day (3): 8 am	**p**	0.407	0.108	0.085	0.092	0.509	0.576	
GRV	**r**	.206	-.205	.418	.547	.170	.274	.496
(Day (3): 11 am	**p**	0.276	0.276	0.021	0.002	0.369	.143	0.005

DISCUSSION

Critically ill patients receiving nutritional support through enteral route require special nursing consideration and focused assessment to exclude gastric intolerance. Among the evidence based guidelines for assessing this intolerance are physical examination, and measuring GRV which was recommended by Mentec, et al., In Guo, (2015), to be frequently checked every 2 to 24 hours with most practicing every 4–6 hour. Patients in the present study (the study group) underwent three sessions of 15 minutes abdominal massage three hours apart for three consecutive days preceded by measuring GRV. They showed lower GRV as compared to the control group (whose gastric residual volume increased significantly) with significant statistical differences suggesting the effectiveness of abdominal massage.

In this regards McClurg, Hagen, Hawkins, & Lowe-Strong, (2011), and Sinclair, (2011) In Momenfar, Abdi, Salari, Soroush and Hemmatpour, (2018) revealed that 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. As well, Liu, Cal & Shi, (2010) indicated that abdominal massage can stimulate the touch and pressure receptors resulting in stimulation of sympathetic nervous system that improves gastrin secretion and accelerates the gastric peristalsis, so decreases the abdominal distention. In addition, Uysal, Eser & Akpinar, (2012), and Fareed & El-Sayad, (2017) carried out similar studies and investigated the effect of abdominal massage on the aspirated residual volume in intensive care units, and found that GRV in the intervention (massage) group was statistically less than the control group. The possible

scientific explanation for that studies result had related to the effect of abdominal massage in improving mesenteric circulation and increasing peristaltic movements.

Moreover, the present study results are consistent with study findings of Tekgunduz et al., (2014) who showed statistically significant difference in residual volume of the first and the last day of assessment in the abdominal massage group. However, the present study finding is not in agreement with a similar study conducted by Dehghan, Poor & Mehdipoor, (2017) who examined the effect of abdominal massage for three times per day on the gastrointestinal functions of intensive care unit (ICU) patients with an endotracheal tube and showed no significant statistical differences between the study and control groups.

Comparison of mean aspirated GRV before and after feeding among the study and control groups in the three assessment days showed significant statistical differences. The residual volume of the last day decreased in comparison to the first day. However, assessing the control group's means aspirated GRV and comparing aspirated values before feeding revealed no significant statistical differences. The current study findings are consistent with that of Aslani et al., (2014) who found gradual reduction in the mean gastric residual volume in the abdominal massage group in the fourth assessment day to significantly change from the first assessment day while the mean gastric residual volume did not significantly change in the four consecutive days in the control group, and showed a tendency toward increment. Reduction in the study group GRV was noticed regardless of patients' age and body mass index (BMI), where no significant statistical correlation what so ever was found. This in one hand could be attributed to and suggest the physiologic effectiveness of abdominal massage on the subsequent reduction of residual volumes, and on the other hand may be related to the short duration of the study period (three days as well as having a small sample size).

The present study showed significant statistical differences in the means of aspirated GRV after feeding preceded by abdominal massage in the study group subjects in three consecutive days. So, the residual volume of the third day reduced in comparison to that of the first day. On the other hand, the mean GRV in the three consecutive days among the control group was statistically significant, where there was increment in the third day volume as compared to the first and second day. These findings confirm the effectiveness of abdominal massage. In this regards Tekgündüz, et al., (2014) supported the effectiveness of abdominal massage in reduction of residual volume. As well, Taylor, et al., (2016), and Philip & Senani, (2014); In Mohammadpour, SajjadiMaghami, & Soltani, (2018) commented on gastric emptying, and described such intervention as a complementary (non pharmacological) method for increasing enteral feeding tolerance and considered it as of particular importance for nursing care that can alleviate side effects of pharmacological interventions.

Based on findings of the present study, the researchers can support the stated research hypothesis which postulated significant lower mean gastric residual volume in adult critically patients who will receive a 15 minutes abdominal massage as compared to those in the control group who will not.

CONCLUSION

The present study documents and demonstrates the efficacy and usefulness of a 15 minutes abdominal massage in reducing GRV among adult critically ill patients receiving enteral tube feeding. It reflects the importance of close monitoring, assessment, proper use of nutrients, so enhancing patients' nutritional status and recovery.

RECOMMENDATIONS

1. Incorporate abdominal massage as a routine care for critically ill patients receiving enteral feeding.
2. Replication of this study on a larger probability sample to ensure generalizability of findings.

REFERENCES

Aslani, N., Hsanifi,, F., Ahmadi, R., & Fallah, (2015). Effect of acupressure on gastric content aspiration in mechanically ventilated patients hospitalized in intensive care units, Prev. Care Nurs. Midwifery J. (PCNM) 5 (1) 1e12. http://www.sid.ir/fa.

Barker, L.A, Gout, B.S., & Crowe, T.C., (2011). Hospital malnutrition: prevalence, identification and impact on patients and the healthcare system. Int J Environ Res Public Health, 8(2): 514–27.

Deane, A., Chapman, M., Fraser, R., Bryant, L., Burgstad, C., & Nguyen Q., (2007). Mechanisms underlying feed intolerance in the critically ill: implications for treatment.

Dehghan, M., Fatehi, Poor, A., Mehdipoor R., & Ahmadinejad, M., (2018). Does abdominal massage improve gastrointestinal functions of intensive care patients with an endotracheal tube? A randomized clinical trial. Complement Ther Clin Pract .;30:122-128.

Fareed E M & El- Sayad E.H., (2017). Effect of Selected Nursing Intervention on Clinical Outcomes among Patients with Nasogastric Tube in Intensive Care Units. IOSR Journal of Nursing and Health Science (IOSR-JNHS). Volume 6, Issue 6 Ver. IV. (Nov.- Dec. PP 21-32.

Guo, B., (2015). Gastric residual volume management in critically ill mechanically ventilated patients: A literature review, Proceedings of Singapore Healthcare, Vol. 24(3) 171–180

Johnson, A. D. (2009). Assessing gastric residual volumes. Critical Care Nurse, 29(5), 72-73.

Kahraman, B.B., & Ozdemir, L.(2015). The impact of abdominal massage administered to intubated and enterally fed patients on the development of ventilator associated pneumonia: A randomized controlled study. Int J Nurs Stud.;52 (2):519–24.

Liu, X.Z, Cal, Z.P., Shi, & G.L., (2010. Effect observation of massage on improving success rate of blind insertion of naso-intestinal tube. Med J Chin People Health; (22):2804-2805 (in Chinese).

McClurg, S.A., Taylor, B.E., Martindale, R.G., Warren, M.M., Johnson, D.R., Braunschweig, C., McCarthy, M.S., Davanos, E., Rice ,T.W., Cresci, G.A., & Gervasio J.M., (2016). Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral & Enteral Nutrition (ASPEN). J Parenteral and Enteral Nutrition; 40 (2):159–211.

McClurg, D., Hagen, S., Hawkins, S., & Lowe-Strong, A., (2011). Abdominal massage for the alleviation of constipation symptoms in people with multiple sclerosis: a randomized controlled feasibility study. Multiple Sclerosis,17: 223-233.

Mentec, H., et al., (2001). Upper digestive intolerance during enteral nutrition in critically ill patients: Frequency, risk factors, and complications. Critical Care Med; 29: 1955–1961.

Mohammadpour, A., Sajjadi M., Maghami, S., & Soltani H., (2018). The effect of gastric gas emptying on the residual gastric volume in mechanically-ventilated intensive care unit patients fed through nasogastric tubes: a randomized, single-blind, clinical trial, Asian J Pharm Clin Res, Vol 11, Issue 9, 2018, 492-495

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. J Intensive Care ;6:47.

Montejo J,et al.(2010) . Gastric residual volume during enteral nutrition in ICU patients: the REGANE study. Intensive Care Med. ;36(8):1386–93.

Moreira, T. V., & McQuiggan, M., (2009). Methods for the assessment of gastric emptying in critically ill, enterally fed adults. Nutrition in Clinical Practice, 24(2), 261-273.

Mosquera, C., et al., (2016). Impact of malnutrition on gastrointestinal surgical patients, J Surg Res.; 205(1):95–101.

Nguyen, N.Q., (2014). Pharmacological therapy of feed intolerance in the critically ills, World J., Gastrointest Pharmacol Therapeutics.; 5(3):148.

Philip, A.K. P.B., Senani, H.A., (2014). Application of modified USP apparatus I and in situ fiber optic analysis for drug release from ibuprofen nanospheres. Int J Pharm., Sci; 6:527-30.

Rezae J, Kadivarian H, Abdi, A., Rezae, M., Karimpour ,K., Rezae, S., (2018). The effect of body position on gavage residual volume of gastric in intensive care units patients. Iran J Nurs. ; 30 (110):58–67.

Ros, C., McNeill L, & Bennett P., (2009) . Review: nurses can improve patient nutrition in intensive care. J Clin Nurs.;18(17):2406–15.

Sinclair, M., (2011). The use of abdominal massage to treat chronic constipation. J Body W Mov Ther.;15(4):436–45.

Taylor, B.E., et al., (2016). Guidelines for the provision and assessment of nutrition support therapy in the adult critically Ill patient: Society of critical care medicine (SCCM) and American Society for parenteral and enteral nutrition (A.S.P.E.N.). Crit Care Med.;44:390-438.

Tekgündüz , K.Ş., Gürol, A., Apay, S.E., & Caner I., (2014). Effect of abdomen massage for prevention of feeding intolerance in preterm infants. Ital J Pediatr ; 40:89.4.

Terry, J. A., (2014). Clinical Research for the Doctor of Nursing Practice, quasi- experimental research design (2nd. ed.). USA: Jones & Bartlett Learning.

Uysal, N., Eser, I. & Akpinar, H.(2012). The effect of abdominal massage on gastric residual volume . Society of gastroenterology nurses and associates; 35(2): 117-23.

Wilson, S., Madisi, N.Y., Bassily-Marcus, A., Manasia, A., Oropello, J., & Kohli-Seth, R., (2016). Enteral nutrition administration in a surgical intensive care unit: achieving goals with better strategies. World J Crit Care Med.;5(3):180–6.