

Original Research Article

To study state of nutrition in liver cirrhosis patients

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Abstract

Liver Cirrhosis is a chronic problem that arises due to many reasons such as excessive alcohol intake, hepatitis, drug toxicities and many more reasons. In India also, the magnitude of the problem is quite severe. It is seen more in men than women due to more alcohol intake in males. Researchers show that 20%-50% of liver cirrhosis patients are malnourished with poor clinical outcomes. Therefore, the present study was planned in order to find out the nutritional state of liver cirrhosis patients on the basis of a subjective global assessment (SGA) tool. It was based on the patient's anthropometry, biochemical profile, clinical signs & symptoms, functional capacity and diet intake. It was found that 80% of the patients were male and 20% were female. Most of the patients were from higher income groups in the age group of 41- 66 years. Forty two percent of patients were found obese. Waist to hip ratio was found above normal for 18 patients out of 30. Eighty three percent patients were found anaemic, while 40% patients revealed hyponatremia. All patients were found to have platelet count below normal range. All patients showed symptoms of weakness, abdomen, pain, portal hypertension and ascites. Diet intake revealed that 33% patients had calorie intake below requirements, that too in form of empty calories. Eighty four percent of patients revealed higher sodium intake than recommended.

Keywords: Liver Cirrhosis, Malnutrition, Sarcopenia, Jaundice, Ascites, Nutrition, BMI

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Introduction

The liver is the largest organ in the human body. It's reddish - brown in colour and weighs three pounds. It's also a gland as it synthesizes proteins and hormones also. Liver performs a number of functions including filtration, digestion, metabolism and detoxification, protein synthesis, storage of nutrients, breakdown of alcohol and medication, production of cholesterol and processing of glucose.

Liver cirrhosis

It is an end-stage liver disease in which healthy liver tissues are replaced with fibrous tissues. It is an irreversible damage. Mokadad et al. (2014)^[1] has reported the global burden of liver disease in 2010 as 2% worldwide mortality.

Liver cirrhosis has been divided into two categories -

1. Compensated cirrhosis: This is the asymptomatic stage. The liver may still be injured but not severe enough to cause much or no symptoms
2. Decompensated cirrhosis: In this stage, most of the symptoms such as jaundice or Ascites appear

With timely detection and treatment, it is possible to return from the decompensated stage to the compensated stage (Heidelbaugh and Bruderly, 2006)^[2].

Symptoms of liver cirrhosis: Common symptoms are loss of appetite, fatigue, nausea, edema, ascitis, yellow discoloration of skin and eyes, easy bruisability and bleeding etc. (Pere Ginès et al. 2021)^[3]. There are many researchers who have shown many technical advancements in liver cirrhosis diagnosis and treatment, but there is scarcity of data on nutritional aspects of liver cirrhosis patients (Erwin and Biecker, 2011; Giovanni et al. 2016) ^[4, 5].

Diet suggested for liver cirrhosis patient: Generally a liver cirrhosis patient is recommended a low sodium, high calorie high protein diet as it is a catabolic disease and patient is prone to loss of lean body mass.

Research Methodology

A prospective observational study was planned and conducted on 30 patients admitted in Mahatma Gandhi Medical College and Hospital under the Department of Hepatology for the treatment of liver disease. Sample selection was done using purposive random sampling technique. Following criteria were taken for patient selection.

Inclusion criteria:

- Patient between 25 - 75 years of age
- Both males and females
- Patient should be willing to participate in the study
- Patients without any serious medical complication

Exclusion criteria:

- Patient < 25 years and 75 > years of age
- Patient unwilling to participate or cooperate
- Patient having serious medical condition

Data Collection

1. General information:

Patient's general information was noted as per following format:

- Name
- Age

- Place
- Education
- Activity pattern
- Economic status
- Marital status

2. Anthropometric measurements:

In this part of study, patient's height, weight, mid upper arm circumference, waist circumference and hip circumference. Patient's body mass index and waist to hip ratio were calculated using the formulas:

- Weight was taken using digital weighing balance by following standard guidelines of taking weight with minimum clothing and without shoes.
- Height was taken using a heightometer. Patients were asked to stand without shoes/ foot wears and without any puffy hair style. It was done on a flat surface.
- Waist circumference was done by a non stretchable flexible measuring tape, just above the iliac crest.
- Hip circumference was also measured using a non stretchable flexible measuring tape.
- MUAC: Length from olecranon to acromion was measured and the midpoint circumference was taken to find out mid upper arm circumference.
- BMI: BMI was calculated as per following formula –

$$\text{Weight (Kg)/Height (m}^2\text{)}$$

- Waist / hip ratio (WHR) :- After measuring waist and hip circumference, it's ratio was calculated to find out the type of fat distribution in the body.

3. Biochemical profile:

Patient's relevant biochemical reports were noted to find out any significant changes such as haemoglobin, total protein etc.

4. Clinical signs and symptoms:

Patients were examined for the presence or absence of many clinical signs and symptoms which are common to liver cirrhosis patients such as weakness, portal hypertension, pain abdomen, jaundice and Ascites.

5. Dietary history:

Patient's 24 hour home diet recall was noted to find out nutrient intake of the person. Comparing this intake with the requirements, one can evaluate the adequacy of diet as well as the nutritional status of the person. Patient's empty calorie intake was also recorded using a food frequency table. Following was the sample menu which was given to all patients. Only the quantity of food products was modified as per their requirements.

Sample Menu

Walk for 30 – 40 mins.

7 am - 1 cup sugar free tea + 3 sugar free biscuits + 1 bowl of sprouts/ roasted chana.

8 am-9am - ½ glass milk(sugarfree) + 1 bowl poha/ 1 bowl upma / 1 bowl cornflakes / 1 suji cheela/ 1 bowl rabdi / 1 bowl daliya

11 am - Fruit 100 g

1 pm - 1 plate salad + 2 chapati / 1 plate rice + 1 bowl dal + 1 bowl veg. + 1 bowl curd / 1 glass buttermilk

5 pm - 1 cup tea sugar free + 2 eggs omelet / 100 g paneer

8 pm - 1 plate salad + 2 chapati / 1 plate rice + ½ bowl dal + 1 bowl veg

Walk for 30 - 40 mins.

Results & Discussion

Data collected has been presented under following subheadings:

1. General information of the patients
2. Nutritional assessment of patients
 - 2.1 Anthropometric measurements
 - 2.2 Biochemical profile
 - 2.3 Clinical signs & symptoms
 - 2.4 Diet intake
3. Final nutritional diagnosis

1. General information of the patients

As shown in the methodology part, the patient's general information was noted on the basis of name, age, sex, educational status, economic status, marital status and activity pattern. The findings have been shown below in table 1.

Parameters	No of patients	Percentage (%)
Age		
<25	1	3.3%
25-40	4	13.3%
41-60	5	16.6%
61-75	20	66.6%
Sex		
Male	24	80%
Female	6	20%
Marital status		
Married	29	96.6%
Unmarried	1	3.3%
Economic status		
LIG	3	10%
MIG	7	23.3%
HIG	20	66.6%
Activity pattern		
Sedentary	10	33.3%
Moderate	20	66.6%
Heavy	0	0

Table 1: General information of the patients

From table 1, it was evident that out of 30 patients, 24 patients were male and 6 were female patients. Sixty six percent of patients were between 41 -60 years of age. Five

percent of the patients were between the age of 61 – 75 years. Economic status of the patients revealed that 3 patients were from lower income group while 23% patients were from middle income group, while sixty six percent patients were from higher income group.

Activity pattern of the patients revealed that maximum no. of patients (20) were from moderate activity type i.e. 66.6%. Out of which 10 patients were seen under sedentary activity type i.e. 33.3% and No patient was found to do heavy activity. Marital status showed that 29 out of 30 patients were married.

2. Assessment of nutritional status

2.1 Anthropometric measurements

Parameters	Total no of male (24)	Total no of female (6)
Mean Height	168	162
Mean weight	68	62
BMI		
Underweight (<18.5)	1	0
Normal range (18.5-22.9)	10	3
Overweight (23-24 .9)	3	3
Obese (>25)	10	0
WHR		
<1	7	5
1	17	
>1		1

Table 2: Results for anthropometric measurement of the patients

The average height and weight of male patients were seen as 169 cm and 69 kg. The average height and weight of female patients were seen as 162 cm and 62 kg. Thirteen out of 24 male patients were found in a normal range of BMI, while 10 out of 24 were found obese. Female patient's BMI ranged between 18 - 24.9 kg/m². Waist to hip ratio was found above normal for 18 patients out of 30.

2.2 Biochemical reports

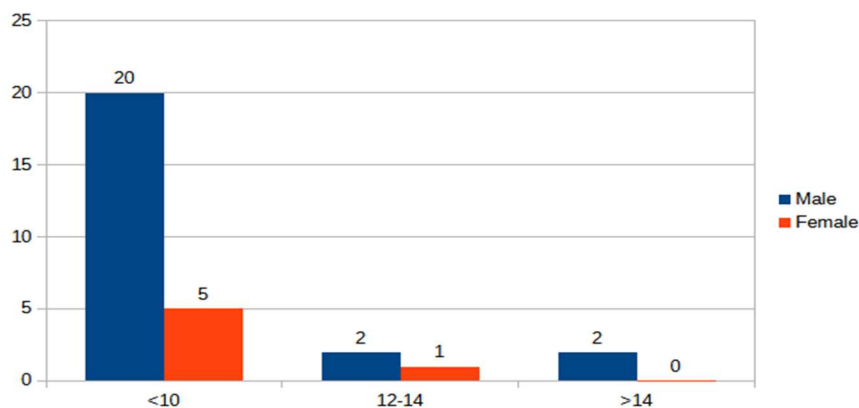


Figure 1: Haemoglobin levels of male and female liver patients

Parameters	Total no. of males	%	Total no. of female	%
Albumin				
<3.5	10	33.3%	3	10%
3.5-5	14	46.6%	3	10%
>5	0		0	
Na				
<135	12	40%	5	16.6%
135-145	12	40%	1	3.3%
>145	0		0	
K				
<3.5	4	13.3%	2	
3.5-5	19	63.3%	3	10%
>5	1	3.3%	1	3.3%
Platelets				
<1.5 lac	24	80%	6	20%
1.5-2 lac	0		0	
>2 lac	0		0	

Table 3: Biochemical profile of liver patients

Data of 30 patients both male and female showed that 25 out of 30 patients were anaemic (Fig 1). Out of which 12 male patients were seen in the normal range of Na i.e. 40%. Twelve patients showed hyponatremia i.e. 40%. In female patients, all were found to have normal sodium levels except one patient who reported hyponatremia. Potassium levels were found in normal range for most of the patients. On the other hand, thrombocytopenia

was a common picture as it was evident from the data that all patients had platelet count below normal range (Table 3). It is a very alarming sign that needs to be addressed timely.

2.3 Clinical signs & symptoms:

Presence or absence of hypertension, pain abdomen, Jaundice, Ascites were noted in all liver patients and the data obtained has been shown in the following figure 2 - 6.

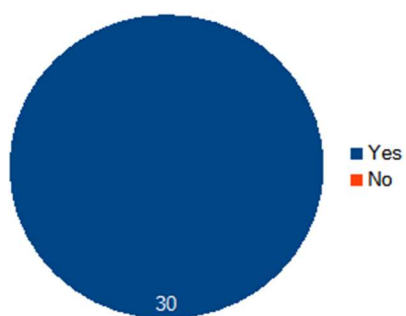


Figure 2: Presence of weakness

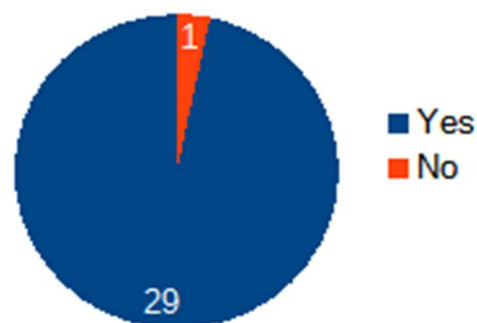


Figure 3: Presence of portal hypertension

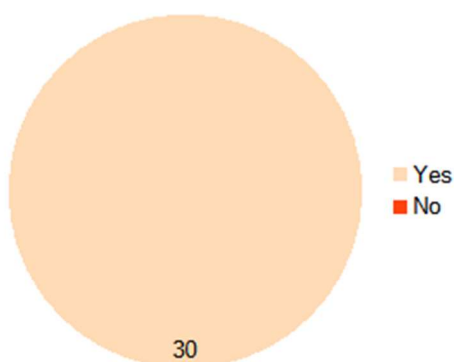


Figure 4: Presence of abdomen pain

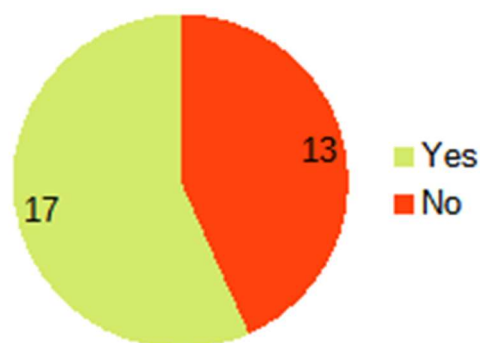


Figure 5: Presence/ absence of jaundice

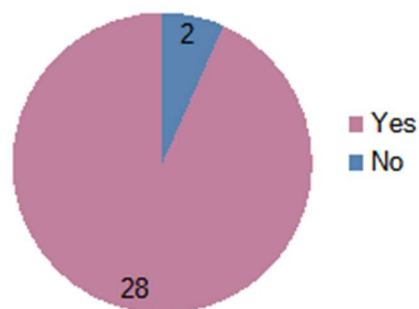


Figure 6: Presence/ absence of ascites

From the above figures 2-6, it is evident that the maximum numbers of patients were seen with anemia, portal hypertension, jaundice and ascites.

2.4 Diet intake recorded through 24 hour home diet recall:

Patient's diet intake for 24 hours was recorded, that was converted into nutrient intake. Simultaneously, empty calorie intake was noted using food frequency tables. The data obtained has been shown in following table 4.

Patient No.	Empty calorie intake	Energy	Protein	CHO	Fat	Sodium
1	1125	2529	105	379	56	2170
2	725	2370	98	355	53	2550
3	520	2150	93	322	48	1250
4	1925	2500	96	375	55	2136
5	345	2325	110	349	57	1270
6	1945	2050	92	307	45	2400
7	200	1896	82	284	42	2500
8	325	1957	89	293	43	2680
9	830	2100	93	315	47	2200
10	1190	2680	100	402	60	2280
11	1320	2100	86	315	47	2670
12	475	2296	86	344	51	2150
13	520	2155	92	323	48	1250
14	610	1800	63	270	40	1160
15	1480	2100	84	315	47	1560
16	1700	2030	87	305	45	2170
17	900	2504	110	375	56	2140
18	385	1762	88	264	39	1280
19	785	2384	90	357	53	1890
20	1480	2275	97	341	50	1950
21	1185	2555	109	383	57	2500
22	1210	2115	70	317	47	1700
23	950	2100	84	315	47	2340
24	1345	2040	102	306	45	2670
25	365	2135	91	320	47	2150
26	1880	2310	115	346	47	3200
27	1300	2100	91	315	41	2500
28	1230	1835	84	275	37	1280
29	1630	1669	60	250	35	2670
30	1585	1600	82	240	37	1950

Table 4: Nutrient and calorie intake of 30 liver disease patients.

From table 4, it is evident that 20 out of 30 patients consumed enough calories as per their requirements, i.e. between 75- 100 % of the requirements, but 33% patients showed lesser calorie intake. It was found in the range of 50 - 60% of the requirements which was not satisfactory intake in terms of recovery. Empty calories intake was also quite high in the form of juices, alcohol, fat and sugar containing foodstuffs. Protein intake of the majority of patients (93%) was found up to the requirements. Remaining calories were obtained in the form of carbohydrates and fats. Sodium intake of only 16% patients was found in acceptable range, while 84% patients consumed higher sodium than their requirements.

3. Nutritional diagnosis

Nutritional diagnosis was derived as per subjective global assessment tool (SGA) rating.

SGA Rating	Total Males	Percentage	Total Females	Percentage
A	8	33.4	5	83.4
B	13	54.2	1	3.3
C	3	12.5	-	-

Table 5. Nutritional diagnosis of liver patients

On the basis of nutritional assessment, which was done on the basis of anthropometry, biochemical profile, clinical examination and diet intake, patients were diagnosed for their nutritional status. It was found that 13 out of 30 patients were healthy (SGA rating A), while 46.66% of the patients were at risk of malnutrition. On the other hand 10% of the patients were found to be malnourished as evident by table 5.

Conclusion

Many clinical advancements have been observed in the treatment of liver cirrhosis patients; still very few researches are there that document the state of nutrition of these patients. Present study shows that out of 30, 17 patients (56.66%) were found either

malnourished or at risk of malnutrition. It is an alarming situation as nutritional state alone is an independent risk factor for poor outcome. As it may lead to loss of fat and lean body mass and decreased functional capacity.

Further recommendations:

The patient should be weighed daily and assessed for functional capacity and lean body mass at regular intervals by health care professionals. It's very important to keenly take care of their diet intake as it's a modifiable risk factor that should be taken care of to provide better outcomes.

References

1. Mokdad AA, Lopez AD, Shahraz S et al. (2014) Liver cirrhosis mortality in 187 countries between 1980 and 2010: a systematic analysis. BMC Med. 12((1): 145. doi: 10.1186/s12916-014-0145-y
2. Heidelbaugh JJ, Bruderly M (2006) Cirrhosis and chronic liver failure: part I Diagnosis and evaluation. Am Fam Physician 74(5): 756-62
3. Pere Ginès F, Aleksander K, Juan GA, Elsa S, Fabrellas N, Patrick S K (2021) Liver cirrhosis. The Lancet 398: 1359-1376.
4. Erwin G, Biecker W (2011) Diagnosis and therapy of ascites in liver cirrhosis. Journal of gastroenterology: WJG 17(10): 1237.
5. Giovanni A, Antonio M, Pablo B, Antonio G (2016) Treatment of alcohol use disorders in patients with alcoholic liver disease. J Hepatol 65(3): 524-31.