Effect of a Designed Nursing Intervention on Knowledge and Fatigue among Patients with Liver Cirrhosis

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Abstract: Background: Liver cirrhosis is characterized by poor life expectancy and is a leading cause of morbidity and mortality. It carries the risk of life-threatening complications, partly due to a number of co-morbidities. **Purpose:** to examine effect of a designed nursing intervention on knowledge and fatigue among patients with liver cirrhosis. **Design:** A quasi-experimental research design was carried out .It conducted in outpatient clinic in Hepatology Department, National Liver Institute, Menoufia University, Egypt. A purposive sample of 80 patients with liver cirrhosis was included. Three instruments was used, a structured interviewing questionnaire that include socio-demographic data and medical data, Knowledge Assessment Questionnaire and Fatigue impact scale (FIS). **Results:** There was a significant statistical improvement in knowledge score at post intervention compared to pre intervention. A highly significant improvement appeared in the fatigue categories after nursing intervention. **Conclusion:** Implementing of a designed nursing intervention has a significant role in improving knowledge and reducing fatigue among studied patients with liver cirrhosis. **Recommendations:** Providing continuous self-care education programs for liver cirrhotic patients in hepatology units to overcome symptoms and complications of the disease.

Key words: *Nursing Intervention, Knowledge, Fatigue, and liver cirrhosis.*

Introduction

Liver cirrhosis has become one of the major causes of morbidity and mortality. The Global Burden of Liver Disease in the world reported that, liver disease accounts for approximately two million deaths per year worldwide, one million due to complications of cirrhosis and one million due to viral hepatitis and hepatocellular carcinoma (Asrani et al., 2019).

Cirrhosis is a late stage of chronic liver disease with extensive scarring replaces healthy liver tissue and impaired liver function lead to liver failure. Cirrhosis is currently the 11th most common cause of death globally and liver cancer is the 16th leading cause of death; combined, they account for 3.5% of all deaths worldwide.

Cirrhosis is within the top 20 causes of disability-adjusted life years and years of life lost, accounting for 1.6% and 2.1% of the worldwide burden (Asrani et al., 2019).

The growing prevalence of liver cirrhosis is due to the increasing burden of its risk factors. Hepatitis B virus (HBV) and hepatitis C virus (HCV) are the two major causes of liver cirrhosis. Globally, 257 million people were infected with chronic HBV in 2015. Asia and Africa were the two highest endemic countries, with an overall prevalence of over 8%. The rising prevalence of HCV is also an emerging issue for health in many regions. There were about 71 million people with HCV in 2015. The prevalence in highly endemic regions,

including Central Asia and the Mediterranean was over 3.5% (Wong et al., 2019).

As a consequence, patients develop a number of complications that result in frequent hospital admissions and high morbidity and mortality. Patients with cirrhosis require constant and rigorous monitoring both in and outside the hospital (Marta et al., 2020). Cirrhosis of liver is an irreversible and a fatal disease arising from different chronic liver disorders and it is an advanced stage of liver fibrosis. It hampers patients' daily life as well as health related quality of life that mostly depend on nursing management, in which damaged tissues are replaced by collagen layers and lead to deficiency of the liver cell function. Decompensated cirrhosis may lead to hepatocellular carcinoma (Zhang et al., 2017).

In one study conducted in El-kasr El Ainy, Cairo University Hospital, entitled "The impact of self-care instructional program on quality of life of patients with liver cirrhosis found that, the patients' knowledge about the prevention and care of cirrhotic patients is improved after the educational program. All of patients knew the complications of cirrhosis, allowed and prohibited food and drugs after the program. The total knowledge score is improved after the educational program (Mahmoud et al., 2013).

Fatigue is the most common complaint amongst patients and is clinically significant in up to 50% of patients. The personal impact of fatigue in patients with chronic liver disease (CLD) can be substantial, with patients reporting that their fatigue interfered with many aspects of their lives, including physical activity (73%), family life (57%) and job performance (30%) (Marrone et al., 2017).

The goal of treatment is to minimize the progression of the disease and to prevent complications. There is no specific cure for cirrhosis. It is well-established that good patient education has proven to be a key tool in disease management, providing significant benefit in knowledge and behavioral modifications. The wide variation in patient knowledge may affect patients' willingness to accept and adhere to medical interventions (Al Ghamdi & Shah, 2018).

The goals of nursing intervention for patient with liver cirrhosis may include increase participation in activities, improve nutritional status, improve skin integrity, decrease potential for injury, improve mental status, and absence of complications (Fabrellas et al., 2020).

Significance of the study:

Liver cirrhosis is chronic disease considered as an Egyptian health problem of wide prevalence. According to the latest WHO data published in 2018 Liver Disease Deaths in Egypt reached 12.40% of total deaths. The age adjusted death rate is 116.08 per 100,000 of population ranks Egypt in the world (WHO, 2018).

Egypt had the highest age-standardized death rate of cirrhosis in all years, 95%. The proportion of cirrhosis deaths due to alcohol-related liver disease was in Egypt specifically 4-8%. There were 10.6 million prevalent cases of decompensated cirrhosis and 112 million prevalent cases of compensated cirrhosis globally. There was a significant increase in age-standardized prevalence rate of decompensated cirrhosis. Causes of liver cirrhosis, hepatitis B caused the greatest proportion of cirrhosis deaths (29.0%) and prevalent cases of both decompensated (27.9%) and compensated (32.6%) cirrhosis. The age-standardized prevalence of compensated and decompensated

cirrhosis increased more than for any other cause of cirrhosis (by 33.2% for compensated cirrhosis and 54.8% for decompensated cirrhosis) (Sepanlou et al., 2020).

Patients with cirrhosis lack important knowledge about disease self-management. This lack of knowledge may pose a barrier to health care providers who are attempting to maximize outcomes for their patients. The study found that patient knowledge, or at least their ability to access the necessary information, was improved by a simple educational intervention. The study also speculate that future efforts in this area could lead to decreased hospitalizations and resource utilization (Elshamy et al., 2019).

Nurses play an important role in the multidisciplinary team because they perform comprehensive and continuous patient care. Nursing-sensitive patient outcomes and select specific nursing interventions to achieve the desired goals, to meet comprehensive and complex patient needs in an efficient and safe way, nurses need to have critical thinking skills to accurately diagnose. In patients with liver cirrhosis, nursing care goals may include prevention of complications; promotion, maintenance, and restoration of health (facilitating optimal functional ability in the patients' desired roles, maximizing well-being, and promoting patient satisfaction (Abo El Ata et al., 2021).

Purpose:

The present study aims at examine the effect of a designed nursing intervention on knowledge and fatigue among patients with liver cirrhosis.

Research Hypotheses:

1. Patients with liver cirrhosis who will receive nursing intervention will have higher score of knowledge than pre nursing intervention

2. Patients with liver cirrhosis who will receive nursing intervention will have an improvement in fatigue score than pre nursing intervention.

Methods

Research design

Quasi-experimental (pre and post) research design was carried out to achieve the aim of the study.

Setting

The study was conducted in outpatient clinic in Hepatology and Gastrointrodology Department, National Liver Institute in Menoufia University, Shebin Elkom city, Egypt.

Sampling

Purposive sample of 80 patients with liver cirrhosis was included in the study.

Sample size and power analysis:

Sample equation

Sample size n = [DEFF*Np (1-p)]/ [(d2/Z21-α/2*(N-1)+p*(1-p)]
Results from Open Epi, Version 3, open source calculator—SSPropor
We used 95% confidence intervals, with a sample size of 80 liver cirrhosis patients.
Population size (for finite population correction factor or fpc) (N): 1000
Hypothesized % frequency of outcome factor in the population (p): 40%+/-5
Confidence limits as % of 100(absolute +/- %)(d): 5%
Design effect (for cluster surveys-DEFF): 0.3. We used Epi website (Open Source Statistics for Public Health)*.

Inclusion criteria

The subjects were recruited based on the following criteria:

- Patients age from 20 – 60 years. Patients diagnosed with liver cirrhosis according to Pugh et al., (1973) and Lucey et al., (1997) - class A and B which indicates a moderate hepatic impairment and patients of both sex was included.

Exclusion criteria

Patients with diabetes, chronic renal failure, stroke, hepatic cells carcinoma (hcc) and any malignancy, heart disease and psychiatric diseases were excluded, because previous diseases affects the findings outcome .

Data collection Instruments

The study included the following Instruments:

Instrument 1: A structured interviewing questionnaire prepared by the researchers which included:
- **Part one:** Socio-demographic data of the patients such as age, sex, level of education, occupational, income, place of residence, telephone number, marital state and family members.
- **Part two:-** Medical data such as; diagnosis of cirrhosis according to child Pugh calcification, duration and detection of the disease, frequency of previous hospitalization and causes of hospitalization. Physiological measurement such as; weight, abdominal circumference, degree of ascites and skin condition and laboratory investigations related to liver cirrhosis patients such as; bilirubin total and direct, albumin, liver function test, kidney function test, prothrombin concentration, complete blood count, hepatitis C virus and hepatitis B virus.

Instrument II: Knowledge Assessment Questionnaire: It was constructed by the researchers based on related literature to evaluate gain of knowledge after implementation of the nursing intervention. It included 20 questions for assessing patient's knowledge about liver cirrhosis, causes, symptoms, complications and disease management (Taha et al., 2015).

Scoring system:

The knowledge assessment questionnaire items contained 20 items and the score of each item as (0) for don't know/ wrong answer and (1) for correct answer. These items were as follow: assessment of patient's knowledge regarding liver cirrhosis, symptoms, manifestation and its management the cirrhotic patients 'knowledge about chronic liver diseases was evaluated giving a score of 0-20. The total score of each patient was categorized into "Poor knowledge" when the patient achieved less than or equal $\leq$ 50% of the total score and "good knowledge" was considered when the patient achieved more than > 50% of the total score. Accordingly, the patient had from 0 – 10 points of the total score, were considered as "Poor knowledge", and those who had 11 - 20 points were considered as "Good knowledge".

Instrument III: Fatigue impact scale (FIS) (Fisk et al., 2010) to measure fatigue related liver cirrhosis symptoms. This instrument provides an assessment of the effects of fatigue in terms of physical, cognitive, and psychosocial functioning. The full-length MFIS consists of 21 items.

Scoring system

The questionnaire contained, items related to the cirrhotic patients'

evaluation regarding Modified Fatigue Impact Scale (MFIS). It consisted of 21 items each was five points Liker scale (0 – 4) as (0) for Never, (1) for rarely, (2) for Sometimes, (3) for Often, and (4) for Almost always. The cirrhotic patients 'fatigue status was evaluated giving a score of 0-84. The total score of each patient was categorized into "Never " when the patient achieved less than 29 of the total score, "Sometimes" when the patient achieved (29 - < 57) of the total score, and "Often" was considered when the patient achieved 57 – 84 of the total score.

Validity

The validity of the tool was ascertained by group of experts (medical & nursing staff) one medical medicine staff, two community nursing staff and tow medical surgical nursing staff who were reviewed the tool for content accuracy and internal validity. They were asked to judge the items for completeness and clarity (content validity).

Reliability

Reliability was applied by researcher for testing the internal consistency of tool. It was done through the administration of the same tool to the same participants under similar conditions on two or more occasions. Scores for repeated testing was compared to test consistency of results over time (test – retest reliability) reliability of A structured interviewing questionnaire it reached 83% (R = 0.83% which is considered reliable. Reliability of Knowledge Assessment Questionnaire it reached 83% (R = 0.83% which is considered reliable. Reliability of duke health profile index it reached 85% (R = 0.85% which is considered reliable. Reliability of chronic liver disease questionnaire it reached 86% (R = 0.86% which is

considered reliable. Reliability of fatigue impact scale it reached 86% (R = 0.86% which is considered reliable.

Administrative Approval and Ethical Consideration

An approval of ethical commit was obtained to carry out the current study; an official permission was obtained from the head of Hepatology and Gastrointrodology Department in National Liver Institute in Menoufia University by submission of a formal letter from the dean of faculty of nursing, Menoufia University.

Written consent was taken from every patient before inclusion in the study. Patients was assured that all their own data are highly confidential; anonymity is also assured through assigning a number for each patients instead of names to protect their privacy. Data is only available to the researchers. The ethical issues consideration included explaining the purpose and natural of the study, stating the possibility to withdraw at any time.

Pilot study

A pilot study was carried out on eight (10% of the total sample) and they were excluded from the total studied patients in order to test the clarity, feasibility, correctness, and applicability of the study tools. It also, provided an estimate of the time needed for answering the questionnaire sheets. Then, the reliability of the study tools was assessed to measure the internal consistency of the study tools.

Data Collection Procedure

Preparatory phase:

The researcher prepare a structured interview questionnaire after:
Review of literature. Gain permission from the head of Hepatology and Gastroentrodology Department in National Liver Institute, Menoufia

University was obtained for carrying out the current study. Gain permission from the dean of faculty of nursing was obtained for carrying out the current study. Prepare study tools and check validity and reliability of tools from experts of nursing staff and medical staff.

Implementation phase:

- Each patient who agreed to participate in the study and fulfilled the inclusion criteria are interviewed individually by the researcher.
- In outpatient clinics at liver institute department, the researcher introduced herself, and explained the aim of the study to the studied patients.
- Data was collected for the current study started from October, 2018 and completed at the end of 2021.
- Gathering data was between 8.30am and 12.30 md in order to reduce variability among patients and time of outpatient clinics department.
- At initial interview, the researcher introduced herself to initiate the line of communication, explain the nature, purpose of the study, during a monthly periodic follow up visit for liver cirrhotic patients, the researcher fill out the three tools of the study as a base line assessment and scheduled with them the educational sessions.
- The researcher demonstrated the contents of the designed protocol of nursing intervention in the form of small group of patients teaching sessions, three sessions in addition to preliminary session, these sessions were repeated to groups, the duration of each session ranged from 30 - 45 minutes, including 15 minutes for discussion and feedback, each session usually started by a summary of what had been taught in the previous session

and the objectives of the new session.
- The first session started by acquiring a designed part of knowledge related to liver anatomy, functions, types of viral hepatitis viruses, liver cirrhosis, causes, signs and symptoms, and its complications.
- An open channel communication was achieved between the researcher and patients to assure understanding, answer any question and to confirm information.
- The component of a designed nursing intervention was implemented to studied patients that contained an integrated package of instructions and guidelines related to management of liver cirrhosis and involved the following items: liver cirrhosis definition, causes. Diagnosis, liver cirrhosis symptoms and its nursing management, healthy and restricted diets, healthy life styles and activities.
- The second session concerning with teaching the patient about healthy and restricted diet for different types of liver cirrhosis.
- The third session of teaching, the patient gain measures that manage their disease related symptoms e.g. how to manage fatigue, pruritus, how to decrease muscular cramps and dry mouth. Medications regimen that can be taken to relieve symptoms associated with patients and contraindicated medications.
- All sessions were conducted by the researcher in a simple Arabic language considering low educated patients using lecture, group discussion and brain storming. Posters, handout and educational videos was used to grantee of their attention and cooperation.
- Each patient obtained a copy of the designed illustrated nursing

intervention booklet included all content.

- A follow up phase was performed weekly for cirrhotic patients under study by telephone calling to answer any enquiry to patients. The intervention took three months duration.

Evaluation phase:

- After implementation of a designed nursing intervention the researcher collect post intervention data by using the previous mentioned tools after 3 months.

Statistical Analysis

Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using Excel program.

Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using paired t- test for comparison between pre and post intervention. However, Repeated Friedman Test (type of Chi square test for repeated procedures for qualitative data) was used for comparison between the two time points of intervention in patients participating in the study.

Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square (χ2) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used (if the table was 4 cells), or Likelihood Ratio (LR) test (if the table was more than 4 cells). Level of significance was set as P value <0.05 for all significant tests.

RESULTS

Table (1) demonstrates that approximately half of studied cirrhotic patients 45% aged between 50 - 60 years with mean of 52.1 ± 8.3 years, 42.5% Illiterate and 20% of them were read and write. Concerning job, one fifth of them 20% had no work, while only 30% were manual works, and 37.5% were housewives. Regarding income majority of studied patients 87.5% had enough income. Regarding residence, majority of studied patients 77.5% were live in rural areas.

Table 2 shows that majority of studied patients (75%) were Grade A Child-Pugh classification of cirrhosis, 40% discovered cirrhosis since 1 - < 3 years, 87.5% did not suffering from other chronic disease, while 12.5% suffered from other chronic diseases and 60% of them had chest diseases and 40% had hypertension. Concerning taking liver cirrhosis drugs, 95% of studied patients taken on continuous basis. Regarding the current diet and liquid intake, 55% of them had normal diet, and 27.5% of them had little salt & much vegetable.

Table (3) shows the distribution of studied patients with liver cirrhosis according to their knowledge, it illustrates a significant improvement in knowledge score at post intervention compared to pre intervention. On the other hand three questions include, alcohol addiction one of the reasons that increase the cirrhosis, the viral infection (A-B-C-D) the causes of the cirrhosis, and is avoiding alcohol drinks and wines the behavior that should be followed to prevent cirrhosis and reviled no significant difference in knowledge score between pre and post intervention.

Table (4) highlights that, the majority of the studied patients demonstrated sometimes (ranged from 40% to 75%) as well as often responses (ranged from 10% to 55%) in each item of Fatigue impact scale (FIS), before intervention. However, the lowest percentages was in never response (ranged 0% to 5%). On the other hand, after intervention, the majority of studied patients showed rarely responses (ranged from 40% to

55%), as well as sometimes responses (ranged from 27.5% to 42.5%). In addition, the never responses increased (ranged from 2.5% to 17.5%). The mean total score of studied patients before intervention was 46.6 ± 6.6, and it decreased significantly ($P<0.0001$) to 31.1 ± 9.3 which indicates improvement in the fatigue scale of studied patients. This result approved our second hypothesis which indicates "Patients with liver cirrhosis who will receive nursing intervention will have an improvement in fatigue score than pre nursing intervention".

Figure 1 highlights the efficacy of the designed nursing intervention for the knowledge aspects of the patients with cirrhosis. Post intervention revealed a highly significant improvement ($p<0.000$) in the different aspects of knowledge. The post good knowledge responses increased from 16.3% pre intervention to 43.7% for post intervention. The poor knowledge responses diminished from 83.7% pre intervention to 56.3% post intervention. In addition, the mean total knowledge score increase from

15.9 ± 9.3 pre intervention to 27.9 ± 8.4 post intervention, and the difference was high significant statistically ($P<0.0001$). This result approves the first hypothesis in this study which mentioned that" Patients with liver cirrhosis who will receive nursing intervention will have higher score of knowledge than pre nursing intervention.

Figure 2: highlights the efficacy of designed nursing intervention on fatigue score groups. Post intervention program revealed a highly significant improvement ($p<0.000$) in the fatigue categories. The post program' never responses increased from zero% pre-intervention to more than half (52.5%) post intervention. On the other hand, the sometimes as well as often responses decreased from 92.5% to 42.5%, and from 7.5% to 5% respectively. This result together with table 11 results approved second hypothesis which indicates "patients with liver cirrhosis who will receive nursing intervention will have an improvement in fatigue score than pre nursing intervention"

Table (1): Percent of the studied patients with liver cirrhosis according to the socio-demographic characteristics (N =80)

Socio demographic characteristics	No.	%
Age (Years):		
20 - <30 Y	4	5
30 – < 40 Y	20	25
40 - < 50 Y	20	25
50 - 60 Y	36	45
Mean ± SD	**52.1 ± 8.3 years**	
Gender:		
Male	30	37.5
Female	50	62.5
Marital status:		
Single	4	5
Married	72	90
Widowed	4	5
Education:		
Illiterate	34	42.5
Read & Write	16	20
Basic education	16	20
Intermediate education	8	10
University	6	7.5
Job:		
No work	16	20
Manual work	24	30
House wife	30	37.5
Others (Farmer & Retirement)	10	12.5
Family members:		
3 to 5	70	87.5
≥ 6	10	12.5
Income:		
Not enough	10	12.5
Enough	70	87.5
Residence:		
Rural	62	77.5
Urban	18	22.5
Total	**80**	**100**

Table (2): Percent of medical data of studied liver cirrhotic patients (N=80)

Medical history	No.	%
Child-Pugh classification of cirrhosis:		
CA :	60	75
CB :	20	25
Cirrhosis discovered since:		
< 1 year	12	15
1 - < 3 years	32	40
3 – < 5 years	12	15
≥ 5 years	24	30
Suffering from other chronic disease		
Yes	10	12.5
No	70	87.5
If Yes, which diseases (n=10)?		
Chest disease	6	60
Hypertension	4	40
Taking liver cirrhosis drugs: on continuous basis		
Yes	76	95
No	4	5
Taking any other drugs Yes	10	12.5
No	70	87.5
If yes, what are the diseases(n=10) Chest disease	6	60
Hypertension	4	40
Admitted to hospital before?		
Yes	18	22.5
No	62	77.5
Reasons for hospital admission, (n=18)		
Hypertension	2	11.1
Chest infection	2	11.1
Increase bile in blood	6	33.4
Bleeding stomach	4	22.2
Appendectomy	2	11.1
Splenectomy	2	11.1
The current diet and liquid intake		
Normal diet	44	55
Little fat & much vegetables	10	12.5
Little salt & much vegetables	22	27.5
On diet	4	5
HCV		
Positive	18	22.5
Negative	62	77.5
HBV	14	17.5
Positive		82.5
Negative	66	
Total	**80**	**100**

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Table (3): Percent of the studied patients according to their knowledge regarding liver cirrhosis, pre and post intervention (N = 80)

Studied patients knowledge regarding liver cirrhosis' symptoms, manifestation and its management	Pre intervention				Post intervention				Test of Significance (χ^2 test)*	P value
	Wrong answer/don't know		Correct answer		Wrong answer/don't know/		Correct answer			
	No.	%	No.	%	No.	%	No.	%		
1- The liver is present in the right top of abdomen in human body	76	95	4	5	32	40	48	60	54.8	<0.0001
2- The functions of the liver is producing the human body bile	36	45	44	55	20	25	60	75	6.99	<0.008
3- The liver cirrhosis is converting healthy liver cells to lives tissue or scars	66	82.5	14	17.5	36	45	44	55	24.21	<0.0001
4 - Alcohol addiction is the reason that increase the cirrhosis	30	37.5	50	62.5	35	43.8	45	56.2	0.64	0.42 NS
5- The viral infection (A-B-C-D) are the causes of the cirrhosis	20	25	60	75	20	25	60	75	0.0	1.0 NS
6- Autoimmune hepatitis, obesity and overweight are Causes of cirrhosis	64	80	16	20	30	37.5	50	62.5	29.61	<0.0001
7- Anorexia, losing weight, tired and fatigue are common symptoms of cirrhosis.	42	52.5	38	47.5	6	7.5	74	92.5	38.3	<0.0001
8- pain and swelling in abdomen and increasing the bile in blood are symptoms of cirrhosis.	62	77.5	18	22.5	16	20	64	80	52.63	<0.0001
9- Nausea vomiting and dark urine are symptoms of cirrhosis..	54	67.5	26	32.5	14	17.5	66	82.5	40.66	<0.0001
10- High portal hypertension is complications of cirrhosis.	74	92.5	6	7.5	52	65	28	35	17.76	<0.0001
11- Varicose veins in the esophagus or stomach are cirrhosis complications.	68	85	12	15	46	57.5	34	42.5	14.67	<0.0001
12- Enlargement of spleen and ascites are cirrhosis complication.	24	30	56	70	40	50	40	50	6.52	<0.001
13- Causes of disorientation with liver patient is the inability of the liver to get rid of harmful substances from the blood that affect the brain.	76	95	4	5	54	67.5	26	32.5	19.73	<0.0001
14- Ultra sound is examination that confirms that you've cirrhosis.	74	92.5	6	7.5	12	15	68	85	96.03	<0.00001
15- Cirrhosis patient should follow ultra sound every 6 months.	74	92.5	6	7.5	36	45	44	55	57.2	<0.0001
16- Endoscopy done for a patient with cirrhosis to find out varicose veins in the esophagus or stomach.	78	97.5	2	2.5	54	67.5	26	32.5	16.75	<0.0001
17- Behavior that should be followed to prevent cirrhosis is avoiding alcohol drinks and wines.	40	50	40	50	34	42.5	46	57.5	0.89	0.34 NS
18- Know important guidelines that reduce the incidence of cirrhosis avoiding causes of injury of hepatitis viruses.	32	40	48	60	12	15	68	85	12.46	<0.0004
19- Diet that should be followed for patients with cirrhosis are foods with little salt, many vegetables, little fats, much carbohydrates and eating protein day after day.	44	55	36	45	30	37.5	50	62.5	4.89	0.02
20- Laxatives used for cirrhosis patient to detoxify the intestine.	76	95	4	5	30	37.5	50	62.5	58.77	<0.0001
Mean total score (Knowledge)	15.9 ± 9.2 (range=0 – 31)				27.9 ± 8.4(range=13-40)				t= 6.94	<0.0001

*Repeated Friedman Test

Table (4): Percent distribution of studied patients according to Modified Fatigue Impact Scale (MFIS) pre and post intervention.

During the Last Month	Never		Rarely		Sometimes		Often		Almost Always		P- value
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
	%	%	%	%	%	%	%	%	%	%	
I have been less alert.	2.5	5	10	42.5	70	40	17.5	12.5	0	0	<0.0001
I have had difficulty paying attention for long periods of time.	0	5	12.5	47.5	40	42.5	47.5	5	0	0	<0.0001
I have been unable to think clearly.	2.5	5	0	47.5	40	42.5	55	5	2.5	0	<0.0001
I have been clumsy and uncoordinated.	5	17.5	40	40	45	37.5	10	5	0	0	<0.0001
I have been forgetful.	0	10	2.5	47.5	55	32.5	37.5	7.5	5	2.5	<0.0001
I have had to pace myself in my physical activities.	0	5	0	55	56.5	35	43.5	2.5	0	2.5	<0.0001
I have been less motivated to do anything that requires physical effort.	0	5	0	52.5	47.5	37.5	50	5	2.5	0	<0.0001
I have been less motivated to participate in social activities.	0	12.4	12.5	46.3	72.5	36.3	15	5	0	0	<0.0001
I have been limited in my ability to do things away from home.	0	10	2.5	50	75	30	22.5	5	0	5	<0.0001
I have trouble maintaining physical effort for long periods.	0	7.5	2.5	47.5	57.5	27.5	37.5	12.5	2.5	5	<0.0001
I have had difficulty making decisions.	2.5	2.5	10	55	57.5	37.5	27.5	5	2.5	0	<0.0001
I have been less motivated to do anything that requires thinking	2.5	11.3	2.5	41.3	50	37.5	42.5	7..5	2.5	2.5	<0.0001
My muscles have felt weak	0	2.5	7.5	52.5	47.5	35	42.5	5	2.5	5	<0.0001
I have been physically uncomfortable.	0	11.3	7.5	38.8	57.5	40	32.5	5	2.5	5	<0.0001
I have had trouble finishing tasks that require thinking.	2.5	8.8	2.5	48.8	42.5	32.5	45	7.5	7.5	2.5	<0.0001
I have had difficulty organizing my thoughts when doing things at home or at work.	2.5	7.5	5	47.5	62.5	32.5	30	10	0	2.5	<0.0001
I have been less able to complete tasks that require physical effort.	2.5	10	2.5	42.5	45	35	50	10	0	2.5	<0.0001
My thinking has been slowed down.	2.5	12.5	5	47.5	42.5	32.5	47.5	5	2.5	2.5	<0.0001
I have had trouble concentrating.	2.5	5	0	52.5	52.5	35	42.5	5	2.5	2.5	<0.0001
I have limited my physical activities.	0	5	0	50	60	32.5	40	7.5	0	5	<0.0001
I have needed to rest more often or for longer periods.	0	5	0	47.5	55	35	40	10	5	2.5	<0.0001
Mean total score pre intervention	46.6±6.6 (range:31 -61)										t_{paired}=8.6, p<0.0001
Mean total score post intervention	31.1±9.3 (range:9 -59)										

Fig.1: Percent of the studied patients according to their knowledge categories among studied cirrhotic patient pre and post intervention
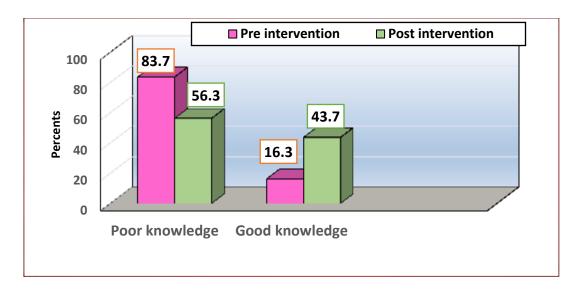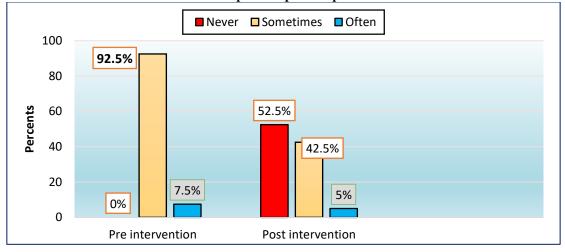

Fig.2: Effect of the designed nursing intervention on groups of fatigue score categories among studied cirrhotic patients pre and post intervention

Discussion

Regarding socio-demographic characteristics of the current study, it reported that; approximately half of studied cirrhotic patients (45%) aged between 50 - 60 years with mean of 52.1 ± 8.3 years while Atya et al ., (2019) found that 60- to less than 65 were studied cirrhotic patients while the mean age was 59.16±6.04 years. The results from data collected in present study showed more than half of studied patients were females. This

result was not agreed with Al Ghamdi & Shah, (2018) who conducted study entitled "An Educational Needs Assessment for Patients with Liver Disease in Tertiary liver center" and reported that more than half of patients were males. Likewise, EL-Shafei et al., (2017) conducted study titled "prevalence of reflux esophagitis in Egyptian patients with liver cirrhosis" at Al azhar University Egypt, it

revealed that slightly more than two thirds of patients were males.

According to occupation, marital status, the present study revealed that only one fifth of studied patients were not work, and the majority of them were married .This result was agreed with Atya et al., (2019) who reported that, the highest percentages of male patients were not work. As regarding to educational level around two thirds of them were illiterate and the majority of them were married. This findings was in line with a study conducted by Atya et al., (2019) who revealed that, the majority of both study and control group patients were married, housewives, and illiterate.

As regards to the place of residence, findings from the current study showed that the majority of patients were lived in rural areas. This finding was supported by Khalil et al., (2015) who conducted a study entitled "Liver Cirrhosis: Effect of Suggested Nutritional Regimen on Patient Outcomes," Doctoral thesis, faculty of nursing, Assuit university, Egypt. Similarly, Atya et al., (2019) reported that, the highest percentage of cirrhotic patients lived in rural area. In addition, Bhattarai et al., (2017) conducted study entitled "Demographic and Clinical Profile in Patients with Liver Cirrhosis in a Tertiary Care Hospital in Central Nepal" found that (56.4%) patients were from rural areas. Similarly, a higher prevalence of cirrhotic (70.1%) were from rural background.

Moreover ,the finding of the present study was in line with Taha et al., (2015) who study in Internal Medical Department in Minia University Hospital and found that the majority of study patients were married, housewives, illiterate, and come from rural areas (88%, 72%, 80% , respectively)

In one study entitled "Knowledge of Patient with Liver Cirrhosis Regarding Ascites Self-Management: Instructions Nursing Guideline" that conducted by Abdel Rehaim et al., (2017), was consistent with the present study ,who found , around half from study sample were aged equal and less than 60 years Mean ± SD52.4 ± 12.7 year and were married & illiterate male constituted (95%,95% 63.3%) respectively. As regarding occupation and residence of study sample, results shows that highest percentage from them were hadn't work and lived in rural area while the lowest percentage from them were employee and housing in urban area.

The Child-Pugh score can help predict all-cause of mortality risk and development of other complications from liver dysfunction, such as variceal bleeding, as well .The present study shows that, the majority of studied patients were diagnosed as Grade A Child- Pugh classification of cirrhosis .This result was not in line with Tsoris & Marlar, (2019) who found that, overall mortality for cirrhotic patients at one year was 0% for Child class A , 20% for Child class B, and 55% for Child class C.

On the other hand, the finding of the present study was inconsistent with Volk et al., (2013) who study "Patient Knowledge about Disease Self-Management in Cirrhosis" and found that the majority of study patients were Child-Pugh class A (70%) and about one third was B (27%) and only C about (3%) respectively.

Regarding to medical data; the results of the present study revealed that, most of studied cirrhotic patients were free from hepatitis B and C (negative). This result was consistent with only one study conducted by Jamil & Durrani, (2018).The study entitled "Assessing the outcome of patients with liver cirrhosis during hospital stay: A comparison of lymphocyte/monocyte

ratio with MELD and Child-Pugh scores" in Islamabad, Pakistan. The study reported that the most common cause of hepatic cirrhosis in the study population was due to chronic infection with hepatitis C.

On the other hand, these results were contradicted with many studies. It was not agreed with Atya et al., (2019) who found that, the majority of patients had diagnosed with hepatitis C as a cause for liver cirrhosis. While, Salam, et al., (2011) not supported the previous finding as they stated that, majority of patients had cirrhosis due to chronic hepatitis C.

Similarly, this finding was inconsistent with Handady et al., (2015) who studied the "Precipitating Factors of Hepatic Encephalopathy among Sudanese Patients with Liver Cirrhosis, Sudan, who reported that regarding etiology of liver cirrhosis nearly half of cases had viral hepatitis B. Finally, this results was not supported with a study conducted by Kamal et al., (2018)

As regarding presence of chronic diseases, the present study revealed that, the majority of cirrhotic patients under study were free from chronic diseases while minority with chronic diseases (60% chest diseases and 40% hypertension).

The current study reported that the main causes of hospital admission due to comorbidities were stomach bleeding, followed by increase bile in blood, then hypertension, and finally diabetes mellitus. These findings were supported by Abd Elkader et al., (2014) who studied that the "Patients' knowledge assessment regarding factors aggravating esophageal variceal bleeding at a university hospital in Egypt, who reported that nearly half of patients presented with hematemesis.

Also, Chang et al., (2015) studied "Epidemiology and clinical evolution of liver cirrhosis in Singapore", reported that diabetes mellitus,

hyperlipidemia and hypertension were present in more than one third of patients while renal impairment was reported in minority. Regarding present health history; the present study revealed that more than fifty of patients had gastrointestinal bleeding and more than thirty of them had excess.

On the other hand, this result was inconsistent with Atya et al., (2019) found that diabetes mellitus, hypertension and cancer were present in minority of patients and all of studied patients hadn't renal disease. Likewise, it was agreed with Kuo et al., (2017) who studied "Factors associated with medication non-adherence in patients with end-stage liver disease" in California, San Francisco. The study reported that regarding to medical co-morbidities: 48% of patients had hypertension.

Regarding laboratory data, there were an improvement in all of mean score of patient's laboratory data that was agreed with Malky et al ., (2016) who carried out study entitled "The Effectiveness of Nursing Intervention Program on Emotional Distress, Self-Efficacy, and Liver Enzymes Among Hepatitis C Virus Patients Undergoing Antiviral Treatment Therapy (Sovaldi Medication) in Liver Institute at Shebin El kom District, Menoufia Governorate, who found a significant reduction of liver enzyme post intervention than pre-intervention .

The present study revealed that there was significant reduction of liver enzyme post program than pre-program. This result was consistent with Foster GR et al., (2015) who studied "Sofosbuvir + peginterferon/ribavirin for 12 weeks vs sofosbuvir + ribavirin for 16 or 24 weeks in genotype 3 HCV infected patients and treatment-experienced cirrhotic patients with genotype 2 HCV: the BOSON study." In London,

Queen Mary University, Barts Health, the findings revealed that the mean Asparate Aminotransferase and Alanine Aminotransferase were increased before applying the nursing intervention while with a significant improvement after applying the nursing intervention. Moreover, it was in agreement with (Alavian S, et al., (2006), who studied "Preliminary report of Interferon Alfa 2b in combination with Ribivirin for 48 weeks for treatment of Iranian patients with chronic hepatitis C: A quasi-experimental study." In Shiraz E-Medical Journal, who stated that; "nursing intervention for patients with liver diseases has a number of positive effects on physical responses including laboratory findings".

Also, it was supported by Rusu, et al., (2013) who studied that the "Effects of lifestyle changes including specific dietary intervention and physical activity in the management of patients with chronic hepatitis C – a randomized trial" in National Institute of Diabetes, Nutrition and Metabolic Diseases-Bucharest, Romania. It showed that, the mean Asperate and Alanine Aminotransferase were decreased after patient's education and this alteration was statistically significant. Moreover Hauschild et al., (2008) supported the findings and revealed that there were highly statistically significant between total blood investigation of patients at pre intervention program and post intervention program which one quarter of clients was normal changed to three quarter of clients after nursing intervention.

In accordance, Patrick, (2014) in California, studied "Effects of lifestyle changes including specific dietary intervention and physical activity in the management of patients with chronic hepatitis C". They reported that; "intervention program had

significant improvements on liver function testes"

Nurses play a pivotal role in the care of patients with cirrhosis not only by bridging the gaps between clinicians and families and between primary and hospital care, but also by providing medical education to patients and caregivers. Despite the extreme importance of cirrhosis as a global disease, very little attention has been paid to the role of nurses by health and hospital authorities, national and international colleges of nurses, and national and international nursing or hepatology societies. Health and hospital authorities should stimulate the creation of positions of nurse liver specialists dedicated to caring for patients with cirrhosis (Nuria., 2020).

In the past, most liver nurse specialists were devoted to care of patients with hepatitis C or B infection or liver transplantation, but not to patients with complications of cirrhosis. This situation should be changed and multidisciplinary teams in all hospitals caring for patients with cirrhosis should include nurse liver specialists with special education in cirrhosis. In this regard, both national and international societies should develop education plans at the nurse practitioner or master level to fill this gap in education. (Nuria., 2020).

The current study revealed a highly significant improvement in the different aspects of knowledge post intervention. Lack of patient's knowledge was appeared pre intervention while it improved after implementation of the nursing teaching guidelines. This finding was supported by Taha et al., (2015) who studied the "Impact of a Designed Nursing Intervention Protocol on quality of life for liver cirrhosis patients in Minia University Hospital" the study ascertain the effect of nursing intervention in improving knowledge

scores after intervention. Also, this finding supported by Volk et al., (2013) who studied "Patient Knowledge about Disease Self-Management in Cirrhosis" and found that liver cirrhotic patients under study had inadequate knowledge about important information needed to self-manage of their disease. Results of the current study established the role of theoretical sessions and follow-up that provided to patients to cover all aspects of hepatic cirrhosis including the provision and explanation of the nursing intervention.

Likewise, in study conducted by Weheida et al., (2009) who studied the "Effect of protocol of care on clinical outcomes of patients with liver cirrhosis" in Alexandria, was in the same line with the current study. It reported that, there were an improvement in the total mean knowledge scores of study patients immediately post intervention three months post discharge from hospital. Moreover, the finding of the present study was congruent with Mahmoud et al., (2013) who studied "The Impact of Self-Care Instructional program on Quality of Life of Patients with Liver cirrhosis at El-Kasr EL Ainy Cairo University Hospital", it reported that the patients' knowledge was improved after the educational program. All of patients knew the complications of cirrhosis, allowed and prohibited food and drugs after the program.

In addition, Taha et al., (2015) who conducted a study entitled "Assessment of educational health problems among liver cirrhosis patients to improve their Quality Of Life in Minia University Hospital". A great lack of patient's knowledge was revealed as regard to liver cirrhosis in study sample. The majority of patients, were having an unsatisfactory knowledge score levels due to lack of patient's education about liver cirrhosis

and the majority of those patients were illiterate. Moreover, Taha et al., (2015) reported that the highest mean knowledge score was appeared after implementation of the highlights the efficacy of the designed nursing intervention program for the Duke Health Profile Index (DHPI) of the patients with liver cirrhosis, and post intervention results revealed a highly significant improvement.

Also, Canobbio, (2000) emphasized that patients with liver cirrhosis need education, counselling and support to enable them to adjust to their chronic illness. Likewise, Mohamed, (2005) who studied "Impact of pat hart net breathing rehabilitation program on physical responses among patients with ascites, unpublished master degree" reported that, cirrhotic patients with ascites had great learning needs due to the poor knowledge about their condition and a low level of performing self-care and prevention of life threatening hazards of liver cirrhosis.

Concerning physiologic characteristics (weight and abdomen circumferences) of patients under study, the current study revealed that, the difference was insignificant between weight pre and post intervention. While concerning abdomen circumference the mean score decreased from 91.6 to 84.0. The difference was significant between abdomen circumference pre and post intervention ($p<0.001$). This result was inconsistent with Celik & Bektas, (2021) in abdomen circumference, it decreased after intervention with preventive nursing measures only. They conducted study entitled "Preventive and Treatment Interventions for Abdominal Ascites of Patients with Liver Cirrhosis: A Systematic Review of Randomized Controlled Trials" and found that, therapeutic approaches were found to be effective, that used in the

management of abdominal ascites and weight in patients with liver cirrhosis.

Fatigue is a complex symptom that encompasses a range of complaints including lethargy, malaise, lassitude and exhaustion. Fatigue is a common side effect associated with liver cirrhosis. The exact prevalence of fatigue in patients with chronic liver disease is somewhat variable in different studies and with different specific liver diseases (Salama et al., 2016) .The current study showed a highly significant improvement in the fatigue categories after nursing intervention .This result was consistent with Mark et al ., (2018) who reported that the management of fatigue in chronic liver disease can involve a combined use of methods to beneficially alter behavioral components and pharmacological interventions, of which several treatments have potential for the improved management of fatigue.

According to Malky et al., (2016) found a reduction of the patients complain except weakness and fatigue (the post program than preprogram) with statistical significance difference. Malky et al., stated that; "the cognitive-behavioral theory posits that patients' beliefs about the illness and fatigue and their coping behaviors, rather than objective disease measures, determine the experience and the consequences of fatigue

Conclusion

In the light of the present study findings, it can be concluded that:

A designed nursing intervention has a significant role in improving knowledge level related liver cirrhosis and lowering fatigue scores among studied patients with liver cirrhosis.

Recommendations

Based on the results of the present study, it can be suggested that:

- Activate periodic checkup for the public especially adults regarding liver investigation and laboratory data to guarantee healthy liver.
- Providing continuous education programs about self-care for liver cirrhotic patients in hepatology units to overcome symptoms especially fatigue and complication of the disease.
- Conducting periodic surveys and medical campaigns under supervision of Ministry of health and Ministry of higher education, including universities to discover new cases of hepatitis B, C viruses to control infection and before occurrence of complications.
- Increase awareness through information dissimination to the public through T.V and mass media about causes and symptoms of liver cirrhosis and encourage people to modifying their behaviors for acquiring healthy lifestyles and prevent exposure to infection.

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