Effect of Lifestyle Modification on Relieving Constipation Symptoms among Patients with Liver Cirrhosis

Dr.Amel Saeid Mahmoud & Dr.Safaa M. Hassanein,
Assistant professors & Researchers of Medical-Surgical Nursing
Faculty of Nursing-Cairo University-Egypt
Corresponding Author:Amel Saied Mahmoud
E-mail:amalsaied19@yahoo.com

Abstract

Background: Constipation in patients with liver cirrhosis is one of the key factors that might lead to hepatic encephalopathy. However, management of constipation stands on a balance between strategies for prevention and self-care/non-pharmacological perspective. **Aim;** Examine effect of Lifestyle Modification on constipation relieve among Patients with Liver Cirrhosis. **Design:** A quazi-experimental non-equivalent pre post-test time series control group. **Setting**; Medical departments at one of the Educational Hospital affiliated to Cairo-University hospital; Egypt.**Hypothesis: H1**: Study group who will receive life style modification will have a significant higher mean activity of daily living score compared to the control group who will receive routine hospital care. **H2**: Study group who will receive life style modification will have a significant lower mean Constipation-Symptoms score compared to the control group who will receive routine hospital care. **H3**: Study group who will receive life style modification will show improvement of the stool form compared to the control group who will receive routine hospital care. **Sample:** A purposive sample of 60 adult male & female patients. **Tools**: Tool I; Glasgow coma scale, Tool II; West Haven Criteria, Tool III: Demographic medical Information Form, Tool IV; Katz Index of Independence in Activities of Daily Living, Tool V; the Bristol Stool Form Scale, and Tool VI; PAC-SYM questionnaire. **Results**: Mean age of the study and the control groups were 55.80 ±12.73 and 52.33±12.42 respectively**.** The total score of activity of daily living were highly statistically significantly F(1.1.93, 56.14) =24.85 at P value=0.000 over the three readings within the study group. The total score of Assessment of Constipation-Symptoms were highly statistically significantly different than the control group as study group F (1.45, 42.19) =147.32 at P value=0.000. While; there was highly statistical significant difference between study and control groups at the 2nd and at the 3rd readings as independent t-test=(5.75, p=0.000), (7.17, p=0.000), respectively. **Conclusion:** The present study underlined the benefits of life style modification instructions to improve constipation symptoms of patients with Liver Cirrhosis **Recommendations:** Replicate the study on a larger study sample and to be followed for longer period.

Keywords: Life style modification, constipation, Liver Cirrhosis.

Introduction

Liver cirrhosis (LC) is the terminal stage for various chronic liver diseases and its impact is growing over time (**Poudyal et al., 2019**). Liver cirrhosis is considered a primary cause of mortality and morbidity all over the world, where it represents the 11th and 15th leading cause of mortality and morbidity respectively. In 2017, LC caused 1.32 million deaths globally, around two-thirds among males and one-third among females **(Roberts et al., 2021 & Sepanlou et al., 2020)**.

In Egypt, liver cirrhosis is considered a major cause of morbidity and mortality (0.727/1000) **(Amer et al., 2021**). Furthermore, from 1990 to 2017, Egypt had the highest mortality rate due to liver cirrhosis **(Elbahrawy et al., 2021)**. Various health care programs in Egypt have been established to combat liver diseases such as schistosomiasis and viral hepatitis **(Alboraie et al., 2019)**. Hepatic Encephalopathy (HE) is one of the serious complications of advanced liver disease. Up to half of patients with LC will suffer from a minimum one attack **(Hafez et al., 2020)**. Moreover HE is a leading cause to morbidity and mortality worldwide, with approximately 30% patients of chronic liver disease die of hepatic encephalopathy **(Handady et al., 2015)**.

Several factors might lead to hepatic encephalopathy in LC, contemporary researches have proved that early identification and the reversal or control of these factors is a crucial step of further hospitalization **(Kabir et al., 2018)**. Numerous studies recognized that one of the most common precipitating factors for HE and hospitalization among patients with cirrhosis was constipation with percentage ranged from 19%-40% **(Hafez et al., 2020;Pantham et al., 2017; Handady et al., 2015)**.

Constipation is a frequent clinical gastroenterological problem. It is mostly defined as infrequent and/or difficult bowel emptying, often associated with straining or a feeling of incomplete evacuation. The prevalence of constipation is about 16%, varies in the range of 0.7–79.0%, and is higher in women. The occurrence of constipation increases with age so that its prevalence is as high as 33% in people aged 60–110 (**Milosavljevic et al., 2021**).

Patients with LC may develop high ammonia concentrations due to impaired liver function. On the other hand, constipation enhances the absorption of ammonia into the mesenteric blood supply, lead to hyperammonemia which precipitates HE **(Hafez et al., 2020)**.

Moreover, **Larkin et al., (2018)** emphasized that constipation as a clinical problem is both poorly recognized and treated. However, its management stands on a balance between strategies for prevention and self-care/non-pharmacological perspective. Likewise, **(Milosavljevic et al., 2021)** stressed the role of dietary and lifestyle modification like encouraging adequate fluid, roughage intake and regular exercise as a primary therapeutic approach to constipation regardless of etiology, which may improve constipation symptoms.

Untreated constipation places a burden on the healthcare system, with a need for increased nursing hours and a higher risk of hospitalization. Prevention of constipation, screening for its presence and early intervention may reduce both patient distress and care costs. Apparently; nurses play an important role on the level of preventing further complications among patient with hepatic cirrhosis; particularly in the prevention of its potentially life-threatening complications as HE which might be precipitated by constipation **(Hearn et al., 2018).** Thus it was crucial to conduct such a study to examine the effect of Lifestyle modification on relieving constipation symptoms among Patients with Liver Cirrhosis.

Significance of the Study:

Based on **Blach et al., (2017)** who performed a systematic review on developing countries; was found that patients with liver cirrhosis experience several health problems; one of these problems is gastro-intestinal problems as constipation. Also stands on **Kalaitzakis (2014)** study; which revealed that gastrointestinal symptoms are common in cirrhosis and their pathophysiology probably factors associated with the liver disease severity, which lead to intestinal dysfunction and delaying intestine transit time. Apparently, as a vicious circle, it might lead to reducing in food intake and contribute to nutritional status deterioration in cirrhotic patients as well.

Moreover; the researchers of the current study observed through their clinical experience; that one of several patients' complaints with liver cirrhosis is constipation. Without efficient nursing management, constipation will interfere with cirrhotic patient's activity of daily living and definite disturbance of conscious level as the intestine content will remain much longer; which will lead to more ammonia and toxins absorption. Also relieving constipation for those patients is not only related from a single perspective of nutritional modification but it is a much wider scope than that view; it is a lifestyle modification. Thus the current study aimed to modify the Life Style for those patients in order to relieve the constipation symptoms and its possible serious consequence as hepatic encephalopathy among patients with liver cirrhosis. It is anticipated that this work might generate evidence-based data valuable for nursing and other health care professionals.

The aim of the study:

The aim of the current study was to examine the effect of Lifestyle modification on

relieving constipation symptoms among Patients with Liver Cirrhosis.

Research hypothesis:

H_1: Study group who will receive life style modification will have a significant higher mean activity of daily living score compared to the control group who will receive routine hospital care.

H_2: Study group who will receive life style modification will have a significant lower mean Constipation-Symptoms score compared to the control group who will receive routine hospital care.

H_3: Study group who will receive life style modification will show improvement of the stool form compared to the control group who will receive routine hospital care**.**

Subjects and Methods

Design: A quazi-experimental non-equivalent pre post-test time series control group design was utilized in the current study. It involves taking a set of measurements at intervals over a period of time there is a study group that is given a pretest, and then is given a posttest after the intervention. But at the same time there is a nonequivalent control group that is given a pretest, does not receive the intervention **(Price, 2017).** The following drawing sketches the design;

Study (intervention) group : O1 X O2 O3

Control group : O1 O2 O3

Where (O) stands for observation and (X) for the current study intervention.

Setting: The study was conducted at four inpatient medical departments; each medical department consists of females and males' zones with total beds' number of 24/each zone, at one of the Educational Hospital affiliated to Cairo University-Cairo- Egypt.

Subject: A purposive sample over six consecutive months and not less than 60 adult male & female patients were included. Sample was divided randomly into 30 patients for each group of both the control and the study groups.

Inclusion criteria: Patients with liver Cirrhosis and had constipation (three or fewer bowel movements a week and/or hard lumpy stool, with or without lower abdominal discomfort, distension, and straining during the last two weeks), a conscious level not less than 13/15 on the Glasgow Coma Scale, Grade 0 or 1 on Hepatic Encephalopathy scale. Patients should not take any laxative medications rather than lactulose "as it is one of inevitable medication of the hospital routine medications".

Exclusion criteria: if the patient reported one or more episode of diarrhea or did not suffer from constipation at the last two weeks was excluded from the study.

Tools of the study: In order to achieve the purpose of the research, six tools were utilized as follows:

Tool (I): Glasgow Coma Scale (GCS): This is an adopted tool developed by **(Gill et al., 2004).** It aims to measure conscious level. It consists of eye opening responses with highest score= 4, verbal response with maximum score = 6 and motor response with top score = 5. Total score of the tool=15 **(Teasdale & Jennett, 1974; Teasdale & Jennett, 1976)** The inter-rater reliability of the total Glasgow Coma Scale is p= 0.86

Tool (II): Hepatic Encephalopathy Grading by West Haven Criteria (WHC): It is adopted from **(Cash et al., 2010).** The severity of HE is graded with the WHC; this is based on the level of impairment of autonomy, changes in consciousness, intellectual function, behavior, and the dependence on therapy. Grade 0- No obvious changes other than potentially mild decrease in intellectual ability and coordination. Grade 1-Trivial lack of awareness; euphoria or anxiety; shortened attention span; impaired performance of addition or subtraction. Grade 2- Lethargy or apathy; minimal disorientation for time or place; subtle personality change; inappropriate behavior. Grade 3- Somnolence to semi stupor, but responsive to verbal stimuli; confusion; gross disorientation and Grade 4 - Coma.

When the patients fulfilled the related inclusion criteria of Glasgow coma scale and hepatic encephalopathy by using tools (I & II) the researchers commenced in applying Tool III.

Tool (III): Demographic-Medical Information Form: Aims to gather both demographic and medical data. Demographic part included education level, age, gender…etc. While medical part included questions related to practicing of exercises, types of food…etc. This tool designed by the researchers after extensive reviewing of related articles and literature.

Tool IV: Katz Index of Independence in Activities of Daily Living: It is developed by **(Katz et al., 1983)**. This tool is used to detect problems in performing activities of daily living and to plan care accordingly. It included six main activities; bathing, dressing, toileting, transferring, continence and feeding. The scale is either independent=1 or dependent=0 with total score of 6 = High (patient independent), while 0 = Low. The Katz might offer a finer distinction picture of disability and is able to detect subtler changes in functioning **(Roedl et al., 2015)**. Construct validity by using factor analysis 5 single factor with all item correlations with the factor being 0.5 or greater Coefficient = 0.6; while its reliability using cronbach alpha=0.87. **(Ciesla, et al., 1993).**

Tool V: The Bristol Stool Form Scale (BSFS): it is developed by **(Lewis & Heaton, 1997)**. It concerned about stool formation assessment. knowing that BSFS has seven stool categories and each patient allocates in only one category/type per each assessment; Type 1: Separate hard lumps, (hard to pass); Type 2: lumpy, Type 3: Like a sausage but with cracks on its surface; Type 4: snake, smooth and soft; Type 5: Soft blobs (passed easily); Type 6: a mushy stool; and Type 7: Watery. Type 1 has spent the longest time in the bowel and type 7 the least time. A normal stool should be type 3 or 4, and depending on the normal bowel habits of the individual, should be passed once every one to three days. Its validity and reliability was established by **Raker and Whelan (2016)** Models were correctly classified (substantial accuracy, =0.78)

Tool VI: PAC-SYM questionnaire**:** Patient Assessment of Constipation-Symptoms developed by **Frank et al., (2001**). It provides a brief method for obtaining constipation-specific symptom and quality-of-life. The scale consisted of 11 items about (discomfort, abdominal pain, bloating, cramps, bowel movement, rectal burning, incomplete bowel movement, hard bowel movement, small bowel movement, staining and false alarm).

Symptoms have been assessed during the past 2 weeks. 0= no symptom during the past 2 weeks, 1= mild symptom, 2= moderate symptom, 3= severe symptom, while 4= very severe symptom. Its reliability was established by **Yiannakou et al., (2017**); with overall, the anchor-based MID estimates fell within a small range (from –0.52 to –0.63).

Life Style Modification:

It is instructions aim to modify patients with LC lifestyle to control constipation conditions. These instructions explained and handed to the patients in form of illustrated colored and simple written instructions. That mainly included; General instructions (related to food & fluid habits, pain killers and medications control taking, bowel monitoring, and bleeding tendency). Abdominal message (following certain technique taught to the patients and do it three to five times/day). Simple exercises (do it 5 times/ week ranged between 25 to 30 minutes/each) as walking two bus station distance, doing house work. Dietary enhancement (as having daily fixed time of eating, follow healthy diet as reach of roughage elements/fresh vegetables and fruits, drinking plenty of fluid that depends on physician monitoring, exchange white wheat with whole wheat). An avoidance list that mainly includes (restrict coffee and tea, fried and fatty food, sugary food). Sleep patterns that instruct the patients to have daily fixed time and hours of sleep).

Pilot study:

was done by 10% of patients before starting the actual data collection; to evaluate the effectiveness of the study tools, clarity,

techniques and the availability of the study sample; and subjects who participated in the pilot study were not included in the study sample.

Ethical considerations:

The Study was commenced after the official permission that obtained from the Research Ethical Committee faculty of

Nursing Cairo University. IRB (00004025). Each participant was informed about the nature and purpose of the study. Then written informed consent was obtained from all patients to participate in the study. The researchers emphasized that participation in the study was entirely voluntary; anonymity and confidentiality were assured though coding the data. Moreover, the intervention used in the current study was safe. By the end of the research the control group was given the Lifestyle Modification instructions to ensure justice between study and control groups.

Field work: The study was divided into three phases:

Phase (1) Assessment: Both study and control groups after fully explanation of the study's nature and ensure their acceptance in sharing in the study; as a base line (first reading) before conduction of Lifestyle Modification; starting by Glasgow coma scale, conscious level was initially assessed; if the GCS score were 13, 14 or 15 they were enrolled in the study; as scores 15 and 14 will reflect Grade 0 while score of 13 will reflect Grade I on WHC as the Glasgow Coma Scale differed among the four stages of the WHC, but the differences between grades I and II were small and not clinically useful **(Hassanein et al., 2009).**

Then, demographic and medical data assessment tool was utilized; knowing that patient who reported that having diarrhea one or more episodes or did not suffer from constipation at the last two weeks were excluded from the study. Then Katz-index to detect problems in performing the activities of daily living was used. At this point the researchers assessed the grade of the stool formation by direct observation or asking the patient if possible, or/and care giver using BSFS; finally, the researchers assessed constipation-specific symptom and quality-of-life using PAC-SYM questionnaire.

Phase (2) Implementation: the first 30 patients who admitted and fulfilled the inclusion criteria constituted the control group. They received their usual routine hospital management. After that, the researchers recruited the study group. For the study group; besides receiving their routine hospital management which was (lactulose & liver support, antibiotics for normal flora, H2 blockers, Vit K., multivitamins).

The researchers offered illustrated simple colored instructions about the Lifestyle Modification for constipation to the study subjects. At the same time the researchers interviewed each of the study subject individually for 30 to 45 minutes to explain and clarify the given instructions.

Moreover the researchers instruct the patient how to do the abdominal message by demonstration and re-demonstration and got a feedback from the patient that the whole instructions were completely understood with emphasizing the importance of its application in a correct and regular pattern to be part of the patient's life.

Phase (3) Evaluation and follow up: a week and two weeks later after the base line data collection for the control group and after the application of the Lifestyle Modification on constipation for the study group; the researchers re-assessed the condition of both the control and the study groups for the second and the third time using tools I, II, IV V and VI. By the end of the current study the life style modification written instructions were offered to the control group to maintain justice between study and control groups.

Statistical analysis:

The data coded and tabulated using a personal computer. Statistical Package for Social Science (SPSS) version 20 was used. **(IBM, 2012)** Data was presented using descriptive statistics in the form of frequencies and percentage. T-test and ANOVA were utilized as inferential statistics to compare means between study and control groups in relation to research variables. Statistical

significance considered significant at P-value ≤ 0.05.

Results

The results divided into two main sections. First section, concerns about demographic and medical result and scores of Glasgow coma scale, HE grading. While the second section focuses on patient's relation results pertaining to**,** activity of daily living's result, stool formation assessment, and Constipation-Symptoms.

Section One:

Table (1): shows the mean age of the study and the control groups were 55.80 ±12.73 and 52.33±12.42 respectively. In addition, 73.3% and 43.3% of the intervention and control groups respectively were females, while, 80 % and 93.3% of the intervention and control groups were married respectively. Moreover, 73.3% and 43.3% of the intervention and control groups were housewives respectively. In relation to place of residence; 60% and, 26.7% originally from rural among study and control groups respectively. The sample was homogeneous as there was no statistical significant differences regarding age, gender, marital status, profession and residence between study and control groups as $\chi2$=27.9, p=0.31. $\chi2$=1.6, p=0.20, $\chi2$=0.53, p=0.46, $\chi2$=8.9, p=0.87 & $\chi2$=3.4, p=0.18 respectively.

Table (2): Illustrates that 13.3% of the study group versus 36.7% at the control group were smokers respectively. 26.7%, 46.7% sweat a lot. While for drinking cup of water was with $\bar{X}$±SD= 4.50±2.23 and 5.60±1.92 among study and control groups respectively. Also 20% at the study group regularly eat whole grain bread versus 40% at the control group eat cereals. It was found that 100% at both study and control groups do not practice any exercises.

However, 73.3% and 96.7% has no regular sleeping hours among study and control groups respectively. The sample was homogeneous as there was no statistical significant differences regarding smoking, sweating, drinking cups of water/day, regular (eating, exercise & sleeping time) between study and control groups as $\chi2$=0.27, p=0.60. $\chi2$=0.36, p=0.54, $\chi2$=24.7, p=0.25, $\chi2$=74.2, p=0.10, $\chi2$=constant, and as $\chi2$=0.37, p=0.54 respectively**.**

Table (3): exemplifies that 26.7% of the study group had co-morbid diseases as; diabetes mellitus with same result to hypertension versus 20% at the control group had mainly diabetes mellitus. Actually total number of co-morbid diseases was with Mean±SD= 0.60±0.89 and 0.30±0.53.

In addition, 23.3% & 16.7% had piles, while 26.7% & 13.3% had bleeding during defecations; among study and control groups respectively.

The sample was homogeneous as there was no statistical significant differences regarding; presence of comorbid diseases additional to the liver cirrhosis, presence of piles and bleeding during defecation between study and control groups as independent t-test =1.5, p = 0.12, $\chi2$= 0.93, p = 0.33, $\chi2$ = 0.01, p = 0.93 respectively.

Table (4): represents that there was no mean of difference between study and control groups regarding Glasgow coma scale measurements over the three readings as independent *t-test* = (0.92, p = 0.35), (1.18, p=0.24), (1.0, p=0.32) respectively

Table (5): it shows up the grades of hepatic encephalopathy between study and control groups; that proved; there was no statistical significant between study and control groups over the three readings as follows; $\chi2$= (1.8, p = 0.39), (0.01, p = 0.93), (1.2, p = 0.53) respectively.

Section Two:

Table (6): Corresponds to patients' activity of daily living between study and control groups as there was no statistical significant mean of difference over the three readings between study and control groups as follows; independent t-test= (1.7, p=0.08), (0.69, p = 0.48), (1.15, p = 0.25) respectively.

But there was marked difference through mean of difference within the study group's three readings as follows Mean±SD = (3.1±1.8) 1st reading, (3.7±1.7) 2nd reading and (4.8±1.8) 3rd reading; in addition to the

statistical confirmation; that ANOVA repeated measures with a greenhouse-Geisser correction the total score of activity of daily living were highly statistically significantly as reported F=24.85 at P value=0.000 over the three readings within the study group.

Table (7): Focuses on patients' Assessment of Constipation-Symptoms between study and control groups; as there was a statistical significant mean of difference over the 2nd and 3rd readings between study and control groups as follows; independent *t-test*= (5.73, p=0.000), (9.23, p=0.000) respectively.

Also there was marked mean of difference within the study group and within the control group over the three readings; but the highest statistical significant difference was within the study group as follows; Mean±SD = (33.26+6.15) 1st reading, (20.36±7.76) 2nd reading and (12.33±7.36) 3rd reading.

In addition to the statistical verification of ANOVA repeated measures with a greenhouse-Geisser correction the total score of Assessment of Constipation-Symptoms were highly statistically significantly different than the control group as study group reported *F*=147.32 at P value = 0.000

Table (8): Illustrates the stool formation progression between study and control groups as it shows there was highly statistical significant difference between study and control groups at the 2nd and at the 3rd readings as independent *t-test* = (5.75, p=0.000), (7.17, p=0.000), respectively.

Table (1): Frequencies and percentages of demographic among patients with liver cirrhosis n=(60)

Variables	Study Group n=30		Control Group n=30		Test
	Frequency	%	Frequency	%	
Age:					
-20<30	1	3.3	2	6.7	
-30<40	3	10	4	13.3	χ^2=27.9
-40<50	4	13.3	3	10	p=0.31
-50<60	8	26.7	12	40	
-60<70	10	33.3	7	23.3	
-≥70	4	13.3	2	6.7	
Mean±SD	55.80±12.73		52.33±12.42		
Gender:					
-Male	8	26.7	17	56.7	χ^2=1.6
-Female	22	73.3	13	43.3	p=0.20
Marital Status:					
-Married	24	80	28	93.3	χ^2=0.53
-Widow	6	20	2	6.7	p=0.46
Profession:					
-Doesn't work	1	3.3	8	26.7	
-House wife	22	73.3	13	43.3	
-Technical work	1	3.3	0	0	χ^2=8.9
-Employer	2	6.7	6	20	p=0.87
-Self employment	1	3.3	0	0	
-Retired	3	10.0	3	10	
Residence:					
-Urban	18	60	22	73.3	χ^2=3.4
-Rural	12	40	8	26.7	p=0.18

***p-value ≤ 0.05** ****p-value ≤ 0.0001**

Table (2): Frequencies and percentages of smoking, sweat, cup of water/day, regular (eating, exercise & sleeping time) among patients with liver cirrhosis n=(60)

Variables	Study Group n=30		Control Group n=30		Test
	Frequency	%	Frequency	%	
Smoking					
-No	25	86.7	19	63.3	χ^2**=0.27**
-Yes	4	13.3	11	36.7	**p=0.60**
Sweat a lot					
-No	22	73.3	16	53.3	χ^2**=0.36**
-Yes	8	26.7	14	46.7	**p=0.54**
Cup of water/day					
-2< 5	20	66.7	11	36.7	χ^2**=24.7**
-5< 8	7	23.3	11	36.7	**p=0.25**
- ≥ 8	3	10	8	26.7	
Mean±SD	**4.50±2.23**		**5.60±1.92**		
Regularly eat:					
-Nothing	0	0	2	6.7	χ^2**=74.2**
-Cereal	4	13.3	12	40	**p=0.10**
-Dry fruit	0	0	0	0	
-Leafy.veg	4	13.3	0	0	
-Fibers as fruits	2	6.7	0	0	
-Whole grain bread	6	20	0	0	
-Milk	2	6.7	0	0	
-Leafy and milk	1	3.3	0	0	
-Vegetables. and fruits	1	3.3	0	0	
-Dry fruit and whole grain	1	3.3	1	3.3	
-Cereal and vegetables	4	13.3	4	13.3	
-Cereal and milk	4	13.3	5	16.7	
-Cereal and whole grain	1	3.3	4	13.3	
-Cereal, milk, dry fruits & fibers	0	0	2	6.7	
Regular exercises:					χ^2**=**
-No	30	100	30	100	**Constant**
Regular sleeping time:					
-No	22	73.3	29	96.7	χ^2**=0.37**
-Yes	8	26.7	1	3.3	**p=0.54**

p-value ≤ 0.05 *****p-value ≤ 0.0001***

Table (3): Frequencies and percentages of medical history among patients with liver cirrhosis n=(60)

Variables	Study Group n=30		Control Group n=30		Test
	Frequency	%	Frequency	%	
Co-morbid diseases					
-Diabetes Mellitus	8	26.7	6	20	
-Hypertension	8	26.7	2	6.7	
-Cardiac	1	3.3	1	3.3	
-Asthma	1	3.3	0	0	
Total Nb. of co-morbid diseases /patient					
-No	19	63.3	22	73.3	
-1 Disease	5	16.7	7	23.3	
-2 Diseases	5	16.7	1	3.3	
-3 Diseases	1	3.3	0	0	
Mean±SD	**0.60±0.89**		**0.30±0.53**		**t-test=1.5 p=0.12**
Presence of piles					
-No	23	76.7	25	83.3	χ^2**=0.93**
-yes	7	23.3	5	16.7	**p=0.33**
Bleeding during defecation					
-No	22	73.3	26	86.7	χ^2**=0.01**
-yes	8	26.7	4	13.3	**p=0.93**

p-value ≤ 0.05 *****p-value ≤ 0.0001***

Table (4): Compare of total mean scores among patients' Glasgow coma scale n=(60)

Study Group n=30	**Control Group n=30**	***t-test***	**p-value**
-1st reading Mean±SD=14.5±1.19	**-1st reading** Mean±SD=14.73±0.69	0.92	0.35
-2nd reading Mean±SD=14.7± 0/57	**-2nd reading** Mean±SD=14.93±0.36	1.18	0.24
-3rd reading Mean±SD=14.9± 0.54	**-3rd reading** Mean±SD=15±0.00	1.0	0.32

***p-value ≤ 0.05** ***p-value ≤ 0.0001**

Table (5): Patients' Hepatic Encephalopathy Grading n= (60):

	1st reading				**2nd reading**				**3rd reading**			
Hepatic Encephalopathy Grade	**(Study)**		**(Control)**		**(Study)**		**(Control)**		**(Study)**		**(Control)**	
	N.	**%**	**N.**	**%**	**N.**	**%**	**N.**	**%**	**N.**	**%**	**N.**	**%**
-No change	21	70	22	73.3	23	76.7	26	86.7	26	86.7	25	86.7
-Trivial	6	20	8	26.7	7	23.3	4	13.3	3	10	4	13.3
-Lethargy	3	10	0	0	0	0	0	0	0	0	0	0
-Somolence	0	0	0	0	0	0	0	0	1	3.3	0	0
-Coma	0	0	0	0	0	0	0	0	0	0	0	0
χ^2=	1.8				0.01				1.2			
P=	0.39				0.93				0.53			

***p-value ≤ 0.05** ***p-value ≤ 0.0001**

Table (6): Compare of total mean scores among patients' activity of daily living. n=(60)

Patient Assessment of ADL-Symptoms			
Study Group n=30	**Control Group n=30**	**t-test**	**p-value**
-1st reading Mean±SD=3.1±1.8	**-1st reading** Mean±SD=4.13±2.63	1.7	0.08
-2nd reading Mean±SD=3.7±1.7	**-2nd reading** Mean±SD= 4.13±2.63	0.69	0.48
-3rd reading Mean±SD=4.8±1.8	**-3rd reading** Mean±SD= 4.16±2.58	1.15	0.25
ANOVA=**24.85 P=0.000	**ANOVA**= 1.00 P=0.32		

***p-value ≤ 0.05** ***p-value ≤ 0.0001**

Table (7): Compare of total mean scores among patients' Assessment of Constipation- Symptoms n=(60)

Patient Assessment of Constipation-Symptoms			
Study Group n=30	**Control Group n=30**	**t-test**	**p-value**
-1st reading Mean±SD=33.26±6.15	**-1st reading** Mean±SD=32.73±7.26	0.30	0.76
-2nd reading Mean±SD=20.36±7.76	**-2nd reading** Mean±SD=31.30±6.96	**5.73	0.000
-3rd reading Mean±SD=12.33±7.36	**-3rd reading** Mean±SD =29.83±7.31	**9.23	0.000
ANOVA= **147.32 p=0.000	**ANOVA= ****10.76 \ p=0.001		

***p-value ≤ 0.05** ***p-value ≤ 0.0001**

Table (8): Patients' stool formation progression. n= (60)

Stool formation progression Scores												
Stool formation	**1st reading (Study)**		**1st reading (Control)**		**2nd reading (Study)**		**2nd reading (Control)**		**3rd reading (Study)**		**3rd reading (Control)**	
	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%
-Hard. *Score (1)*	12	40	16	53.3	2	6.7	14	46.7	0	0	9	30
-Lumpy. *Score (2)*	10	33.3	12	40	9	30	14	46.7	4	13.3	15	50
-Cracks. *Score (3)*	7	23.3	2	6.7	17	56.7	2	6.7	16	53.3	6	20
-Smooth. *Score (4)*	0	0	0	0	1	3.3	0	0	9	30	0	0
-Cut edges. *Score (5)*	1	3.3	0	0	1	3.3	0	0	1	3.3	0	0
-Mushy. *Score (6)*	0	0	0	0	0	0	0	0	0	0	0	0
-Watery. *Score (7)*	0	0	0	0	0	0	0	0	0	0	0	0
t-test	1.88				**5.75				**7.17			
p-value=	0.06				0.000				0.000			

p-value ≤ 0.05 ****p-value ≤ 0.0001***

Discussion

Constipation has been recognized as one of the main precipitating factors for hepatic encephalopathy, the later is a dangerous and common complication of liver cirrhosis **(Hafez et al., 2020)**. Accordingly, constipation should be avoided and early treated specially in cirrhotic patients. Constipation necessitates a nurse's consideration and plans to avoid undesired consequences on a patient's condition progress. Therefore, the purpose of this study was to examine the effect of lifestyle modification instructions on relieving constipation symptoms among patients with liver cirrhosis. The discussion will be presented in two sections: first section; concerns about discussing the description of the study samples' demographic characteristics, and medical related information. While the second section; focuses on argue the hypotheses under the study.

First section:

The results of the current study revealed that the studied patients including the study and the control groups were homogenous concerning their demographic characteristics and medical data relevant information. This is related to the conscious sample selection based on specific inclusion and exclusion criteria, then randomly divided into two groups. Correspondingly **Abd-Elraheem et al.,(2020)** in a study evaluating the effect of using Murdoch Bowel Protocol on the occurrence of constipation for patients in the critical care unit found the baseline characteristics of the study group and the usual care control group were similar regarding demographic and health related data.

Regarding demographic characteristics, the current study results revealed that the mean age was 55.80±12.73 and 52.33±12.42 of the intervention and control groups respectively. These results are nearly compatible with a study done by **Hafez et al., (2020)** who reported the mean age of the included patients was 53.19 ±3.6 years old. However, **Medhat et al., (2021**) found the mean age of their study sample was 58.6 years old. Moreover, **Liu et al., (2017)** confirmed that age over 50 years old is a well-known risk factor for both cirrhosis and HE.

In a marked contrast with a large amount of existing information highlighting the higher prevalence of cirrhosis in the Egyptian males than females, as male-to-female incidence ratio of cirrhosis and HE varies between 2:1 and 4:1 across populations based on **(Hafez et al., 2020**). But; considering the current study researchers registered a substantial percent of the entire sample was female patients. The justification of that was referred to the current researchers concerns, as recruiting only patients with constipation in the study was one of main important target, which also grounded on previous studies that reported a higher prevalence of constipation among females.

A relevant study congruent with the current study finding as they reported the prevalence of constipation was more among female where female: male ratio=1.44 (**Encket al., 2016)**. Speaking the same language, a systematic review reported a female to male ratio of 2.1, worldwide

(Moezi et al., 2018a). Female sex hormones can be contributed to this higher prevalence along with pelvic floor injury related to obstetric trauma, which may contribute to constipation **(Xiao et al., 2005).**

Regarding medical data, the majority of the study and control groups were non-smokers. This could be attributed to the nature of the LC as a debilitating disease that the patients become reluctant to smoke. In Egypt, a recent study documented the most updated prevalence of smoking is 22% in 2010 and is rising **(Fouda et al., 2018)**. While the mean of drinking cup of water was 4.50±2.23and 5.60±1.92 among study and control groups respectively.

Also, less than one-fourth of the study group had whole-grain bread versus one-third of the control group had cereals. It was found that the entire sample, both study and control groups did not practice any exercises. However, the vast majority of both the study and the control groups have no regular sleeping hours. On top of that, the sample was homogeneous as there were no statistically significant differences regarding smoking, sweating, drinking cups of water/day regular (eating, exercise & sleeping time) between study and control groups.

This is nearly similar to a study assessing barriers to lifestyle engagement in cirrhosis, and concluded that 47% of subjects reported low activity levels; this is because patients with LC were more fatigued with exercise **(Ney et al., 2017)**. However**, Elgammal et al., (2020)** reported an association between liver cirrhosis and sleep disorders especially noted in ascetic patients. Where 33.3% of cirrhotic patients experienced excessive daytime sleepiness compared to none of the healthy control.

Moreover, study and control groups was homogenous regarding presence of piles and bleeding during defecation; in-spite it was an expected finding, as it is well known that patients with hepatic condition suffers from piles leading to bleeding susceptibility but it was important result that merely quarter of both groups suffers from both problems; so patients and nurses should assess it consciously for immediate physician report in case of any progression. Certainly such finding must be a considerable as it is related to major complications which must be treated wisely though both medical and/or surgical procedures along with nursing management through life style modifications in form of tolerable exercises, meal regulation….etc. A study was held in Egypt by **Zeineldin et al., (2018)** that goes with the current study as they reported that internal hemorrhoids were testified to be common in patients with portal hypertension and liver cirrhosis with prevalence ranging between 21% and 36%.

There was no mean of difference variation between study and control groups regarding Glasgow coma scale measurements over the baseline assessment, one and two weeks after the implementation of the lifestyle modification instructions. The researchers could interpret this result as one of the inclusion criteria in the current study is that the patients should be conscious, not less than 13/15 on the Glasgow Coma Scale so patient can understand and implement the instructions given by the researchers.

Concerning Hepatic Encephalopathy Grading by WHC, the study result proved that there was no statistical significant difference over the three readings between the study and control groups. Notably, the majority of the entire sample either study or control groups had Grade (0) on WHC**.** This could be explained partially in the light of the sample inclusion criteria, mean age of the sample was middle-aged adult. In addition to the study results which proved that the minority (about one fourth) of the entire sample only had co-morbid diseases as (diabetes mellitus, hypertension) and the smallest absolute percentage of them had more than one co-morbid disease which could justify that there is no obvious risk for developing HE.

Weissenborn, (2019) have been agreed with the current finding and reported an association between some factors as presence of co-morbid diseases like (renal disorders, diabetes mellitus, infections) as well as older age definitely could affect the general health condition of patients with LC but will not considered a risk factor for developing HE.

In brief, the results of the demographic and medical data in the study on hand revealed that patients in both groups were homogenous and there was no statistically

significant difference between the two groups which control external variables that might interfere with the explanation of the study results.

Second section:

It is worth reminding lifestyle modification instructions of the current study mainly based on regular bowel habits, a healthy balanced and adequate fiber diet, sufficient fluid intake, proper exercise to patient's condition, last but not least doing abdominal massage.

Corresponding to patients' activity of daily living between study and control groups surprisingly there was no statistically significant mean of difference over the three readings between study and control groups. The researchers could attribute this reasoning result to the short duration of the follow up where the patients were followed up for two weeks after implementation of the lifestyle modification instructions.

This result is congruent with **Zhang et al., (2019)** who studied the effect of health education in the activity of daily living and quality of life for patients with liver cirrhosis and found no difference in the activity of daily living scores between the study and control groups on hospital admission and at discharge, but when expanding the follow up to additional two months after hospital discharge; the ADL scores were significantly higher in the study group compared with the control group.

On the other hand, the current study revealed marked difference through the mean of difference within the study group at baseline, one and two weeks after the implementation of the lifestyle modification instructions where the total score of activity of daily living was highly statistically significantly over the three readings within the study group. This could be explained by the researchers as empowerment of the patients by the given lifestyle modification instructions that inspired and improved patient compliance as the patient felt more in handle of the management of their complaints.

To conclude constipation could dramatically alter the activity of daily living and compromised the quality of life for patients as declared by **Yu et al., (2018)** in their study findings. For the nurses to educate and alter the patient's lifestyle to control constipation and bring a positive outcome on the activity of daily living as speculated by the researchers of the current study, this may need a longer time as evidenced in the study on hand. So regarding differences of activity of daily living between study and control groups, although there was no statistically significant mean of difference; but there was a statistically significant difference within the three study readings versus within the three control readings, therefore, the first study research hypothesis will be partially accepted.

With respect to Assessment of Constipation-Symptoms, the present study results depicted that there was a statistically significant mean of difference over the 2nd and 3rd readings between study and control groups. Notably, there was a marked mean of difference within the study group versus within the control group at the three readings; although the highest statistical significant difference was within the study group in addition to the statistical verification of ANOVA repeated measures with a greenhouse-Geisser correction the total score of Assessment of Constipation-Symptoms were highly statistically significantly different than the control group.

These current results were in agreement with **Nour-Eldein et al., (2014**) study which showed a highly statistically significant enhancement in post-intervention total score and sub-scores of the severity of symptoms of constipation based on PAC-SYM after implementing education on lifestyle modification for elderly with constipation. What is more, **Ilyas et al., (2021)** reported that there was a significant relation between decreased constipation and high fiber (as fruits and vegetables) and fluid intake which are considered an effective approaches to constipation management. Speaking the same language, in a systematic review done by **Kayikci et al., (2020)**, it was concluded that abdominal massage reduced the intensity of constipation symptoms, enhanced bowel movements, and the frequency of defecation. This could be attributed to a great extent to the effect of the lifestyle modification instructions that were given to the study group. Accordingly, the second study research hypothesis was

accepted.

The present study results were consistent with the study by **Daley et al., (2008)**, who confirmed that exercise (which considered one item of our instructions) significantly enhanced symptoms of constipation incomparable to usual care at 12-weeks follow-up. The findings of a cohort study of 9000 Adults in Iran highlighted that the rate of constipation reduced to half in those with higher physical activity (**Moezi et al., 2018)**. This could be attributed to increasing propulsive movements in the colon as a result of physical activity. Another 6-month study by **Chin A Paw et al., (2006)** who negates the effect of moderate intensity exercise training on improving the complaints of constipation in the elderly, this contradiction might be due to methodological variation.

Regarding, the assessment of stool formation based on BSFS the existing study findings represented a highly statistically significant difference between study and control groups at the 2nd and the 3rd readings. It is worth noting that the dominant Bristol form was Type 1 for both study and control groups in the baseline (1st) reading indicating the presence of constipation with no significant statistically difference between both groups. While one week (2nd reading) after study group's lifestyle modification instructions were applied, was noticed that; more than half of the study group reported Bristol form (Type 3) which indicates a normal stool consistency; however, near half of the control group reported Bristol form (Type 1). Looking for the Bristol form in the second week (3rd reading) the majority of the study group showed (Type 3 and Type 4) while, the majority of the control group showed (Type 1and Type 2) forms, this could be attributed to the effect of the implementation of the instructions. Bearing in mind this finding, the 3rd study research hypothesis was greatly accepted.

The current study finding was in agreement with a study delineated a significant association between moderate physical activity and softer stool type where, 35.5% of the studied sample who were moderately active had (Type 4) stool consistency, versus 17.8% of sedentary participants. Also a significant association was noticed between the amount of water consumed and softer stool consistency. where, 8.3% of the studied sample who consumed ≥ 8 glasses of water/day had (Type 1) stool form, in comparison to 21.1 % who had < 8 glasses of water/day **(Sajitha&Kumari, 2021)**.

In accordance with these results **Borre et al., (2015)** stressed that increased fiber intake will decrease colonic transit time along with improve the frequency and consistency of stools in 50% of patients. Moreover, 2L/day of fluid and 30 minutes' exercise per day enhance the positive effects of fiber and lighten symptoms of constipation. **Fathallah et al., (2017)** declared that the benefit of increasing fluid intake or daily physical exercise in the treatment of chronic constipation have a lack of evidence, except specific situations such as elderly, hospitalized, institutionalized, dehydrated people or people consuming fluids less than 500mL/day. What's more several researches confirmed the importance of abdominal massage intervention, which improved the constipation problem according to Bristol Stool Scale **(Fekri et al., 2021;Baran &Ates, 2019 ; Çevik et al., 2018)).**

In a word, evidence from various researches indicated that life style modification as high fiber diet, increased fluid intake, mild to moderate physical activity, abdominal massage, regular sleeping hours, and regular bowel habit are the most preferable and effective non-pharmacological means to counter constipation symptoms. It is important to urge nurses to encourage patients with liver cirrhosis assume a healthy lifestyle. Long-term benefits can be established by large studies over a longer period of time, where the patient has assumed the habit of healthy lifestyle. Also the current study result hopefully adds to the body of knowledge in word of delineating strategies for relieving constipation symptoms in patients with LC; especially the current study includes application of more than one perspective modification (General instruction, abdominal massage, simple exercises, dietary enhancement and an avoidance list).

Conclusion

The present study establishes the benefits of life style modification instructions to improve constipation symptoms among patients Liver Cirrhosis. Based on the growing emphasis on the role of nurses in implementation of independent interventions with no risk to maintain patients' safety, the nurse would have a crucial role in implementing the nursing instructions regarding lifestyle modifications to relieve constipation for patients with liver cirrhosis in order to reduce the risk of negative consequences of this evident clinical problem specially in form of hepatic encephalopathy. This study may provide an evidence base practice for the future development of both nursing practice and research.

Recommendation

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

1. It is suggested to apply lifestyle modification instructions for patients with liver cirrhosis, to maximize those patients' benefits especially for their bowel movement and decreasing hepatic encephalopathy.
2. Replicate the study on a larger study sample and to be followed for longer period.

Conflict of interest:

The researchers declared no conflict of interest and no fund from any institution.

Acknowledgements:

The researchers are extremely grateful to all participants of the current research and those who facilitate the study conduction.

References

Abd-Elraheem, M. R. A.-E., Ali, Z. H., Khalil, N. & Mohamed, D. H. (2020). Effect of Implementing Murdoch Bowel Protocol on the occurrence of Constipation among Critically Ill Patients. Egyptian Journal of Health Care, 11(4), 279–299.

Alboraie, M., Youssef, N., Sherief, A. F., Afify, S., Wifi, M.-N., Omran, D., Hafez, E., Omar, H., Eltabbakh, M., Abdellah, M., El Badry, M., Salaheldin, M., Ahmed, Y., Ali-Eldin, Z., Farid, A., Abdeen, N., El Halwagy, H., Abdalgaber, M., Moaz, I., … El Kassas, M. (2019). Egyptian liver library: An indexed database for liver disease evidence in Egypt. Arab Journal of Gastroenterology, 20(2), 109–113. https:// doi. org/ 10. 1016/j.ajg.2019.05.004

Alboraie, M., Madian, A., & Aly, H. H. (2021). Current situation of viral hepatitis in Egypt. Microbiology and Immunology, 65(9), 352–372. https://doi. org/ 10. 1111/ 1348-0421.12916

Amer, I. F., Shennawy, E. M. E., Batea, H. E., Ahmed, M. H., Sharawy, S. E., &Mahros, A. M. (2021). Accuracy of noninvasive tests in the prediction of portal hypertensive gastropathy in Egyptian patients with cirrhosis. JGH Open, 5(2), 286–293. https://doi.org/10.1002/jgh3.12486

Baran, A., &Ates, S. (2019). The Effects of Abdominal Massage in the Management of Constipation in Elderly People: A Randomized Controlled Study. Topics in Geriatric Rehabilitation, 35(2), 134–140. https://doi.org/10.1097/TGR.0000000000000223

Blach, S., Zeuzem, S., Manns, M., Altraif, I., Duberg, A.-S., Muljono, D. H., Waked, I., Alavian, S. M., Lee, M.-H., Negro, F., Abaalkhail, F., Abdou, A., Abdulla, M., Rached, A. A., Aho, I., Akarca, U., Al Ghazzawi, I., Al Kaabi, S., Al Lawati, F., … Razavi, H. (2017). Global prevalence and genotype distribution of hepatitis C virus infection in 2015: A modelling study. The Lancet Gastroenterology & Hepatology, 2(3), 161–176. https:// doi. org/ 10. 1016/S2468-1253(16)30181-9

Borre, M., Qvist, N., Raahave, D., Worsøe, J., Ærthøj, J. P., Christensen, P., & Krogh, K. (2015). [The effect of lifestyle modification on chronic constipation]. Ugeskrift for Laeger, 177(15), V09140498.

Cash WJ, McConville P, McDermott E, McCormick PA, Callender ME, McDougall NI (January 2010). "Current concepts in the assessment and treatment of hepatic encephalopathy". QJM. 103 (1): 9–16.doi:10.1093/qjmed/hcp152. PMID 19903725

Çevik, K., Çetinkaya, A., YigitGökbel, K., Menekse, B., Saza, S., &Tikiz, C. (2018). The Effect of Abdominal Massage on Constipation in the Elderly Residing in

Rest Homes. Gastroenterology Nursing, 41(5), 396–402. https:// doi. org/10.1097/SGA.0000000000000343

Chin A Paw, M. J. M., van Poppel, M. N. M., & van Mechelen, W. (2006). Effects of resistance and functional-skills training on habitual activity and constipation among older adults living in long-term care facilities: A randomized controlled trial. BMC Geriatrics, 6, 9. https:// doi.org/ 10.1186/1471-2318-6-9

Ciesla JR, et al. Eval Health Prof (1993); Validity and Reliability of Katz ADL Index16(2):190-203.

Daley, A. J., Grimmett, C., Roberts, L., Wilson, S., Fatek, M., Roalfe, A., & Singh, S. (2008). The effects of exercise upon symptoms and quality of life in patients diagnosed with irritable bowel syndrome: A randomised controlled trial. International. Journal of Sports Medicine, 29(9), 778– 782.https://doi.org/10.1055/s-2008-1038600

Elbahrawy, A., Ibrahim, M. K., Eliwa, A., Elgammal, N., Zaher, T. I., Elkomy, H., Abdelmoaty, A. A., Abdallah, M., &Emara, M. H. (2020). How frequent is sleep-disordered breathing among Egyptian cirrhotic adults? Clinical and Experimental Hepatology, 6(2), 150–157. ttps://doi. org/ 10. 5114/ ceh.2020.95940

Enck, P., Leinert, J., Smid, M., Köhler, T., &Schwille-Kiuntke, J. (2016). Prevalence of constipation in the German population – a representative survey (GECCO). United European Gastroenterology Journal, 4(3), 429–437. https://doi.org/10.1177/2050640615603009

Fathallah, N., Bouchard, D., & de Parades, V. (2017). [Diet and lifestyle rules in chronic constipation in adults: From fantasy to reality…]. PresseMedicale (Paris, France: 1983), 46(1), 23–30. https://doi.org/10.1016/j.lpm.2016.03.019

Fekri, Z., Aghebati, N., Sadeghi, T., &Farzadfard, M. taghi. (2021). The effects of abdominal "I LOV U" massage along with lifestyle training on constipation and distension in the elderly with stroke. Complementary Therapies in Medicine, 57,102665. https:// doi. org/ 10.1016/j.ctim.2021.102665

Fouda, S., Kelany, M., Moustafa, N., Abushouk, A. I., Hassane, A., Sleem, A., Mokhtar, O., Negida, A., &Bassiony, M. (2018). Tobacco smoking in Egypt: A scoping literature review of its epidemiology and control measures. Eastern Mediterranean Health Journal = La Revue De Sante De La MediterraneeOrientale = Al-Majallah Al-Sihhiyah Li-Sharq Al-Mutawassit, 24(2), 198–215.

FrankL.,FlynnJ., RothmanM., 2001. Use of a Self-Report Constipation Questionnaire With Older Adults in Long-Term Care. The Gerontologist, Volume 41, Issue 6, 1 December 2001, Pages 778–786, https://doi.org/10.1093/geront/41.6.778.

Gill M, Reiley D, Green S. (2004) Interrater reliability of Glasgow Coma Scale scores in the emergency department. Annals of Emergency Medicine;43(2):215- 23https:// doi.org/10.1016/S0196-0644(03)00814-X

Hafez, M. Z. E., Abdallah, H. A. M., & Hamad, M. A. M. (2020). Assessment of Precipitating Factors and Outcomes of Hepatic Encephalopathy in Cirrhotic Patients. The Egyptian Journal of Hospital Medicine, 81(3), 1718–1721. https://doi.org/10.21608/ejhm.2020.118575

Handady, S. O., Ahmed, M. A., Fadl, A. A., &Alawad, A. A. M. (2015). Precipitating factors of hepatic encephalopathy among Sudanese patients with Liver Cirrhosis. Chest, 6, 5.

Hassanein T., Blei, A. T., Perry W. &Hilsabeck R. (2009). Performance of the Hepatic Encephalopathy Scoring Algorithm in a Clinical Trial of Patients With Cirrhosis and Severe Hepatic Encephalopathy. The American Journal of Gastroenterology 104(6):1392-400. DOI: 10.1038/ajg.2009.160

Hearn, C., Ellington, B. J., & Jones, R. (2018). The Role of the Nurse Practitioner in the Management of Nonalcoholic Fatty Liver Disease. Gastroenterology Nursing, 41(5), 424–426. https:// doi. org/ 10. 1097/ SGA. 0000000000000394

IBM Corp. Released (2012). IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.

Ilyas, J., Shahid, S., Jafri, A., Saeed, M., Rizwan, A., Khan, U., &Zahir, S. M. (2021). Functional constipation and its association with lifestyle habits of medical

students using Rome IV Diagnostic Criteria. Middle East Journal of Family Medicine, 7(10), 62.

Kabir, M. A., Chowdhury, J., Bari, M. A., Bodruddoza, K., Saha, A. K., &Alam, S. B. (2018). Detection of Precipitating Factors of Hepatic Encephalopathy in Chronic Liver Disease Patients in a Tertiary Hospital. Journal of Medicine, 19(1), 10–14. https:// doi. org/10.3329/jom.v19i1.34833.

Kalaitzakis E. (2014). Gastrointestinal dysfunction in liver cirrhosis. World Journal of Gastroenetrology, v.20(40); 2014 Oct 28.

Katz, S., Down, T.D., Cash, H.R., &Grotz, R.C. (1983) Progress in the development of the index of ADL. The Gerontologist, 10(1), 20-30. In. McCab D., 2019. Katz Index of Independence in Activities of Dai ly Living (ADL). https://consultgeri.org/try-this/general-assessment/issue-2.pdf**.**

Kayikci, E. E., Kocatepe, V., Akyuz, F., & Can, G. (2020). The Effects of Abdominal Massage on the Management of Constipation: A Systematic Review of Randomised Controlled Trials.

Larkin, P. J., Cherny, N. I., La Carpia, D., Guglielmo, M., Ostgathe, C., Scotte, F., &Ripamonti, C. I. (2018). Diagnosis, assessment and management of constipation in advanced cancer: ESMO Clinical Practice Guidelines. Annals of Oncology, 29, iv111–iv125.

Lewis SJ, Heaton KW (1997) Stool form scale as a useful guide to intestinal transit time. Scandinavian Jorunal of Gastroenterology 32: 920–4.

Liu, P., Xie, S.-H., Hu, S., Cheng, X., Gao, T., Zhang, C., & Song, Z. (2017). Age-specific sex difference in the incidence of hepatocellular carcinoma in the United States. Oncotarget, 8(40),68131–68137. https:// doi. org/ 10. 18632/ oncotarget.19245

Medhat, M. A., Gushken, F., Khaled, T., Hassan, E., Abd El-Rehim, A., &Kamel, S. (2021). Acute-on-chronic liver failure in Egypt: An underestimated complication of liver cirrhosis. European Journal of Gastroenterology &Hepatology, 30, 00–00.

Milosavljevic, T., Popovic, D. D., Mijac, D. D., Milovanovic, T., Krstic, S., &Krstic, M. N. (2021). Chronic Constipation: Gastroenterohepatologist's Approach. Digestive Diseases. https:// doi. org/ 10. 1159/ 000516976

Moezi, P., Salehi, A., Molavi, H., Poustchi, H., Gandomkar, A., Imanieh, M. H., &Malekzadeh, R. (2018a). Prevalence of Chronic Constipation and Its Associated Factors in Pars Cohort Study: A Study of 9000 Adults in Southern Iran. Middle East Journal of Digestive Diseases, 10(2), 75–83. https://doi.org/10.15171/mejdd.2018.94

Ney, M., Gramlich, L., Mathiesen, V., Bailey, R. J., Haykowsky, M., Ma, M., Abraldes, J. G., &Tandon, P. (2017). Patient-perceived barriers to lifestyle interventions in cirrhosis. Saudi Journal of Gastroenterology: Official Journal of the Saudi Gastroenterology Association, 23(2), 97–104. https://doi.org/10.4103/1319-3767.203357

Nour-Eldein, H., Salama, H. M., Abdulmajeed, A. A., &Heissam, K. S. (2014). The effect of lifestyle modification on severity of constipation and quality of life of elders in nursing homes at Ismailia city, Egypt. Journal of Family & Community Medicine, 21(2), 100–106. https:// doi. org/ 10. 4103/ 2230- 8229.134766

Pantham, G., Post, A., Venkat, D., Einstadter, D., & Mullen, K. D. (2017). A New Look at Precipitants of Overt Hepatic Encephalopathy in Cirrhosis. Digestive Diseases and Sciences, 62(8),2166–2173. https://doi.org/10.1007/s10620-017-4630-y

Poudyal, N. S., Chaudhary, S., KC, S., Paudel, B. N., Basnet, B. K., Mandal, A., Kafle, P., Chaulagai, B., Mojahedi, A., Paudel, M. S., Shrestha, B., &Gayam, V. (2019). Precipitating Factors and Treatment Outcomes of Hepatic Encephalopathy in Liver Cirrhosis. Cureus, 11(4), e4363. https:// doi. org/ 10. 7759/cureus.4363

Price P.C., Jhangiani R., Chiang I.A., Leighton D. C, & Cuttler C. (2017). Research Methods in Psychology. https:// opentext. wsu. edu/ carriecuttler/ front-matter/about-this-book-2/

Raker J. M. Whelan K., 2016.Validity and reliability of the Bristol Stool Form Scale in healthy adults and patients with diarrhoea- predominant irritable bowel

syndrome https:// www. researchgate. net/ publication/ 305922733_ Validity_ and_ reliability_ of_ the_ Bristol_ Stool_ Form_ Scale_ in healthy_adults. and patients with diarrhea predominant irritable bowel syndrome.

Roberts, S. B., Hansen, B. E., Shin, S., Abrahamyan, L., Lapointe-Shaw, L., Janssen, H. L. A., Razak, F., Verma, A. A., & Hirschfield, G. M. (2021). Internal medicine hospitalisations and liver disease: A comparative disease burden analysis of a multicentre cohort. Alimentary Pharmacology & Therapeutics, 54(5), 689–698. https:// doi. org/ 10. 1111/apt.16488

Roedl K.L., Wilson L. S. & Fine J. (2015). A systematic review and comparison of functional assessments of community-dwelling elderly patients J Am Assoc Nurse Pract. 2016 Mar;28(3):160-9. doi: 10.1002/2327-6924. 12273**.**

Sajitha, N., &Kumari, B. (2021). Association of gender, physical activity, and fluid intake with bowel habits and symptoms of constipation. National Journal of Physiology, Pharmacy and Pharmacology, 11(6), 657–661.

Sepanlou, S. G., Safiri, S., Bisignano, C., Ikuta, K. S., Merat, S., Saberifiroozi, M., Poustchi, H., Tsoi, D., Colombara, D. V., Abdoli, A., Adedoyin, R. A., Afarideh, M., Agrawal, S., Ahmad, S., Ahmadian, E., Ahmadpour, E., Akinyemiju, T., Akunna, C. J., Alipour, V., … Malekzadeh, R. (2020). The global, regional, and national burden of cirrhosis by cause in 195 countries and territories, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. The Lancet Gastroenterology &Hepatology, 5(3), 245–266. https://doi.org/10.1016/S2468-1253 (19) 30349-8.

Teasdale, G., Jennett, B., (1974). Assessment of coma and impaired consciousness. Lancet; Acta Neurochir (Wien) 81-84. https://www.ncbi.nlm.nih.gov/pubmed/961490**.**

Teasdale G., Jennett B. (1976). Assessment and prognosis of coma after head injury. PMID: **961490** DOI: 10.1007/BF01405862

Weissenborn, K., (2019). Minimal/Covert Hepatic Encephalopathy – Impact of Comorbid Conditions. Journal of Clinical and Experimental Hepatology. Jan-Feb; 9(1): 109–111. Published online 2018. Sep. doi: 10. 1016/ j.jceh.2018.08.010.

Xiao, Z.-L., Pricolo, V., Biancani, P., & Behar, J. (2005). Role of progesterone signaling in the regulation of G-protein levels in female chronic constipation. Gastroenterology, 128(3), 667–675. https:// doi. org/ 10.1053/j.gastro.2004.12.001.

Yiannakou,Y.,Tack, J., Piessevaux, H., Dubois,D., Quigley, Silva, Joseph, Kerstens,, (2017). Gastrointestinal Drugs Advisory Committee Briefing Document Prucalopride for Chronic Idiopathic Constipation. https://www.fda.gov/media/119034/download

Yu, Q.-J., Yu, S.-Y., Zuo, L.-J., Lian, T.-H., Hu, Y., Wang, R.-D., Piao, Y.-S., Guo, P., Liu, L., Jin, Z., Li, L.-X., Chan, P., Chen, S.-D., Wang, X.-M., & Zhang, W. (2018). Parkinson disease with constipation: Clinical features and relevant factors. Scientific Reports, 8, 567. https:// doi.org/10.1038/s41598-017-16790-8.

Zhang, X., Xi, W., Liu, L., & Wang, L. (2019). Improvement in Quality of Life and Activities of Daily Living in Patients with Liver Cirrhosis with the Use of Health Education and Patient Health Empowerment. Medical Science Monitor: International Medical Journal of Experimental and Clinical Research, 25, 4602–4608. https:// doi. org/ 10. 12659/ MSM.914487.

Zeineldin, A.A., Gaber, A., Shabana M. M. A (2018) Rubber band ligation for bleeding hemorrhoids in hepatic patients. Menoufia Medical Journa. Volume : 31 | Issue : 1 | Page : 108-113l DOI: 10.4103/1110-2098.234236