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Indicators and risk factors associated with Malnutrition among patients with Liver Cirrhosis: Nursing Perspective

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Abstract

Background: Cirrhosis is a multi-organ disease that affects the kidneys, heart, arterial circulation, lungs, stomach, and brain, in addition to the liver. As a result, individuals may develop a range of issues, leading to many hospitalizations and high rates of morbidity and mortality. One of the goals of this study is to look at the status of nutrition among cirrhotic patients, as well as look into other factors that might be linked to malnutrition. Further, any possible links between nutrition and cirrhosis were investigated in order to better assess and manage individuals with cirrhosis and improve their outcomes. **Aim:** To investigate the indicators and risk factors associated with malnutrition in cirrhotic patients **Subjects:** A convenient sample of 60 adult male and female patients with a confirmed diagnosis of liver cirrhosis admitted to the Medical Hospital Cairo University. **Results:** This study shows that malnutrition indicators, anthropometric arm indicators and biochemical assessment can be useful techniques for assessing nutritional status in cirrhotic patients. According to the findings, various socio-demographic characteristics including age, gender, marital status, occupational status, etiology of liver cirrhosis have an important link with liver diseases, malnutrition in patients. Anthropometric measurements and biochemical parameters are in support of this. **Conclusion:** Dietary intervention in the form of nutrition assistance must be integrated in nursing care plan to help patients achieve better results. For this purpose, a better diagnosis, nursing care, and therapy of patients with varying degrees of malnutrition, a complete clinical examination, anthropometric measures, and objective biochemical tests are required.

Keywords: Liver cirrhosis; Nutritional status; Socio-demographic factors; Anthropometric measurements; Biochemical parameters, Nursing.

Introduction

Liver disorders have been proven to have a significant impact on the worldwide burden of mortality and morbidity (Asrani et al., 2019). The liver is involved in iron homeostasis, the production of essential plasma proteins, digestion, xenobiotic detoxification, gluconeogenesis, lipid metabolism, and storage. In addition, the liver turns harmful ammonia to less toxic urea and processes hemoglobin. Furthermore, the liver manages the levels of different substances in the blood, and all blood leaving from the gut and stomach goes via the liver. Bile is an essential excretory product of the liver that transports waste materials out from the liver. Bile aids in the breakdown of fat in the small intestine (Cullen and Stalker, 2016). Oxidative stress and antioxidants have a significant effect in liver diseases (Li et al., 2015).

Liver cirrhosis (LC) is a crucial stage of chronic liver disease with poor outcomes because iron is required for many fundamental physiological and molecular functions (Wang et al., 2014). Significant evidence suggests that impaired liver function and the presence of hepatocellular carcinoma (HCC) are to blame for the reduced life of LC patients. Data has also shown that LC patients frequently develop protein-energy malnutrition (PE) (Nishikawa et al., 2016). Cirrhosis is a pathological consequence of liver injury caused by a variety of factors. It is characterized by hepatocyte loss, fibrosis of the hepatic lobule with loss of hepatic lobular architecture, and vascular perturbations that result in elevated pressure in the portal venous system and shunting of blood across the liver, as well as regenerative activity that may progress to neoplasm or hepatocellular carcinoma (Schuppan and Afdhal, 2008).

The maximum not unusual place reasons of cirrhosis encompass nonalcoholic fatty liver sickness (NAFLD), hepatitis C or B virus infection, alcohol abuse, cholestasis, and metabolic/inherited sickness. Both NAFLD and alcohol-associated liver sickness are unexpectedly turning into the maximum common reasons of cirrhosis (Benedict and Zhang, 2017). Continual liver injury leads to histological improvement of regenerative nodules that are surrounded with the fibrous bands. This ultimately contributes to portal hypertension and end stage liver diseases or cirrhosis (Schuppan and Afdhal, 2008). The cost of liver cirrhosis in term of human suffering, financial burden and loss of productive life is divesting (Kabar et al., 2018).

The burden of liver disease is exceptionally high, maintaining the highest prevalence of hepatitis C virus (HCV) worldwide, as well as rising rates of liver cirrhosis (Razavi et al., 2013). Manifestation of liver cirrhosis occurs as the liver damage is extensive. It includes; fatigue, bleeding, bruising, itchy skin, yellow discoloration in the skin and sclera of the eyes, fluid accumulation in abdomen (ascites), loss of appetite, nausea, swelling in the legs, weight loss, testicular atrophy and breast enlargement and muscles weakness (Kim et al., 2006).

It is considered that life span and quality of cirrhosis patients can be improved by understanding the cause and pathophysiology of cirrhosis (Nusrat et al., 2014). Appropriate nutritional support has been reported to be have a great impact in management of liver disease management, clinical outcomes, and quality of life for such patients. Besides, the elimination of some diets has been recommended to prevent and protect liver diseases (Silva et al., 2015). Deficits in vitamins and minerals can affect metabolic activities at the cellular and molecular levels. Even before clinical and physical changes occur, vitamin and mineral shortages can affect metabolic processes at the cellular and molecular levels (Tardy et al., 2020).

All patients with chronic or severe liver disease must have their micronutrient status assessed as part of a thorough nutrition examination. Further, the nutritional problems of such cases are multifactorial, and it is a tremendous challenge to recommend a balanced nutritional support in cases of liver cirrhosis (Shergill et al., 2018). Malnutrition should be examined in two stages: the first is to determine the cause of malnutrition, and to identify patients who are at risk of malnutrition based on the severity of their liver disease. Despite the fact that there are various nutritional status assessment approaches in cirrhotic patients, there is little current study on the topic. More research is needed to discover if this enhanced method is useful (Saunders et al., 2010). Thus, present study investigated the nutritional status, link between risk factors and malnutrition indicators associated with liver cirrhosis, and various biochemical parameters in liver cirrhosis patients.

The aim of nursing interventions is to explore the effect of individualized nursing intervention on the quality of life and mental health of patients with cirrhosis and to carry out nursing rehabilitation for patients with liver cirrhosis in order to assist them to enjoy a peaceful life (Lewis &Dirksen 2017).

Nursing interventions should incorporate the following measures; (a) observe stools and emesis for color, consistency and amount, and test each one for occult blood, (b) monitor fluid intake and output and serum electrolyte levels to prevent dehydration and hypokalemia, which may precipitate hepatic encephalopathy, (c) maintain some periods of rest with legs elevated to mobilize edema and ascites and (d) alternate rest periods with ambulation (Wahlang, et.al, 2019).

Encouraging the patient to eat high-calorie, moderate protein meals and supplementary feedings. Suggest small, frequent feedings. Encourage oral hygiene before meals. Administer and teach self-administration of medications for nausea, vomiting, diarrhea or constipation. Encourage frequent skin care, bathing with soap, and massage with emollient lotions. Keep the patient's finger nails short to prevent scratching from pruritus (Cholankeril, et. al. 2017).

Material and methods

Aim of the study

The aim of the current study was to investigate the indicators and risk factors associated with malnutrition in cirrhotic patients.

Research question

To fulfill the aim of this study the following research question was formulated:

Q1: What are the risk factors associated with malnutrition in cirrhotic patients?

Q2: What are the indicators of malnutrition in cirrhotic patients?

Significance of the study

The burden of liver disease in Egypt is exceptionally high, maintaining the highest prevalence of hepatitis C virus (HCV) worldwide, as well as rising rates of liver cirrhosis (Lehman, 2016). In 2018 were 1187, 728 and 860 respectively (statistics and Medical Records Depsrtment ,2019) The cost of liver cirrhosis in term of human suffering, financial burden and loss of productive life is divesting. Cirrhosis of the liver is the third cause of death in people between the ages of 25-65 years.

Research design

Elucidating design was used in the current study. Elucidating design was led in a characteristic setting to address research questions identified with rate, pervasiveness or recurrence of event of a marvel of revenue and its attributes. There for, this sort of research design was utilized to portray or survey weariness and level of day by day living exercises among patients had liver cirrhosis.

Sample and setting:

A convenient sample of 60 adult male and female patients with a confirmed diagnosis of liver cirrhosis constituted this study sample. All patients admitted to the Medical Hospital Cairo University and met the inclusion criteria throughout 2 months from November to December, 2019 were included in the study. Patients were excluded if they had associated comorbidities e.g. renal and cardiac insufficiency, received a liver transplant and who were very ill.

Ethical consideration. An official permission was obtained from hospital administrators to conduct the study. Patients also were informed that participation in the study completely voluntary and they have the right to withdraw from the study without any penalty. Moreover, all patients were assured that the anonymity and confidentiality of the data were assure through coding the data. in addition, patients were informed that the data will not be reused in another research without their permission.

Procedure

The procedure of the study was performed through three phases: First phase (preparatory phase) : after extensive literature review , the investigators developed the study tool , validated this tool by panel of three Medical Surgical Nursing experts, then based on experts' recommendation, the necessary modifications were done .Once official permission granted to proceed with the proposed study from The appropriate authoritative personnel in the hospital ,the investigators were proceeding to the second phase . Second phase (implementation phase): the patients were interviewed individually to explain the nature and purpose of current study and assure that participation in the study is completely participated in the study.

Data collection was done as explained elaborately in the following paragraphs. The third phase (evaluation phase): the investigators analyzed the collected data based on the study and evaluate fatigue and level of physical activities among patients had liver cirrhosis**.**

Data collection: Socio-demographic characterization

The inclusion criteria include patients who admitted to the medical hospital had liver cirrhosis, their aged ranged between 20 to less than 60 years, alert, able to communicate and free from handicaps. The medical records of various patients were documented using a specially designed form. The demographic data included age, sex, marital status, level of education, occupational status, and residence. Moreover, the etiology of liver cirrhosis was used as clinical data for this study.

Screening and comparison of liver disease signs among studied patients

Various signs and symptoms of the liver cirrhosis were screened among patients, and were compared. The specific complications of liver cirrhosis were selected as signs of liver cirrhosis. The bleeding tendency was selected because an increased risk for bleeding has been found to be associated with cirrhosis. A buildup of fluid in the abdomen is called as ascites. Ascites often occurs as a result of cirrhosis, and is selected as a characteristic sign in this study. Portal hypertension linked with cirrhosis leads to splenomegaly or enlarged spleen. Liver cirrhosis makes liver unable to remove bilirubin leading to Jaundice linked with yellowing of the skin, darkening of urine, and whites of the eyes. As a result jaundice and the severity of liver cirrhosis was also included as signs of liver diseases.

Risk factors associated with nutritional deficiency among cirrhosis patients

Liver disease has a significant impact on food intake, nutrient metabolism, and nutrition status, frequently resulting in some degree of malnutrition, particularly micronutrient deficiencies Micronutrients are important dietary components that are necessary to sustain basic physiological functioning. Various risk factors have been considered to be linked with liver cirrhosis. Still, there are some risk factors for liver cirrhosis remain unclear. In present investigation, we aimed to explore the correlation between risk factors such as dry mouth and taste alteration, vomiting, diarrhea etc., and liver cirrhosis.

Anthropometric measurements

Anthropometric measures are a set of quantitative measurements of muscle, bone, and adipose tissue used to determine body composition. Anthropometry's fundamental components include height, weight, body mass index (BMI), body circumferences (waist, hip, and limbs), and skinfold thickness. These measures are crucial because they serve as diagnostic criteria for obesity, which greatly raises the risk of diseases such as diabetes mellitus, hypertension, cardiovascular disease, many others. Anthropometric measures include Triceps skin fold thickness (TCF), Mid Arm Muscle Circumference (MAMC), Mid Arm Circumference, and height. BMI, triceps skin fold thickness, mid-arm circumference, and calf circumference were investigated in the

present study. The triceps skinfold (TSF) was measured in triplicates using standard procedures and a Harpenden caliper (Frisancho, 1981). Mid-arm circumference (MAC) was measured using a Lufkin tape measure at the standard anatomically marked site.

Biochemical parameters

After 12 hours of fasting, a venous blood sample was drawn from each participant and was collected using 10 ml tubes and centrifuged at 1500 × g for 10 min at 4°C. To establish whether or not the liver was working correctly, a series of specific blood tests were performed. Biochemical parameters were measured immediately after centrifugation using commercially available kits. These tests can help tell the difference between acute and chronic liver diseases, as well as hepatitis and cholestasis. The following laboratorial tests were performed: hemoglobin, hematocrit, serum albumin, INR, hematocrit, hemoglobin, and serum bilirubin.

Assessment of malnutrition indicators

Malnutrition is a major issue in individuals with liver cirrhosis, and methods for nutritional evaluation are being debated. Malnutrition is a prevalent and deadly major characteristic and consequence of liver cirrhosis. Diagnosis is difficult and sometimes missed. Anthropometric data and biological specimens were used to calculate the PCM score, which was used to assess malnutrition. A decrease in body cell mass is an indication of malnutrition, cachexia, dehydration. In this study, malnutrition indicators score of patients was studied considering the complex interplay between the liver cirrhosis and nutrient metabolism using the Child–Pugh score and BMI.

Statistical analysis

Descriptive as well as inferential statistics were utilized to analyze data pertinent to the study. The collected data was scored, tabulated and analyzed by personal computer using statistical package for the social signs (SPSS) program. A P- value of 0.05 or less was considered to be statistically significant.

Results

Participant characteristics and socio-demographic characteristics of studied patients

A total of 30 patients were recruited and the socio-demographic characteristics of the sample are shown in Table 1. The 60% of total patients aged under 50 to 60 age group. 30% of total studied patients belonged to 40-50 age group. However, 3.3 and 6.7 % of total patients belonged to age of this sample, given that 34.0 % had at least 4 chronic conditions. For the purposes of understanding the gender vise prevalence of liver cirrhosis, we included both male (43.3%) and female population (56.7%). The people belonged to all kind of marital status were included like single status (10%), married (66%), and widowed (23.3%). We investigated patients with all kind of educational qualifications using the two questions including illiterate (63.3%), basic education (10.0%), secondary/ deplume (20.0%), and university (6.7%). The survey of these studies further considered the occupational status like house wife (53.3%), worker (13.3%), farmer (3.3%), retired (13.3%), and employer (16.7%). Among the injury and healthcare characteristics (Table 4), those with lower extremity injuries had a high prevalence of mobility problems; pain or discomfort was more likely to be associated with spine and back injuries and injuries to multiple regions. In terms of the etiology of liver cirrhosis, notable findings were that those with HCV were 66.7%. However, the other cases related to etiology of liver cirrhosis included unknown causes (3.3%), HBV (6.7%), HCV & bilharzia (10.0%), and HCV & others (13.3%).

Study group (n=30)		
	N.	%
Age groups Mean + SD	**28.0+4.1**	
18 >30 years	1	3.3
30>40 years	2	6.7
40>50 years	9	30.0
50>65 years	18	60.0
Gender		
Male	13	43.3
Female	17	56.7
Marital Status		
Single	3	10.0
Married	20	66.7
Widow	7	23.3
Level of education		
Illiterate	19	63.3
Read and write	0	0.0
Basic education	3	10.0
Secondary/ deplume	6	20.0
University	2	6.7
Occupational status		
House wife	16	53.3
Worker	4	13.3
Farmer	1	3.3
Unemployed	0	0.0
Retired	4	13.3
Employer	5	16.7
Residence		
Urban	6	20.0
Rural	24	80.0
Etiology of liver cirrhosis		
HCV	20	66.7
Unknown causes	1	3.3
HBV	2	6.7
HCV & Bilharzia	3	10.0
HCV & others	4	13.3

Table (1): Socio-demographic characteristics of studied patients (n=30). Various socio-demographic characteristics were studied included age, gender, marital status, occupational status, etiology of liver cirrhosis.

Screening and comparison of liver disease signs among studied patients

Table 2 shows the majority of liver cirrhosis study sample group are class B and they accounted 83.3%. However, 16.7% of liver cirrhosis patients are class A. Child-Pugh Bottom interpretation Score was 5-6 points for class A, and 7-9 points for Class B. In relative cause of hepatic cirrhosis, the results indicate 41.7% had jaundice. However, 58.30% did not have jaundice. In addition, regarding the case of bleeding was observed with 53.3% samples. Moreover, 46.7% of the study sample did not have bleeding tendency. Also this table shows that 56.7% of patients have ascites but 43.3 did not have ascites. In regarding the cases of splenomegaly, 40.0% of studied samples accounted splenomegaly. 60.0% did not have splenomegaly.

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Study group (n=30)		
	N.	**%**
Bleeding tendency		
Yes	16	53.3
No	14	46.7
Ascites		
Yes	17	56.7
No	13	43.3
Splenomegaly		
Yes	12	40.0
No	18	60.0

Study group (n=30)		
	N.	**%**
Jaundice		
Yes	12	41.7
No	18	58.3
Severity of liver cirrhosis		
Class A	5	16.7
Class B	25	83.3

Table (2): signs of liver disease among studied patients (n=30).

Risk factors associated with nutritional deficiency among cirrhosis patients

Dry mouth was found in 26 (85%) patients. However, 15 (16.7%) patients did not have dry mouth. Out of 31 patients, the taste alteration was present in 20 (66.7%) patients. The majority of patients (n=22, 71.7%) did not show the sign of vomiting as compared with patients with vomiting (n-9, 28.3%). The patients without diarrhea were significantly higher (n=27, 90%) in comparison with patients with diarrhea (n=3, 10%). In the case of patients, the samples having constipation were 13 (41.7%), whereas the samples (n=18, 58.3%) did not show constipations. Patients with food allergies or intolerance (n=10, 33.3%) compared to those without food allergies or intolerance (n=20, 66.7%), and poor fitting or no dentures / poor dental health was (n=15, 50.0%) vs. without poor fitting or no dentures / poor dental health (n=15, 50%). 28.3 percent of patients (n = 9) had transportation problems as compared with 71.1% of patients (n = 22) without this problem. Of 30 patients, 13 (41.7%) had inability to prepare meals, whereas 18 (58.3%) had no tendency of it. Loneliness and /or depression was confirmed in 41.47% (n = 13) as compared with 58.3% (n = 18) of patients without loneliness and /or depression. The failures to thrive was also investigated in the group and was found to be associated with 58.3% (n=18) as compared to patients (n=13, 41.7%) without this feature. Patients with history of OTC drugs (n = 7) comprised the 21.7%, followed by without history of OTC drugs (n=24, 78.3%). The number of patients with acute or chronic pain was 13 (43.3%) as compared with patients (n=17, 56.7%) without acute or chronic pain.

The patients with history of surgery/trauma were 11 (36.7%). The patients without history of surgery/trauma were 19 (63.3%). The samples with multiple medications were 16 (51.7%). However, the samples without multiple medications were 15 (48.3%).

Risk factors	Study group (n=30)			
	Yes		No	
	N.	%	N.	%
Dry mouth	26	85.0	5	15.0
Taste alteration	20	66.7	10	33.3
Vomiting	9	28.3	22	71.7
Diarrhea	3	10.0	27	90.0
Constipation	13	41.7	18	58.3
Poor fitting or no dentures / poor dental health	10	33.3	20	66.7
Food allergies or intolerance	15	50.0	15	50.0
Transportation problems	9	28.3	22	71.7
Inability to prepare meals	13	41.7	18	58.3
Loneliness and /or depression	13	41.7	18	58.3
Failure to thrive	18	58.3	13	41.7
History of OTC drugs	7	21.7	24	78.3
Acute or chronic pain	13	43.3	17	56.7
History of surgery/trauma	11	36.7	19	63.3
Multiple medications	16	51.7	15	48.3
Low income	10	33.3	20	66.7

Table (3): Risk factors for nutritional deficit in studied patients (n=30).

Anthropometric measurements

Anthropometric screening has been used as an indicator of undernutrition because it is simple, inexpensive and non-invasive. Male individuals had a BMI of average 13.5 (s.d. 1.8) kg/m^2, whereas females were found to have a BMI over 14 (s.d. 2.4) kg/m^2. The triceps skin fold thickness was 1.1 (s.d.0.6) mm in male patients, and was 1.3 (s.d. 0.6) mm in female patients. Mid arm circumference values were 14.8 (s.d. 1.7) mm in male and 13.8 (s.d. 2.3) mm in female subjects. Mean calf circumference was significantly higher in male 17.9 (s.d. 1.6) mm compared to female subjects 17.3 (s.d. 2).

Anthropometric measurements		Study group(n=30)
BMI	M	13.5+1.8 kg/m^2
	F	14+2.4 kg/m^2
Triceps skin fold thickness	M	1.1+0.6 mm
	F	1.3+0.6 mm
Mid-arm circumference	M	14.8+1.7 mm
	F	13.8+2.3 mm
Calf circumference	M	17.9+1.6 mm
	F	17.3±2 mm

M: *male* ***F:*** *female*

Table (4): Mean and SD for anthropometric measurements of studied patients (n= 30).

Biochemical measurements among the study group

Table 5 shows the mean biochemical parameters of patients and provides the results of mean values of biochemical parameters for the overall individuals studied. Based on hematologic analysis, only the 63.3% patients have low albumin as compared with 36.7% samples with normal value. However, mean value of albumin is 1.6+1.2 µmol/l. Hemoglobin mean values were 6.5+2.7 µmol/l, and 17 samples (56.7%) have low hemoglobin as compared with 13 samples (43.3%). Nineteen samples (63.3%) had low levels of hematocrit value, while the hematocrit levels were the normal in 81% of cases (n = 11). The international normalised ratio (INR) has been used to determine the effects of oral anticoagulants on the clotting system. Of 30 patients, 10 (33.3%) had had INR in normal range i.e. <1.1 as compared to 20 patients (66.7%) with high INR. Low platelet count was confirmed in 80% (n = 24) and 20% (n = 6) had normal platelet counts. Besides, table 5 illustrates the normal bilirubin range in 14 (46.7%) as compared with 16 patients (53.7%).

Table (5): Biochemical measurements among the study group (n=30).

	Study group (n=30)	
	N.	%
Serum albumin		
Low	19	63.3
Normal	11	36.7
Mean+SD	1.6±1.2	
Hemoglobin		
Low	17	56.7
Normal	13	43.3
Mean±SD	6.5±2.7	
Hematocrit		
Low	19	63.3
Normal	11	36.7
Mean±SD	17.5±4.7	
INR		
Normal	10	33.

		3
High	20	66.7
Mean±SD	1.4±1.8	
Platelet count		
Low	24	80.0
Normal	6	20.0
Mean±SD	61.4±74	
Serum Bilirubin		
Normal	14	46.7
High	16	53.3
Mean±SD	13.6±34.6	

Percentage distribution of malnutrition indicator score

Table 6 shows the percentage distribution of malnutrition indicator score of studied patients (n= (30). Malnutrition was directly correlated to the severity of hepatic dysfunction with a substantial number of Child-Pugh C cases. There were 20 (66.7%) malnourished, 5 patients at the risk of malnutrition (16.7%). However, the normal nutritional status was noted only in 5 patients (16.7%). Table 7 shows malnutrition indicator score of studied patients (n=30) according to Child-Pugh Classes (A and B).

Table 7 exhibits the malnutrition indicator score of studied patients (n=30) according to Child-Pugh Classes (A and B). In class A, 40% of patients were malnourished and around 40% individuals had risk of malnutrition. However, 20% individuals showed normal nutritional status. In class B, 18 individuals (72 %) had malnutrition as compared with 3 peoples (12 %) with risk of malnutrition. Four individuals (16 %) showed normal nutritional status in his class.

Various risk factors and malnutrition indicators of studied patients are listed in table 8. Besides, table 8 shows a significant correlation between risk factors and malnutrition indicators scores of studied patients (n=30).

Table (6): Percentage distribution of malnutrition indicator score of studied patients (n= (30).

Malnutrition Indicator	**Cases (n=30)**	
	N.	**%**
Malnourished	20	66.7
At risk of malnutrition	5	16.7
Normal nutritional status	5	16.7

** =Significant difference **= highly significance Ns= Non significant difference*

Table (7): Malnutrition indicator score of studied patients (n=30) according to Child-Pugh Classes (A and B).

Malnutrition Indicator	Severity of liver disease (Child-Pugh Classes)				P. value
	Class A		Class B		
	N.	%	N.	%	0.121
Malnourished	2	40.0	18	72.0	
At risk of malnutrition	2	40.0	3	12.0	
Normal nutritional status	1	20.0	4	16.0	

Table (8): Correlation between risk factors and malnutrition indicators scores of studied patients (n=30).

	Malnutrition Indicator						P. value
	Malnourished N=20		At risk of malnutrition N=5		Does not suffer from malnutrition N=5		
	N.	%	N.	%	N.	%	
Dry mouth	19	95.0	4	80.0	3	60.0	0.025*
Taste alteration	16	90.0	2	40.0	1	20.0	0.002*
Vomiting	6	30.0	2	40.0	2	40.0	0.732
Diarrhea	2	10.0	1	20.0	1	10.0	0.134
Constipation	9	45.0	2	40.0	2	40.0	0.156
Poor fitting of dentures	8	40.0	1	20.0	2	40.0	0.089
Food intolerance	12	60.0	2	40.0	1	20.0	0.047*
Transportation problems	5	25.0	2	40.0	2	40.0	0.500
Inability to prepare meals	10	50.0	2	40.0	1	20.0	0.069
Loneliness / depression	9	45.0	1	20.0	1	20.0	0.089
Failure to thrive	12	60.0	3	60.0	3	60.0	0.176
History of OTC drugs	5	25.0	1	20.0	1	20.0	0.193

Acute or chronic pain	10	50.0	2	40.0	2	40.0	0.300
Recent surgery/trauma	9	45.0	1	20.0	1	20.0	0.395
Multiple medications	13	65.0	2	40.0	1	20.0	0.022*
Low income	7	35.0	2	20.0	1	20.0	0.085
Child ClassA Child ClassB	2 18	10.0 90.0	2 3	30.0 70.0	1 4	20.0 80.0	0.121
Ascites	15	75.0	2	40.0	1	20.0	0.005*
Jaundice	10	50.0	2	40.0	2	40.0	0.251
Splenomegally	9	45.0	2	40.0	2	40.0	0.082

** =Significant difference **= highly significance Ns= Non significant difference*

Discussion

Nutrition also examines how people may utilize dietary choices to minimize their risk of disease and manage the diseases. People are more likely to acquire various health issues if their diet lacks the proper nutritional balance. If someone consume too much or too little of a nutrient, it may lead to disease a condition. Nutrients nourish the body and include proteins, carbs, fat, vitamins, minerals, fiber, and water. According to increasing evidence, a balanced diet may help prevent you from some diseases such as heart disease, cancer, osteoporosis, and type 2 diabetes (Tuso, 2013).

The liver is among the most important organs that plays a significant part in metabolic regulation. A complex system of antioxidant molecules and enzymes works provides protection against oxidative stress leading to a variety of health disorders (Anwar et al., 2020). The antioxidants could be possible mechanisms against many health complications. Superoxide dismutase is an important antioxidant enzyme (Khan et al., 2014; Anwar et al., 2014; Anwar et al., 2017 a; Anwar et al., 2017 b). Targeting of superoxide dismutase to the liver results in anti-inflammatory effects in rats with fibrotic livers (Swart et al., 1999). Cirrhotic patients typically have either general deficiency or changes in particular areas of nutritional status, like micronutrient deficiencies, as a result of a variety of processes, including inadequate nutritional intake, impaired absorption, and elevated loss. Malnutrition affects nearly every patient with alcoholic cirrhosis and is common in the majority of other forms of cirrhosis (Bemeur and Butterworth, 2014). Poor dietary intake is common in cirrhotic individuals, particularly those with alcoholic liver disease, which is a major cause of cirrhosis in the United States and across the world (Silva et al., 2015). Wellbeing standard of living is among the most key things throughout medicine, and its monitoring is essential, since it is an indispensable step for assessing the effectiveness of medical treatment as well as the associated health consequence for the patient.

It is well known that cirrhosis patients at high risk of readmission within a year can be identified using biomarkers and socio-demographic variables (Dai et al., 2019). Our findings confirm that socio-demographic factors like education level, gender, marital status, residence and etiology have a great impact on liver cirrhosis. On the basis of these factors, the adequate liver care should be prioritized for individuals who have been identified on the basis of these factors. Bleeding tendency, ascites and splenomegaly, is a common clinical problem. Liver cirrhosis was found to be associated with the ascites in this study contributing to nearly half (56.7%) of the cases. Bleeding tendency were the linked with liver cirrhosis (53.3%). However, splenomegaly was exhibited by 40% of the studied population. When individual items were considered, the signs including jaundice and severity of cirrhosis were investigated. Our study found that jaundice was found to be among 12 patients (41.7%). However, severity of cirrhosis was more common in individuals of class B (83.3%).

The discovery of risk factors associated with nutritional deficit in liver cirrhotic patients, revealed is a significant result that has not before been evaluated. This implies that there may be several factors linked with the development of nutritional deficiency over time. This would also be consistent with our results of malnutrition indicators. This might be explained by disease severity, with more worse illness leading to the development of liver cirrhosis.

Body composition assessment is an essential aspect of evaluating nutritional status because it may give predictive information as well as a way to track the effects of nutrition-related disease development and nutritional treatments (Knox et al., 2003). Anthropometric measures (AMs) are a relatively painless way to assess body composition, making them ideal for nutritional assessment in managing patients (Bhattacharya et al., 2019).

The most practicable objective indicators used for nutritional evaluation in cirrhotic patients are anthropometric measures. More than half of the studied individuals had a variety of dietary problems, which was consistent with earlier research (El Koofy et al., 2019). In around 40% of the patients, traditional anthropometric measures like BMI, triceps skin fold thickness, mid arm circumference, and calf circumference were investigated. In the current study, arm markers enhanced the identification of malnourished patients. Our data support previous findings. This might be due to the fact that muscular tissue and fat reserves becomes continuously lost and depleted in such individuals, respectively. In addition, one of the most significant nutritional problems in cirrhotic patients is muscle wasting and sarcopenia (Kalafateli et al., 2015). Sarcopenia is common in individuals with end-stage liver disease (ESLD) and has been associated to serious complications (Montgomery et al., 2019).

Clinical nurse specialists are responsible for providing care for patients with chronic and complex issues (Yahia, 2017). Patients with cirrhosis often go into a catabolic phase overnight due to limited glycogen stores in the liver. Thus, it is critically important for cirrhotic patients to maintain their muscle mass. The nutritional conditions of individuals may be predicted by prolonged INR > 1, biochemical liver markers, namely conjugated bilirubin and serum albumin. Increased unconjugated bilirubin, reduced serum albumin, and have been linked to greater risks of intensive care unit admission and mortality in two previous trials (Kalafateli et al., 2015). In our study, serum albumin, hemoglobin and platelets were low in majority of the studied populations. Bilirubin and INR were found to be high in most of the patients. Consistent with other studies, we found that most of the cases were malnourished. Further, there was a strong correlation between risk factors and malnutrition indicators scores that is in accordance of previous results. Thus, risk factors may be contributing factors to malnutrition in such patients.

To our recollection, very few Egyptian research have explored into the nutritional status of liver cirrhosis patients using clinical, anthropometric, and biochemical assessments. As a result, this study may justify the need for strong assessment techniques that might either aid early detection of malnutrition or establish separate instruments for predicting morbidity and death associated with malnutrition in liver cirrhosis patients. Our findings might also help in the identification of liver transplant patients, which might be the largest important predictor for long-term survival.

Conclusion

The limitations of traditional nutritional assessment methods are important factors for the development of quick and practical assessment techniques of supplement nutritional state predictors in liver cirrhosis patients. In this regards, the anthropometric arm markers, malnutrition indicators, and biochemical assessment were shown to be useful techniques for measuring nutritional status in liver cirrhosis patients. Thus, the evaluation, follow-up, and therapy of liver cirrhosis patients with varying degrees of malnutrition may be benefitted by a combination of complete clinical assessment, anthropometric measures, and objective biochemical tests such as albumin and conjugated bilirubin.

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