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Walaa Abdelwahab Mohamed
Assistant lecture, Medical-Surgical Nursing, Faculty of Nursing - Minia University, Minia, Egypt

Jehan Sayyd Ali
Professor, Medical-Surgical Nursing, Faculty of Nursing – Minia University, Minia, Egypt

Jehan Ahmed Gamal El-Deen
Assistant Professor, Medical-Surgical Nursing, Faculty of Nursing - Minia University, Minia, Egypt

Sherif Nesnawy
PhD, Medical-Surgical Nursing, Faculty of Nursing - Minia University, Minia, Egypt

Corresponding Author:
Walaa Abdelwahab Mohamed
Assistant lecture, Medical-Surgical Nursing, Faculty of Nursing - Minia University, Minia, Egypt

Effect of abdominal massage technique on constipation for post stroke patients: As a preventive measure

Walaa Abdelwahab Mohamed, Jehan Sayyd Ali, Jehan Ahmed Gamal El-Deen and Sherif Nesnawy

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Abstract
Background: Constipation is a prevalent complication for stroke patients, but massage therapy for the abdominal area has been demonstrated to enhance digestive functioning overall, making it both a relief and a preventative precaution.
Objective: The purpose of this study was to assess the effect of abdominal massage technique as a preventive measure against constipation in post-stroke patients.
Methods: This is a quasi-experimental research design of 60 adult post-stroke patients who were purposively selected and classified into two equal groups of 30 each (Study and control group). The study was conducted at the stroke department of Minia University Hospital in Minia governorate. Data was collected using three tools: a structured interview assessment sheet for socio-demographic and medical data, a tool of two parts for assessing constipation, and the abdominal massage technique.
Results: The study group demonstrated a statistically significant difference in the prevention of constipation occurrence compared to the control group on the third day.
Conclusion: The study findings indicate that abdominal massage can significantly reduce the incidence of constipation in post-stroke patients.
Recommendation: The application of abdominal massage is an effective and safe intervention for the prevention of constipation, and it is recommended that an in-service educational training program about abdominal massage be implemented.

Keywords: Abdominal massage, constipation, stroke

Introduction

Globally, there are 13.7 million annual occurrences of stroke, with 60% of them affecting individuals under the age of 70 [1]. The rising incidence of stroke in younger people can be attributed to a number of interconnected causes, including an expanding elderly population, shifting dietary patterns, increased levels of stress at work, and brisk economic growth [2].

Stroke patients frequently suffer from the unpleasant symptom of constipation, which has been linked to an increased risk of mortality. Stroke victims are disproportionately impacted since it can cause or exacerbate issues like digestive distress, foul breath, melancholy, and hemorrhoids. And it can lead to more cerebrovascular episodes like strokes [3].

Constipation occurs when the lower gastrointestinal (GI) tract is unable to move food along normally, either because of a lack of peristalsis or because of paralysis. This makes passing stool difficult. When someone is being fed orally or enterally, constipation is considered to have set in after two days if the stool is firm and dry, and after five days if the person has been receiving only parenteral nutrition or has had no food at all [4].

Prolonged squatting and forceful feces, which are both symptoms of constipation, might hamper a stroke patient's rehabilitation and potentially lead to a recurrence of cerebrovascular illnesses [5]. Thus, the effects of constipation on individuals, families, and communities are substantial [2].

Post-stroke constipation can be caused by a number of factors, including decreased mobility, altered defecation posture due to postural abnormalities brought on by the stroke, negative pharmacological reactions, and psychological shifts. Constipation is far more common in stroke patients than among healthy people [6].

Hence, keeping bowel movements uncomplicated after a stroke is essential for the survival of these patients. Constipation can be treated with both pharmaceuticals and alternative methods at the present time. Stool softeners, prokinetic agents, osmotic laxatives, and stimulant laxatives are the usual drugs used in treatment. Regrettably, it is common for these medications to have undesirable side effects such flatulence, nausea, and diarrhea [7].

By contrast, non-pharmaceutical approaches may involve alterations to one's food and way of life, as well as other forms of treatment. It's crucial to locate a treatment that works and causes few side effects because of the downsides of various therapeutic approaches [8, 9]. One such strategy that has seen increased usage in recent years is massage. Abdominal massage, in particular, is a helpful treatment that is easy to implement, cost-effective, and time-efficient **(10)**.

Massage works by employing several techniques to set in motion the connective tissue and the superficial and deep muscle layers. Massage has been demonstrated in scientific studies to provide a number of health benefits, including the alleviation of stress and anxiety, the reduction of pain, improved circulation, lowered stress levels, and the elimination of bloating and constipation [6].

The bowels can be retrained to function normally with regular abdominal massage. By applying intra-abdominal pressure, stimulating peristalsis, and amplifying contraction power, massage has a dual mechanical and reflex effect on the gastrointestinal system. The transition time in the digestive tract can be shortened and the stool can be loosened by using the massage technique [11].

As a safe, low-cost, and time-efficient technique, nurses can use abdominal massage to enhance gastrointestinal health and prevent complications like distension and constipation. Massage of the abdomen area has additional benefits, including increased blood flow, decreased muscle tension, increased stomach acid output, and improved digestion [12, 13].

Significance of the study

Stroke is the third greatest cause of death in Egypt, accounting for 6.4% of all fatalities, with a crude prevalence rate of 963 per 100,000 inhabitants, greater than that of many surrounding countries [14, 15]. Population-based research shows that thirty percent to sixty percent of stroke patients experience constipation after their stroke [5, 2]. Despite being linked to a longer time spent in the hospital, worse neurological outcomes, the onset of additional complications, and even death [3], As a non-neurological bowel issue following a stroke, constipation currently receives less attention than it deserves. To alleviate patient suffering and facilitate their return to normal function, this study evaluates the effect of abdominal massage technique as a preventive measure on post-stroke constipation.

Aim of the study

This study aimed to was to assess the effect of abdominal massage technique as a preventive measure against constipation in post-stroke patients.

Research hypotheses

The current study hypothesizes that

Ha: Adult stroke patients who will receive abdominal massage will have a significantly lower incidence of constipation as compared to those in the control group who will not.

Operational definitions

Abdominal massage is an intervention used to strengthen the abdominal and digestive system muscles. It consists of massaging the abdominal and intestinal areas with four main techniques: petrissage, effleurage, kneading, and vibration.

Subjects and Methods

This study was conducted using four main designs: Technical, Operational, Administrative, and Statistical.

1. The Technical design

It encompassed research design, setting, subjects, and tools for data collection.

Research Design: To achieve the aim of this study, a quasi-experimental research design was employed.

Setting: The study was conducted at the Stroke Department of Minia University Hospital, located in Minia Governorate.

Subjects: A purposive sample of 60 adult stroke patients was assigned for this study. The first patient was randomly selected for the study group, and then an alternate patient was chosen for the control group, and so on, until the sample was complete. The necessary sample size was calculated using the Isaac & Michael formula **(16)**, which is represented by (N = n x 30/100), where N is the sample size, n is the total number of 100 adult stroke patients at Minia University Hospital during the 2019-2020 period. Thus, N = 100 x 30 / 100 = 30 patients. The study group consisted of 30 patients, and an additional 30 patients were assigned to the control group, resulting in a total of 60 patients. The researcher divided the sample into two matched equal groups, with each group containing 30 patients. Group I (the control group) was exposed to routine hospital care, while Group II (the study group) was exposed to the abdominal massage technique.

Inclusion criteria

Participants were required to meet the following criteria to be included in the study:

1. Age between 18 and 64 years.
2. Both sexes.
3. Willingness to participate in the study.

Exclusion criteria

Patients were excluded if they met any of the following criteria:

1. They received prokinetic medications, such as metoclopramide, which stimulate digestive tract motility or stool softener medications.
2. Furthermore, they had taken moxibustion and acupuncture.
3. They had intestinal diseases.
4. They had habitual or chronic constipation.
5. They had abdominal malignancies.
6. They had undergone abdominal surgeries and radiotherapy within the past 6 weeks (approximately 1.5 months).

Tools of Data Collection: The current study collected data using three tools, which were designed by the researcher after conducting a literature review [17-20].

The First Tool: Structured Interview Assessment Sheet

The first tool was collected during the initial interview and consisted of two main parts: Part one: Patients' Sociodemographic Characteristics, which included the patients' age, gender, education, residence, occupation, etc.
Part two: Patients' medical data, which encompassed their past medical history, as well as current medical data, such as the type of stroke, blood glucose level, blood pressure, etc.

The Second Tool: The Assessment Sheet to Assess Constipation

This tool was divided into two parts

Part I: Abdominal Distention Monitoring: This part collected data regarding the baseline of abdominal distention. Operationally, "No distension by palpation and percussion" indicated that the abdomen was soft, moving, and not tense, whereas a distended abdomen was characterized by a hard, tender, bloated, and increased abdominal diameter. This section was collected daily before performing the first abdominal massage and after one hour from the second massage for three consecutive days.

Part II: Constipation Monitoring

This part collected data regarding the baseline of constipation, including the assessment of occurrence of defecation, consistency of defecation, and auscultation bowel sound for one minute (Normal bowel sound ranging from5 to 35 sounds per minute). This section was collected daily before performing the first abdominal massage and after one hour from the second massage for three consecutive days.

The Third Tool: Abdominal Massage Practice

The third tool in this study is abdominal massage practice, which was developed by the researcher based on an extensive review of the relevant literature [12, 18, 20-22] and consultation with experts. The massage technique is applied to the large intestine in a clockwise direction, incorporating various movements, including petrissage, effleurage, kneading, and vibration to relax the abdominal wall. The intervention lasts for 15 minutes, during which the massage stimulates the passage of gas and intestinal sounds, induces peristaltic activity, which moves stool through the digestive tract and into the rectum, relieving constipation. Trigger points on the anterior and posterior abdominal walls are massaged.

2. Operational Design

The study design consists of several stages, including the preparatory phase, content validity and reliability, pilot study, and fieldwork.
The preparatory phase involved reviewing the relevant literature and theoretical knowledge to develop the data collection tools, educational guidelines, and media.
As for content validity, a panel of five medical-surgical nursing staff experts from Minia University examined the tools to ensure their validity.
A pilot study was conducted on 10% of the total sample to test the feasibility, objectivity, and applicability of the data collection tool. Based on the results of the pilot study, no modifications were made by the researcher, and the patients involved were included in the study.
As for ethical considerations, official permission was obtained from the ethical committee of the Faculty of Nursing, Minia University and the Minia University hospital director, and the stroke department director. Participants provided both verbal and written consent to participate in the study and were informed of their right to refuse participation or withdraw from the study at any time.
The study field work took place between July 2021 and March 2022 and involved the assessment and planning phase and the implementation phase.
The assessment and planning phase comprised several steps, including developing data collection tools, obtaining expert opinions, and conducting an initial assessment of all subjects to confirm their eligibility. Patients who met the inclusion criteria were randomly assigned to the control or study group.
In the implementation phase, data were collected from the study group, starting with the collection of demographic and medical data. Abdominal distension was examined by palpation and measurement of abdominal girth using a 150-cm inflexible tape measure. The researcher also auscultated bowel sounds and assessed the time and consistency of defecation using the second tool. The first abdominal massage was then performed for 15 minutes, followed by a second massage after two hours, and a third assessment one hour later. The patient was placed in a supine position, with the head-of-bed angle elevated at 30°–45°, and the legs straightened. The massage technique consisted of four steps in a clockwise direction over the intestines on the abdominal wall, and the three basic massage manoeuvres for constipation (Effleurage, petrissage, and vibration) were applied three times during each abdominal massage. Effleurage was started on the cecum with the right hand at the bottom and the left hand at the top, followed by petrissage manoeuvres to reach deeper tissues. The intervention was performed twice daily for three consecutive days.

B. Implementation phase

During the implementation phase, the researcher collected data from both the study and control groups. In the study group, the data collection process involved several steps. Firstly, the researcher conducted a patient interview to collect demographic and medical information. Secondly, the researcher assessed the occurrence of abdominal distension by palpation and measured abdominal girth using a 150-cm inflexible tape measure. The researcher also auscultated bowel sounds and assessed the time and consistency of defecations using a second tool.
Subsequently, the researcher performed abdominal massage on the study group using a specific technique. The patient was positioned supine, with the head-of-bed angle elevated at 30°–45°, and the researcher stood on the right side of the patient. The massage technique involved four steps in a clockwise direction over the intestines on the abdominal wall, with three basic massage manoeuvres, namely effleurage, petrissage, and vibration, being applied three times during each abdominal massage.
Effleurage, which involved the application of superficial and deep effleurage, was used to relax the abdominal wall and reach the deep tissues. Petrissage manoeuvres were applied to increase and decrease pressure on the ascending and descending colon, while friction movement was used to stimulate the distal of the descending colon. Vibration was applied to create reflex physiological effects that allowed the muscles to relax and reduced spasms in the intestine, while enabling gas to be removed from the body.

Throughout the process, the researcher used lubricant gel or paraffin oil to facilitate the massaging.
In the control group, no intervention was applied, except for routine hospital care. The researcher collected demographic and medical data from patients and assessed abdominal distension, occurrence of defecation, consistency of defecation, and auscultated bowel sounds using the second tool at 9 o'clock and 3 hours later at 12 o'clock.

3. Administrative design
Official permission was obtained from the Director of the stroke care unit at Minia University Hospital is affiliated to Minia University. The researcher and nursing administration staff had a meeting and discussion to go over the research goals and objectives and figure out how to work together more efficiently throughout the implementation phase. These were essential in getting patients motivated about participating in the study.

4. Statistical design
Statistical methods for data analysis
There was a complete collection of data that was tabulated and analyzed statistically. SPSS (Version 21) is utilized for most statistical analysis, and Microsoft Office Excel is used for both data management and graphical representation. P <0.05 is considered significant, whereas P < 0.01 was considered highly significant.

Results

Table 1: Distribution of socio-demographic characteristics among both control and study group subjects. (n= 60).

socio-demographic characteristics	**Groups**				**Test of significance**	**P – value**
	Control (n=30)		**Study (n=30)**			
	No.	**%**	**No.**	**%**		
Age/years						
30-40	***2***	6.7%	3	10.0%	Fisher exact =0.485	0.835 NS
41-50	5	16.7%	***6***	20.0%		
51-64	23	76.7%	21	70.0%		
Mean ±SD	***56.2***±8.2 years		55.4±8.4 years		t=0.386	0.700 NS
Gender						
Male	16	53.3%	14	46.7%	χ^2 =0.266	0.605 NS
Female	14	46.7%	16	53.3%		
Marital status						
Single	3	10.0%	0	0.0%	Fisher exact = 3.077	0.272**NS**
Married	20	66.7%	24	80.0%		
Widow	7	23.3%	6	20.0%		
Residence						
Urban	10	33.3%	11	36.7%	0.073χ^2=	0.786 NS
Rural	20	66.7%	19	63.3%		
Educational level						
Illiterate	14	46.7%	21	70.0%	Fisher exact = 6.522	0.138NS
Read and write	6	20.0%	3	10.0%		
elementary	6	20.0%	2	6.7%		
Secondary	4	13.3%	2	6.7%		
University	0	0.0%	2	6.7%		
Occupation status						
Housewife	14	46.7%	13	43.3%	Fisher exact = 5.21	0.269NS
employee	3	10.0%	1	3.3%		
Farmer	4	13.3%	8	26.7%		
Un employee	8	26.7%	4	13.3%		
pension	1	3.3%	4	13.3%		

NS= not significant

Table (1) presents the socio-demographic characteristics of the control and study groups. The mean average age of the two groups was similar, with the control group having a mean age of 56.2±8.2 years and the study group having a mean age of 55.4±8.4 years. The majority of participants in both groups were married, with married individuals constituting 66.7% and 80.0% of the control and study groups, respectively. Additionally, more than two-thirds of both groups lived in rural areas, with 66.7% and 63.3% of the control and study groups, respectively. The educational level of the participants in both groups varied, with about 46.7% and 70.0% of individuals in the control and study groups, respectively, being illiterate. Furthermore, around half of the participants in both groups were occupied as housewives. Lastly, there were no significant differences between the study and control groups in terms of their socio-demographic characteristics.
This figure indicate that more than one-quarter of the control and study groups were smokers, accounting for 30.0% and 26.7%, respectively. Furthermore, approximately half of the participants had a history of diabetes, with 53.0% and 36.7% for the control and study groups, respectively. The highest percentage of participants in both groups had a history of hypertension, accounting for 60.0%. Finally, there was no significant difference between the study and control groups concerning their past medical data.

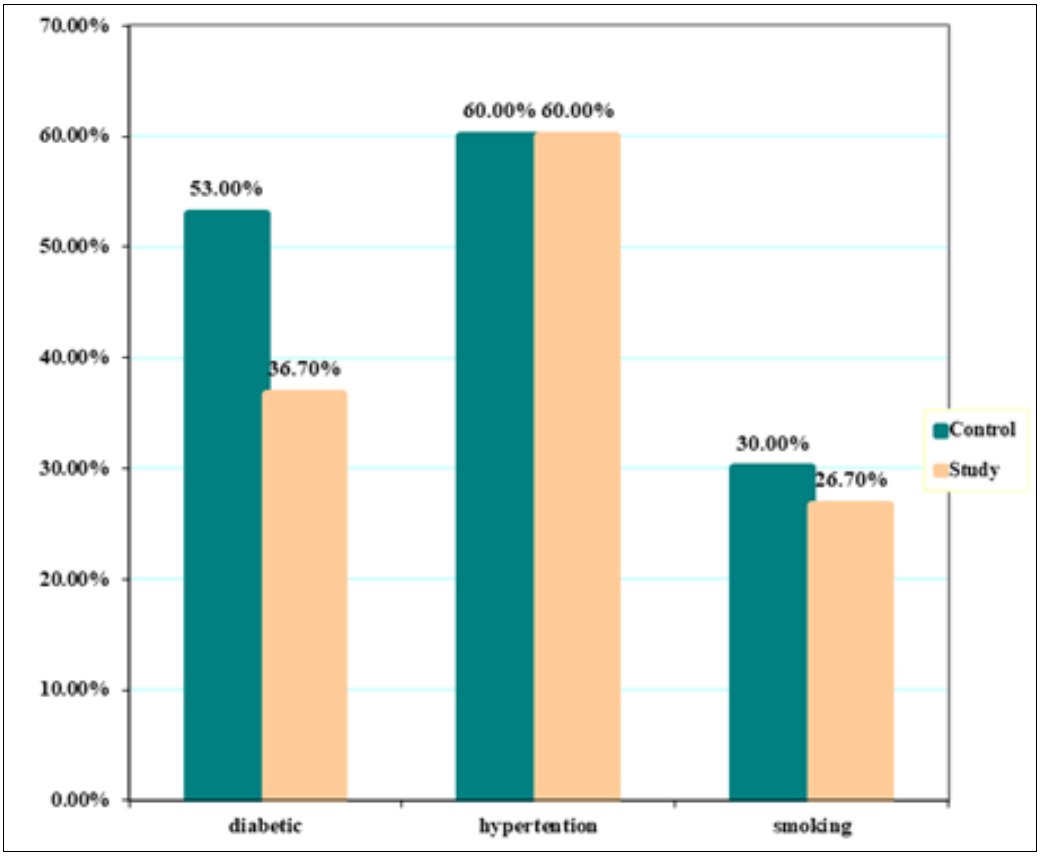

Fig 1: The distribution of medical data (past medical history) among the control and study groups

Table 2: Percentage distribution of current medical data among both control & study groups (n= 60).

Current Medical data	Groups				Test of significance	*P* – value
	Control (n=30)		Study (n=30)			
	No.	%	No.	%		
Type of stroke						
Hemorrhagic	6	20.0%	9	30.0%	0.800χ^2=	0.371 NS
Ischemic	24	80.0%	21	70.0%		
Blood glucose level						
Normal	26	86.7%	25	83.3%	Fisher exact =0.130	0.717 NS
hyperglycemia	4	13.3%	5	16.7%		
Systolic Blood pressure level						
Normal	24	80.0%	22	73.3%	Fisher exact =1.1*32*	0.761 NS
hypotension	0	0.0%	1	3.3%		
hypertension	6	20.0%	7	23.3%		
Diastolic Blood pressure level						
Normal	28	93.3%	23	76.7%	Fisher exact =3.385	0.174***NS***
hypotension	1	3.3%	5	16.7%		
hypertension	1	3.3%	2	6.7%		

NS= not significant

Table 2 presents the distribution of current medical data among the control and study groups. The majority of subjects in both groups had a history of ischemic stroke, with proportions of 80% and 70%, respectively. With regard to blood glucose levels, the highest percentage of subjects in both the control and study groups had normal levels, with proportions of 86.7% and 83.3%, respectively. Similarly, the majority of subjects in both groups had normal blood pressure. Notably, no statistically significant differences were observed between the control and study groups in terms of their current medical data. The findings reveal a decline in the percentage distribution of abdominal distension among the study group after receiving abdominal massage during three days, with values of 16.7%, 13.3%, and 10.0%, respectively. In contrast, an increase in the percentage distribution of abdominal distension is observed among the control group subjects during three days, with values of 23.3%, 36.7%, and 40.0%, respectively.

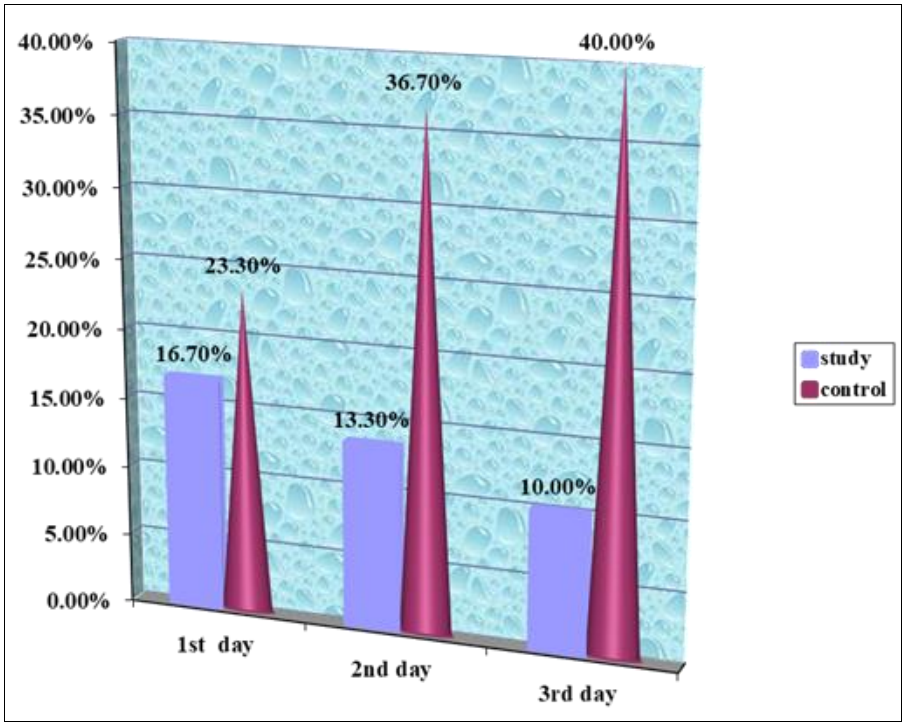

Fig 2: Depicts the percentage distribution for the presence of abdominal distension in three consecutive days post-intervention among both study and control subjects

Table 3: Percentage distribution according to occurrence of defecation post-intervention during the three days among both control & study groups (n= 60)

	Post-intervention occurrence of defecation	Control (n=30)		Study (n=30)		Fisher exact	P – value
		No.	%	No.	%		
1st day	No	27	90.0%	25	83.3%	0.576	0.706
	Yes	3	10.0%	5	16.7%		
2nd day	No	27	90.0%	23	76.7%	1.920	0.298
	Yes	3	10.0%	7	23.3%		
3rd day	No	28	93.3%	15	50.0%	13.871**	0.003
	Yes	2	6.7%	15	50.0%		

Table 3 presents the results of the study, where the control group had the highest percentage (90.0%, 90.0%, and 93.3%) of no defecation, indicating an increased occurrence of constipation over three days. On the other hand, the study group showed a reverse percentage (83.3%, 76.7%, and 50.0%) over three days post-intervention, which indicates a decrease in the occurrence of constipation. The difference between the study and control groups was highly statistically significant only on the 3rd day post-intervention (P-value = 0.003**), indicating an improvement in the times of defecation.

Table 4: Percentage distribution of defecation consistency post-intervention during three days among both control & study groups (n= 60)

	Post-intervention Consistency of defecation	Control (n=30)		Study (n=30)		Fisher exact	P – value
		No.	%	No.	%		
1st day	No defecation	27	90.0%	25	83.3%	0.976	0.832
	Normal	1	3.3%	1	3.3%	3.462	0.243
	Solid	2	6.7%	4	13.3%		
2nd day	No defecation	27	90.0%	23	76.7%		
	Normal	0	0.0%	3	10.0%	14.360**	0.0004
	Solid	3	10.0%	4	13.3%		
3rd day	No defecation	28	93.3%	15	50.0%		
	Normal	0	0.0%	6	20.0%		
	Solid	2	6.7%	9	30.0%		

Table 4 illustrates the variation in defecation consistency among the control and study groups over a three-day period. The data indicate that the percentage of normal defecation consistency was recorded at 3.3%, 0.0%, and 0.0% for the control group, while the study group experienced an increase in normal defecation consistency, with percentages of 3.3%, 10.0%, and 20.0% for the respective days. The findings suggest a notable improvement in the defecation status of the study group after receiving abdominal massage. A highly significant statistical difference was observed between the study and control groups on the third day in terms of defecation consistency.

Table 5: Comparison between patients in both control & study groups according to abdominal sound over the three days of intervention (n= 60)

Post-intervention Abdominal sound	Control (n=30) Mean±sd	Study (n=30) Mean±sd	T	P – value
1st day	23.0±4.3	25.2±4.5	0.000*	*0.054*
2nd day	22.4±4.5	25.5±3.6	2.904**	*0.005*
3rd day	21.7±3.8	27.1±4.0	5.211**	*< 0.001*

* $p = \leq .05$ (statistical significance)
** $p = \leq .01$ (highly statistical significance)

Table 5 presents the mean average of abdominal sound over a period of three days for both the study and control groups. The study group showed an increase in abdominal sound, with mean averages of 25.2±4.5, 25.5±3.6, and 27.1±4.0 on days 1, 2, and 3 respectively after receiving abdominal massage. Conversely, the control group exhibited a decrease in abdominal sound, with mean averages of 23.0±4.3, 22.4±4.5, and 21.7±3.8 on the respective days. The differences between the two groups were statistically significant on the first day and highly statistically significant on the second and third days, with p-values of 0.005** and 0.000** respectively.

Table 6: Correlations between the presence of constipation and the abdominal distention and bowel sound on 3rd day intervention (n=60)

	Abdominal distension *r* (p-value)	Bowel sound *r* (p-value)
Constipation	0.363** (0.004)	-.090(0.496)

Table 6 indicates that on the third day, there was a significant positive correlation between the occurrence of constipation and abdominal distension among the participants. However, a non-significant negative correlation was observed between constipation and bowel sound in all subjects.

Discussion

Abdominal massage, which is a mild, non-invasive therapy. Indigestion, flatulence, and other stomach-related issues are just some of the ailments that have benefited from its use [13]. Increased peristalsis, decreased abdominal distension, faster bowel transit time, reduced gastric volume, more frequent feces, and reduced vomiting are just some of the ways in which massage therapy has been found to benefit digestive function. That's why it's recommended to massage the stomach to aid in digestion [13].

Regarding the demographic characteristics of patients in the control and study groups, the mean average age was similar, with the study and control groups averaging 56.2±8.2 years and 55.4±8.4 years, respectively. This may be related to an increased risk of stroke with age among the Egyptian population, as the risk of hypertension increases with age, and it is considered the primary risk factor for stroke in Egypt. This finding is in line with the study conducted by Ding *et al.* [23], which found an increase in the incidence of ischemic stroke with age globally, especially in women aged 50 to 69 years or older. Furthermore, Osama *et al.* [24] concluded that hypertension was the primary risk factor for cardiovascular disease in Egypt. These findings are also supported by a study by Essmat *et al.* [25], which found that the incidence of stroke increases with age and that risk factors for stroke include older age, hyperlipidemia, diabetes mellitus, and hypertension.

In terms of residence, the study found that over two-thirds of patients in both groups were from rural areas. This finding is consistent with Morsy *et al.* [26], who reported similar findings. From the viewpoint of the researcher, being from rural areas can affect access to healthcare facilities and lead to a lack of awareness of cerebrovascular disease warning signs, except in the urban area of the Minia government. Additionally, rural patients may have specific personal characteristics and economic factors, such as low income, that result in their income not covering their treatment. Feigin *et al.* [27] found that a higher prevalence of cerebrovascular illness is linked to lower income and wealth. This finding generates questions into the accessibility and utilization of preventative, screening, and diagnostic services in less-populated rural areas.

In terms of occupation, the present study found that almost half of the studied groups were occupied as housewives, reflecting their rural residence. This result is consistent with the findings of Mohammed and El-Sayed [28]. With regard to educational level, more than two-thirds of the studied groups were illiterate, which is in agreement with the findings of Morsy *et al.* [26], Farrag *et al.* [29], and Osama *et al.* [24]. From the researcher's perspective, patients with low income and education tend to have more advanced diseases. The Egyptian rural culture in the past did not allow individuals to attend or complete their education, leading to a lack of awareness of stroke warning signs and causes.

More over half of participants in both groups had no history of diabetes mellitus but did suffer from untreated hypertension. It's possible that this finding explains why untreated hypertension is linked to both ischemic and hemorrhagic strokes. These results were inconsistent with previous literature, including Mohammed and El-Sayed [28], Aiyagari and Gorelick [30], Du *et al.* [31], and Ren *et al.* [32], who examined the correlation between systolic and diastolic blood pressure and the risk of stroke, and found that the risk of stroke increased with both systolic and diastolic blood pressure.

The current study found that more than two-thirds of the studied groups were diagnosed with ischemic stroke, which is in line with the findings of Tian *et al.* [33], Barthels and Das [34], and Ding *et al.* [23], who reported that ischemic stroke represents the majority of total strokes, particularly in women aged 50 to 69 years or older. Additionally, the study found that around one-quarter of the study and control groups had hyperglycemia, likely due to the strong relationship between physiologic stress post-stroke and increased blood glucose levels. Results like these were supported by Al-Kawaz *et al.* [35], who revealed that stress hyperglycemia is a protective response of the body to critical and severe diseases and injuries.

In addition, the present study corroborated the findings of Robinson *et al.* [36], who demonstrated that raised blood

pressure is common after stroke and is associated with a poor prognosis, in that roughly one-third of both the control and study groups have seen an increase in systolic blood pressure. In addition, Vitt *et al*. [37] suggested that hypertension could be an indicator of stroke severity, with increased blood pressure occurring naturally as a protective measure to keep the brain supplied with blood.

Patients suffering from acute ischemic stroke have been shown to have raised blood pressure (BP) in a research by Al-Kawaz *et al*. [35], and this elevation may linger into the chronic phase post-stroke. In the hours and days following a cerebrovascular stroke, elevated blood pressure (>140/90 mmHg) is usually shown. This may be due to the increased reliance on systemic BP for the preservation of appropriate cerebral blood flow after stroke, which is caused by the malfunction of cerebral auto regulation (CBF).

Constipation was shown to be greatly reduced in the study group after receiving abdominal massage, while it was dramatically increased in the control group. This might be because abdominal massage stimulates the digestive system, which in turn enhances food digestion, modifies the bowel movement pattern, and decreases constipation. Constipation is a common symptom among stroke survivors, and this discovery backs up the findings of Wang *et al*. [6], who found that massage therapy is an effective and safe intervention for treating this condition.

Similarly, Helen Prathiba [38], who studied the effects of abdominal massage on patients recovering from cerebrovascular accidents, found a statistically significant reduction in the severity of constipation after receiving treatment abdominal massage. In addition, etinkaya Eng al. [20] found that abdominal massage sped up the digestion process, increased intestinal motility, boosted circulation, and decreased intra-abdominal pressure. Both the frequency of distension and constipation were decreased with abdominal massage.

In addition, Durmuş skender and alşkan [39], who studied the effects of massage on constipation, found that it alleviated the pain of constipation and sped up the first time the patient went. Yet, when constipation sets in, doctors often prescribe laxatives or enemas, which can be unpleasant for patients, make them reliant on others, disrupt their body's liquid-electrolyte balance, drive up healthcare costs, and add more work for nurses. Using an abdominal massage to avoid constipation is a good option.

ICU patients who receive abdominal massage have shown improvement in gastrointestinal function, as documented by both Kosasih *et al*. [40] and Dehghan *et al*. [41]. The decreased frequency of constipation and the accelerated rate at which stomach distension can be reduced are two indicators of this progress. Okuyan and Bilgili [42] showed that the rate of constipation in the massage group was considerably lower than in the control group after the intervention. Constipation can be relieved and the time it takes to defecate shortened with the use of an abdominal massage, as observed by Turan and Atabek Aşt [43].

Following abdominal massage, the incidence of distension is lower in the study group than in the control group. On the third day, there were huge variations in abdominal distension between the two groups. Because of its ability to alleviate abdominal distension, abdominal massage may explain this phenomenon. By activating the skin's touch and pressure receptors, abdominal massage can provide sympathetic activation, which in turn increases gastrin secretion, improves gastric peristalsis, and decreases abdominal distention. This is according to Dehghan *et al*. [44].

This finding was consistent with the findings of a systematic review and meta-analysis conducted by Xinbo *et al*. [45], who confirmed that the rate of abdominal distension was significantly lower in the abdominal massage group compared to the control group. Consistent with this finding, Wang *et al*. [46] discovered that abdominal massage decreased the occurrence of gastric residue, abdominal distension, gastric retention, and vomiting among intensive care unit (ICU) patients, demonstrating the massage's efficacy.

Results from the current study showed that on days 2 and 3, post-intervention, there were statistically significant differences in the number of abdominal sounds (bowel movement) between the study group and the control group. After abdominal massage, the mean average abdominal sound in the study group was substantially greater than in the control group.

This result agrees with the findings of Altun Ugras *et al*. [47], who found that abdominal massage is a useful nursing intervention for enhancing bowel sounds and frequency of bowel movements. In a similarly, research by Sinclair (48) found that abdominal massage can improve the frequency of bowel movements, decrease discomfort, and stimulate peristalsis. This finding is in agreement with research by Ayas, Leblebici [49], which found that abdominal massage stimulated bowel movements and prompted bowel elimination more frequently. Moreover, studies by Altun Ugras, Yüksel [47], demonstrate that abdominal massage is an efficient nursing intervention for enhancing bowel sounds and reducing the frequency with which patients need to defecate after undergoing neurosurgical intensive care.

It was found in the present study that the presence of constipation was positively correlated (r=0.04) with abdominal distention on day three, meaning that a rise in constipation leads to an increase in abdominal distention and vice versa.

Conclusion

The results of this study showed that abdominal massage can alleviate symptoms of both constipation and distention. Defecation frequencies had increased while the frequency with which patients in the study group experienced distention significantly decreased in comparison to the control group through the third day after the intervention. This provides support for the idea that constipation in post-stroke patients may be avoided through the use of preventative measures, such as abdominal massage, which has been shown to improve gastrointestinal function.

Recommendations

In light of the results of the current research, it is clear that an in-service educational training program outlining the value of abdominal massage is required. In addition, the study authors advocate including abdominal massage as a necessary part of post-stroke therapy.

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