# Child Pugh Score A Liver Cirrhosis: Effect of Development of Nursing Education program for Patients to Minimize Ascites

#### Maha Nafady Abd Elhafez<sup>1</sup>, Nour Eleman Hassan Ali<sup>2</sup>, Marwa Abdelrazek Ahmed<sup>3</sup>, Kawther Badry Mobed<sup>4</sup>

<sup>1,2,4</sup> Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.

<sup>3</sup>Lecturer of Hepatology and Gastroenterology, Faculty of Medicine, Assiut University, Egypt

**Corresponding author:** Maha Nafady Abd Elhafez

Email: <u>Maha.nafady@aun.edu.eg</u>

#### Abstract

**Background:** The most significant clinical consequence of liver cirrhosis is ascites, which is the buildup of fluid in the abdominal cavity. Aim: This study was conducted to evaluate the effect of development of nursing education program for patients with Child Pugh score A liver cirrhosis to minimize ascites. Design: A quasi-experimental research design. Sample: A purposive sample of sixty adult patients with child Pugh score A liver cirrhosis, which placed into two equal-numbered groups at random: the study group and the control group. Setting: The tropical medicine department, the gastroenterology department, and the outpatient clinic at El-Rajhi Liver Hospital, Assiut University. Tools: Tool I: A Structured Interview, Tool II: Compliance of patients with medication and Tool III: Assessment occurrence and degree of ascites sheet. Results: The result revealed that regarding study groups, after 6 months (16.7%) developed ascites while after 12 months (33.3%) developed ascites in comparison to control groups which after 6 months were (46.7%) while after 12 months (73.3%) developed ascites. Conclusion: Nursing education has a good effect on improving patients' knowledge, increasing level of drug compliance and minimizing occurrence of ascites Recommendations: It is recommended to repeat of this research using a bigger likelihood sample picked from other regions so that the results can be used more widely.

Key words: Ascites, Child Pugh score A, liver cirrhosis, Nursing education

#### Introduction

Liver Cirrhosis is an advanced stage of chronic liver disease, where healthy liver tissue is replaced by severe scarring cells, and liver failure results from reduced liver function. The primary factors of illness and death nowadays is liver cirrhosis (Asrani et al., 2019).

Currently, Cirrhosis is the eleventh most common cause of mortality globally. Cirrhosis accounts for 1.6% and 2.1% of the global burden of disability-adjusted life years and years of life lost, respectively, and is among the top 20 such causes. The rising burden of liver cirrhosis risk factors is the cause of the disease's rising prevalence. Liver cirrhosis is mostly caused by hepatitis B (HBV) and hepatitis C (HCV) (Wong et al., 2019).

During clinical practice, the Child-Turcotte-Pugh score (CTP score) is now frequently utilized to evaluate the degree of liver dysfunction. It divided patients into three groups: good liver function (A), mild liver dysfunction (B), and advanced liver dysfunction (C). It is based on five clinical and laboratory standards that are used to classify patients: Ascites, hepatic encephalopathy, serum albumin, serum bilirubin, and prothrombin time, or INR (**Munoli et al., 2024**).

disease symptoms Liver and indicators may be minimal or absent in cirrhosis. Certain symptoms could not be specific, meaning they don't necessarily show that the liver is the origin, such as yellowing of the skin, anorexia, fatigue and weakness. Once cirrhosis liver becomes decompensated, a variety of complications occur. The most common complication is ascites (Carrier et al., 2024).

Preventing complications and slowing the disease's course are the main objectives of treatment. For cirrhosis, there is no treatment. Effective patient education has long been recognized as a crucial factor for managing diseases. offering notable advantages in terms of knowledge and behavioral changes could influence patients' that readiness to accept and follow treatment recommendations (Sabola et al., 2022).

Cirrhosis is the cause of ascites. Ascites is present in about 20% of cirrhosis patients upon diagnosis, and 20% of ascites patients dead within a year of diagnosis. It is vital to do a thorough diagnostic work-up of liver illness and exclude cancer and other ascites-causing factors when individuals evaluating who are exhibiting ascitic decompensation for first time. diagnostic the А paracentesis will ascertain whether the characteristics of the ascitic fluid are compatible with cirrhosis (Xia et al., 2024).

Ascites is building up fluid in the peritoneal cavity, with half of cirrhotic patients developing ascites within 10 years of diagnosis. Most common signs of ascites are recent weight gain abdominal and increased circumference, which the patient frequently describes as a narrowing of clothing across the abdomen. Ascites can be detected on examination by bulging flanks, flank dullness, and shifting dullness when they are present in small to moderate levels (Al-Khazraji et al., 2021).

Nurses are crucial to the treatment and avoidance of illness problems and provide medical education to patients and caregivers. Multidisciplinary teams that care for inpatient and outpatient patients with cirrhosis should include nurses with specialized understanding of liver diseases (Qiu, 2024).

Initial patient education for ascites includes information about diet. especially salt restriction (The recommended daily intake of sodium is between 2,000 and 4,000 mg), medication (diuretics), amount of fluid, importance of follow up and warning signs. It is necessary to quit using medications that are known to lower glomerular perfusion or to be directly harmful to the kidneys. Therapeutic paracentesis is performed for patients with tense ascites (Du et al., 2024).

Adherence to medications is essential patient essential for care, for achieving clinical objectives, and has a major influence on the efficacy of clinical treatment and health recovery. In general, better clinical results will result from adherence rates above other 80%. On the hand. noncompliance might result in higher medical expenses, less effectiveness, and early illness recurrence (Xu et al., 2024).

## Significance of the study

Liver cirrhosis is widely prevalent in Egypt. According to the latest WHO data published in 2020 Liver Disease Deaths in Egypt reached 60,122 or 11.20% of total deaths (WHO, 2020). With a 95% age-standardized death rate from cirrhosis, Egypt had the highest of any country (Sepanlou et al., 2020) Decompensated liver cirrhosis patients are often admitted to the hospital three times a year, and 20% to 37% are readmitted within 30 days after their discharge (O'Connell et al., 2024). In spite of the paramount significance of cirrhosis, Egypt has been paid little attention to the role of nursing education in minimize development complication of or progression worsening and of complication if it occurs. It is observed that patients with liver cirrhosis are ignorant of the disease's repercussions such as ascites, so there is a certain need for health education regarding the risk of ascites and decrease the occurrence. So, this study was done to evaluate the effect of development of nursing education program for patients with Child Pugh score A liver cirrhosis to minimize ascites.

#### Aims of the study Goal

## **Joal**

Evaluate the effect of development of nursing education program for patients with Child Pugh score A liver cirrhosis to minimize ascites.

## Objectives

- 1. Determine level of knowledge, degree of compliance to drug and occurrence of ascites for patients with child Pugh score A liver cirrhosis.
- 2. Develop nursing education program to minimize ascites in patients with child Pugh score A liver cirrhosis.
- **3.** Evaluate the effect of development of nursing education program for patients with child Pugh score A liver cirrhosis on patient knowledge, degree of compliance

with drug and occurrence of ascites.

## **Research Hypotheses**

- **H0:** There is no relation between nursing education program and the occurrence of ascites.
- H1: Mean knowledge score of study groups would be higher than control groups after implementing of nursing education program.
- H2: Study groups would show higher drug compliance than control groups after implementing of nursing education program.
- H3: Occurrence of ascites would be minimized among study groups than control groups after implementing of nursing education program.

#### Subjects and Methods Research design

A quasi-experimental research methodology (study and control) was used to carry out this study. The independent variable in this study was nursing education program, and the dependent variables were the patients' knowledge, drug compliance, and occurrence of ascites.

## **Research setting**

The study was carried out in the tropical medicine department, the gastroenterology department, and the outpatient clinic at El-Rajhi Liver Hospital, Assiut University. Located Egypt, in southern the hospital specializes in liver transplantation, hepatobiliary diseases. and gastroenterological conditions Thus, the hospital's greater emphasis on treating hepatological disorders is the reason we selected this site. The medicine tropical and the gastroenterology department are on the 3<sup>rd</sup>, 4<sup>th</sup>, and 7<sup>th</sup> floor. There are ten rooms per level, with six bedrooms in each. The outpatient clinic on the ground floor, its one room.

## Sample

A purposive sample of sixty adult patients with child Pugh score A liver cirrhosis was recruited for the study. The chosen patients according to inclusion and exclusions criteria were split into two equal groups at random: thirty patients each for the study and control groups. The study group was developed given the nursing education instructions along with the routine hospital care, and only standard hospital treatment was given to the control group. Qota sampling was used in this study. The total number of liver cirrhosis patients with child score A who attending El-Rajhi Liver Hospital, Assiut University in the previous one year from January to December 2022 was 400. Sample size was calculated by using EPI info 7, with a confidence level of 95 % and confidence limit 5%, the calculated sample size was 198. The instructions applied to 25% of this sample (49.5) with dropout 10 % to be 60 cases. equation: (Steven, 2012)'  $n = \frac{N \times p(1-p)}{\left[ \left[ N - 1 \times \left( d^2 \div z^2 \right) \right] + p(1-p) \right]}$ 

## Inclusion criteria

Adult patients of both genders, aged from 21-65 years, consented to take part in the study, who had child Pugh score A liver cirrhosis.

## **Exclusion criteria**

Patients who are physically or mentally handicapped, disoriented & comatose, patients who have other complications from liver cirrhosis such as variceal bleeding, hepatic encephalopathy, or patients with child Pugh score B or C liver cirrhosis.

# Tools of data collection

#### Tool (I): A Structured Interview:

It was developed by researchers based on review of literature (Tapper and Parik., 2023, and Mansour, et al., 2023). It was comprised of four parts: Part (1): Demographic data for the patient as (age, gender, occupation, marital status, residence, level of education).

**Part (2): Medical data as:** Etiology of Liver cirrhosis, presence of chronic diseases, weight, height, body mass index.

**Part (3): Child Pugh score**: It was modified by **Pugh et al. in 1973**. The researchers adopted it to determine severity of liver cirrhosis. It consists of five elements (prothrombin time, INR, total bilirubin, serum albumin, existence of hepatic encephalopathy and ascites). The total score of child Pugh 5 to 15, with 5–6 is considered class A, 7-9 is consider class B, while 10-15 representing class C.

Part (4): Knowledge questionnaire about definition of ascites, risk symptoms, factors. signs and preventive nutritional measures, regimen, medications used and their instructions, when patient should seek medical advice and go to hospital. It took measures both before and after providing nursing education. It had eight questions with three answers. Scores assigned to each item are between 0 and 2 points as follows; (0 unknown or incorrect, 1 incomplete correct and 2 complete correct). According to the range of total scores lie between 0-16. Patients' knowledge was classified as:

- Satisfactory knowledge  $\geq$  50% and
- Unsatisfactory knowledge <50 (Abd-Almageed et al., 2024).

Tool II: Compliance of patients with medication:

This tool was developed by Morisky Medication Adherence Scale (MMAS – 8). It is a self-reported scale developed by Morisky et al., (2008).

It consists of 7 items answered with (yes) or (No) and 1 item with a 5-point Likert scale.

Each "no" response is rated as "1" and each "yes" is rated as "0" except for item 5, in which each response "yes" is rated as "1" and each "no" is rated as "0".

For item 8, if a patient chooses response "0", the score is "1" and if they choose response "4", the score is "0". Responses "1, 2, 3" are respectively rated as "0.25, 0.5, 0.75".

The scores of MMAS-8 range from 0 to 8.

- Low adherence is indicated by a score less than 6.
- Medium adherence is indicated by a score between 6 and 8.
- High adherence is indicated by a score of 8.

#### Tool III: Assessment occurrence and degree of ascites sheet:

Researchers prepared this sheet based on review of literature (Kadono et al., 2023, Cizmic et al., 2023 and Iwai et al., 2024). Degree of ascites determined by physical examination and abdominal ultrasound which classified to none, mild (within the pelvic cavity), moderate (beyond the pelvic cavity), or severe (extending throughout the abdominal cavity), based on the classification used in previous studies.

## **Content validity**

professors Three from Assiut University. faculty of nursing's medical surgical nursing department and two assistant professors from University, Assiut faculty of medicine's tropical medicine and gastroenterology department review the tools and nursing educational, and a few changes were made.

## Reliability

The researchers statistically tested the instruments' reliability using Cronbach's Alpha, an internal consistency model with a typical range of 0 to 1 (value more than 0.5 acceptable reliability). Tool (I): structured Interviewing Questionnaire reliable at 0.89. Tool II: was Compliance patients with of medication was reliable at 0.635. Tool III: assessment occurrence and degree of ascites sheet was reliable at 0.825.

## **Pilot study**

In order to determine the time needed for the tools' deployment and to evaluate their relevance and clarity, six patients (10% of the subjects) took part in a pilot study. Because no modification was added to tools. The study included patients who took part in the pilot study.

## **Ethical Consideration**

To conduct the current investigation, ethical commit approval was obtained (27/8/2023)with ethical code (1120240647); an official permission was obtained from the head of tropical gastroenterology medicine. the department, and the outpatient clinic at El-Rajhi Liver Hospital, Assiut University by delivery of an official

letter from the nursing faculty dean, Assiut University. The patients were informed of the study's aim and objective as well as their right to participation discontinue at anv moment, oral consent was obtained from the patients, patients received assurances that all personal information will be kept very private.

#### Procedure

Data collection took place over a 15month period, from early October 2023 to the end of January 2025. The researchers went to the hospital three times a week (on Saturday, Monday and Wednesday) during the morning shifts, for three hours a day there, to obtain data from the patient through four phases:

## Assessment phase

After obtaining approval to do the study, the researchers introduced themselves, goal and objectives of the study were explained and oral consent to participate in the study was obtained from the patients. Patients randomly assigned into study and control groups by using 1: 1 method respectively. The researchers met patient everv individually. The researchers gather demographic data by using tool I (part 1) then medical data by tool I (part 2), Child Pugh score by tool I (part 3), patient knowledge by using tool I (part 4), then drug compliance by using tool II and finally occurrence of ascites and its degree by tool III which physician perform abdominal ultrasound. The total amount of collecting data is 18 – 20 minutes depending on the patients' response.

#### **Planning phase**

Researchers prepared the educational booklet based on the assessment needs of the patients, literature review (Hamberg et al., 2023, and Mansour et al., 2023), researchers' experience and opinion of physician and nursing expertise to minimize ascites in patients with child Pugh score A. The researchers prepared colored banner, power point picture presentation, teaching aid, and planned the schedule of education according to content of educational program.

## Implementation phase

Control group patients received routine hospital care, while study groups patients received nursing education program in addition to routine hospital care. The researchers explained to the study' patients individually in the presence of a relative to be a reminder to the patients of the developed nursing education through four sessions.

The first session: Focused on general theoretical information about liver cirrhosis such as definition of liver cirrhosis, etiology of liver cirrhosis, and signs and symptoms of liver cirrhosis, medications, investigations done during routine follow up and warning signs. It took approximately 20 minutes besides 10 minutes for feedback and discussion.

**The second session:** Focused on dietary Recommendations (diet regimen, supplement, prohibited diet), lifestyle Modifications (smoking, exercises, managing extra weight) it took approximately 30 minutes besides 10 minutes for feedback and discussion. The third session: Focused on theoretical information and drug treatment, which include definition of ascites, causes of ascites, and signs and symptoms of ascites, in addition to the medication name, action of drugs, side effects, different methods and way about how remember taking the medications in time, when to take, stop, and how), it took approximately 20 minutes beside 10 minutes for feedback and discussion.

The fourth session: Focused on diet regimen (decrease salt amount, salt substitute, fast food that has high salt, prevented food), fluid (importance of taking fluid, amount, how to measure output), intake and general measure instructions (how to abdominal circumference. body weight, warning signs and when go to the hospital), it took approximately 30 minutes beside 10 minutes for feedback and discussion. The total amount of sessions was 140 minutes. The researchers used different methods (colored pictures, videos for measuring abdominal circumference, body weight, cups, and bottles to show how to measure intake) and a manner of motivation. At the end of sessions, each patient receives a copy of the nursing education in basic Arabic.

## **Evaluation phase**

After 6 and 12 months following the implementation of the developed nursing education, the control and study groups of patients come to the outpatient's clinic (follow up), the researchers evaluated the patient's knowledge (tool I (part 4)), Child Pugh score by tool I (part 3) and drug compliance (tool II) by using the same tools used during assessment phase

and approximately the same time. Also, the Grade of ascites was evaluated by doing abdominal ultrasound and physical examination which was performed by the physician and divided it to grade (tool III). The researchers compared the findings to the pre assessment.

#### Statistical design

The data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described number and by percentage (N, %). where continuous variables are described by mean and standard deviation (Mean, SD). The Chi-square test and fisher exact test used to between categorical compare variables where compare between continuous variables by t-test. We are used person Correlation to Appear the Association between scores. A two-tailed p < 0.05 was considered statistically significant. All analyses were performed with the IBM SPSS 20.0 software.

## Results

Table (1): Displays that; over than two thirds of the study and the control groups (73.3%, 76.7%) respectively, their age ranged from (54-65 years) with a mean age (range)  $(55.40 \pm 10.27)$ (20-64)) (25-64),54.71±11.99 respectively. Two thirds of study group (66.7%) and more than two thirds of control group (70%) were males. As regards the level of education, more than half of both groups (56.7%) had no education. In both groups (study and control), married patients made up the majority (90%, 83.3%) respectively. Regarding where they reside, over three-quarters of both groups (76.7%) are in rural areas. Regarding occupation, almost two-thirds of the study and control groups (73.3%, 70%) respectively had no work. Patients in the study and control groups did not differ statistically significantly as regards demographic data.

Table (2): Illustrates that, regarding etiology of liver cirrhosis, a third of the study group (33.3%) and about half of control group patients (46.7%) had HCV. More than half of the study group (53.3%) and about two thirds of the control patients (60%) had no other history of chronic diseases. The mean height was (168.17±13.15,  $163.7\pm7.14$ ) respectively. There was no statistically significant difference between study and control groups as regards medical history before nursing education.

Table (3): Indicates that, there was no significant statistical difference between study and control groups regarding body weight before nursing education with (P.value = 0.395), while there was statistical significant difference between both groups after 6 and 12 months with p.values  $(0.046^*,$ 0.031\*) respectively. Concerning BMI, there was no statistically significant difference between both groups before nursing education with (p.value = 0.138), while there was statistical difference between both groups after 6 months (p.value= 0.020\*) and high difference after 12 months (p.value=  $0.002^{**}$ ).

**Table (4):** Clarifies that, As regardschild Pugh grade, before nursingeducation all patients in both groups

had liver cirrhosis grade A, while after 6 months, majority of study group (83.3%) and more than half of control group (53.3%) had grade A with statistical significant difference (p. value=0.012\*), and after 12 month, two thirds of study group (66.7%) had grade A, but about three fourths of control group (73.3%) had grade B with highly statistical significant difference (p. value=0.002\*\*).

Table (5): Clarifies that, there was no statistically significant difference between study and control group patients regarding knowledge about ascites before nursing education (p= 0.240) with Mean± SD (range) (5.97±1.67  $5.47 \pm 1.59(2-9)$ (3-9), respectively, while there was highly statistically significant difference between both groups after 6 months  $(p<0.001^{**})$  with Mean± SD (range) (12.03±1.92 (9-15), 8.03±1.13(6-11)) respectively and after 12 month  $(p < 0.001^{**})$  with Mean  $\pm$  SD (range)  $6.41 \pm 1.11(4-8)$  $(10.57 \pm 1.76(8-14)),$ respectively.

Table (6): States that, there was no statistically significant difference between both groups regarding medication adherence before nursing education (p=0.175) with Mean $\pm$  SD  $(range) (4.5 \pm 1.72 (1-7), 3.8 \pm 2.2 (1-8))$ respectively, while there was highly significant statistically difference between both groups after 6 months  $(p<0.001^{**})$  with Mean± SD (range)  $(6.33\pm1.3 \quad (4-8), \quad 4.23\pm2.13 \quad (1-8))$ respectively and after 12 month  $(p < 0.006^{**})$  with Mean  $\pm$  SD (range)  $(5.13\pm2.05 (2-8), 3.63\pm2.04 (1-8))$  respectively.

Figure (1): Demonstrates that all patients under study had no ascites when taken by researchers, then after 6 months found that one sixth of study group (16.7%) and about half of control group (46.7%) (43.3% mild and 3.3% moderate) develop ascites with statistically significant difference between both groups ( $P= 0.012^*$ ). After 12 months, one third of the study group (33.3%) (23.3% mild and 10% moderate) and about three fourths of control ones (73.3%) (40% mild, 26.7 % moderate, and 6.7 % severe) had with highly statistically ascites significant difference between both groups (P= 0.002\*\*).

 

 Table (7): Shows that, post 6 months

 after nursing education, there was negative correlation between grade of ascites and medication adherence in both groups, which was significant in group only. There study was significant negative correlation between of grade ascites and knowledge in study and control group. There was a significant positive correlation between knowledge and medication adherence in study group only. Post 12 month, there was significant positive correlation between grade of ascites and body weight in control group only. There was significant negative correlation between grade of ascites and knowledge in both groups. There was significant positive correlation a between knowledge and medication adherence in study group only.

	Study		Cor	ıtrol		
Demographic data	(n=30	)	(n=30)		X2	P. value
	No	%	No %			
Age						
18-29 years	2	6.7	3	10.0		
<b>30-41</b> years	1	3.3	2	6.7	1 0/	0.000
42-53 years	5	16.7	2	6.7	1.04	0.000
54-65 years	22	73.3	23	76.7		
Mean±SD (range)	55.40±10.27(	25-64)	54.71±11.9	99(20-64)	T=0.05	0.809
Sex						
Male	20	<b>66.</b> 7	21	70.0	0.00	0 701
Female	10	33.3	9	30.0	0.00	0.781
Level of education						
not educate	17	56.7	17	56.7		0.682
Primary	8	26.7	5	16.7	1 50	
Intermediate	3	10.0	4	13.3	1.50	
High	2	6.7	4	13.3		
Marital status						
Single	3	10.0	2	6.7		
Married	27	90.0	25	83.3	3.28	0.194
Widow	0	0.0	3	10.0		
Residence						
Urban	7	23.3	7	23.3	0.00	1 000
Rural	23	76.7	23	76.7	0.00	1.000
Occupation						
Non-working	22	73.3	21	70.0	0.00	0 77 4
Working	8	26.7	9	30.0	0.08	<b>U.</b> //4

Table (1): Frequency & percentage distribution of demographic data for studied patients (n=60).

Chi square test for qualitative data between the two groups

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.01

	Study (n=30)		Control				
Medical data			(n=30)		X2	P. value	
	No	%	No	%			
Etiology of liver cirrhosis							
None	7	23.3	4	13.3			
HBV	8	26.7	6	20.0			
HCV	10	33.3	14	46.7		0.490	
Alcohol ±Viral	1	3.3	2	6.7			
Others	2	6.7	0	0.0	7 11		
HBV&HCV	0	0.0	1	3.3	/.44		
HCV& Alcohol ± viral	2	6.7	1	3.3			
HCV& Portal vein thrombosis	0	0.0	1	3.3			
HCV& Alcohol± viral &Portal	Δ	0.0	1	2.2			
vein thrombosis	U	0.0	I	5.5			
History of other chronic disease							
None	16	53.3	18	60.0			
Diabetes	6	20.0	6	20.0			
Hypertension	3	10.0	2	6.7	3 60	0 (00	
Cancer	0	0.0	1	3.3	3.00	0.008	
Other 0		0.0	1	3.3			
Diabetes & Hypertension	5	16.7	2	6.7			
Height	168.17	±13.15	163.7±	7.14	1.64	0.107	

Table (2): Frequency & percentage	distribution	of medical	data for	studied
patients (n=60).				

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.05

# Table (3): Comparison between study and control groups regarding body weight and BMI before, after 6 months, and after 12 months (n=60).

	Study (n=30)		Control			
Continue medical data			(n=	=30)	X2	P. value
	No	%	No	%		
Body weight						
Before						
Mean± SD	<b>71.8</b> ∃	-11.16	74.27	±11.15	-0.856	0.395
After 6 months						
Mean± SD	69.5±9.59		74.9±10.85		-2.042	0.046*
After 12 months						
Mean± SD	70.2±11.92		76.87±11.42		-2.212	0.031*
BMI						
Before						
Mean±SD	25.55±3.98		27.01±3.53		-1.50	0.138
After 6 months						
Mean±SD	25.04±5.14		28.11±4.79		-2.397	0.020*
After 12 months						
Mean±SD	25=	±4.7	28.71±4.26		-3.203	0.002**

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.05

Table (4): - Comparison l	between study and	control group reg	arding Child pugh
grade before, after 6 mon	ths and after 12 m	onths (n=60).	

Child pugh grade	Study (n=30) No. (%)	Control (n=30) No. (%)	X2/t	P. value
Before				
Grade A	30(100%)	30(100%)	-	-
After 6 months				
Grade A	25(83.3%)	16(53.3%)	( )20	0.012*
Grade B	5(16.7%)	14(46.7%)	0.239	0.012*
After 12 months				
Grade A	20(66.7%)	8(26.7%)	0.64	0.007**
Grade B	10(33.3%)	22(73.3%)	7.04	0.002

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.05.

Table (5): Comparison of patients' knowledge before, after 6 months and after 12 months for study and control groups (n=60).

knowledge	Study		Control			
	(n=	30)	(n=30)		X2	P. value
	No	%	No	%		
Before						
unsatisfactory	27	90.0	29	96.7	1.07	0 201
Satisfactory	3	10.0	1	3.3	1.07	0.301
Mean±SD (range)	5.97±1.67(3-9)		5.47±1.59(2-9)		1.18	0.240
After 6 months						
unsatisfactory	0	0.0	23	76.7	27 20	<0.001**
Satisfactory	30	100.0	7	23.3	57.50	<0.001***
Mean±SD (range)	12.03±1.	92(9-15)	8.03±1.13(6-11)		9.84	<0.001**
After12 months						
unsatisfactory	3	10.0	25	83.3	22 42	~0.001**
Satisfactory	27	90.0	5	16.7	52.42	~0.001
Mean±SD (range)	10.57±1.	76(8-14)	6.41±1.11(4-8)		11.21	<0.001**

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\* Significant level at P value < 0.05, \*\*Significant level at P value < 0.05

Table	(6):	Comparison	between	study	and	control	groups	regarding
Medica	ation	adherence bef	ore, after	6 mont	hs and	l after 12	months	(n=60).

Medication adherence	Study (n=30)		Control (n=30)		X2	P. value
	No	%	No	%		
Before						
Low adherence	19	63.3	22	73.3		
Medium adherence	11	36.7	7	23.3	2.11	0.348
High adherence	0	0.0	1	3.3		
Mean± SD (range)	4.5±1.72 (1-7)		3.8±2.2 (1-8)		1.37	0.175
After 6 months						
Low adherence	7	23.3	20	<b>66.</b> 7		
Medium adherence	15	50.0	7	23.3	11.44	0.003**
High adherence	8	26.7	3	10.0		
Mean±SD (range)	6.33±1	.3 (4-8)	4.23±2.13 (1-8)		4.61	<0.001**
After 12 months						
Low adherence	14	46.7	23	76.7		
Medium adherence	11	36.7	6	20.0	6.33	0.042*
High adherence	5	16.7	1	3.3		
Mean±SD (range)	5.13±2.05 (2-8)		3.63±2.04 (1-8)		2.84	0.006**

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups

\*Significant level at P value < 0.05, \*\*Significant level at P value < 0.05



Figure (1): Comparison between study and control groups regarding degree of ascites before, after 6 months and after 12 months (n=60).

Connelations		Study		Control			
Correlations	A1	A2	A3	A1	A2	A3	
after 6 months							
Grade of ascites(A1)	1			1			
Body weight(A2)	0.289	1		0.092	1		
Morisky Medication adherence (A3)	576-**	-0.183	1	-0.347	0.130	1	
Knowledge	538-**	-0.147	.439*	665-**	- 0.154	0.083	
after 12 months							
Grade of ascites(A1)	1			1			
Body weight(A2)	0.159	1		.422*	1		
Morisky Medication adherence (A3)	-0.358	-0.179	1	0.327	0.276	1	
Knowledge	812-**	-0.124	.381*	836-**	- 0.330	0.093	

Table (7): - Correlation coefficients matrix between grade of ascites, body weight, medication adherence and knowledge among study and control group after 6 months and after 12 months (n=60).

\*Statistically Significant Correlation at P. value < 0.05

\*\*Statistically Significant Correlation at P. value <0.01

#### Discussion

Cirrhosis is the most common cause of ascites. In addition, ascites is the most common complication of cirrhosis. Patients of all age groups may develop ascites (Theodorakopoulos, 2020).

Ascites is a serious turning point in the natural history of cirrhosis because it is associated with two years mortality of fifty percent that may need to consider liver transplantation as a therapeutic option. In recent years, clinical therapy of cirrhotic ascites has undergone a number of modifications. Ascites typically signifies severe liver disease, but patients with cirrhosis and ascites have somewhat diverse clinical histories (Awadallah et al., 2020). This study was conducted to evaluate the effect of development of education program nursing for patients with Child Pugh score A liver cirrhosis to minimize ascites.

Regarding demographic sample characteristics of the studied, the present findings display that more than two thirds of both groups their age ranged from fiftyfour to sixty-five years. Males made up more than two-thirds of the control group and two-thirds of the study Regarding the level group. of education in both groups, over half were uneducated. Most of the patients in both groups were married, more than three-fourths of both groups reside in rural areas, the majority of both groups do not work Demographic data did not show a statistically significant difference between study and control group patients. From point of view, this may be related to those chronic diseases such as liver cirrhosis happen with wide range in old age, not educated persons and those live in rural areas who exposed to bilharzial infection.

The previous findings agreed with (Mohammed et al., 2023) regarding socio-demographic characteristics of cirrhotic ascites patients. The finding of their study showed that almost two thirds of studied patients were in age more than fifty years old, regarding gender two thirds of studied patients were male. Moreover, majority of them were married, and the majority of the patients in the study lived in rural regions.

The result supported the findings of (Atya et al., 2019) who found that the largest percentages of male patients unemployed. were Regarding educational level, nearly two thirds of them were illiterate, most of them married. and largest were the percentage of cirrhotic patients were in rural areas. A study by (Abdel Rehaim and Mohamed., 2017) entitled, "Ascites Self-Management: Instructions Nursing Guideline," was in line with the current investigation, which discovered that about half of the study population was under sixty vears old. and were married & illiterate, majority of study group and more than three fifth of control group were males. As regards occupation and residence of study sample, results show that the highest percentage from them were hadn't work and lived in while the lowest rural areas employees percentage were and housing in urban areas. This is reflected in the large number of people who live together and share their items and objects in rural areas which increases the chance of the spreading of virus c, which is considered the major cause of liver cirrhosis.

Concerning medical data of the sample studied, the result illustrated that about half of the patients in the control group and one-third in the study group had HCV. From researchers' point of view, that HCV is the primary cause of liver cirrhosis in the elderly and that Egypt has the highest HCV prevalence in the world, also alcohol is not common in Egypt. As regarding presence of chronic diseases, the present study revealed that, higher than half of study group and three fifth of control group of cirrhotic patients in this study were free from other chronic diseases while minority with chronic diseases (twenty percent diabetes followed by hypertension). This reflects that people may develop liver cirrhosis in the absence of other chronic diseases. No statistically significant difference was found between the study and control groups' patients in terms of medical history.

This result was consistent with study conducted by (Azeem et al., 2023) which detected that more than half the patients of both groups observed that chronic viral hepatitis was the cause for liver cirrhosis and with study by (Jamil & Durrani., 2018) which revealed that chronic hepatitis C infection was the most frequent reason of hepatic cirrhosis in the research population. Likewise. it was confirmed with (Atya et al., 2019), who observed that hepatitis C was the primary cause of liver cirrhosis in the majority of patients. Contrary to studies done by (Fagerström and Frisman., 2017) reported that the main cause of liver cirrhosis for the patients was alcoholic liver disease and by (Kuo et al., 2017) who stated that viral hepatitis B was responsible for almost half of cases of liver cirrhosis. From researchers' view, these differences in results are attributed to different populations and their different social and cultural lifestyle.

These results were supported by a study conducted by **(Kamal et al., 2018)** which showed that while a minority of the cirrhotic individuals in the study had chronic conditions (40 percent had hypertension and 60 percent had chest disorders), the majority were clear of these conditions.

The current study clarified that there statistically significant was no difference between study and control groups regarding body weight before nursing education, while there was statistical difference between both groups after six and twelve months. Concerning BMI, there was no difference statistically significant between both groups before nursing education, while there was statistical difference between both groups after six months and high difference after twelve months. This result shows the positive relation between grade of ascites, body weight, and BMI, which reflected that as body weight and BMI increased, grade of ascites increased as well. This concurred with (Mobed et al., 2020) who found that prior to implementation of nursing the instruction, less than half of the study patients' weight ranged from seventy kg to less than eighty kg; however, following three and six months, their weight varied from sixty kg to less

than seventy kg, with a statistically significant difference.

As regards child Pugh grade, before nursing education all patients in both groups had liver cirrhosis grade A, while after 6 months, majority of study group and more than half of control group had grade A with statistical significant difference and after twelve months, two thirds of study group had grade A, but about three fourths of control group had grade В with highly statistical significant difference. Researchers' view, this finding could be attributed to the benefits from adherence to nursing education, that resulted in improvements study group' in condition as slower the progression of the disease.

This confirmed result was bv (Rajpurohit et al., 2023) in their study which revealed a significant, proportional relationship directly between the length of the disease and knowledge of the disease. Therefore, patient education is crucial for newly diagnosed patients with liver cirrhosis. It will help people understand the benefits of treatment and get rid of jargon and take an active role in managing their condition.

Concerning patients' knowledge, there was no statistically significant difference between study and control group patients regarding knowledge about ascites before nursing education, while there was a highly significant statistically difference between both groups after six and twelve months. This may reflect the benefits of the nursing educational booklet. (Mahmoud et al., 2020) provided support for this finding, stating that more than 60% of the patients in the studv had unsatisfactory knowledge score. where only thirty seven percent of them had satisfactory knowledge score. Additionally (Mohammed et al., 2023) found that approximately two fifth of cirrhotic ascites patients had average total knowledge level about cirrhotic ascites disease, slightly less than two fifth of them had poor total knowledge, and one fifth of studied patients had good total knowledge level about cirrhotic ascites disease. On another hand this result disagreed with (Piano et al., **2020**), who reported that third patients had good knowledge, while the remaining less than third of patients had poor knowledge. Three quarters of study patients reported that there is no effective coping and knowledge level about cirrhotic ascites disease.

Additionally, (Azeem et al., 2023) who indicated that prior to the intervention, most of both groups had inadequate overall knowledge regarding liver cirrhosis. However, this significantly improved among the study group compared to the control group both immediately following the intervention and two months later.

These findings are consistent with the study done by (Ali et al., 2023) who mentioned that regarding the level of knowledge possessed by the majority of the control and study groups prior to the implementation of designated nursing guidelines, no statistically significant difference could be found between the two groups.

In this respect, **Mobed et al., 2019**), reported that more than half of the study patients had poor level of total knowledge implementing of pre designing instructions. nursing Following the implementation of nursing teaching design for three and six months, most study participants had good level of overall a knowledge, which is consistent with the findings of Abdel Rehaim and Mohamed., 2017), who found that applying the nursing prior to recommendations, the majority of the study group had an inadequate degree of understanding regarding ascites management.

As regards medication adherence, the results stated that there was no statistically significant difference between groups regarding both medication adherence before nursing education, while there was a highly significant statistically difference between both groups after six months and after twelve months. This may be the result of demographic and cultural disparities.

This result was supported bv (Ghorbani et al., 2024) who stated that the majority of the patients did not adhere to refills and medications. This can be due to the poor economic status and low education of most of the samples. These results come along with a study done by (Xu et al., 2018) explored adherence which and perceived barriers to oral antiviral therapy for chronic hepatitis B, which patients shows most had low adherence to medication. The findings of (Rahmati et al., 2019)'s study indicate that more than sixty percent of people have poor adherence to treatment.

In this respect according to (Kuo et al., 2017), forgetting to take

medication is the primary cause of low medication adherence in the majority of research participants. Additionally, Mobed et al., 2020), found that after three and six months of implementing the nursing instruction design, the majority of the patients in their study exhibit strong medication adherence statistically significant with differences. Regarding grade of ascites, this study reveals that all patients under study had no ascites when taken by researchers, then after 6 months found that one sixth of study group and about half of control group develop ascites with statistically significant difference between both groups. After twelve months, one third of study groups and about three fourths of control had ascites with highly significant differences between both groups. From researchers' point of view, this may be related to low adherence to prescribed medications negligence of the and disease chronicity.

The result is in line with (Azeem et al., 2023) who reported that, most of both groups didn't have ascites before. This finding disagrees with (Ali et al., 2023) who found that over 50% of the patients under investigation exhibited ascites. This may be because most study groups were in the early stages of LC.

In this respect, (Mobed et al., 2019), reported that; following three and six months of implementing the nursing instruction design, the study's findings revealed that approximately half of the patients had moderate ascites with a statistically significant difference. Also, (Atya et al., 2019) showed that most of the patients in the study had

ascites; just over one-third had tense ascites, and one-third had moderate ascites. This finding was in line with (Abdel Rehaim & Mohamed., 2017) who found that the majority of the study group had moderate ascites, whereas the minority had mild ascites. The current research mentioned that, post six months after nursing education; negative there was correlation between grade of ascites and medication adherence in both groups, which was significant in study group only. There was significant negative correlation between grade of ascites and knowledge in study and control group. There was a significant correlation positive between knowledge and medication adherence in study group only. Post twelve month, there was significant positive correlation between grade of ascites and body weight in control group only. There was significant negative correlation between grade of ascites and knowledge in both groups. There was a significant positive correlation between knowledge and medication adherence in study group only. This may be explained by the importance of the educational booklet and its benefits on study group patients in addition to adherence to routine hospital instructions for study and control patients.

This result confirmed by (Adel et al., 2024) who reported that, the severity of ascites significantly improved over the study period. This improvement can be attributed to better adherence to diuretic medications, as supported by the strong correlation between medication adherence and ascites degree by the end of the study. This

also aligns with (Nobbe and McCurdy, 2022) and (Wang et al., emphasized who 2023) the importance of adherence to diuretic therapy and dietary advice in managing ascites effectively, noting that family involvement can be a key factor in ensuring adherence to such regimes.

These findings are in line with (Havward al., 2020). who et mentioned that effective chronic disease management requires patients and their caregivers to have the necessary knowledge and skills to participate in self-care tasks, selfmonitor for evolving complications, adhere to clinician recommendations and cultivate positive health behaviors. However, many patients have poor comprehension of chronic disease, mismanage their medications and fail to adopt important lifestyle modifications. Also, Mobed et al., **2020)** showed that the grade of ascites before, after three months, and six putting the nursing months of instruction design into practice had a statistically significant relationship with drug compliance.

## Conclusion

Nursing education program has a good effect on improving patients' knowledge, minimizing occurrence of ascites, and increasing level of drug compliance

## Recommendations

- The research' findings suggested that these educational instructions should be implemented as standard care in the hospital and similar settings.
- Repeat of the study with a bigger probability sample drawn from

various regions to allow for the results to be more broadly applied.

#### References

- Abd-Almageed, A. S., Ali, N. H., &<br/>Mobed, K. B. (2024). Effect of<br/>Nursing Discharge Instructions on<br/>Outcomes for Patients<br/>Undergoing Primary<br/>Percutaneous Coronary<br/>Intervention. Assiut Scientific<br/>Nursing Journal, 12(41), 28-40.
- Abdel Rehaim J. & Mohamed I. (2017). Knowledge of Patient with Liver Cirrhosis Regarding Ascites Self-Management: Instructions Nursing Guideline, *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*; 6 (4):88-95.
- Mohamed Ibrahim, Adel **B.**. Faheem Gendy, J., Mostafa Mahrous, F., & Nesnawy, S. (2024). Effect of a Family-Involved Educational Approach Adherence Diuretic on to Medication, Ascites Severity and Daily Living Activities Among Patients with Liver Cirrhosis. Egyptian Journal of Health Care, 15(3), 1214-1232.
- Ali, Z., Abdulfatah, M. & Mohamed, T. (2023). The effect of designed nursing guidelines on the outcomes of hepatic encephalopathy patients. *Eur Chem Bull.*; 12(4): 2802-17.
- Al-Khazraji, K. A., Hashim, M. K., Hashim, M. K., Abdulla, M. K., Khudhair, I. H., & Abbas, W. K. (2021). Etiologies of Liver Cirrhosis and Their Clinical Presentation among Inpatients in Medical City Complex-Baghdad Teaching Hospital. Global

Journal of Health Science, 13(5), 64.

- Asrani, S. K., Devarbhavi, H., Eaton, J., & Kamath, P. S. (2019). Burden of liver diseases in the world. *Journal of hepatology*, 70(1), 151-171.
- Atya, M. S., Mekkawy, M. M., Elmalek, A., Omar, M., & Abd Almeged, A. S. (2019). Effect of Nursing Teaching Guidelines among Patients with Cirrhosis on Their Knowledge Regarding Minimizing Hepatic Encephalopathy. Assiut Scientific Nursing Journal, 7(18), 1-11.
- Awadallah, M., Abd Elhameed, S., & Hassaneen, A. (2020). Healthy behaviors adjustment in the elderly patients with chroniclivercirrhosis. *Mansoura Nursing Journal*, 7(2), 245. https://doi.org/10.21608/mnj.202 0.179 752
- Azeem, A. M. A., Fareed, M. E., Mohamed, E. K., & Elmadbouh,
  G. (2023). Educational Nursing Program Implementation: It's Effect on Hepatic Encephalopathy Severity among Patients with Liver Cirrhosis. *Menoufia Nursing Journal*, 8(3), 375-401.
- Carrier, P., Loustaud-Ratti, V., Debette-Gratien, M., & Elkrief, L. (2024). Ascites in cirrhotic patients: a comprehensive review. *Exploration of Digestive Diseases*, 3(5), 362-381.
- Cizmic, A., Rahmanian, P. B., Gassa, A., Kuhn, E., Mader, N., & Wahlers, T. (2023). Prognostic value of ascites in patients with liver cirrhosis undergoing cardiac surgery. *Journal of*

*Cardiothoracic Surgery*, 18(1), 302.

- Du, L., Wei, N., Maiwall, R., & Song, Y. (2024). Differential diagnosis of ascites: etiologies, ascitic fluid analysis, diagnostic algorithm. *Clinical Chemistry and Laboratory* Medicine (*CCLM*), 62(7), 1266-1276.
- Fagerström, C., & Frisman, G. H. (2017). Living with liver cirrhosis: a vulnerable life. *Gastroenterology Nursing*, 40(1), 38-46.
- Ghorbani, A., Kareem Abed, E., Ghiyasvandian, S., & Salami, M. (2024). Association between Health Literacy and Medication Adherence in Patients with Cirrhosis. *Journal of Clinical Care and Skills*, 5(2), 63-68.
- Hamberg, M. L. S., Dupont, L., Jønsson, M. F., Bennick, H., Teisner, A. S., Andersen, M. L., & Danielsen, A. (2023). A Nurse-Led Outpatient Clinic for Patients with Decompensated Liver Cirrhosis: Staffing, Structure, and Patient Satisfaction. *Gastroenterology Nursing*, 46(2), 107-117.
- Hayward, K. L., Valery, P. C., Patel, P. J., Horsfall, L. U., Wright, P. L., Tallis, C. J., & Powell, E. (2020). E. Effectiveness of patient-oriented medication education and management intervention in people with decompensated cirrhosis. Internal Medicine Journal, 50(9), 1142-1146.
- Iwai, N., Ohara, T., Okuda, T., Oka, K., Sakai, H., Kajiwara-Kubota, M., ... & Itoh, Y. (2024).

Prognostic value of moderate or massive ascites in patients with advanced gastric cancer. *Oncology Letters*, 27(3), 116.

- Jamil, Z., & Durrani, A. A. (2018). Assessing the outcome of patients with liver cirrhosis during hospital stay: A comparison of lymphocyte/monocyte ratio with MELD and Child-Pugh scores. *The Turkish journal of* gastroenterology, 29(3), 308.
- Kadono, T., Ishiki, H., Yokomichi, N., Ito, T., Maeda, I., Hatano, Y., ... & Mori, M. (2023). Malignancy-related ascites in palliative care units: prognostic factor analysis. *BMJ Supportive & Palliative Care*, 13(e3), e1292e1299.
- Kamal, S. M., Abdelhakam, S. M., Massoud, Y. M., Abd El Hafeez,
  K. A. E. A., & Kamal, H. A. (2018). Clinical Profile of patients with ascitic fluid infection at Ain Shams University Hospitals. *The Egyptian Journal of Hospital Medicine*, 72(9), 5241-5250.
- Kuo, S. Z., Haftek, M., & Lai, J. C. (2017). Factors associated with medication non-adherence in patients with end-stage liver disease. *Digestive diseases and sciences*, 62, 543-549.
- Mahmoud, A., Abdallah, F., Mahmoud, H., & Taha, S. (2020). Assessment of Acute Hepatitis C patients' Performance regarding Self-Care Management for Complications Prevention. *Journal of Nursing Science Benha University*, 1(1), 19-39.

- Mansour, D., Masson, S., Corless, L., Douds, A. C., Shawcross, D. L., Johnson, J., & West, R. (2023).British Society of Gastroenterology Best Practice Guidance: outpatient management cirrhosis-part of 2: decompensated cirrhosis. Frontline *Gastroenterology*, 14(6), 462-473.
- Mobed, K. B., Mekkawy, M. M., Makhlouf, N. A., & Abd Almageed, A. S. (2019). Impact of Designing Nursing Instructions on Knowledge and Activity of Daily Living for Cirrhotic Patients With Ascites. *Assiut Scientific Nursing Journal*, 7(19), 1-8.
- Mobed, K. B., Mekkawy, M. M., Makhlouf, N. A., & abd Almageed, A. S. (2020). Impact of designing nursing instructions on compliance to diuretic drugs among cirrhotic patients with ascites. doi: https://doi. org/10.33545/26649187.20, 19, v1.
- Mohammed Kamel, S., Mohammed Abdelal, E., & Gamal El-Dein Ibraheim, S. (2023). Coping Strategies among Patients with Cirrhotic Ascites. Journal of Nursing Science Benha University, 4(2), 1016-1029.
- Morisky D.E., Ang A., Krouselwood M and Ward H., (2008): Predictive validity of a medication adherence measure in an outpatient setting, *Journal of clinical hypertension*, volume (10), issue (5) P.p 348: 354.
- Munoli, A. S., Mantur, P. G., & Jalawadi, V. M. (2024). Child-

Pugh Score and Vitamin D: Exploring a New Frontier in Liver Cirrhosis Assessment. *Cureus*, 16(11), e74738.

- Nobbe, A. M., & McCurdy, H. M. (2022). Management of the Adult Patient with Cirrhosis Complicated by Ascites. *Critical Care Nursing Clinics*, 34(3), 311-320.
- O'Connell, M. B., Brødsgaard, A., Matthè, M., Hobolth, L., Wullum, L., Bendtsen, F., & Kimer, N. (2024). A randomized controlled trial of a postdischarge nursing intervention for patients with decompensated cirrhosis. *Hepatology communications*, 8(5), e0418.
- Piano, S., Dalbeni, A., Vettore, E., Benfaremo, D., Mattioli, M., Gambino, G., Framba, V., Cerruti, L., Mantovani, A., Martini, A., Luchetti, M., Serra, R., Cattelan, A., Vettor, R., & Angeli, P. (2020). Abnormal liver function tests predict transfer to intensive care unit and International, death in COVID-19. Liver 40(10), https://doi.org/10. 1111/liv.14565.2394-2406.
- Pugh R, Murray-Lyon I, Dawson J, Pietroni M, Williams R (1973). "Transection of the oesophagus for bleeding oesophageal varices". *The British Journal of Surgery*. 60 (8): 646–9.
- Qiu, X. (2024). Nurse-led intervention in the management of patients with cardiovascular diseases: a brief literature review. *BMC nursing*, 23(1), 6.

- Rahmati M, Rejeh N, Heravi Karimooi M, Tadrisi SD.(2019). Investigating the relationship between health literacy and adherence with treatment regimen in the elderly with hypertension. *Iran J Nurs Res.* 2019;13(5):15-22. [Persian]
- Rajpurohit, **S.**, Musunuri, **B.**. Mohan, P. B., Vani, L. R., Bhat, Shetty, & (2023). **G.** S. Development and evaluation of patient information leaflet for liver cirrhosis patients. Clinical *Epidemiology* and Global Health, 24, 101436.
- Sabola, N. E., Elshikh, A. A., El-Nagar, S. A., & Elshebeny, N. H. (2022). Effect of a designed nursing intervention on knowledge and fatigue among patients with liver cirrhosis. *Menoufia Nursing Journal*, 7(2), 411-431.
- Safiri, Sepanlou, S. **G.**, **S.**, Bisignano, C., Ikuta, K. **S.**, Merat, S., Saberifiroozi, M., & Padubidri, J. 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.
- Steven K (2012): Sample size, P.P 59-60.
- Tapper, E. B., & Parikh, N. D.(2023).Diagnosismanagement of cirrhosis and itscomplications:areview.Jama, 329(18), 1589-1602.

- **Theodorakopoulos, T. (2020).** Natural history of grade 1 ascites in patients with liver cirrhosis. *Annals of Gastroenterology*. https://doi.org.
- Wang, N., Li, P., Suo, D., Wei, H., Wei, H., Guo, R., & Si, W. (2023). A Predictive Model for Identifying Low Medication Adherence among Patients with Cirrhosis. *Patient preference and adherence*, 2749-2760. doi: https://doi.org/10.2147/PPA.S426 844
- Wong, M. C., Huang, J. L., George, J., Huang, J., Leung, C., & Eslam, M., (2019). The changing

epidemiology of liver diseases in the Asia–Pacific region. Nature reviews *Gastroenterology & hepatology*, 16(1), 57-73.

- WORLD HEALTH ORGANIZATION, (2020).https://www.worldlifeexp ectancy.com/egypt-liver-disease, visited at 15-1-2025
- Xu, K., Liu, L. M., Farazi, P. A., Wang, H., Rochling, F. A., Watanabe-Galloway, S., & Zhang, J. J. (2018). Adherence and perceived barriers to oral antiviral therapy for chronic hepatitis B. *Global health action*, 11(1), 1433987.