ORIGINAL RESEARCH

Nutritional indicators among patients with liver transplantation: A cross sectional study

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ABSTRACT

Background and objective: The trouble of nutritional state is considered as a prophet of morbidity and mortality in patients with advanced liver disease. The severity of nutritional disorder increases with diminished liver function. The aim of this study was to explore the nutritional indicators among patients with liver transplantation patients in Egypt.

Methods: Outlined is a descriptive cross-sectional research design using a convenience sampling of 210 patients following liver transplantation from the outpatient of transplantation centre the Mansura university Hospital, Wady el-Nile Hospital, International Military Medical centre, Almady Military Hospital. Data were collected using an adapted four parts tool that gathered sociodemographic data of patients; data about patient dietary habits and dietary balance and an assessment of patients physical and anthropometric measurements as nutritional predictor's.

Results: There is a highly significant relation between nutritional status, gender and sociodemographic characteristics among patients with liver transplantation. As well, educational levels and occupation point to difference between physical and nutritional indicators parameter and sociodemographic characteristics. As well, high body mass indicators (BMI) vary between physical and nutritional indicator parameters.

Conclusions: There are noticeable needs for instructional schemes to be offered on simple media to increase awareness of patient's nutritional requirements post transplantation. *Implications for Nursing and Health policy:* There is a growing demand for strategies and programs that take into consideration all the needs of liver transplantation patients. Efforts should be carried out to design and implement interventions that suit the patients following liver transplantation using simple media and suitable language.

Key Words: Nutritional indicators, Patient, Liver transplantation

1. INTRODUCTION

Chronic liver disease has a sharp effect on the nutritional state and malnutrition commonly present in patients with end-stage liver disease undergoing liver transplantation. The liver is a significant controller of metabolism, storage, production, and absorption of nutrients. For that reason, the severity of malnutrition increases with decline in liver function. Therefore, the value to cautiously assess the nutritional indicator parameters in the improvement of patient's state for liver transplantation is broadly recognized.[1]

1.1 Literature review

Statistically, the most common indication for liver transplantation in Egypt is Hepatitis C Virus (HCV) which is

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connected to cirrhosis. Egypt is a vast populated country with increased prevalence of HCV infection of 26% this high prevalence of chronic liver diseases in Egypt has related to growing numbers of Egyptian patients with end stage liver disease.[2] Nowadays, the rates of successful health outcomes have increased from 30% in the 1970s to nearly 80%.[3]

Along with World Health Organization's (2014)[4] definition of health, well-being is a main concern of health this is established when a person's psychosocial demands more achieved.

Recently, the significance of carefully assessing the nutritional state for patients with liver transplantation has been noted because of there are many metabolic alterations faced , which need a dietary plan with additional modified lifestyle and physical activity.[5]

Thus, developing strategies for proper nutrition among hospitalized patients has a direct effect on patient health outcomes and exploring nutritional indicator and parameter for patients with liver transplantation and highlighted patients at nutritional risk and monitoring adherence is considered as a key role for improve patient's health outcomes.[6]

Moreover, a prior malnutrition state may present among patient who has improper nutritional habits which fail to improve their health and achieved successful outcomes.[7]

Consequently, the level of patients nutritional status is recognized as a predictor of morbidity and mortality in patients with advanced liver disease. Thus it is vital to explore the level of patients nutritional condition to improve the outcomes for those patients.[8]

Unfortunately, there is no specific nutritional marker that can be easily performed to detect the state of malnutrition. Thus, health teams follow certain measures for detection as biochemical tests, anthropometric measurements, and functional liver parameters to estimate patient's nutritional state.[9]

Therefore, the implementation of evidence-based practice strategies in public health and effective evaluation of interventions has a great impact on health achievement and well-being.[10] For that reason the present study was carried out aimed to explore the nutritional indicators among patients with liver transplantation.

1.2 Significance of study

Nutrition is correlated with health outcome of liver disease patients, it is essential to assess nutritional condition and provide required nutritional support. These challenges linked to the complications resulting from liver disease such as ascites and edema.[11] In addition, malnutrition is commonly present among patients with end-stage liver disease (ESLD) who are needed for liver transplantation.[12]

1.3 Objectives of the study

To explore the nutritional indicators among patients with liver transplantation in Egypt.

1.4 Research questions

1) What is the nutritional status of patients who have had a liver transplantation?
2) Is there a relationship between biochemical and nutritional parameters among patients with liver transplantation?
3) Is there a relationship between socio demographic characteristics and nutritional status among patients with liver transplantation?

2. SUBJECTS AND METHODS

A descriptive cross-sectional research design was utilized. This study was carried out in Cairo, Egypt in outpatient of transplantation centre at Mansura University Hospital, Wady el-Nile Hospital, International Military Medical Centre, and the Almady Military Hospital, Convenience sampling as selected from all liver transplantation patients attend in the period from March 2019 to July 2019. It included 210 patients with liver transplantation in Egypt with inclusion criteria of adult patients in age group 20-60 years who are willing to participate, newly liver transplantation patients and excluded patient's have post transplantation complications related to dietary imbalance, fluid and electrolytes imbalance. Data were collected by using one tool contains 4 main parts based on literature review & adapted tool from Abu-Al Makarem (2004);[13] Rodigas (2015)[14] and El-Gamal et al. (2013).[15]

It contains 4 parts as follows: Part I: contains items related to sociodemographic data of patients. Part II: Dietary habits Questionnaire, It includes 12 questions related to preferred foods and patient's habits in eating meals through the day, special diet, etc. Part III: Dietary Balance sheet: it contained 31 questions regarding the eating habits of balanced diet and manners through the day for the 3 meals and snacks and preferred foods in each meal, etc. Part IV: Assessment of Physical and anthropometric measurements as nutritional predictor's sheet: It includes 10 items related to measure physical patient's health status as B.P, Pulse, some manifestations especially edema in the face, hands, legs and assess anthropometric measurements as weight, height, arm circumference, Body Mass Index (BMI), etc.

2.1 Scoring system

Scoring system for nutritional habits was ranged from 0 to 1 scores as zero for No answer and one for yes answer then arranged as below 60% had poor nutritional habits, and above

60% had good nutritional habits. Regarding dietary balance in meal each right answer got one score with total scores of 80 as scores less than 48 (< 60%) are considered as severe dietary imbalance, from 48-64 (60%-80%) are considered as moderate dietary imbalance, from 65-80 (> 80%) are considered as had good dietary balance.[15] Regarding physical measurements, it was measured then compared to the normal values of each one , in addition to , anthropometric measurements as body weight and height , arm circumference are measured then compared to ideal weight and calculated BMI which ranged then as normal value talk 2 more than normal value take 1, below normal value take.[14]

2.2 Ethical considerations

Ethical permission was obtained from the administrative authorities of hospital directors and head nurse to take permission to do this study in liver transplantation centers and a brief oral explanation of the purpose and importance of the study was given to the patients and assured that the obtained information was confidential and used only the purpose of the study. The researcher fills the questionnaire for illiterate patients individually to assure confidentiality.

2.3 Procedure

After collection of references and developing a tool based on recent literature review, the tool was validated after translation into Arabic language through face validity by five professors from medical and nursing specialists. A Pilot study was carried out after the development of the tools on 10% of the patients to test applicability of the tools then necessary modifications were done, those patients were then excluded from the sample of research work to assure the stability of answers. The tool reliability was tested by Cronbach alpha coefficient as follows: dietary habits (0.961), dietary balance (0.86). Data were collected post liver transplantation through individually filled the questionnaire from March 2019 until July 2019 according to availability of post- transplantation patients over a period of six months starting according to patients flow rates and their appointment schedule (Wednesday ,Thursday , Saturday) each week and availability of time for both patients and the researcher and anthropometric measurements was taken by researchers ranged from 15-30 minutes. Data were revised, coded, entered, analyzed and tabulated using SPSS version 19. Both descriptive statistics (frequency, percentage,) and Chi-2 or Fisher Exact test was used. Statistical significance was considered at p-value < .05 and highly significance at p-value < .00.

3. Results

Table 1 shows that there are above half (60%) of sample were male, about (55.2%) are aged more than 45 years. Slightly more than half (53.3%) employed and (39%) had Technical/secondary level of education. Finally, above half (69.5%) of patients are married.

Table 1. Number and percent distribution of patients according to their demographic characteristics

Parameter	N = 210	%
Age		
< 25	9	4.3
25-	31	14.8
35-	54	25.7
45-	116	55.2
Mean of age	44.31 ± 9.53	
Gender		
Male	126	60
female	84	40
Occupation		
Student	21	10
Employee	112	53.3
House wife	25	11.9
Farmer	29	13.8
Retired	23	11
Educational level		
Illiterate	30	14.3
Primary and preparatory	69	32.8
Technical/secondary	82	39
University and above	29	13.8
Marital status		
Single	24	11.4
Married	146	69.5
Widowed	14	6.7
Divorced	26	12.4
Family numbers		
< 4	49	23.3
4-	130	61.9
> 4	31	14.8

Table 2 shows that more than half of sample (53.8%) weren't following a special diet in there dietary balance in breakfast with (64.3%) hadn't follow healthy snack. While in lunch below half of them (43.3%) hadn't follow dietary balance with (60.5%) hadn't follow healthy snack. Furthermore in dinner below half of them (44.3%) had balanced their diet but not enough as patients perceived.

Table 3 revealed that (49.5%, 66.7%, 62.9%) of liver transplantation patients had normal blood pressure, respiratory rate, pulse rate respectively while the most of them (51%, 44.8%) had yellowish face color, redness face color respectively. concerning body edema (71.9%, 40.5%) had hand

swelling, inability to walk respectively, while the minority of them (8.1%) had face and leg swelling.

Table 2. Assessment of nutritional status according to meal intake per day as patient's perceived

Parameters	N	%
Breakfast quantities		
Balanced	31	14.8
Balanced but not enough	66	31.4
Not balanced	113	53.8
Breakfast Snack quantities		
Healthy and well nourished	75	35.7
Not healthy and low nutrient	135	64.3
Launch quantities		
Balanced	39	18.6
Balanced but not enough	80	38.1
Not balanced	91	43.3
Lunch Snack quantities		
Healthy and well nourished	83	39.5
Not healthy and low nutrient	127	60.5
Dinner quantities		
Balanced	40	19.0
Balanced but not enough	93	44.3
Not balanced	77	36.7

Table 4 revealed that (65.7%, 84.8%) of liver transplantation patients had normal BMI respectively based on the equation of weight & high measurements with (84.8%) of normal arm circumstance measurement.

Table 5 revealed that there are a highly significant relation were found between nutritional status and sociodemographic characteristics among patients with liver transplantation only in gender $p = .001$.

Table 6 revealed that there are a highly significant relation were found between physical and nutritional indicators parameters and sociodemographic characteristics among patients with liver transplantation mainly in educational level, occupation with $p = .001$ respectively.

Table 7 revealed that there are a highly significant relation were found between physical and nutritional indicators parameters and sociodemographic characteristics among patients with liver transplantation only in BMI with $p = .001$, while a significant relation were found in items related to mid arm circumference, Latest virus test virus c with $p = .000, .002$ respectively.

4. Discussion

Patients with advanced liver disease have several risk factors to develop malnutrition. Accurate nutritional assessment is a actual agreement with related to variety of measured parameters of nutritional condition with severity of liver disease.[16] Thus, there is a need for more attention to malnourished patients as they increased numbers of liver survival. The subjective nutritional assessment and anthropometric measurements are known in guidelines to be adequate in identifying those patients at risk of malnutrition.[1] Even as, nutritional disorders are a common manifestation in end-stage liver disease. Moreover, obesity may occur in liver survival during long-term follow-up.[5]

Table 3. Distribution of Physical indicators parameters among studied sample

Parameters	N	%
Blood pressure		
Normal	104	49.5
Elevated	70	33.3
Abnormal	36	17.1
Respiratory rate		
Normal	140	66.7
Tachypnea	51	24.3
Bradypnea	19	9
Pulse		
Normal	132	62.9
Tachycardia	54	25.7
Bradychardia	24	11.4
Yellowish		
Yes	107	51
No	103	49
Redness face		
Yes	94	44.8
No	116	55.2
Hand swelling		
Yes	59	28.1
No	151	71.9
Swelling of the face & legs		
Yes	17	8.1
No	193	91.9
Inability to walk		
Yes	85	40.5
No	125	59.5

Regarding sociodemographic characteristics of the studied sample, the present study revealed that there are more than half of sample was male and in age group more than 45 years and married, slightly more than half of them employee and more than one quarter had technical/secondary level of education. These findings goes in the same line with Green et al. (2011)[17] on their study regarding prevalence and demographic and clinical Associations of Health Literacy who stated that patients with less than a high school education

exhibited more than a 12-fold increased risk of low health literacy, and African Americans and veterans had more than a 3-fold increased risk of having inadequate health literacy.

The present study revealed that the most of sample weren't follow special diet in there dietary regimen and snacks which more than half of sample weren't follow special diet in there dietary balance in breakfast hadn't follow healthy snack. while in lunch below half of them hadn't follow dietary balance with hadn't follow healthy snack. Furthermore in dinner below half of them balanced their diet but not enough. In theses concern, Hegazy et al. (2013)[18] recommended on their study of the effect of dietary teaching on the improvement of patient outcomes and that proper nutrition play vital role in reverse the wasting syndrome in dialysis patients. Nutritional education of their study found a statistically significant post-intervention improvement through using Karnofsky performance scale, nutritional knowledge, improved patient's nutritional knowledge and practices, health outcomes and daily life activities.

Table 4. Distribution of anthropometric measurements parameters among studied sample

Parameters	N	%
BMI		
Under weight	12	5.7
Normal	138	65.7
Overweight	50	23.8
Obese	10	4.8
Mid arm circumferences		
Malnutrition	32	15.2
Normal	178	84.8

Table 5. Correlation between socio demographic characteristics and Nutritional status

Parameter		Protein	Ca	Fat	Cabohy drate	Vitamins mineral	Fiber	Na
Age	*R*	-.126	-.083	-.012	.031	-.132	-.021	.080
	p value	.069	.231	.868	.653	.056	.764	.249
Gender	*R*	-.034	-.007	.238**	.164*	.380**	.332**	-.208**
	p value	.622	.920	.001	.017	.000	.000	.002
Educational level	*R*	.217**	.189**	.037	-.139*	-.009	.094	-.055
	p value	.002	.006	.594	.044	.897	.173	.431
Occupation	*R*	.070	-.141*	.006	-.054	-.047	.047	-.004
	p value	.311	.041	.927	.436	.498	.499	.958
Marital status	*R*	-.002	.204**	-.085	.051	-.099	-.020	-.073
	p value	.978	.003	.219	.464	.154	.773	.294

**Correlation is a highly significant at the .01 level (2-tailed); *Correlation is significant at the .05 level (2-tailed).

Table 6. Correlation between socio demographic characteristics , physical and nutritional indicators parameters

		BMI	Mid arm circumference	Yellowing	Idle	Redness face	Hand swelling	Swelling leg	Swelling face	Inability to walk
Age	*R*	-.002	-.036	-.018	.078	-.053	.086	.069	-.065	.084
	p value	.972	.604	.797	.263	.442	.217	.319	.347	.227
Sex	*R*	-.170*	-.154*	.074	-.031	.168*	.035	.106	.064	-.059
	p value	.014	.025	.287	.654	.015	.618	.126	.355	.392
Educational level	*R*	-.157*	-.135	.157*	-.106	.015	-.040	.063	.203**	-.023
	p value	.023	.052	.023	.125	.825	.565	.362	.003	.744
Occupation	*R*	-.228**	-.221**	-.056	-.114	-.085	.044	.002	-.025	.074
	p value	.001	.001	.420	.101	.222	.527	.982	.719	.288
Marital status	*R*	.047	.049	.020	-.116	-.011	-.051	-.161*	-.030	-.064
	p value	.501	.484	.768	.094	.875	.458	.019	.669	.353

**Correlation is highly significant at the .01 level (2-tailed); *Correlation is significant at the .05 level (2-tailed).

From the other point of view, Health literacy acting as a key role in chronic disease for self-management. Patients must be able to understand and assess health information, which includes a complex regimen, plan lifestyle approach, and appointment schedule if needed.[19] Additionally, the intention of nutritional adherence improved with levels of social support requires more social support for dietary management behavior among geriatrics than younger persons.[20]

Table 7. Correlation between biochemical parameter and nutritional status

		Proteins	Ca	Fat	Cabohydrate	Vitamins mineral	Fiber
BMI	*R*	-.282**	.030	-.154*	.233**	-.095	-.037
	p value	.000	.667	.026	.001	.169	.597
Mid arm circumference	*R*	-.279**	-.042	-.134	.204**	-.096	-.063
	p value	.000	.543	.052	.003	.165	.361
Last hemoglobin ratio	*R*	-.004	.018	-.090	.181**	.038	-.068
	p value	.955	.800	.195	.008	.581	.326
Last liver enzymes value SGOT	*R*	.032	.089	-.061	-.008	-.073	.048
	p value	.644	.200	.376	.907	.291	.488
SGPT	*R*	-.011	.110	-.025	-.038	-.041	.101
	p value	.870	.111	.713	.582	.555	.145
Latest virus test virus c	*R*	.000	-.217**	-.022	-.006	.074	.015
	p value	.994	.002	.754	.929	.289	.826

**Correlation is a highly significant at the .01 level (2-tailed); *Correlation is significant at the .05 level (2-tailed).

Concerning physical and nutritional indicators parameters, the present study revealed that there are more than half of studied sample had respiratory rate, pulse rate respectively and yellowish face color, redness face color while nearly tow third of them had body edema and the minority of them had face and leg swelling. Moreover, the majority of them had normal BMI. These findings supported with Yosry et al. (2014)[12] who highlighted on that malnutrition among Egyptian patients with end stage liver disease negatively affects the patients' outcomes after living donor liver transplantation (LDLT).

In relation between nutritional habits and health well-being, the current finding revealed that there are a highly significant relation was found between nutritional status and sociodemographic characteristics among patients with liver transplantation only in gender. This finding goes in the same line with Zabel et al. (2012)[21] who mentioned that nutritional parameters, using PGSGA score and appetite assessment are an essential for the physical domain of Quality of Life (QoL). Also, any alterations on nutritional condition were affect and lower QoL scores. In addition to, de Carvalho et al. (2010)[22] highlighted on that dietary factors, mainly intake enough calorie, were always associated with nutritional condition among those patients.

As regard, the present study there are a highly significant correlation were found between physical, nutritional indicators parameters and sociodemographic characteristics among patients with liver transplantation mainly in educational level, occupation. This finding goes in the same line with Moon and Kim (2019)[23] in Korea who concluded that there is an obvious need to learning package nursing intervention which matched with patient's sociodemographic characteristics and affect their self-efficacy, knowledge, and compliance with the dietary regimen following liver transplantation.

Furthermore, the current study revealed there are a highly significant relation was found between physical and nutritional indicators parameters and sociodemographic characteristics among patients with liver transplantation only in BMI, while a significant relation were found in items related to mid arm circumference, virus test. This finding supported with Caccialanza et al. (2012)[24] who necessitated on that nutritional assessment as a central part of the clinical assessment of liver transplant patients. Thus, nutritional intervention modalities are necessary among liver transplantation patient.

From the forgoing discussion, Compliance with dietary regimen is considered an essential issue in the health- wellbeing of the patient post liver transplantation. However, Picon et al. (2013)[25] necessitated on develop a protocol as a partnership between academia and policy makers has a significant role, which made possible the widespread broadcasting of the clinical practice guidelines.

Implications for nursing & health policy

There is a growing demand for strategies and programs that take into consideration all the needs of liver transplantation patients. Efforts should be carried out to design and implement interventions that suit the patients following liver transplantation using simple media and suitable language.

5. Conclusion

From the foregoing discussion, it can be concluded that there are noticeable needs for instructional schemes to be offered on simple media to increase awareness of patient's nutritional requirements post transplantation.

Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

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