Assessment of Nutritional Status of patients with Liver Cirrhosis at Minia University Hospital

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Abstract:

There is limited data on the nutritional status of Egyptians with various etiology of cirrhosis, this study **aimed to**, assess the nutritional status for patients with liver cirrhosis at Minia University Hospital. **Patient and Methods**: 100 adult patients with liver cirrhosis (63 male and 37 female with mean age (45.58, 45.11 years respectively) and 20 patients as controls with mean age 42.20 years, the study was conducted at the General Medical Department and outpatient clinic in Minia University Hospital. Assessment of nutritional status was done using (1) anthropometric measurements as mid-arm circumference, mid-arm muscle circumference, triceps skin fold thickness, (2) Biochemical measurements as serum albssessmentmin, hemoglobin, WBCs, total protein, and INR, also; Mini-Assessment sheet was used. **Results**: the cause of liver cirrhosis among study group was 77% HCV and 22% HBV and 1%Mixed HBV and HCV infection, they were Child Pugh Class B and C (66%, 34% respectively). The most common nutritional risk factors for patients are gastrointestinal problems such as dry mouth, taste alteration, anorexia, nausea, and flatulence Malnutrition was prevalent in 85% of patients in study group in comparison with control group none of them have malnutrition. There is a high statistical significant difference found between liver cirrhosis group and control group in all anthropometric measurements. **Conclusion**: the majority of patients with decompensated liver cirrhosis were malnourished regardless the etiology of liver cirrhosis. Identifying the patients that are approaching the state of malnutrition by simple and easily applied methods is necessary in order to provide nutritional support. Follow up and correction of the nutrient deficit is very important and can improve the clinical outcome.

Key words: Nutritional Status, Liver Cirrhosis, Dependent Edema, Esophageal Varices.

Introduction:

Liver cirrhosis is a chronic hepatic disease characterized by diffuse destruction and fibrotic regeneration of hepatic cells. As necrotic tissue yields to fibrosis, this disease alters liver structure and normal vasculature, impairs blood and lymph flow, and ultimately causes hepatic insufficiency **(Black, and Hawks, 2009).** The incidence of cirrhosis is increasing in the developing world, mainly because of the life style factors which lead to its development **(Walsh and Crumbie, 2007).**

Liver cirrhosis is an irreversible scarring of the liver that occurs when liver cells die. In our country, one of the main causes of cirrhosis is viral hepatitis, especially hepatitis C. Other causes include alcohol abuse, conditions that damage the bile ducts, and fatty liver (caused by obesity and diabetes). Cancer can develop in a cirrhotic liver as well **(Franco, 2007).**

According to the World Health Organization (WHO), there is about 3% of the world's population is infected with Hepatitis C virus (HCV) and that there are more than 170 million chronic carriers who are at risk of developing liver cirrhosis and/or liver cancer **(Muhlberger, etal.,2009).**

The current population in Egypt is about 78 to 80 million. 14.7% of this population (11,466,000 persons) have been infected with Hepatitis C virus **(El-Zanaty and Ann, 2009).**

Manifestations of early cirrhotic changes generally go unrecognized with the disease progress, signs and symptoms of impaired liver function appear gradually over a period of years. In the early stages, the symptoms are vague digestive disturbances such as : anorexia, flatulence, nausea, But with advanced cirrhosis, loss of weight, intense prurities and later jaundice, dependent edema, spider angioma, anemia, increased abdominal girth due to ascites, splenomegaly, neurological involvement (hepatic coma), hemorrhage from esophageal varices will develop as a result of advanced cirrhosis and serious liver dysfunction **(Wolter, 2008).**

Complications of liver cirrhosis are hepatic encephalopathy, hepatic coma, portal hypertension and bleeding esophageal varices **(Rick, lauran and Leslie, 2007).** The prognosis of patients with cirrhosis depends on the degree of liver insufficiency and if the treatment is instituted in the early stages a normal lifespan is still possible and if portal hypertension has

developed with ascites and esophageal varices, the prognosis is grave **(Maggie, Carole and David, 2004).** As the blood deliver all products of digestion first to the liver, which possesses enzymes to modify nutrients, making them useful to the body **(Sizer and Whttney, 2008).** Patients with liver cirrhosis often suffer from malnutrition because of reduced nutrient intake or impaired metabolism in liver **(Campillo, etal., 2003).**

In cirrhotic patients, both nutrient intake and metabolism are likely to be impaired. Some parameters used for the nutrition assessment are influenced by liver disease and its complications, and the others are influenced by nutrient intake. Thus accurate assessments of nutritional status are not easily obtained in patients with cirrhosis, making it difficult to identify those at risk for malnutrition and to evaluate the need and efficacy of nutritional intervention **(Kawabe etal., 2008)**.

Patient with cirrhosis have increased nutritional requirements; high carbohydrate, moderate fat and high protein foods. However, the diet is often changed for those who have elevated serum ammonia levels with sign of portal systemic encephalopathy (PSE). Patient should have moderate amount of proteins and fat foods and simple carbohydrates. Previously used protein restrictions are no longer required because patients need protein for healing **(Ignatavicus and Workman, 2010).**

Carvalho and Rober (2006) added that; protein-calorie malnutrition (PCM) is frequent finding in patients with liver cirrhosis, leading to severe consequences to the general state and clinical evaluation of the patient. It has been demonstrated that PCM is an independent risk factor for death among patients with chronic hepatic disease, contributing to the emergence of more severe complications in cirrhotic patients, such as ascites, hepatic encephalopathy and infections. Multiple factors which are common to the underlying disease directly contribute to malnutrition, among them; anorexia, nausea, deficient food intake and absorption and catabolic state.

In addition, the many dietary restrictions used to control symptoms and specific complications, such as ascites and hepatic encephalopathy, aggravate the nutritional status, predisposing the patients to infections and worsening of the functional hepatic status **(Riggio, etal., 2003).**

The measurement of anthropometric parameters has been considered to be a reliable and safe method to assess nutritional status even in patients with cirrhosis, but most of these studies evaluate patients with cirrhosis who have been hospitalized, in general as a consequence of hepatic decompensation (**Carvalho and Rober 2006)).**

The patient with cirrhosis who has no ascites or edema and exhibits no signs of impending hepatic coma should receive a nutritious, high-protein diet if tolerated, supplemented by vitamins of the B complex and others as indicated (including vitamins A, C, K and folic acid). Because proper nutrition is so important, the nurse makes every effort to encourage the patient to eat. This is as important as any medication **(Smeltzer and Bare, 2004).**

If the patient shows signs of impending or advancing coma, the amount of protein in the diet is decreased temporarily. Incorporating vegetable protein to meet protein needs may decrease the risk of encephalopathy. In the absence of hepatic encephalopathy, a moderate-protein, high-calorie intake is provided, with protein foods of high biologic value. A diet containing 1 to 1.5 g of protein per kilogram of body weight per day is required unless the patient is malnourished. Protein is restricted if encephalopathy develops. Sodium restriction is also indicated in presence of ascites. A high-calorie intake should be maintained, and supplemental vitamins and minerals should be provided (e.g., oral potassium if the serum potassium level is normal or low and if renal function is normal) **(Smeltzer and Bare, 2008).**

The aim of the study:

was to assess the nutritional status of patients with liver cirrhosis at Minia University Hospital.

Significance of the study:

In Egypt, there is an increase in incidence and prevalence of liver cirrhosis and according to patient's records of Minia University Hospital, the incidence were approximately 2400 patients during period from , from January 2008 to January 2009 and it is important to know and assess the nutritional status of this group of patients because these patients suffer from protein calorie malnutrition which is contributing to sever complications such as ascites, hepatic encephalopathy and infections and it causes significant health- related quality of life (QOL) impairment and morbidity.Therefore, the present study was done in an attempt to collect data that could provide nurses, care providers and other health professionals with an in-depth understanding of nutritional status of this group of patients. These collected data may be useful to nurses in planning and implementing intervention for this group of patients, which could be reflected positively on the quality of patient's life.

Subjects and Methods:

Research Design:

Descriptive research design has been used to carry out this study.

Setting:

The study carried out in the Internal Medical Department and out patient clinic in Minia University Hospital.

Subjects:

Study participants drawn from a convenience sample (100 patients) of those diagnosed with liver cirrhosis in Minia University Hospital.

Patients will be selected according to the following criteria:

Inclusion Criteria:

Adult conscious patients diagnosed with liver cirrhosis.

Patients age from 18 years to 64 years.

Both sexes (male and female).

Ability to complete the participation in the research regardless educational level.

Exclusion Criteria:

Patient in hepatic coma, renal failure, hypertension, diabetic patients and patient with cancer.

Tools: Tools will be utilized to collect pertinent data to the study, these are:

Tool I: Personal and Medical Data sheet:

It was developed by the researcher to include : (patient's name, age, sex, level of education, occupation, marital status, residence, income, length of stay, onset of disease, etiology, ascites, esophageal varices, jaundice, severity of liver disease, …..etc).

Tool II: Nutritional assessment sheet:

Includes four parts (part I, II and III Adopted from Jarvis (1996), to cover data related to patient's nutritional status:

Part I: Risk factors affecting nutritional status.

Part II: Anthropometric measurements: (Weight, Height, Body mass index (BMI), Triceps Skinfold Thickness (TSF), Mid Arm Circumference (MAC) and Mid Arm Muscle Circumference (MAMC) measured on the right arm, and Calf Circumference (CC).

Part III: Biochemical measurements: (serum albumin, hemoglobin, hematocrite and WBCs, total protein, prothrombine time – concentration, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), platelet count, and bilirubin).

Part IV: Mini-Nutritional Assessment: The Mini Nutritional Assessment (MNA) is a rapid and reliable tool for evaluating the nutritional status. It is composed of 18 items.

Method:

Study was conducted through:

- Tools development.
- Content validity was done by expertise (medical staff) from the medical field & (Nursing staff) from the medical-surgical nursing field (5).
- An official permission will be obtained from the head of the internal medicine department to conduct the study.
- At initial interview the researcher introduce herself to initiate communication, explain the nature and purpose of the study.
- Data will be assured confidentiality and was been collected using the study tools.

Data analysis:

Data collected and analysis by computer program SPSS" ver. 17" Chicago .USA Data expressed as mean, Standard Deviation, number, and Percentage. Using T- test to determine significant for numeric variable. Correlation Coefficient (r) analysis was used for assessment of the inter-relationships among quantitative variables. Using chi square to determine significance form non significance variables. Statistical significance difference was considered when statistical significance was considered at p-value < 0.05.

Ethical considerations

The researcher will explain the eligibility of patients about the research. Patients will be advised of their right to withdraw from the study at any point, and that their participation's status would not affect the care they receive. Patient's names will be coded for data entry so that their names could not be identified.

Results:

Part (I): Personal and Medical data of the studied patients

Table (1): Frequency and percentage distribution of Personal and Medical data of the studied patient:-

Personal data of the studied patients: : (N=100)					
Characteristics	**No**	**%**	**Characteristics**	**No**	**%**
Age			**Marital status**		
18 – 40 years	27	27	Single	15	15
41 – 65years	73	73	Married	76	76
Mean ± SD	45.58± 1.126		Divorced &Widow	9	9
Gender			**Residence**		
Male	63	63	Urban	27	27
Female	37	37	Rural	73	73
Occupation			**Level of education:**		
House wife	33	33	Illiterate	51	51
Employer	25	25	Read & write	22	22
Farmer	20	20	Basic education	24	24
Student	1	1	University	3	3
Unemployed, Retired	21	21	**Low income** Yes	97	97
			No	3	3
Medical data and Child Pugh Class of the studied patients:					
Characteristics	**No**	**%**	**Characteristics**	**No**	**%**
Etiology of disease			**Onset of disease**		
HCV	77	77	< 5 years	67	67
HBV	22	22	6- 10 years	31	31
Mixed	1	1	>10years	2	2
Hospital stay			**Other chronic disease**		
< 5 days	87	87	Non	88	88
6 – 10 days	10	10	Rheumatoid arthritis	12	12
>10 days	3	3			
Bleeding			**Esophageal varices**		
No	61	61	Injected	36	36
Nose	7	7	Ligated	8	8
Esophagus\ nose	11	11	Sungestakins	4	4
Esophagus	8	8	Non	52	52
Rectum	5	5			
Other	8	8			
Ascites			**Splenomegally**		
No	4	4	No	23	23
Mild	44	44	Mild	57	57
Moderate	50	50	Moderate	19	19
Severe	2	2	Severe	1	1
Jaundice			**Child Pugh Class**		
No	40	40	A	0	0
Yes	60	60	B	66	66
			C	34	34

Part (II):- This part presents results related to nutritional assessment including:

a) Risk factors affecting nutrition status

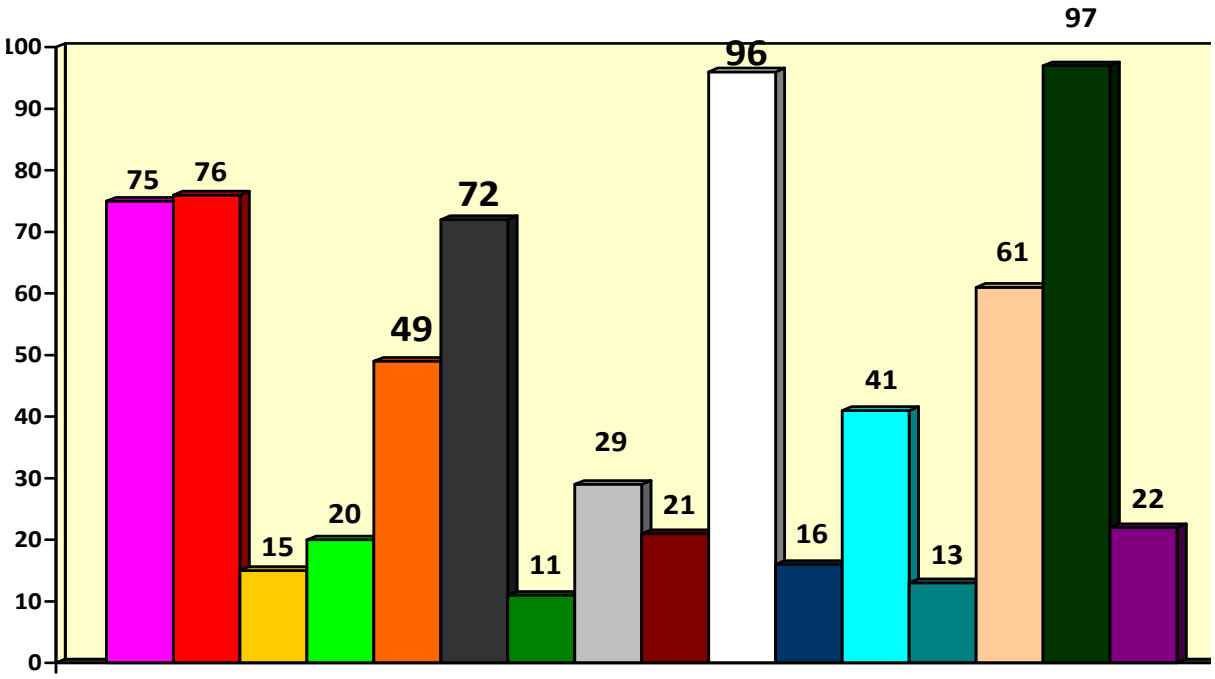
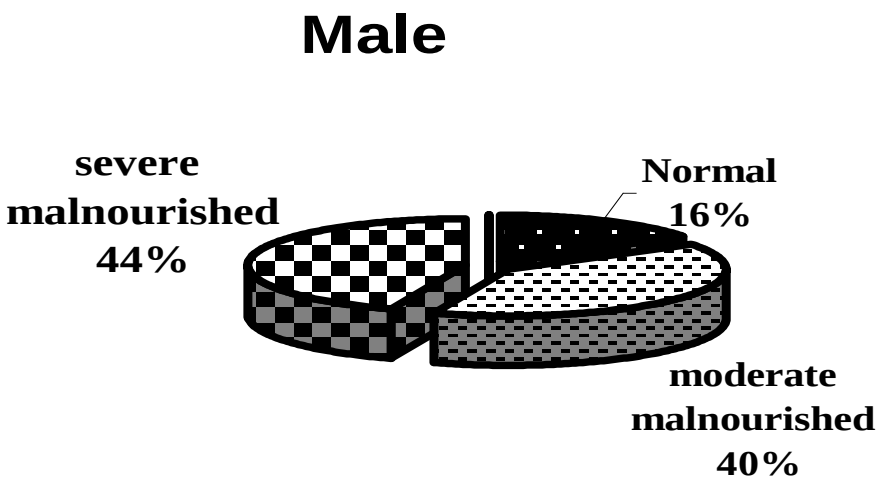


Fig. (1): Percentage distribution of nutritional risk factors among the study patients:-

B)Anthropometric measurements

1- Mid- arm circumference:-



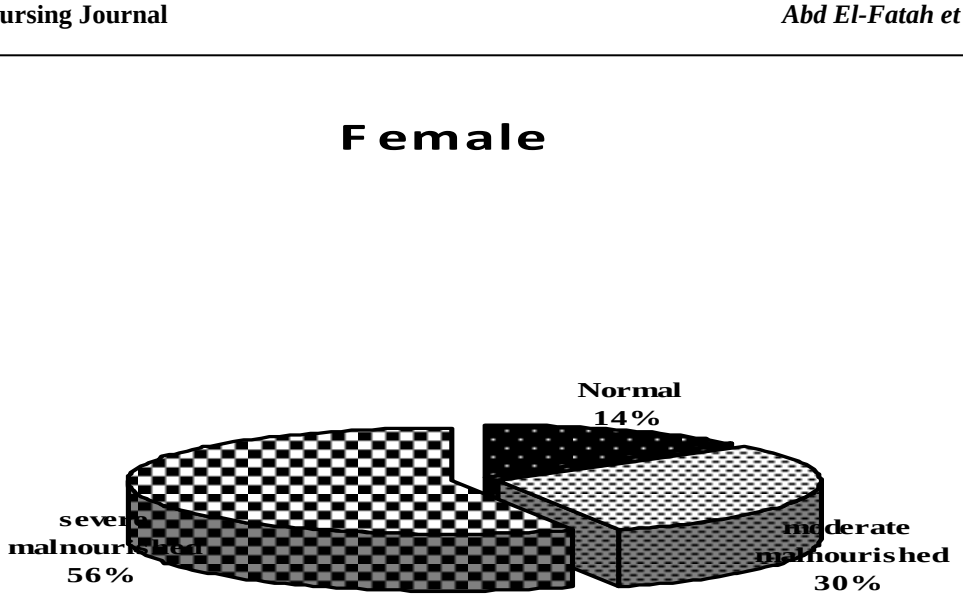
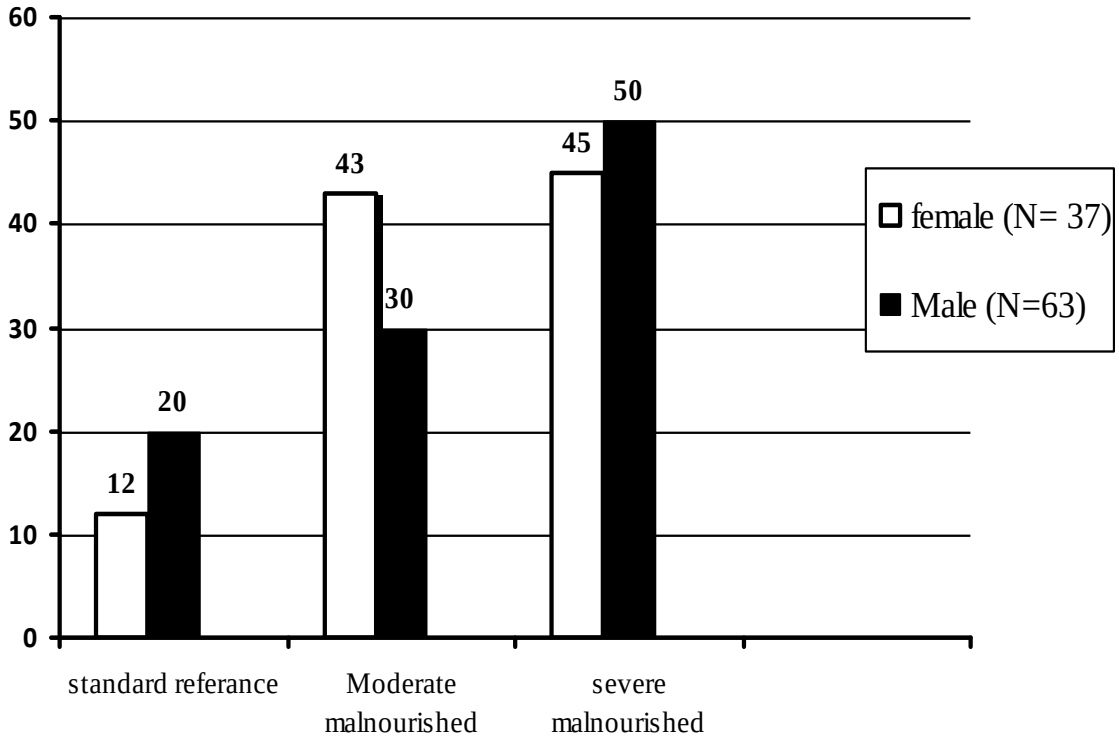


Fig. (2): Percentage distribution of mid-arm circumference (MAC) of the study patients according to gender

3- Mid- arm muscle circumference (MAMC):-



4- Triceps skin fold thickness:-

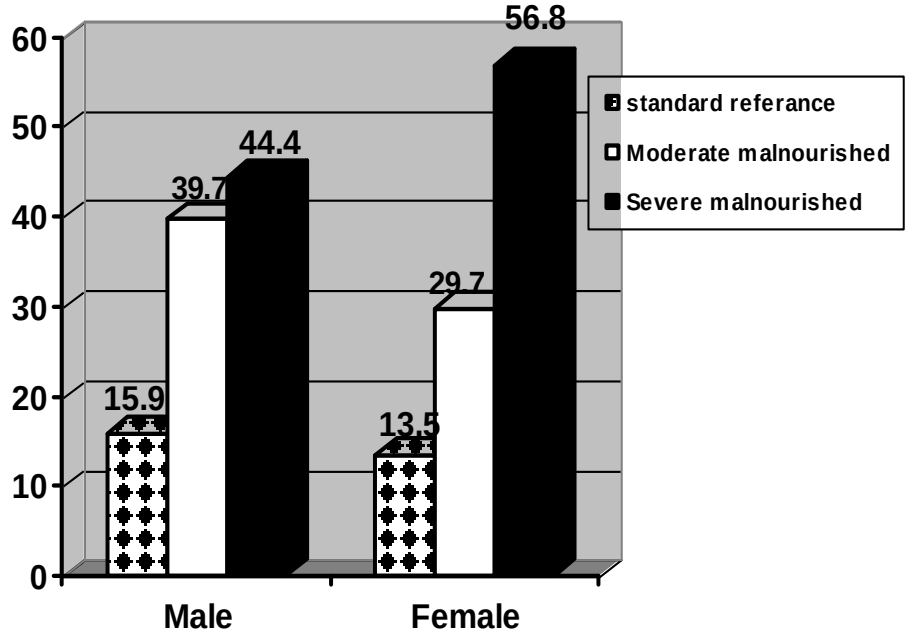


Fig. (4): Percentage distribution of (TSFT) among the study subjects as regarding to gender

Table (2): Mean and Standard deviation for anthropometric measurements between the study subjects (N= 100) and Control group (N=20):-

Anthropometric measurements		Liver cirrhosis Group(N=100)	Mean ± SD	Control group(N=20) Mean ± SD	P- value
TSFT Mm	**M**	8.3863	8.578 ± 4.379	14.4700 ± 2.055	• 0.694 NS •• 0.000**
	F	8.9054			
MAC Cm	**M**	27.5794	26.495 ± 5.105	28.880 ± 0.436	• 0.005** •• 0.000**
	F	24.6486			
MAMC Cm	**M**	24.889	23.7391± 4.940	24.240 ± 1.0835	•0.006** •• 0.000**
	F	21.7811			
CC Cm	**M**	31.2159	31.052 ± 4.497	31.100 ± 0.967	•0.173 NS •• 0.000**
	F	30.7730			

* = Statistical significant ** = Highly statistical significant

• *P* – value of Liver cirrhosis group (male and female)

•• *P* – value of Liver cirrhosis group and control group

C) - Laboratory results:

Table (3): Percentage distribution of laboratory tests among the study patients according to gender (N = 100):

Laboratory tests	Sex				Control group	*P* – value
	Male (63)		Female(37)			
	No	%	No	%		
Serum albumin						
Lower	61	96.8	27	73		
Normal	2	3.2	8	21.6		0.002**
Higher	0	0	2	5.4		
	2.615 ±2.631				4.300 ± 0.736	0.000**
Hemoglobin						
Lower	53	84.2	29	78.4		0.492
Normal	10	15.8	8	21.6		NS
	11.300 ± 10.554				13.450 ±1.979	0.005**
White blood cells						
Lower	6	9.5	5	13.5		
Normal	39	61.9	24	64.9		0.641NS
Higher	18	28.6	8	21.6		
	9.244 ± 5.422				6.450 ± 0.759	0.000**
●Total protein						
Lower	19	31.7	9	25.7		
Normal	35	58.3	26	74.3		0.199NS
Higher	6	10	0	0		
	6.396 ± 1.400				7.000 ±0.858	0.000**
●Prothrombine time						
Lower	1	3	1	5.9		0.735
Higher	32	97	16	94.1		NS
●Prothrombine concentration						0.793
Higher	51	100	31	100		NS
●MCV						
Lower	8	19	6	24		
Normal	24	57	10	40		0.588
Higher	10	24	9	36		NS
●MCH						
Lower	6	14.6	8	32		0.323
Normal	23	56.1	13	52		NS
Higher	12	29.3	4	16		
●MCHC						
Lower	22	52.4	18	72		0.177
Normal	19	45.2	5	20		NS
Higher	1	2.3	2	8		
Platelet count		74.6		69.4		0.363
Lower	47	25.4	25	30.6		NS
Normal	16		12			
	193.259 ± 1.263				250.000 ± 51.298	0.000**
Total Serum bilirubin						
Lower	1	1.6	1	2.7		0.278
Normal	4	6.3	0	0		NS
Higher	58	92.1	36	97.3		
	2.755 ± 1.759				0.205 ± 0.083	0.000**
●Direct bilirubin						0.767
Higher	55	100	31	100		NS
	1.577 ± 1.190				0.250 ± 0.115	0.000**
I.N.R						
Normal	2	3.2	1	2.7		1.000
Higher	61	96.8	36	97.3		NS
	1.805 ± 0.631				1.000 ±0.000	0.000**

●This test was not done for all study subjects. **NS** = No statistically significant ****** Highly statistically significant

D) - Mini- Nutritional Assessment: (Malnutrition indicators score)

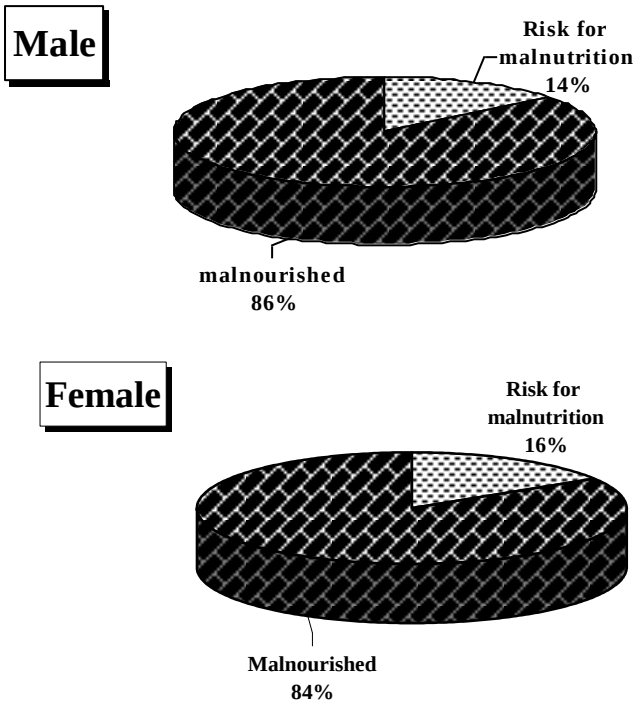


Fig. (7): Percentage distribution of malnutrition indicators scores according to gender

Table (4): Correlation between medical data and malnutrition indicators scores of the study patients:

Characteristics	Risk for malnutrition	Malnourished	P – value
Bleeding			
No	10	51	
Nose	2	5	
Esophagus\ nose	2	19	0.849
Esophagus	1	5	NS
Rectum	0	2	
Other	0	3	
Esophageal varices			
Injected	6	31	0.617
Ligated	0	8	NS
Sungestakins	0	4	
Non	9	42	
Ascites			
No	2	2	
Mild	2	42	0,020*
Moderate	11	39	
Severe	0	2	
Splenomegally			
No	6	17	
Mild	7	50	0.388
Moderate	2	17	NS
Severe	0	1	
Jaundice			
No	9	31	0.086
Yes	6	54	NS

NS= Not significant * = Statistical significant

Table (5): Percentage distribution between Child Pugh Class (B and C) and different characteristics among the study patients (N = 100):-

Characteristic	Child Pough Class				*P* – Value
	Class B (66)		Class C (34)		
	No	%	No	%	
Age / years					
≤40	21	31.8	6	17.6	0.394
> 40	45	68.2	28	82.4	NS
Gender					
Male	43	65.2	20	58.8	0.535
Female	23	34.8	14	41.2	NS
Residence					
Urban	15	22.7	12	35.3	0.180
Rural	51	77.3	22	64.7	NS
Malnutrition indicator score					
Risk of malnutrition	13	19.7	2	5.9	0.65
Malnourished	53	80.3	32	94.1	NS
TSFT (mm)					
Standard	9	13.6	6	17.6	0.291
Moderate	27	40.9	10	29.4	NS
Severe	30	45.5	18	52.9	
MAC (cm)					
Standard	9	13.6	6	17.6	0.291
Moderate	27	40.9	9	26.6	NS
Severe	30	45.5	19	55.8	
MAMC (cm)					
Standard	8	12.1	7	20.6	0.340
Moderate	28	42.4	10	29.4	NS
Severe	30	45.5	17	50	
Albumin					
Lower (< 3.4)	55	83.3	33	97.1	
Normal	9	13.7	1	2.9	0.130
Higher	2	3	0	0.0	NS
H.B					
Lower	52	78.8	31	91.2	0.215
Normal	14	21.2	3	8.8	NS
Total bilirubin					
Lower	2	3	0	0	0.193
Normal	4	6	0	0	NS
Higher	60	91	34	100	

NS = Not significant ** = Highly statistical significant

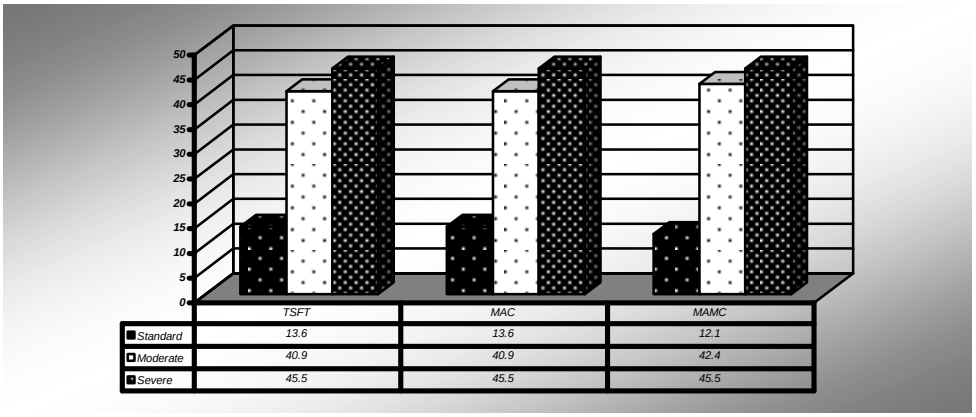


Fig. (10): Percentage distribution of malnutrition among the study patients (N =66) as regarding to Child Pugh Class (B)

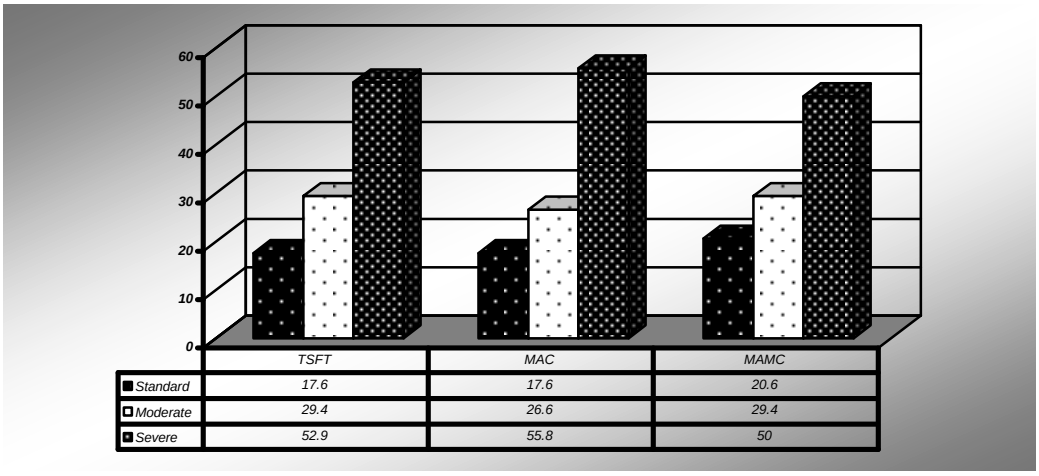


Fig. (11): Percentage distribution of malnutrition among the study patients (N =34) as regarding to Child Pugh Class (C)

Table1: The table demonstrated that; the majority of the study patients were males, aged more than 40 years, married, live in rural area, and have low income, (63%, 73%, 76%, 73% and 97% respectively). As regards to medical data the majority of them have HCV infection as a cause of liver cirrhosis with onset of disease less than 5 years, Child Pugh Class B, have jaundice, and presented with different degree of splenomegally, ascites, with absence of other chronic disease, (77%,67%, 66% , 60%, 77%, 96%, and 88% respectively).

Fig. (1): Percentage distribution of nutritional risk factors among the study patients this figure shows that; the most common nutritional risk factors were low income (97%), failure to thrive (96%), taste alteration (76%), dry mouth (75%), and poor dental health (72%).

Fig. (2): Percentage distribution of mid-arm circumference (MAC) of the study patients according to gender The figure illustrate that;): Shows that; female patients complain from severe malnourished more than male (56%, 44% respectively). While (40%, 30% respectively), have moderate malnourishment in male and female patients

Fig. (3): Percentage distribution of (MAMC) among the study subjects as regarding to gender:- The figure shows that; (50%) of the male patients and (45%) of the female patients had severe malnutrition, and (30% and 43% respectively) had moderate malnutrition. Also it shows that the male and female patients in control group were normal (standard reference) (20% and 12% respectively).

Fig. (4): Percentage distribution of (TSFT) among the study subjects as regarding to gender:- The figure shows that; Shows that according to TSFT, (44.4%) of the male, and (56.8%) of the female patients had severe malnourished, and (39.7%) of the male, and (29.7%) of the female patients had moderate mal nourished. Also it shows that the minority of both male and female patients in the study

subjects were normal (standard reference) (15.9% and 13.5% respectively).

Table2: This table clarifies that the mean value of anthropometric measurements of male patients was higher than female patients in MAC, MAMC, and CC. while it is lower than female patients in TSFT. With statistical significant differences between both sex as regard to MAC, and MAMC in the study subjects, and there is a highly statistical significant was found between study and control groups in TSFT, MAC, MAMC, and CC.

Table3: This table Illustrates that; the majority of male and female patients have lower value in serum albumin, hemoglobin, MCHC, and platelet count. While higher percentage in laboratory investigation results was found in prothrombine time, prothrombine concentration, direct bilirubin, and I.N.R. Also the table show that no statistical significant correlation between both sexes as regard to laboratory investigation except in serum albumin, and there is highly statistical significant correlation was found between study and control group in all laboratory investigation which done to control group.

Fig. (7): Percentage distribution of malnutrition indicators scores according to gender:- shows that the majority of male and female patients in study group (86% and 84% respectively) had malnutrition, while (14% and 16% respectively) have a risk for malnutrition in the both sex.

Table4: This table shows that no statistical significant differences were found between medical data and malnutrition indicator score except for patient with ascites.

Table5:This table shows that; there is no statistical significant relation was found between Child Pugh Class (B and C) and different characteristics among the study subjects.

Fig. (10): Percentage distribution of malnutrition among the study patients (N =66) as regarding to Child Pugh Class **(B):-** Show that the majority percentage distribution of TSFT, MAC, MAMC in the study patients as regarding to Child Pugh Class (B) were moderate and severe malnourished (86.4%, 86.4%, and 87.9% respectively).

Fig. (11): Percentage distribution of malnutrition among the study patients (N =34) as regarding to Child Pugh Class (C):- Show that the majority of percentage distribution of TSFT, MAC and MAMC among the study patients as regarding to Child Pugh Class (C) were moderate and severe malnourished (82.3%, 82.4%, and 79.4% respectively).

Discussion:

The discussion will cover the main result findings as follow:

(1)Sociodemographic and medical characteristics of the studied sample

Based on the results of present study; the majority of the patients were males in middle adulthood, that is characteristically a life stage of work and production. This finding supported by **Abd el Ghaffar (2004)** who reported that the percentage of liver cirrhosis is higher among male patients than female patients in Egypt.

Cahill et al., (1996), Buczko (2001), Vanderplas et al., (2003), Iber (2004), Smith (2004) , and Dataller and Gines (2005) in the same line with the current study finding which, mentioned that; liver cirrhosis is as twice as common in men than in women and is especially prevalent among malnourished patients over age 50 years of age.

The results of the current study represented that; about more than half of the study patients were illiterates, this would be attributed to the fact that the majority of the study patients was residing in rural areas. These finding are consistent with **Sallam (2007)** who reported that; more than half of the study patients were illiterate. According to the study which was carried out by **Vanderplas et al., (2003)** on a number of cirrhotic liver patients, it revealed that the majority of the sample had secondary education, this result disagree with the present study which may be due to the different nature of the study population.

In relation to patient's residence, The results of the present study agrees with study by **Rao et al., (2002)** who reported that; in Egypt, liver cirrhosis is more common in rural than urban regions because rural regions present a suitable environment for developing a schistosomal infection due to exposure to canal water that may be polluted by snails that harbor the schistosomal parasite. Also, **Abd el Ghaffar (2004)** added that in Egypt, liver cirrhosis with or without chronic active hepatitis constituted about 50% of all chronic liver diseases that met within Egypt and even higher percentage in rural Egypt. This means that cirrhosis is the commonest chronic liver disease in the country.

In relation to occupation, the present study revealed that, the majority of male patients work as employers and farmers. While most of the female patients were housewives, this result supported by **Rao et al., (2002)** and **Vanderplas et al**., (2003), finding, according to the study which was carried out on a number of cirrhotic liver patients in Egypt which found that the majority of the sample were working as farmers which put them at high risk for developing schistosomal infection and the majority of the patient were married.

The current study represented that; the majority of the study patients infected with HCV and suffered

from mild to moderate ascites and splenomegally. This result agrees with **Sharif, etal., (2005)**, finding who stated that twenty-five to thirty-five percent of patients with chronic hepatitis C virus progress to cirrhosis. Hepatitis C virus (HCV) is recognized as a major threat to global public health, especially in Egypt which has possibly the highest HCV prevalence in the world; 10% - 20% of the general populations are infected. HCV is the leading cause of liver cirrhosis, hepatocellular carcinoma (HCC) in this country.

EL- Zayadi et al., (2001), Hassan et al., (2001) and Faust and Reedy, (2006) added that ,in Egypt over the past decade, chronic hepatitis C (HCV) has replaced alcohol as the leading cause of cirrhosis**. Cesario et al., (2011)** reported that ascites is the most common major complication of cirrhosis and is an important landmark in the natural history of chronic liver disease. It observed for 10 years, approximately 60% of patients with cirrhosis develop ascites requiring therapy.

In the results of present study, the severity of liver cirrhosis was classified according to Child Pugh class to class B and C and the majority of them (66%) were in class B while the minority of them (34%) were in class C. This finding agree with **Tai et al**., (2010) who reported that; all patients had advanced liver disease with 16 (44.4%) cases of Child-Pugh B and 20 (55.6%) cases of Child-Pugh C cirrhosis and this result disagree with Faiyaz (2007) who reported that; 109 patients were selected with 72 males and 37 females patient, classified according to Child class A, B & C was (30, 38 & 41 respectively) this is because the present study were excluded patient with hepatic encephalopathy and this lead to decreased the number of patient in class C.

(2) Nutritional assessment that includes :

A- Risk factors affecting nutritional status:

The present study revealed that; the most common nutritional risk factors were related to gastrointestinal problem, also nutritional risk factors that affect nutritional status as failure to thrive, low income, multiple medication, inability to prepare meals and isolation. This result agrees with finding of ; **Yao et al., (2001), Plauth & Schutz,(2002), Aweseman (2004) , Hogan & Madyag (2004), Figueiredo et al. (2005), Carvalho & Rober (2006), Kondrup (2007), Norman et al., (2008),** which reported that; Multiple factors which are common to the underlying disease directly contribute to malnutrition, among them, anorexia, nausea, deficient food intake, maldigestion, malabsorption and catabolic state. In addition, the many dietary restrictions used to control symptoms and specific complications, such as ascites and hepatic encephalopathy, aggravate the nutritional status, predisposing the patients to infections and worsening of the functional hepatic status and **David, (2009)** who added that, the liver plays a role in normal appetite regulation and liver disease may impair food intake.

Also the results agrees with **Anne and Alan, (2006)** who reported that; many patients with advanced liver disease have an altered sense of taste, which might be related to vitamin A and/or zinc deficiency, often experience early satiety that is related to mechanical compression from massive ascites; early satiety can also result from an increased serum concentration of leptin, which has been found in patients with advanced liver disease, restriction of sodium, protein, and fluids, can discourage adequate oral intake.

B- Anthropometric measurements:

Nardi et al., (2009) stated that, skin fold anthropometry is considered a useful technique for assessment of body composition in patients with chronic liver disease. It is value in detecting mild or moderate signs of malnutrition, which are difficult to recognize clinically. Also **Caregaro et al., (1996)** stated that, because of limitations of other nutritional indexes, skin fold anthropometry represents-at present-the most reliable clinical measure of nutritional status in patients with chronic liver disease. Its correlation with survival could be used to improve the accuracy of the commonly used prognostic formulas.

Carvalho and Rober (2006) stated that alteration of the anthropometric and biochemical parameters of the cirrhotic patients based on TSFT values, the groups already presented a 50% loss of fat reserves regardless of the etiology of the disease. However, this loss was more significant in females (46.6% presented a moderate to severe TSF loss) than in males (26.5%).

The present study revealed that, the majority of both sex in the study patient have moderate to sever malnourished according to Triceps Skin fold Thickness (TSFT) measurement and in comparison with control group there is no one having malnutrition according to anthropometric measurements. The results of the present study supported by **Riggio et al., (2003) and Fyke (2004)** who stated that, there is an increased risk of malnutrition associated with liver cirrhosis, therefore cirrhotic patients may lose their weight rapidly and become susceptible to malnourishment because they can't absorb valuable vitamins, calories, and iron .

Demling and Desanti (2004) reported that (MAC), (TSFT), (MAMC) are useful in identifying the most

severely malnourished patients especially those with fluid retention as a result of disease. On the other hand **American physician family (2003)** reported that mild to moderate protein calorie malnutrition was found in liver cirrhosis, adults generally lose their body weight although edema may mask weight loss, triceps skin fold thickness and mid arm muscle area are reduced below than normal range.

With reference to mean of anthropometric measurements, the study shows that, there is a highly statistical significant was found between two groups(male & female) in TSFT, MAC, MAMC, and CC, male patients were higher than female patients in MAC, MAMC and calf circumference. While it is lower than female patients in BMI, and TSFT, this result disagree with **Carvalho and Rober (2006)** who reported that, fat reserves, evaluated by TSFT, were more depleted in females than in males (48.6% and 26.6%) regardless of the etiology of the cirrhosis, whereas muscle reserves (MAMC) were more depleted in males (43.4% and 13.4%) regardless of the etiology of cirrhosis. According to the study which was carried out by **Fusha** (2002) on patients with liver cirrhosis, it revealed that the mean values for (MAC) decreased in female more than male patients with liver cirrhosis .

In present study the majority percentage distribution of TSFT, MAC, MAMC in the study patients as regarding to Child Pugh Class (B) has moderate and severe malnourished. This supported by **Kawabe et al.**, (2008) who reported that, the higher grade of the Child–Pugh classification was significantly more prevalent in the patients with moderate malnutrition than in those with mild malnutrition (P = 0.0002).

C- Laboratory results:

As regards to laboratory tests in relation to gender, the study illustrated that, the majority of male and female patients had a lower percentage of laboratory tests than normal range as in albumin, Hb, and platelet count except for total protein and MCH which were within normal range. The study also revealed that, the majority of both sex had a higher percentage than normal range in P.T, and I.N.R, direct and total bilirubin. This finding agrees with **kontorinis, (2004) and. Dataller and Gines (2005)** pointed out that anemia is a common manifestation of liver cirrhosis; it may be due to gastrointestinal bleeding.

D-Mini- Nutritional assessment: (malnutrition indicators score)

The study reported that the majority of male and female patients had malnutrition; while the minority of them had a risk for malnutrition. According to study which was carried out on a number of hospitalized cirrhotic patients by **Campillo et al., (2003)** showed that, cirrhotic patients have a high prevalence rate of malnutrition, and most of them don't satisfy their nutritional requirements, so their caloric intake are decreased which is an independent risk factor of short term mortality and according to study which was carried out by **Gunsar et al.,(2006)** (42%) of the patients were well nourished, (40%) were mildly or moderately malnourished and (18%) were severely malnourished.

Nutrition Research Newsletter (2001) mentioned that there is a relationship between prevalence and characteristics of malnutrition, nutritional status, and the severity of liver disease. The study which was carried out on 60 patients with liver cirrhosis by **Pablo and Alday (2003)** it pointed out that the majority of them were malnourished on admission. Malnutrition is a complication of liver cirrhosis that should be treated together with the others complications **Kondrup (2007). Caregaro et al., (1996)** reported that nutritional disorders are common in both alcoholic and viral cirrhosis and are related to the severity of liver disease rather than to its etiology. This predisposing the patients to infections and worsening of the functional hepatic status **Carvalho and Rober (2006).** In conclusion the present study findings support that nutritional assessment is an essential part of medical and nursing care for liver cirrhotic patients to identify who are nutritionally at risk**.**

Conclusion:

Based on nutritional assessment data such as anthropometric measurements, mini nutritional assessment combined with the additional of biochemical markers, the researcher found that, the majority of patients with decompensated liver cirrhosis were malnourished regardless the etiology of liver cirrhosis, however, the minority of patients were at risk for developing malnutrition.

Correction of the nutritional deficiency can improve the clinical outcome. Therefore, nutritional advice, guidelines by dietitian and supplementation of nutrients and/or administration of specially designed formulae should be undertaken.

Recommendations:

* Based on the findings of present study, the following recommendations are derived:

- It is important for all health care team as physicians, nurses, and dietitian to do the following:

1. Provide nutritional guidelines hand book for patients with liver cirrhosis in simplified term

2. Formulate nutritional assessment form or sheet to be suitable for Egyptian patients in the hospitals.
3. All laboratory investigations and measurements, which are essential for assessing nutritional status of liver cirrhotic patients, should be done
4. Provide nutritional counseling for all patients with liver cirrhosis in the hospital.
5. Replication of the study on large number of patients liver with liver cirrhosis from different geographical areas in Egypt

Nursing Implications:

1. Having a hand book of nutritional instructions guidelines for patients with liver cirrhosis in the unit.
2. Apply nutritional assessment form for all admitted patients.
3. Having a needed equipment for assessing nutritional status of the patients as skin fold calipers, tape measure, and body weight scale, and identify how to use it correctly.
4. Use standard form for interpretation the results of anthropometrics measurements.
5. Record body weight and height for all liver cirrhotic patients in the hospitals.
6. Identify how to calculate ideal body weight for those patients, to identify who are at risk for developing underweight or overweight.
7. Follow up sheet for nutritional assessment by observe and inspect all physical signs of nutritional deficiency as mouth, eyes, musculoskeletal, and neurological problems, and identify how to provide care for these problems.

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