

## The Effects of Abdominal "I LOV U" Massage with Lifestyle Training on Constipation and Distension in Patients with Liver Cirrhosis

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### Abstract

**Background:** Patients with liver cirrhosis often experience constipation, which potentially worsens hepatic encephalopathy. While the general population has benefited from abdominal massage, little is known about its specific effects on cirrhotic patients. **Aim of the study:** This study aimed to evaluate the impact of abdominal massage combined with lifestyle training on constipation and distension in patients with liver cirrhosis. **Method:** A quasi-experimental study was conducted on patients with liver cirrhosis at Zagazig University Hospital and continued at home after discharge. Sixty patients with liver cirrhosis were randomly assigned to control and intervention groups and completed the study from November 2023 to June 2024. The intervention included abdominal massage using the "I LOV U" method, along with lifestyle training. Each massage session lasted 15 minutes, twice daily for ten days, initially performed by the researcher and then continued by the key caregiver after training. Data was collected using a demographic form that included information such as age; sex; profession; length of hospital stay in days, constipation assessment score, and distension measurement tool. **Results:** The groups were similar in demographic variables ( $P > 0.05$ ). The intervention group exhibited a significant decrease in abdominal circumference over the 10-day study period ( $P = 0.001$ ). There was a significant difference in defecation frequency between the two groups ( $P < 0.001$ ). The CAS Score decreased significantly in the intervention group compared to the control group ( $P = 0.001$ ). **Conclusion:** The results indicate that abdominal massage with lifestyle training can improve constipation and distension in patients with liver cirrhosis.

**Keywords:** "I LOV U" Abdominal Massage; Lifestyle Training; Liver Cirrhosis; Constipation; Distention

### Introduction

Liver cirrhosis (LC) is the final stage of various chronic liver diseases, and its impact increases over time (Poudyal et al., 2019). It is considered a primary cause of mortality and morbidity worldwide, ranking as the 11th leading cause of mortality and the 15th leading cause of morbidity. Liver cirrhosis (LC) remains a major global health challenge, contributing significantly to morbidity and mortality. In 2017, the condition accounted for 1.32 million deaths globally, with the majority affecting males (Quek et al., 2023; Roberts et al., 2021; Sepanlou et al., 2020). Egypt is disproportionately burdened by liver cirrhosis, largely due to the country's high prevalence of hepatitis C virus (HCV) infection, previously recognized as the highest in the world. This discussion highlights the prevalence, mortality rates, and healthcare efforts targeting liver diseases in Egypt (Alboraie et al., 2019).

Hepatic Encephalopathy (HE) is a serious complication of advanced liver disease. Up to half of

patients with LC will experience at least one episode (Amer et al., 2021; Hafez et al., 2020). Additionally, HE is a leading cause of morbidity and mortality globally,

with around 30% of patients with chronic liver disease succumbing to hepatic encephalopathy (Handady et al., 2015).

Several factors may contribute to hepatic encephalopathy in LC. Recent research has shown that early identification and the reversal or control of these factors are crucial steps before further hospitalization (Kabir et al., 2018). Numerous studies have identified constipation as one of the most common precipitating factors for HE and hospitalization among patients with cirrhosis, with percentages ranging from 19% to 40% (Dai et al., 2019; Hafez et al., 2020).

Constipation is a common clinical gastroenterological issue, often defined as infrequent and/or difficult bowel emptying, associated with straining or a feeling of incomplete evacuation. The prevalence of constipation is higher in women and the occurrence of constipation increases with age (Milosavljevic et al., 2021). Patients with LC may develop ammonia concentrations due to impaired liver function. Additionally, constipation can enhance the absorption of ammonia into the mesenteric blood supply, leading to hyperammonemia, which can precipitate HE (Hafez et al., 2020; Pantham et al., 2017)).

Liver cirrhosis often leads to complications such as constipation and abdominal distension. Constipation of patients with liver cirrhosis is causing discomfort and potentially worsening hepatic encephalopathy (Blach et al. 2017; Kaplan & Rosenblatt, 2022; Mandiga et al., 2019)). While abdominal massage has shown benefits for the general population, its specific effects on cirrhotic patients are not well researched. Due to the unique pathophysiology of liver cirrhosis, including portal hypertension and ascites, caution is recommended (Kaplan & Rosenblatt, 2022).

### Significance of the study:

Untreated constipation puts a burden on the healthcare system, requiring increased nursing hours and leading to a higher risk of hospitalization. Preventing constipation, screening for its presence, and early intervention can reduce both patient distress and care costs (Fabrellas et al., 2023).

Abdominal massage, particularly the "I LOVE U" technique, has been studied as a non-pharmacological intervention for relieving constipation and abdominal distension. This method involves specific hand movements that follow the path of the colon by tracing the letters "I," "L," and "U" on the abdomen to stimulate bowel activity (Fekri et al., 2021; Tekgündüz et al., 2014).

A greater involvement of nurses in the care of patients with cirrhosis is necessary, both in hospital and primary care. Nurses have a crucial role in preventing complications among patients with liver cirrhosis, especially in preventing potentially life-threatening complications like HE, which can be triggered by constipation (Fabrellas et al., 2023; Hearn et al., 2018). Incorporating non-pharmacological interventions such as "I LOV U" abdominal massage with lifestyle training has shown potential in relieving these symptoms. Moreover, the active participation of caregivers is essential for the effective execution of these therapies. Caregivers who perform massages should receive proper training to ensure that their techniques are safe and effective. The importance of caregivers is highlighted by the fact that fatigue is a common symptom in patients with liver disease. The pathogenesis of fatigue is poorly understood and is considered multifactorial. Fatigue can have both peripheral and central components (Bhandari & Kapoor, 2022).

While studies support the use of abdominal massage for constipation and distension, it is important to note that the specific effects of the "I LOV U" massage combined with lifestyle training as a non-pharmacological intervention have not been extensively

studied in patients with liver cirrhosis. Liver cirrhosis can lead to unique complications, and interventions that work for other populations may not have the same results for these patients (Wang et al., 2022). However, further research is needed to determine its efficacy specifically in patients with liver cirrhosis.

### Aim of the study:

The present study aimed to evaluate the impact of abdominal "I LOV U" massage with lifestyle training on constipation and distension in patients with liver cirrhosis

### Research objectives:

- Evaluating the effect of "I LOV U" abdominal massage with lifestyle training on the constipation in patients with liver cirrhosis
- Evaluating the effect of "I LOV U" abdominal massage with lifestyle training on the distention of patients with liver cirrhosis

### Research Hypothesis:

H1: The study group who will receive "I LOV U" abdominal massage with lifestyle training will have a significant decrease in the constipation assessment score (CAS) compared to the control group of patients with liver cirrhosis.

H2: The study group who will receive "I LOV U" abdominal massage with lifestyle training will have a significant decrease in abdominal circumference compared to the control group of patients with liver cirrhosis.

### Subjects and methods

#### Research Design

Pre-post quasi-experimental nonequivalent design was utilized to conduct the current study.

#### Study Setting

This study was conducted on patients with liver cirrhosis at the medical departments for both females and males at Zagazig University Hospital in Egypt and continued at home after discharge for a period of ten days for each

patient. Data was collected from November 2023 to June 2024.

### Study Subjects

A purposeful sample of key caregivers of 60 adult patients with liver cirrhosis aged  $\leq 60$  years old were included. The sample size was divided randomly into 30 patients for each group of both the control and the study groups accounted to type I error: 0.05 and test power 80.

#### Inclusion criteria:

Patients with a definitive diagnosis of liver cirrhosis, graded 0 or 1 on the hepatic encephalopathy scale, experienced distension in the last two weeks. They also scored 5 or higher on the constipation assessment score (CAS). These patients were not taking any laxative medications other than lactulose, as it is a necessary part of the hospital's routine medications. Additionally, they had a key caregiver.

#### Exclusion criteria:

Patients were involved: previous abdominal or pelvic surgery; disorders such as pancreatitis, gastrointestinal ulcer or cancer, liver or kidney failure; ulcers on abdominal wall; a situation when the key caregiver could not continue abdominal massage more than 3 times; being NPO; a situation when a semi-upright position is prohibited for the patient; the patient shows the symptoms of acute abdomen.

#### Tools of Data Collection:

1- Interviewing questionnaire was structured by the researchers according to literature to assess demographic information of the patient and key caregiver. such as medical history such as co- morbid diseases.

2- Constipation assessment scale (CAS), CAS was used to assess patient's constipation. It is a valid scientific tool which was first designed and psychometrically evaluated by **McMillan & Williams, (1989)** to evaluate the severity of constipation. The tool has 8 questions with 3 grades. Grade 0 means that the patient has no constipation, Grade 1 means that the patient has moderate constipation, Grade 2 means severe constipation. If the patients get a 1–4 score in the CAS, they have mild constipation. Score 5–9 in the CAS tool indicates moderate constipation. Score 10 and above indicates severe constipation. The tool assesses the clinical severity of constipation, including 8 characteristics: Frequency of defecation; abdominal distension, bloating and changes in gas excretion; fluid secretion around the stools during the defecation; feeling

of fullness and pelvic pressure; anal pain during defecation; low stool volume; and failure to defecate for 24 h. its reliability with a 24 -h interval test-retest with Pearson correlation coefficients of  $r = \% 82$  and  $r = \% 84$ . In the present study, reliability was confirmed by obtaining the kappa coefficient of higher than 0.7 by inter-observer reliability. CAS was completed before the intervention and ten days after.

3- Meter, to measure abdominal distention, the researcher trained the caregiver to measure the abdominal circumference with a meter every morning. Inform the patient and caregiver about the measurement process, with the patient lying supine on a flat surface. Ask them to relax their abdominal muscles and empty the bladder before measurement to prevent bladder distention from affecting the results. Mark consistent landmarks for measurements over time. For abdominal girth measurement, use a flexible, non-stretchable tape measure. Identify the midpoint between the iliac crest and the lower costal margin on one side (usually at the level of the umbilicus). Wrap the tape measure around the abdomen at this level, ensuring it is parallel to the floor. Note the circumference in centimeters and record the value. Repeat measurements at the same time every morning to ensure consistency.

#### Ethical considerations:

The study began after obtaining official permission from the Research Ethical Committee at the Faculty of Medicine, Zagazig University (ZU-IRB #: 11074-10-9-2023). Each participant was informed about the nature and purpose of the study, and written informed consent was obtained from all patients. The researchers emphasized that participation was voluntary, and anonymity and confidentiality were ensured through data coding. Additionally, the intervention used in the study was deemed safe. At the end of the research, the control group received abdominal "I LOV U" massage with lifestyle modification training materials to ensure fairness between the study and control groups.

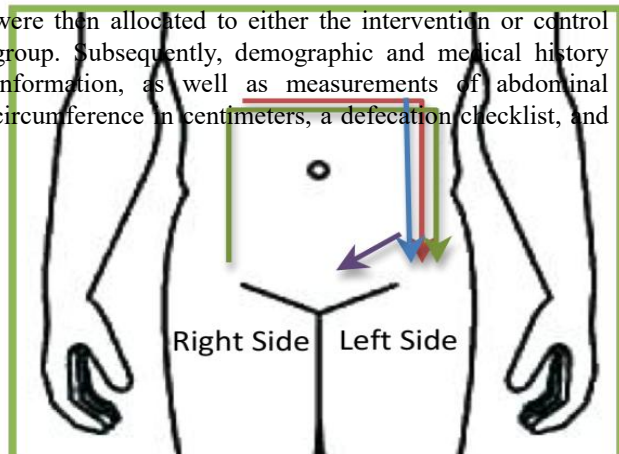
#### Pilot study

A pilot study was conducted with 10% of patients before beginning the actual data collection. The purpose was to evaluate the effectiveness of the study tools, clarity techniques, and the availability of the study sample. Subjects who participated in the pilot study were not included in the study sample.

### Fieldwork

After obtaining informed consent, patients were assessed for inclusion criteria. Those who met the criteria

were then allocated to either the intervention or control group. Subsequently, demographic and medical history information, as well as measurements of abdominal circumference in centimeters, a defecation checklist, and



persistent gastrointestinal issues in patients with liver cirrhosis, the researcher initially demonstrated the massage to the patient individually and then had the caregiver observe.

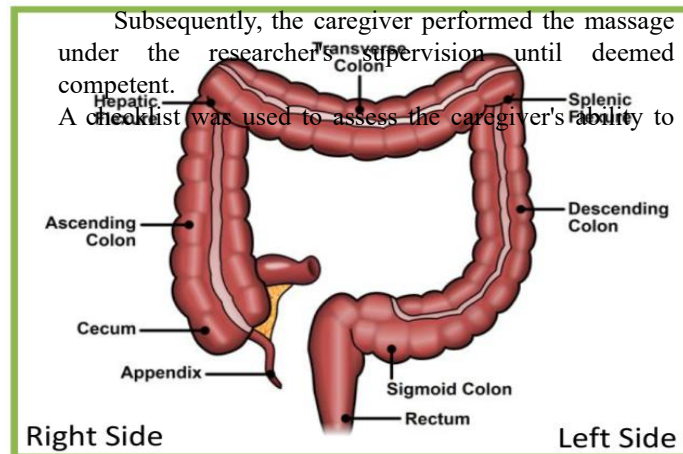


Figure 1 ("I L U" Abdominal Massage, n.d.) Retrieved November 29, 2023, from <https://static.thepelvicpt.com/docs/illustration-of-the-i-lov-u-abdominal-massage.pdf>

the Constipation Assessment Scale (CAS) were completed daily before and after the ten-day intervention with the assistance of the patient's key caregiver. The study began with a pretest on day one, continued for ten days, and concluded with a posttest on day ten.

The intervention group received the "I LOV U" abdominal massage along with lifestyle training for a period of ten days according to the previous literature of (Fekri et al., 2021). Each "I LOV U" abdominal massage session lasted 15 minutes and was conducted twice daily, with one session occurring 2 hours after breakfast and another 2 hours after dinner. Key caregivers of the patients, their wives, were permitted to escort their husbands at night during their hospital stay and continue the same routine after discharge. Researchers conducted home visits in the morning and provided phone reminders between 7:00 pm and 8:00 pm.

The training in the intervention group was divided into two parts: abdominal massage and lifestyle.

Abdominal massage: As described by Tekgündüz et al. (2014), the I LOV U abdominal massage technique can be taught to the patient's caregiver. Therefore, the primary focus of this study was to train the patient's key caregiver to perform the massage daily, even after the research concluded. Since constipation and distention are

perform the massage.

I LOV U abdominal massage: The "I LOV U" massage involves mechanically stimulating the abdominal wall and underlying gastrointestinal structures to mimic the natural movement of peristalsis. This stimulation enhances vagus nerve activity, promoting digestion and relaxation. The massage also helps expel trapped gas, alleviating bloating and discomfort commonly experienced by cirrhosis patients.

The steps for performing the "I LOV U" abdominal massage were outlined, including starting in a supine position, explaining the procedure to the patient and caregiver, teaching diaphragmatic breathing, and using circular clockwise movements with moderate pressure. Directions were provided for following the path of the large intestine, forming the letters "I," "L," and "U," and finishing with a circular clockwise massage around the belly button.

Overall, the "I LOV U" abdominal massage technique aims to improve gastrointestinal function and provide relief for cirrhosis patients.

**The lifestyle education content included** in this study focused on helping liver cirrhosis patients prevent

constipation and distension by following specific instructions.

These instructions were explained and handed to the patients in the form of illustrated colored and simple written instructions. They encompassed dietary modifications, regular physical activity, maintaining a consistent eating schedule, avoiding constipating medications, limiting toxin intake, and practicing stress management techniques. It was also advised to consume high-fiber foods, adequate protein, and avoid gas-producing foods. Drinking 6-8 glasses of water daily (if there are no fluid restrictions), engaging in low-impact exercises, and eating smaller, more frequent meals are also beneficial. Restricting coffee, fried tea and fatty foods, and sugary foods is recommended. Sleep patterns were addressed by instructing patients to have a fixed daily sleep time and hours.

Education was provided in the correct defecation position and daily physical activities, both active and passive. Techniques such as squatting, leaning forward, and relaxation methods can help improve bowel movements. It

is important to avoid delaying defecation, establish a routine, prevent straining, drink warm water and use gentle abdominal massages to stimulate bowel movements. Additionally, assistive devices like toilet footrests can be beneficial.

Prior to the intervention, a pre-test was conducted in both groups to assess constipation and distension. Following this, abdominal massages and lifestyle training were administered to the intervention group.

For patients in the hospital, the researcher completed the constipation and distension assessment daily in the morning between 7:00 and 8:00. After discharge home follow-up was conducted.

After completing the research and posttest scales on the final day, the control group received lifestyle education tips.

### Statistical design

The data was analyzed using SPSS 27, which included descriptive tests such as mean, standard deviations and frequencies, as well as analytical statistics like repeated measure ANOVA, Chi square test. The significance level was set at  $\leq 0.05$

### Results:

The mean ages of the study and control groups were  $51.47 \pm 4.92$  and  $54.70 \pm 4.31$ , as shown in Table 1. Additionally, the intervention group consisted of 73.3% males, while the control group had 66.7% males. In terms

of marital status, 96.7% of the intervention group and 90% of the control group were married. Moreover, 73.3% of the intervention group and 66.7% of the control group were self-employed, while 26.7% of the intervention group and 33.3% of the control group were housewives. Both groups resided in rural areas.

The sample was homogeneous as there were no statistically significant differences regarding age, gender, marital status, and profession between the study and control groups ( $t=0.54$ ,  $p=0.60$ .  $\chi^2=0.09$ ,  $p=0.55$ ,  $\chi^2=0.12$ ,  $p=0.90$ ,  $\chi^2=0.09$ ,  $p=0.55$  &  $\chi^2=3.4$ ,  $p=0.18$ , respectively). In terms of the presence of co-morbid diseases, 70 % and 63.3% did not have any, 13.3% and 10% had diabetes and 16.7% and 26.7% had hypertension. The key caregiver relationships were predominantly female, with 73.3% and 66.7% being wives and 26.7 % and 33.3 % being daughters of the intervention and control groups, respectively. The mean hospital stay length was  $5.37 \pm 1.16$  and  $5.20 \pm 1.19$  in the intervention and control groups respectively with homogeneity and no significant difference between both groups

According to the results, most of the patients did not have a defecation on the first day in both groups ( $P = 0.631$ ). However, starting from the second day, patients in the intervention group began to have defecation. By the fifth day, half of the intervention group had defecation, increasing to 96.7% by the tenth day, which was significantly higher than the control group ( $X^2 = 7.240$   $P = 0.000$ ) (Table 2).

Figure 2 shows a comparison of abdominal distention levels among patients in both groups over a 10-day period. The line graph illustrates a continuous decrease in abdominal round and level of distention in the intervention group with significant differences from the control group ( $P = 0.001$ ).

Table 3 shows a significant improvement ( $P < 0.001$ ) in the mean constipation assessment scores, with  $10.37 \pm 0.56$  in the pretest and  $10.37 \pm 0.56$  in the posttest for the intervention group, compared to  $10.23 \pm 0.43$  in the pretest and  $5.77 \pm 2.30$  in the posttest for the control group after ten days intervention.

**Table 1: Demographic characteristics of the patients with liver cirrhosis in both intervention and control groups (n=60).**

Variables	Intervention group		Control group		Test result
	N	%	N	%	
<b>Age/years</b>					t-test .54 P-value .60 (n.s) *
45-49	10	33.3	4	13.3	
50-54	11	36.7	5	16.7	
55-≤60	9	30	21	70	
Mean ±SD	51.47±4.92		54.70± 4.31		
<b>Gender</b>					Chi-square .09 P-value .55 (n.s) *
Male	22	73.3	20	66.7	
Female	8	26.7	10	33.3	
<b>Marital status</b>					Chi-square .12 P-value .90 (n.s) *
Married	29	96.7	27	90	
Widowed	1	3.3	3	10	
<b>Work</b>					Chi-square .09 P-value .55 (n.s) *
Self-employment	22	73.3	20	66.7	
Housewives	8	26.7	10	33.3	
<b>Residence</b>					
Rural	30	100	30	100	
<b>Presence of co-morbid diseases</b>					
No co-morbid disease	21	70	19	63.3	
Diabetes Mellitus	4	13.3	3	10	
Hypertension	5	16.7	8	26.7	
<b>Key- caregiver relation</b>					
Wife	22	73.3	20	66.7	
Daughter	8	26.7	10	33.3	
<b>Length of hospital stay/days</b>					F= .29 P-value .59 (n.s) *
Mean ±SD	5.37±1.16		5.20± 1.19		

- No statistically significant

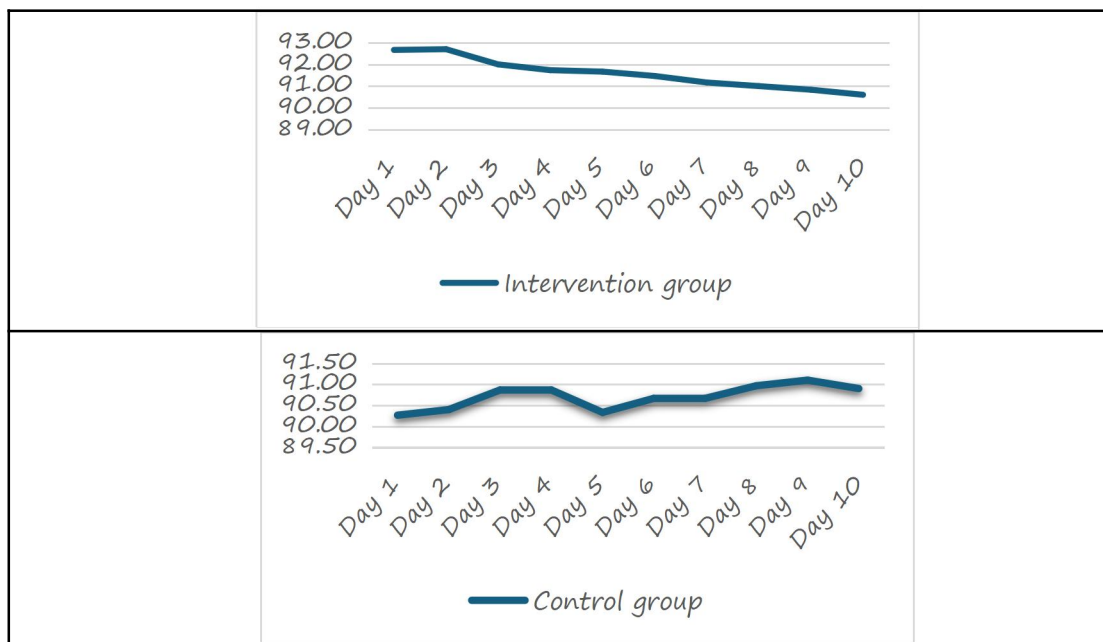
**Table 2: Compare the frequency of defecation among patients in both groups over a 10-day period**

Days		Intervention group (n=30)		Control group (n=30)		Chi Square test	P- value
		N	%	N	%		
Day 1	Yes	5	16.7	4	13.3	X <sup>2</sup> =0.231	P = 0.631*
	No	25	83.3	26	86.7		
Day 2	Yes	8	26.7	3	10	X <sup>2</sup> =9.167	P = 0.002**
	No	22	73.3	27	90		
Day 3	Yes	9	30	5	16.7	X <sup>2</sup> =14.000	P = 0.000**
	No	21	70	25	83.3		
Day 4	Yes	11	36.7	7	23.3	X <sup>2</sup> =15.771	P = 0.000**
	No	19	63.3	23	76.7		
Day 5	Yes	15	50	11	36.7	X <sup>2</sup> =11.627	P = 0.001**
	No	15	50	19	63.3		
Day 6	Yes	18	60	13	43.3	X <sup>2</sup> =5.792	P = 0.016**
	No	12	40	17	56.7		
Day 7	Yes	21	70	17	56.7	X <sup>2</sup> =6.212	P = 0.013**
	No	9	30	13	43.3		
Day 8	Yes	21	70	17	56.7	X <sup>2</sup> =6.212	P = 0.013**
	No	9	30	13	43.3		
Day 9	Yes	22	73.3	17	56.7	X <sup>2</sup> =4.455	P = 0.035**
	No	8	26.7	13	43.3		
Day 10	Yes	29	96.7	24	80	X <sup>2</sup> =4.138	P = 0.042**
	No	1	3.3	6	20		
Test	X <sup>2</sup> =7.240 P = 0.000						

\*No statistically significant

\*\*No statistically significant

**Figure 2: Compare the level of abdominal distention among patients in both groups over a 10- day period**



Repeated measures ANOVA	Bayes Factor	Mauchly's W	df	Sig.
	.001	.000	189	.000

**Table 3: Comparison of constipation assessment scores between the intervention and control groups over a period of ten days**

Constipation Assessment Score	Intervention group		Control group		Test Result
	Pretest	Posttest	Pretest	Posttest	
No	0.00	10(33.3%)	0.00	0.00	Chi-Square = 58.515 P-value=0.000
Mild	0.00	18 (60%)	0.00	10(33.3%)	
Moderate	0.00	2 (6.7%)	0.00	19 (63.3%)	
Severe	30 (100%)	0.00	30 (100%)	1 (3.3%)	
Mean ±SD	10.37 ± 0.56	1.93 ± 1.74	10.23 ± 0.43	5.77 ± 2.30	

**Discussion**

One of the primary risk factors for hepatic encephalopathy, a serious and frequent side

effect of liver cirrhosis, has been identified as constipation (Hafez et al., 2020). Constipation should therefore be prevented and treated as soon as possible, particularly in patients with



cirrhosis. A nurse must pay attention to constipation and make plans to avoid negative effects on a patient's condition. Thus, the aim of this study was to investigate the effects of "I LOV U" abdominal massage with lifestyle training on constipation and distension in patients with liver cirrhosis. The discussion will focus on the debate surrounding the study's hypotheses.

According to the results of the current study, the majority of patients in both groups did not defecate on the first day. However, over the course of the ten-day intervention, half of the patients in the intervention group had defecated by the fifth day, which was significantly higher than the control group. Following the 10-day intervention, there was a notable improvement in the intervention group's mean constipation assessment scores compared to the control group. Additionally, over the 10-day period, there was a continuous decrease in abdominal roundness and level of distention in the intervention group, with significant differences from the control group.

In the present study, not only did the post-intervention constipation score improve, but the severity of constipation also decreased. The severity of constipation increased from mild to moderate in patients in both groups, while most patients in the intervention group had mild constipation. The results of the study indicated that abdominal massage using the "I LOV U" technique, combined with lifestyle education, could improve constipation and reduce distension in patients with liver cirrhosis. It can be concluded that the use of abdominal massage, along with lifestyle training such as adequate hydration, appropriate physical activity, and correct positioning during defecation, can help establish a regular bowel movement routine in patients with liver cirrhosis.

A randomized controlled trial investigated the effects of abdominal "I LOV U" massage combined with lifestyle training on constipation and distension in elderly stroke patients (Fekri

et al., 2021). The study found significant improvements in defecation frequency and reduced abdominal circumference in the intervention group compared to controls. Another study highlighted that abdominal massage could effectively manage constipation in the elderly, suggesting its potential applicability to other populations experiencing similar gastrointestinal issues

Patients with liver cirrhosis often experience gastrointestinal symptoms, including constipation and abdominal distension, due to factors like reduced physical activity, dietary restrictions, and medication side effects. While direct evidence in cirrhotic patients is scarce, the positive outcomes observed in other groups suggest that abdominal "I LOV U" massage, alongside lifestyle modifications, could offer relief. Abdominal "I LOV U" massage, combined with lifestyle training, has demonstrated potential benefits in alleviating constipation and abdominal distension in various patient populations. While specific studies focusing on patients with liver cirrhosis are limited, existing research provides insights that may be applicable to this group (Kalaitzakis, 2014).

The findings of the present study indicated that measuring abdominal circumference, using the "I LOV U" abdominal massage technique, along with lifestyle training based on daily abdominal measurements, significantly reduced distension (abdominal bloating) in the intervention group compared to the control group. The results also showed that patients' distension decreased continuously over the ten-day period in the intervention group. Consistent with the results of the current study on abdominal circumference, Dehghan et al. (2018) also demonstrated a significant decrease in patients' abdominal circumference.

In a study by Tekgündüz et al. (2014) on the effect of abdominal massage using the "I LOVE U" technique on the nutritional tolerance of 14 preterm infants, it was found that abdominal massage improved abdominal

distension during a 5-day intervention. Similarly, the results of the present study indicated an improvement in bloating in cirrhotic patients. However, Tekgündüz indicated the improvement in bloating at the end of the study (day 5) in infants, but did not mention the improvement during the study days. In the present study, the process of improving abdominal distension was clear with daily abdominal circumference measurements. Given the infant population in Tekgündüz's study and their earlier improvement in bloating (day 5), their follow-up time was shorter than in the present study. Therefore, based on the results of Tekgündüz's study and the present research, massage using the "I LOV U" technique could be effective in the elderly, although the duration of intervention was longer than in infants.

Results of a study by **Fatehipour et al. (2016)** on the effect of abdominal massage on gastrointestinal function and the incidence of aspiration in 35 patients admitted to intensive care units of hospitals in Kerman were consistent with the present study, showing that Swedish abdominal massage reduced abdominal distension. A notable point in Fatehpour's study was that Swedish abdominal massage twice a day for three consecutive days quickly improved symptoms of abdominal flatulence after the third day, whereas in the present study, symptoms of abdominal flatulence improvement emerged on day six. The difference in timing may be attributed to the technical differences between Swedish abdominal massage and the "I LOV U" abdominal massage technique.

Swedish abdominal massage is a professional technique that requires special training. In Dehghan's study, the massage was performed by a researcher. However, in the present study, the massage technique was taught to patient caregivers who then performed the massages for the patients. The cooperation and accuracy of the caregivers in massaging, as well as their adherence to proper nutrition principles to relieve bloating and constipation,

may have contributed to the delayed symptoms of bloating observed in the present study.

Each Swedish massage session lasted 45 minutes, which may have further stimulated the intestines. In addition to providing relief for bloating and constipation, a secondary goal of the study was to prevent constipation, a known precipitating factor for hepatic encephalopathy, a dangerous complication of liver cirrhosis (**Hafez et al., 2020**). The study also aimed to reduce the dependency of key caregivers on health centers by providing abdominal massage and lifestyle training, aligning with the findings of (**Fekri et al., 2021**).

Unlike Dehghan's study where no training was provided to patient caregivers and the researcher performed the abdominal massage, the present study involved caregivers in performing the massages. The study intervention involved abdominal "I LOV U" massage combined with lifestyle training. The lifestyle modification instructions in the current study focused on establishing regular bowel habits, maintaining a healthy balanced diet with adequate fiber, ensuring sufficient fluid intake, and incorporating appropriate exercise based on the patient's condition

In a word, evidence from various research indicates that lifestyle modifications such as a high fiber diet, increased fluid intake, mild to moderate physical activity, abdominal massage, regular sleeping hours, and regular bowel habits are the most preferable and effective nonpharmacological means to counter constipation symptoms. It is important to urge nurses to encourage patients with liver cirrhosis to adopt a healthy lifestyle. Long-term benefits can be established by large studies over a longer period, where the patient has adopted the habit of a healthy lifestyle. Aligned with **Mahmoud and Hassanein (2021)** and **van der Schoot et al. (2022)** added to the body of knowledge by delineating strategies for relieving constipation symptoms in patients with LC; especially the current study includes the application of more than one perspective

modification (general instruction, abdominal massage, simple exercises, dietary enhancement, and an avoidance list).

## Conclusion

The present study suggests that using an "I LOVE U" massage technique and lifestyle training can improve constipation and distension. Abdominal massage is a simple and inexpensive procedure that is easy for key caregivers to learn and perform. In this study, utilizing the "I LOVE U" massage technique to promote normal bowel movements and bowel stimulation helped with gas excretion and reduced constipation. When combined with lifestyle training, such as consuming fiber-rich foods and engaging in movement and activity, significant improvements in gastrointestinal issues were observed.

With the increasing recognition of the role of nurses in implementing safe independent interventions to ensure patient well-being, nurses play a crucial part in providing abdominal "I LOVE U" massage and lifestyle training to alleviate constipation in patients with liver cirrhosis. This can help reduce the risk of complications, particularly hepatic encephalopathy. This study can serve as a foundation for evidence-based practice in nursing and future research endeavors.

## Recommendations:

Based on the results of the study, the following recommendations were concluded:

- It is suggested to apply abdominal "I LOVE U" massage combined with lifestyle training for patients with liver cirrhosis to maximize those patients' benefits, especially for their bowel movement and decreasing hepatic encephalopathy.

- Replicate the study on a larger sample size and follow up for longer periods.

## Conflict of interest statement

The authors declare that they have no conflict of interest.

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