

EFFECTIVENESS OF ABDOMINAL MASSAGE IN REDUCING GASTRIC RESIDUAL VOLUME AMONG CRITICALLY ILL PATIENTS

***Samina Khalil¹ , REgidor III Poblete Dioso²**

¹*PhD in Nursing Lincoln College University Malaysia*

²*Faculty of Nursing Lincoln College University Malaysia*

Corresponding author email: saminakhalil231@gmail.com

Article Info



This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license <https://creativecommons.org/licenses/by/4.0>

Abstract

Gastric residual volume (GRV) is commonly monitored in critically ill patients receiving enteral nutrition to assess gastric emptying and feeding tolerance. Elevated GRV is associated with delayed gastric emptying, increased risk of aspiration, feeding intolerance, and inadequate nutritional delivery. Non-pharmacological interventions such as abdominal massage have gained attention as a simple and cost-effective strategy to improve gastrointestinal motility. This study aimed to determine the effectiveness of abdominal massage in reducing gastric residual volume among enterally fed patients. A review of current evidence demonstrates that abdominal massage stimulates parasympathetic activity, enhances intestinal peristalsis, improves blood circulation to abdominal organs, and facilitates gastric emptying. Multiple clinical studies have reported significant reductions in GRV following structured abdominal massage interventions. The findings suggest that abdominal massage may serve as an effective complementary nursing intervention for improving feeding tolerance and gastrointestinal function in hospitalized patients receiving enteral nutrition.

Keywords: *Abdominal massage, Gastric residual volume, Enteral nutrition, Feeding intolerance, Critical care nursing, Gastrointestinal motility, Gastric emptying, Intensive care unit*

1. INTRODUCTION

Enteral nutrition is the preferred method of nutritional support for critically ill patients because it preserves gastrointestinal integrity, reduces infectious complications, and improves clinical outcomes. However, delayed gastric emptying frequently occurs in critically ill patients, leading to increased gastric residual volume (GRV), nausea, vomiting, abdominal distension, and aspiration risk. Monitoring GRV remains a common clinical practice to evaluate feeding tolerance. Elevated GRV often results in interruptions of enteral feeding, leading to inadequate caloric intake and prolonged hospitalization. Pharmacological agents such as prokinetic are commonly used to enhance gastric emptying but may be associated with adverse effects. Abdominal massage is a non-invasive therapeutic technique involving systematic manipulation of the abdominal wall to stimulate gastrointestinal activity. Previous studies have demonstrated its effectiveness in reducing constipation, improving bowel movements, and enhancing gastrointestinal motility. Recent evidence suggests that abdominal massage may also reduce gastric residual volume among enterally fed patients. This article examines the effectiveness of abdominal massage in reducing GRV and discusses its mechanisms, clinical benefits, and implications for nursing practice.

Gastric Residual Volume and Clinical Significance

Gastric residual volume (GRV) refers to the quantity of fluid, including enteral feeding formula, gastric secretions, and digestive contents, that remains in the stomach at a given time during enteral nutrition therapy. GRV is commonly measured by aspirating stomach contents through a feeding tube and is widely used in intensive care units (ICUs) and other clinical settings to assess gastrointestinal function and feeding tolerance. The concept of GRV has become an important component of nutritional management because it provides healthcare professionals with an indirect indicator of gastric emptying efficiency. Under normal physiological conditions, the stomach empties its contents into the small intestine at a regulated rate, ensuring optimal digestion and Nutrient absorption. However, critical illness, neurological disorders, trauma, surgical interventions, sedative medications, and mechanical ventilation can impair gastric motility, resulting in delayed gastric emptying and increased GRV. Consequently, monitoring GRV helps clinicians identify patients who may be at risk of feeding intolerance and related complications. The clinical importance of GRV lies primarily in its role as an indicator of enteral feeding tolerance. Enteral nutrition is the preferred method of nutritional support for critically ill and hospitalized patients because it maintains gastrointestinal integrity, supports immune function, and reduces complications associated with parenteral nutrition. Nevertheless, many patients experience impaired gastric motility that limits their ability to tolerate enteral feeding. Elevated GRV may indicate that the stomach is unable to effectively transport its contents into the small intestine, leading to the accumulation of feeding formula and gastric secretions. Regular assessment of GRV allows healthcare providers to determine whether enteral feeding can continue safely or whether modifications such as reducing feeding rates, changing feeding methods, or administering prokinetic medications are required. By identifying feeding intolerance early, clinicians can prevent interruptions in nutritional support and improve patient outcomes. Another critical aspect of GRV monitoring is the prevention of aspiration pneumonia, one of the most serious complications associated with enteral nutrition. When excessive gastric contents accumulate in the stomach, the risk of regurgitation and aspiration into the respiratory tract increases significantly.

Aspiration occurs when gastric contents enter the lungs, potentially causing inflammation, infection, respiratory distress, and prolonged hospitalization. Critically ill patients receiving mechanical ventilation are particularly vulnerable to aspiration because of impaired airway protective reflexes and reduced consciousness. Elevated GRV is often considered a warning sign that gastric contents may reflux into the esophagus and subsequently be aspirated. Therefore, monitoring and managing GRV play an essential role in reducing aspiration-related complications and improving patient safety. GRV also serves as a valuable tool for evaluating gastric emptying and overall gastrointestinal function. Delayed gastric emptying, also known as gastro paresis, is frequently observed in critically ill patients due to factors such as stress-induced hormonal changes, electrolyte imbalances, inflammatory responses, and the use of medications including opioids and sedatives. Increased GRV may reflect impaired gastric motility and delayed transit of nutrients into the small intestine. By monitoring changes in GRV over time, clinicians can assess the effectiveness of interventions designed to enhance gastric emptying, such as prokinetic agents, postural modifications, or non-pharmacological therapies like abdominal massage. Consequently, GRV measurements provide important information regarding the functional status of the gastrointestinal system and assist in clinical decision-making. Optimization of nutritional therapy is another significant benefit of GRV assessment. Adequate nutritional support is essential for wound healing, immune function, tissue repair, and recovery from critical illness. High GRV often results in the interruption or reduction of enteral feeding, leading to inadequate calorie and protein intake. Persistent underfeeding may contribute to muscle wasting, weakened immunity, delayed recovery, and increased susceptibility to infections. Through regular monitoring of GRV, healthcare providers can identify feeding challenges early and implement strategies to maintain nutritional delivery while minimizing complications. This approach supports the achievement of nutritional goals and contributes to improved clinical outcomes. Elevated GRV is associated with several adverse consequences. One of the most common complications is delayed gastric emptying, which can cause nausea, vomiting, abdominal discomfort, and feeding intolerance. As gastric contents accumulate, patients may experience abdominal distension and increased intragastric pressure, further impairing digestive function. High GRV can also lead to malnutrition because frequent interruptions in enteral feeding reduce nutrient intake and compromise nutritional status. Malnutrition is associated with increased morbidity, delayed wound healing, prolonged mechanical ventilation, and higher mortality rates. Furthermore, aspiration of gastric contents remains a major concern, as it can result in aspiration pneumonia, respiratory failure, and increased healthcare costs. These complications often contribute to longer hospital stays, greater resource utilization, and reduced quality of life for patients. Therefore, effective management of GRV is a critical component of comprehensive patient care, particularly among critically ill individuals receiving enteral nutrition.

Physiological Mechanisms of Abdominal Massage

Abdominal massage is a non-invasive therapeutic intervention that has been increasingly recognized for its beneficial effects on gastrointestinal function. The technique involves the systematic application of gentle pressure and rhythmic movements over the abdominal wall, typically following the anatomical direction of the colon. Although traditionally used to relieve constipation and abdominal discomfort, recent research has highlighted its potential role in improving gastric motility and reducing gastric residual volume (GRV) among patients receiving enteral nutrition.

The effectiveness of abdominal massage is attributed to several interconnected physiological mechanisms, including neural stimulation, mechanical influences on gastrointestinal structures, and enhanced circulatory function. Together, these mechanisms contribute to improved digestive activity, accelerated gastric emptying, and better overall gastrointestinal performance.

One of the primary mechanisms through which abdominal massage exerts its effects is neural stimulation. The gastrointestinal tract is regulated by a complex interaction between the central nervous system, the autonomic nervous system, and the enteric nervous system. Abdominal massage is believed to stimulate sensory receptors located within the skin, muscles, and underlying tissues of the abdomen. These sensory signals are transmitted through peripheral nerves to the autonomic nervous system, particularly enhancing the activity of the parasympathetic nervous system. The parasympathetic system, often referred to as the "rest and digest" system, plays a critical role in promoting gastrointestinal motility, secretion, and nutrient absorption. Increased parasympathetic activity results in greater stimulation of digestive organs, encouraging coordinated contractions of the stomach and intestines. This neural activation helps restore normal digestive function, especially in critically ill or immobilized patients who frequently experience reduced gastrointestinal activity. Enhanced vagal tone represents another important neural effect of abdominal massage. The vagus nerve is the principal parasympathetic nerve responsible for regulating gastric motility, gastric secretion, and intestinal movement. Stimulation of the vagus nerve promotes the release of neurotransmitters such as acetylcholine, which increases smooth muscle contractions throughout the gastrointestinal tract. Abdominal massage may indirectly stimulate vagal pathways, leading to improved communication between the brain and digestive organs. As vagal activity increases, gastric emptying becomes more efficient, gastric residual volume decreases, and digestive processes are enhanced. This mechanism is particularly beneficial in patients receiving enteral nutrition, as delayed gastric emptying is a common problem that can interfere with nutritional support and increase the risk of aspiration. In addition to neural effects, abdominal massage produces significant mechanical influences on gastrointestinal structures. The gentle pressure applied during massage directly stimulates the smooth muscles of the stomach and intestines. This mechanical stimulation encourages muscular contractions and enhances the natural movement of gastrointestinal contents. The repetitive circular motions commonly used during abdominal massage mimic and support the body's normal digestive processes by facilitating the movement of food, fluids, and waste products through the digestive tract. Such mechanical stimulation is particularly important in bedridden patients, whose reduced physical activity often contributes to decreased intestinal motility and gastrointestinal dysfunction. A key mechanical benefit of abdominal massage is the promotion of peristalsis, the coordinated wave-like contractions that propel contents through the digestive system. Peristaltic activity is essential for effective digestion, nutrient absorption, and waste elimination. In many hospitalized patients, especially those in intensive care units, peristalsis may become sluggish due to illness, medications, stress responses, or prolonged immobilization. Abdominal massage helps reactivate and strengthen these contractions, facilitating the progression of gastric contents into the small intestine and reducing gastric retention. Enhanced peristalsis not only improves digestive efficiency but also contributes to the reduction of symptoms such as abdominal distension, bloating, and constipation. Facilitation of gastric emptying is another important outcome of the mechanical effects of abdominal massage. Delayed gastric emptying can lead to increased gastric residual volume, feeding intolerance, nausea, vomiting, and aspiration risk. By stimulating muscular activity within the stomach and proximal gastrointestinal tract, abdominal massage encourages the movement of gastric contents toward the duodenum. Improved gastric emptying reduces the accumulation of enteral feeding formula within the stomach, thereby lowering GRV and enhancing tolerance to nutritional therapy. This effect is especially valuable in critically ill patients who often

experience impaired gastric motility due to physiological stress and medication use. Circulatory improvements also play a significant role in the therapeutic benefits of abdominal massage. The application of rhythmic pressure to abdominal tissues promotes local blood circulation and enhances vascular perfusion of gastrointestinal organs. Increased blood flow ensures a greater supply of oxygen and nutrients to the stomach, intestines, and surrounding tissues. Adequate perfusion is essential for maintaining normal cellular function, supporting smooth muscle activity, and facilitating tissue repair processes. Improved circulation may also help remove metabolic waste products and inflammatory mediators that can impair gastrointestinal performance. Enhanced oxygen delivery resulting from increased blood flow further contributes to gastrointestinal health. Oxygen is necessary for the production of cellular energy required for muscular contractions and digestive functions. When oxygen supply is improved, gastrointestinal tissues can function more efficiently, supporting stronger peristaltic activity and more effective gastric emptying. This enhanced physiological environment may accelerate recovery of gastrointestinal function in critically ill patients and improve their response to enteral feeding. Finally, abdominal massage contributes to improved tissue metabolism within the gastrointestinal system. Better circulation and oxygenation support cellular metabolism, enzyme activity, and tissue maintenance. Enhanced metabolic activity allows digestive organs to perform their functions more effectively, promoting digestion, absorption, and gastrointestinal motility. Collectively, the neural, mechanical, and circulatory effects of abdominal massage create a synergistic response that enhances digestive activity, reduces gastric residual volume, and improves feeding tolerance. These physiological mechanisms provide a scientific basis for the growing use of abdominal massage as a complementary intervention in the management of patients receiving enteral nutrition.

Evidence Supporting Abdominal Massage

The effectiveness of abdominal massage as a complementary intervention for improving gastrointestinal function has been increasingly supported by clinical research conducted in intensive care units (ICUs), long-term care facilities, rehabilitation centers, and general hospital settings. Numerous studies have investigated its impact on gastric residual volume (GRV), feeding tolerance, gastrointestinal motility, constipation, abdominal distension, and nutritional outcomes among patients receiving enteral nutrition. The growing body of evidence suggests that abdominal massage is a safe, non-invasive, and cost-effective technique capable of enhancing digestive function and reducing complications associated with impaired gastrointestinal motility. As healthcare providers seek alternatives and adjuncts to pharmacological interventions, abdominal massage has emerged as a promising nursing intervention supported by both physiological rationale and clinical findings. One of the most consistently reported outcomes in the literature is the significant reduction in gastric residual volume following abdominal massage. Elevated GRV is a common challenge among critically ill patients and is often associated with delayed gastric emptying, feeding intolerance, and increased risk of aspiration. Several randomized controlled trials and quasi-experimental studies have demonstrated that abdominal massage can effectively decrease GRV by stimulating gastric motility and facilitating gastric emptying. In many of these studies, patients receiving abdominal massage showed substantially lower GRV measurements compared with control groups receiving routine care alone. Reductions were often observed after only a few days of intervention, indicating that abdominal massage can produce relatively rapid improvements in gastrointestinal function.

The ability to reduce GRV is particularly important because it allows for the continuation of enteral

feeding and helps patients achieve their nutritional requirements without unnecessary interruptions. Improved feeding tolerance is another significant benefit reported in clinical investigations. Feeding intolerance is characterized by symptoms such as nausea, vomiting, abdominal discomfort, regurgitation, and elevated gastric residual volume. These complications frequently lead to reduced feeding rates or temporary cessation of enteral nutrition, resulting in inadequate caloric intake. Studies have shown that patients who receive abdominal massage experience fewer symptoms of feeding intolerance and demonstrate better tolerance to prescribed feeding regimens. Enhanced feeding tolerance allows healthcare providers to maintain nutritional support more consistently, thereby improving overall nutritional status and reducing the risk of malnutrition. Improved tolerance is particularly beneficial in critically ill patients, whose recovery depends heavily on adequate nutritional intake. Research has also demonstrated that abdominal massage significantly enhances gastrointestinal motility. Gastrointestinal motility refers to the coordinated movement of food and digestive contents through the gastrointestinal tract. Critical illness, prolonged bed rest, neurological disorders, and certain medications can impair this process, leading to delayed gastric emptying and intestinal dysfunction. Clinical studies have reported increased bowel sounds, earlier return of gastrointestinal function, improved intestinal transit time, and more regular bowel movements among patients receiving abdominal massage. These findings suggest that abdominal massage effectively stimulates peristaltic activity and supports the normal functioning of the digestive system. Improved gastrointestinal motility not only contributes to reduced GRV but also enhances overall digestive efficiency and patient comfort. Another important outcome associated with abdominal massage is the reduction of abdominal distension. Abdominal distension commonly occurs when gastrointestinal contents accumulate due to impaired motility or delayed gastric emptying. This condition can cause discomfort, respiratory compromise, feeding intolerance, and increased intra-abdominal pressure. Several studies have found that patients undergoing regular abdominal massage experience less abdominal bloating and distension compared with those receiving standard care. The mechanical stimulation provided by massage helps promote the movement of gas, fluids, and intestinal contents through the digestive tract, thereby relieving pressure and improving abdominal comfort. Reduced abdominal distension contributes to improved patient well-being and may facilitate more effective enteral nutrition delivery. The beneficial effects of abdominal massage on constipation have also been well documented. Constipation is one of the most common gastrointestinal complications among hospitalized and critically ill patients due to immobility, medication use, dehydration, and altered dietary intake. Multiple clinical trials have demonstrated that abdominal massage increases bowel movement frequency, shortens transit time, and reduces the severity of constipation symptoms. Patients receiving abdominal massage often require fewer laxatives and report improved bowel function. These findings support the use of abdominal massage as a valuable non-pharmacological intervention for maintaining gastrointestinal health and preventing constipation-related complications. An additional advantage observed in clinical research is increased nutritional delivery. Because elevated GRV and feeding intolerance frequently result in interruptions of enteral feeding, many patients fail to achieve their prescribed nutritional goals. By reducing GRV and improving feeding tolerance, abdominal massage enables more consistent administration of enteral nutrition. Studies have shown that patients receiving abdominal massage are more likely to achieve target calorie and protein intake levels compared with control groups.

Table 1 Example Reduction in Gastric Residual Volume Following Abdominal Massage

Time Point	Mean GRV (mL)
Before Massage	180
Day 1	155
Day 3	120
Day 5	95
Day 7	70

Days	GRV (mL)
Baseline	180
Day 1	155
Day 3	120
Day 5	95
Day 7	70

The growing evidence supporting abdominal massage as an effective intervention for reducing gastric residual volume (GRV) has important implications for nursing practice, particularly in intensive care units (ICUs), rehabilitation centers, long-term care facilities, and medical-surgical wards where enteral nutrition is frequently administered. Nurses play a central role in monitoring gastrointestinal function, assessing feeding tolerance, preventing complications, and ensuring adequate nutritional delivery. Because abdominal massage can be safely incorporated into routine patient care, it offers nurses an additional evidence-based strategy for enhancing gastrointestinal motility and improving patient outcomes. As healthcare systems increasingly emphasize non-pharmacological interventions and patient-centered care, abdominal massage represents a practical approach that complements existing nutritional and gastrointestinal management protocols. One of the primary advantages of abdominal massage in nursing practice is that it is a non-invasive intervention. Unlike pharmacological treatments, abdominal massage does not require medication

administration and therefore avoids the risk of drug-related adverse effects, medication interactions, and additional healthcare costs. Many critically ill patients receive multiple medications, increasing the likelihood of adverse drug reactions and complications. By utilizing abdominal massage as a supportive therapy, nurses can promote gastrointestinal function through a natural and therapeutic approach while minimizing patient exposure to unnecessary medications. This characteristic makes abdominal massage particularly valuable in vulnerable populations, including elderly patients and those with complex medical conditions. Another significant benefit is its cost-effectiveness. Healthcare institutions continually seek interventions that improve patient outcomes while reducing costs. Abdominal massage requires minimal equipment, no specialized technology, and can be performed by trained nursing staff during routine patient care activities. Because the technique does not involve expensive devices or medications, its implementation places little financial burden on healthcare facilities. Furthermore, by reducing complications such as feeding intolerance, aspiration risk, constipation, and prolonged hospitalization, abdominal massage may indirectly contribute to reduced healthcare expenditures and improved resource utilization. The simplicity and ease of implementation further enhance its value in nursing practice. After appropriate training, nurses can perform abdominal massage safely and effectively at the bedside. The procedure requires only a basic understanding of abdominal anatomy, proper massage techniques, and patient assessment. Because it can be incorporated into routine nursing care without significantly increasing workload, abdominal massage offers a practical intervention for improving patient comfort and gastrointestinal function. The technique also promotes therapeutic nurse-patient interaction, allowing nurses to assess patient responses while providing individualized care. An additional advantage is the minimal risk of adverse effects when abdominal massage is performed correctly. Clinical studies have generally reported high levels of patient tolerance and very few complications associated with the intervention. Most patients experience relaxation, improved comfort, and enhanced gastrointestinal function following treatment. This favorable safety profile supports its integration into routine nursing protocols, particularly for patients receiving enteral nutrition who are at risk of delayed gastric emptying and elevated GRV. To achieve optimal outcomes, nurses should follow a standardized abdominal massage procedure. Before initiating the intervention, the patient should be positioned comfortably, preferably in a semi-recumbent or supine position with slight elevation of the head of the bed. Proper positioning promotes patient relaxation and facilitates access to the abdominal region. Nurses should ensure privacy, explain the procedure to the patient whenever possible, and assess for any contraindications. Warming the hands before massage is recommended because warm hands improve patient comfort and help reduce abdominal muscle tension. Gentle contact also promotes relaxation and increases patient acceptance of the intervention. The massage itself typically involves gentle clockwise circular movements following the natural anatomical direction of the large intestine. This direction corresponds to the physiological movement of intestinal contents and supports normal peristaltic activity. Pressure should be moderate and adapted to the patient's tolerance level, avoiding excessive force that could cause discomfort or tissue injury. Most protocols recommend continuing the massage for approximately 15 to 20 minutes once or twice daily, depending on patient condition and institutional guidelines. During the procedure, nurses should continuously monitor the patient's comfort level, abdominal response, vital signs, and any signs of distress. Observation of bowel sounds, abdominal distension, and patient-reported symptoms can provide valuable information regarding treatment effectiveness. Following the intervention, reassessment is essential to evaluate outcomes. Nurses should monitor gastric residual volume, feeding tolerance, abdominal distension, bowel activity, and other indicators of gastrointestinal function. Documentation of findings before and after massage enables healthcare

providers to assess treatment effectiveness and guide future care decisions. Regular evaluation also supports evidence-based practice by providing objective data regarding patient response to the intervention. Despite its benefits, careful attention to safety considerations is crucial. Abdominal massage should not be performed in patients with abdominal trauma because manipulation may worsen internal injuries or increase the risk of bleeding.

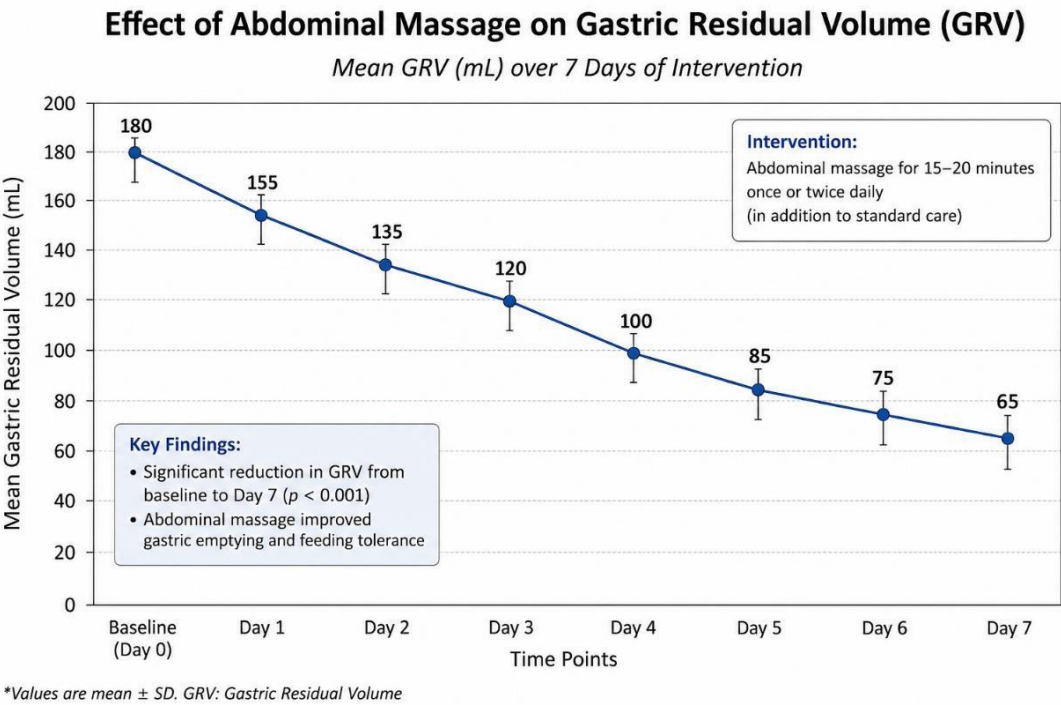
Patients who have undergone recent abdominal surgery are also generally unsuitable candidates until sufficient healing has occurred, as massage could disrupt surgical sites, sutures, or healing tissues. Similarly, abdominal massage is contraindicated in cases of gastrointestinal obstruction because increased mechanical stimulation may exacerbate the blockage and potentially lead to serious complications. Active gastrointestinal or abdominal bleeding represents another important contraindication, as massage may increase blood flow and worsen hemorrhage. Patients experiencing severe abdominal pain of unknown origin should be thoroughly evaluated before abdominal massage is considered, since the pain may indicate an underlying condition requiring urgent medical attention. Overall, abdominal massage offers nurses a safe, cost-effective, and evidence-based intervention for improving gastrointestinal function and reducing gastric residual volume in patients receiving enteral nutrition. Its non-invasive nature, ease of application, and minimal adverse effects make it an attractive addition to nursing care plans. Through appropriate patient assessment, standardized implementation, and continuous monitoring, nurses can utilize abdominal massage to enhance feeding tolerance, support nutritional goals, and improve overall patient outcomes while maintaining the highest standards of safety and quality care.

Future Research Directions

Although current evidence suggests that abdominal massage is a promising non-pharmacological intervention for reducing gastric residual volume (GRV) and improving gastrointestinal function, several gaps remain in the scientific literature. Most existing studies have been conducted using relatively small sample sizes, single-center designs, and varying intervention protocols, which limit the generalizability of findings. Consequently, further research is necessary to strengthen the evidence base and provide healthcare professionals with clear guidelines for clinical practice. Future investigations should focus on establishing standardized protocols, identifying optimal treatment parameters, evaluating effectiveness in diverse patient populations, examining long-term outcomes, and assessing broader impacts on nutritional status, morbidity, and mortality. One of the most important priorities for future research is the establishment of standardized abdominal massage protocols. Current studies vary considerably in terms of massage techniques, pressure intensity, movement patterns, session duration, treatment frequency, and overall intervention periods. Some researchers use gentle circular movements, while others incorporate deeper pressure or different massage sequences. These methodological differences make it difficult to compare findings across studies and determine which approach is most effective. Developing standardized, evidence-based protocols would improve consistency in clinical practice and facilitate more accurate comparisons among future investigations. Standardization would also support the integration of abdominal massage into nursing guidelines and institutional care pathways. Another critical area for future investigation involves determining the optimal frequency and duration of abdominal massage. Existing studies have employed interventions ranging from 10 to 30 minutes per session and from

once daily to multiple sessions per day. While many studies report positive outcomes, there is currently no consensus regarding the most effective treatment schedule. Future randomized controlled trials should compare different massage durations and frequencies to identify the minimum intervention required to achieve meaningful clinical benefits. Determining the optimal treatment regimen would help maximize therapeutic effectiveness while ensuring efficient use of nursing time and healthcare resources. Research should also explore the effectiveness of abdominal massage across different patient populations. Most available studies have focused on critically ill adults receiving enteral nutrition in intensive care units. However, gastrointestinal dysfunction and elevated gastric residual volume are not limited to ICU patients. Elderly individuals, postoperative patients, neurological patients, individuals with spinal cord injuries, pediatric populations, and patients undergoing long-term enteral feeding may also benefit from abdominal massage. Future studies should investigate whether patient characteristics such as age, diagnosis, disease severity, mobility status, and nutritional condition influence treatment outcomes. Understanding these variations would enable healthcare providers to tailor interventions to specific patient groups and improve individualized care. The evaluation of long-term clinical outcomes represents another important research priority. Most current studies assess short-term changes in gastric residual volume, bowel function, or feeding tolerance over periods ranging from several days to a few weeks. While these findings are encouraging, limited information is available regarding the sustained effects of abdominal massage over longer periods. Future longitudinal studies should examine whether improvements in gastrointestinal function persist over time and whether continued abdominal massage contributes to long-term health benefits. Such research could provide valuable insights into the role of abdominal massage as a routine component of supportive care for patients requiring prolonged nutritional support. In addition, future investigations should assess the impact of abdominal massage on overall nutritional status and patient recovery. Improved gastric emptying and feeding tolerance may facilitate greater nutrient delivery, but relatively few studies have directly measured nutritional outcomes such as calorie intake, protein adequacy, body weight, muscle mass preservation, or biochemical nutritional markers. Research examining these outcomes would help clarify whether reductions in GRV translate into meaningful improvements in nutritional status. Such information is particularly important because adequate nutrition is strongly associated with enhanced immune function, wound healing, recovery from illness, and reduced healthcare complications. The relationship between abdominal massage and major clinical outcomes, including morbidity and mortality, also warrants further investigation. While improved gastrointestinal function may reduce complications such as aspiration pneumonia, feeding interruptions, and malnutrition, evidence regarding its influence on survival and overall clinical prognosis remains limited. Large-scale multicenter studies are needed to determine whether abdominal massage contributes to reduced infection rates, shorter durations of mechanical ventilation, decreased length of hospital stay, lower healthcare costs, and improved survival outcomes. Demonstrating benefits in these areas would significantly strengthen the rationale for incorporating abdominal massage into routine clinical practice. Future research should additionally explore the physiological mechanisms underlying abdominal massage using advanced diagnostic technologies. Imaging studies, gastrointestinal motility assessments, autonomic nervous system monitoring, and biomarker analyses could provide deeper insights into how abdominal massage influences digestive function at the cellular and systemic levels. Improved understanding of these mechanisms would enhance scientific credibility and support the development of optimized intervention strategies. Finally, multicenter randomized controlled trials with larger sample sizes and rigorous methodological designs are essential to establish high-quality evidence. Such studies should incorporate standardized protocols, objective outcome

measures, and diverse patient populations to improve external validity. Collaboration among researchers, nurses, physicians, and nutrition specialists would facilitate comprehensive investigations and contribute to the development of evidence-based clinical guidelines. While current findings support the beneficial effects of abdominal massage in reducing gastric residual volume and improving gastrointestinal function, additional research is needed to refine its application and confirm its broader clinical value. Future studies focusing on standardized protocols, optimal treatment schedules, diverse patient populations, long-term outcomes, nutritional benefits, and mortality-related endpoints will help establish abdominal massage as a scientifically validated and widely accepted component of patient care. Through continued research and evidence generation, healthcare professionals can better utilize this simple, safe, and cost-effective intervention to improve patient outcomes and enhance the quality of nutritional support.



Summary

Abdominal massage is an effective, safe, and economical intervention for reducing gastric residual volume in patients receiving enteral nutrition. By stimulating gastrointestinal motility, improving blood circulation, and enhancing parasympathetic activity, abdominal massage promotes gastric emptying and feeding tolerance. Available evidence suggests that regular abdominal massage significantly reduces GRV and may contribute to improved nutritional outcomes. Integration of this intervention into routine nursing care may help optimize enteral feeding management while reducing complications associated with delayed gastric emptying. Further large-scale randomized controlled trials are recommended to establish standardized protocols and strengthen the evidence base.

References

- DeLegge, M. H. (2020). Enteral nutrition and gastric residual volume. *Nutrition in Clinical Practice*, 35(2), 221–228.
- McClave, S. A., Taylor, B. E., Martindale, R. G., et al. (2016). Guidelines for nutrition support therapy in critically ill adults. *JPEN*, 40(2), 159–211.
- Uysal, N., Eser, I., & Akpınar, H. (2012). The effect of abdominal massage on gastric residual volume. *Gastroenterology Nursing*, 35(2), 117–123.
- Lamas, K., Lindholm, L., & Stenlund, H. (2010). Effects of abdominal massage in patients with bowel dysfunction. *Journal of Clinical Nursing*, 19(3–4), 410–417.
- Sinclair, M. (2011). The use of abdominal massage to treat chronic constipation. *Journal of Bodywork and Movement Therapies*, 15(4), 436–445.
- Coggrave, M., Norton, C., & Wilson-Barnett, J. (2007). Management of gastrointestinal dysfunction. *Nursing Standard*, 21(42), 49–56.
- Emly, M., & Cooper, S. (2014). Enteral feeding and gastric emptying. *British Journal of Nursing*, 23(10), 536–541.
- Kim, H., & Park, J. (2015). Effects of abdominal massage on digestive function. *International Journal of Nursing Practice*, 21(3), 297–304.
- Koca Kutlu, A., & Yılmaz, E. (2016). Abdominal massage and gastrointestinal motility. *Nursing in Critical Care*, 21(3), 176–182.
- Camilleri, M. (2019). Gastrointestinal motility disorders. *New England Journal of Medicine*, 380(12), 1158–1168.
- Reintam Blaser, A., et al. (2014). Gastrointestinal function in intensive care patients. *Intensive Care Medicine*, 40(7), 899–909.
- Metheny, N. A., & Stewart, B. J. (2012). Monitoring gastric residual volume in enteral feeding. *American Journal of Critical Care*, 21(5), 343–350.