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Dietary regimens for chronic hepatic diseases: advice and compliance

Nargis Albert Labib, Laila Mahmoud Kamel, Rasha A. Salama, Fayrouz M. El Aguizy
Department of Public Health and Community Medicine, Faculty of Medicine, Cairo University, Egypt
Correspondence to: Rasha A. Salama, Department of Public Health and Community Medicine, Kaser El Aini Faculty of Medicine, Cairo University, Egypt. E-mail: rashasalama_71@yahoo.com

Abstract
Background: Nutrition is coming to the fore as a major determinant of chronic diseases, and scientific evidence supports this view. The link between diet and chronic liver disease is an important area of study, as it could help reduce the suffering and the economic burden caused by liver disease. The study aimed to assess the current dietary guidelines of chronic hepatic disease patients and to determine their compliance and that of service providers to following these guidelines.
Methods: A cross sectional descriptive study was conducted in the inpatient section of one of Cairo's University hospitals in Egypt for a duration of 12 months. Interviewing questionnaires were used to collect the required data from 60 patients and 20 service providers. The objective of the study was adequately explained to participants and their consensus was obtained with assured confidentiality.
Results: The majority of patients (73.5%) received dietary advice from hospital physicians only or in conjunction with their private physician. The advice was given orally by 100% of hospital physicians though only by 21% of private physicians which could have negatively affected patients' compliance. About 60 % of the patients claimed to be compliant with the dietary regimens prescribed. Non-compliance was related to lack of supportive measures (52.2%) or to negative patient attitude (48.8%). Hospital meals were not satisfactory neither to the service providers nor to clients. Hospital physicians did not properly prescribe regimens for reasons related to insufficient knowledge (66.7%), patients' attitudes (20%) and patients' over load (13.3%).
Conclusions: A standardized comprehensive set of dietary guidelines for different liver disease patients should be developed and communicated to service providers so as to promote compliance amongst patients.

Key words: dietary regimen, hepatic diseases, compliance, advice

Introduction

Chronic diseases constitute a fast increasing burden to society. The World Health Organization (WHO) estimated that 46% of global diseases morbidity and 59% of mortality are due to chronic diseases [1]. Chronic liver diseases (CLDs) are the seventh most common cause of death after heart disease, stroke, respiratory disease, kidney disease and perinatal conditions in Egypt [2]. These diseases are either compensated or decompensated with liver failure causing hepatic encephalopathy [3].However, unlike other major causes of mortality, liver disease rates are increasing rather than decreasing [4].

The constituents of dietary regimen are very important for those patients and can help reduce the suffering and economic burden caused by such diseases [5,6]. So, a proper diet in patients afflicted by liver disease provides the nutrients needed to stay healthy, while at the same time limits nutrients that cause further liver damage [7]. Specifically, compensated cirrhotic patients are hyper-metabolic and need a normal or higher quantity of protein to achieve nitrogen balance and avoid malnutrition [8].

Surveys in general hospitals found that about 20% of hepatic disease patients are malnourished [9].Malnutrition affects the progress and recovery of these patients as it increases the risk of infection, extends hospital stay, and makes re-admission more likely. Therefore, clinicians need to be able to identify patients who are at risk of malnutrition and refer them to dieticians or nutrition support teams as appropriate .The European Society for Clinical Nutrition and Metabolism (ESPEN) has developed and implemented nutritional guidelines for liver disease [10]. Following that, surveys have been conducted to investigate whether

clinicians follow these guidelines or not [11,12]. Furthermore, evidence based recommendations complementary to the ESPEN guidelines were continued to be given based on further field studies [13].

Our study aimed to assess the current dietary guidelines of chronic hepatic disease patients, in Cairo university hospitals, Egypt and to determine the compliance of both patients and service providers to following these guidelines.

Materials and Methods

Setting and design

A cross–sectional descriptive study was conducted over a time period of 12 months, in the inpatient section (hospitalized patients) of El Manial Cairo University Hospital, Egypt, namely, the Internal Medicine and Tropical Medicine departments. El Manial university hospital is a non- profit teaching hospital and the majority of its clients are of low or middle socioeconomic class.

Ethical consideration

The required administrative regulations were fulfilled. University authorities were informed about the purpose and content of the study before conducting it. Objectives of the study were explained to the participants and their consensus was obtained with assured confidentiality.

Pilot study

A pilot study was undertaken to test the validity and reliability of the data collection tools and to identify possible field problems. Necessary modifications were made accordingly.

Sampling design

The sampling frame composed of the hospitalized patients aged more than 17 years old and previously diagnosed with hepatic disease for more than six months. Encephalopathy cases and those who completed the pilot questionnaire were excluded. A sample size of 67 patients was decided based on the margin of error (5%), confidence level (95%), total population size (2182) and response distribution (50%) as recommended by many citations [14,15]. The sample size *n* and margin of error *E* were calculated by the following equations:

x	=	Z(c/100)2r(100-r)
n	=	N x/((N-1)E2 + x)
E	=	Sqrt[(N - n)x/n(N-1)]

Where N is the population size, r is the fraction of responses, and Z(c/100) is the critical value for the confidence level c.

Subsequently, patients were selected by a systemic random sampling technique to ensure adequate coverage of all the studied departments. A representative sample of 22 physicians and 8 nutrition supervisors that represented approximately 20% of the total service providers were also recruited by the systemic random sampling technique.

Data collection

Data collection tools included the following:

1. A semi-structured interview questionnaire was used, that took about 25 minutes to administer to the subject. It included close-ended questions with pre-coding and open-ended questions which were coded after data collection. The questionnaire covered the socio-demographic characteristics, medical history of the liver disease, especially the complications, the dietary pattern of the patients, including; the type and source of the prescribed diet regimen, details of dietary advice , the compliance with the diet during and after hospital stay and reasons underlying any incompliance.
2. Diet menu review: as regard to its availability, accessibility and utilization by service providers.
3. In depth interviews with the service providers (the physicians and nutrition supervisors) at the departments under study. The aim of these interviews was to determine the presence of a protocol for the dietary management of hepatic disease patients, its source, and the management plan (if not present). Their compliance to prescribing the diet regimens to the patients and the underlying influencing factors that determined their choice were also explored.

Data analysis

The data were entered in IBM compatible computer, using the Statistical Package for Social Science (SPSS), version 11. Descriptive analysis using means with standard deviations, frequency counts and percentages was carried out. The statistical significance of associations was evaluated with the chi-square. The level of statistical significance was set at $P<0.05$.

Results

Of the 67 inpatients selected randomly, 60 patients (89.6%) agreed to participate in the study).The mean age of the studied patients was 52.56 ± 10.32 years, 53.3% were males, 85% were

illiterate, 41.4% were unemployed, 55.0% of them were residents of rural and squatter areas with a monthly family income of 434±132 Egyptian Pound . About one-third of them (29.3%) were smokers with no history of alcohol consumption. A great proportion of them (71.7%) were diagnosed as cirrhotic patients with 18.3% reporting hepatic encephalopathy attack(s) (Table 1).

All of the patients received dietary advice as part of their management. The source of the advice came from hospital physicians in 73.5% of cases with or without joint advice from private physicians too. None of hospital physicians prescribed a written form of the diet whilst 21% of the private physicians did so (Figure 1).

As regards the dietary advice delivered to patients, only 16.1% of cases reported that the physicians when in consultation emphasized the importance of eating small frequent meals and having nutritious snacks. Requests to restrict animal protein intake prophylactically were received by 69.5% of the advised patients. Moreover, the duration of Protein restriction was not specified to them. The importance of pulses as a plant protein was not advised in 94.6% of cases. Milk was restricted in 26% of the advised patients. About 50% of patients weren't advised about the types of carbohydrate they could eat but only the amount of sugar was defined by the physician and in 50% of advised cases only. Almost 29% of cases were advised to restrict all form of fat. The importance of fruits and vegetables were advised by the physicians, over fifty percent of them recommended abundant amount of fruits and vegetables. Only 3% of cases mentioned that the physician defined the amount of water intake. Salt restriction, in case of manifestations of salt and water retention, was advised to 80.0% of patients. Avoidance of preservatives was advised in 31.66 % of cases. Cut down of tea, coffee (50%) and avoidance of spices (78.33%) was also mentioned by a high percentage of cases. Although none of the patients mentioned drinking alcohol, 40% of them mentioned that physicians still emphasized the non use of alcohol (Table2).

Only 60% of the patients admitted being compliant to the dietary regimens prescribed to them. With regard to non compliance, Half of them (52.2%) referred that they could not follow the diet adequately due to lack of supportive measures (presence of clear written regimens or a helpful person). Another reason for non compliance was the negative patient attitude (being bored with the prescribed foods or lack of concern) in 48.8% of instances. Among the studied sociodemographic characteristics, gender and employment status, had a significant relationship with compliance to diet (P=0.001). Compliance was significantly higher among females (82.14%) and employed patients (82.85%). Education and better income appeared to influence patients' compliance but neither of these findings was statistically significant (P>0.05) (Table 3).

Patient's knowledge also was associated with reported likelihood of compliance. Over a third of patients (35%) had no knowledge of the complications that could arise from non-compliance although, 43.3% of them had already suffered from such complications (Table1). Moreover, compliance was significantly higher among those who received written advice (100%) than oral advice (48.9%) (p=0.001) (Table 3).

In-depth interviews were carried out with 15 physicians and 5 Nutrition supervisors in consultation (response rate was 68%, 62.5% respectively).The presence of diet protocols for hepatic disease patients was reported by 13/15(86.67%) physicians and 3/5(60%) of nutrition supervisors. The sources of these protocols were variable; guidance by senior physicians, self knowledge or it was the policy of the internal medicine department. However, all 13 physicians did not advise these protocols in written from. The reasons for this lack of practice were: Insufficient knowledge (66%), expected non-compliance of patients (20%) and overload with a large number of patients (13.3%).

All service providers had the knowledge that the dietary regimen should be modified according to different hepatic diseases. Yet only 11/15(73%) physicians and 2/5(40%) nutrition supervisors reported that they prescribed a specific diet regimen according to patient condition.

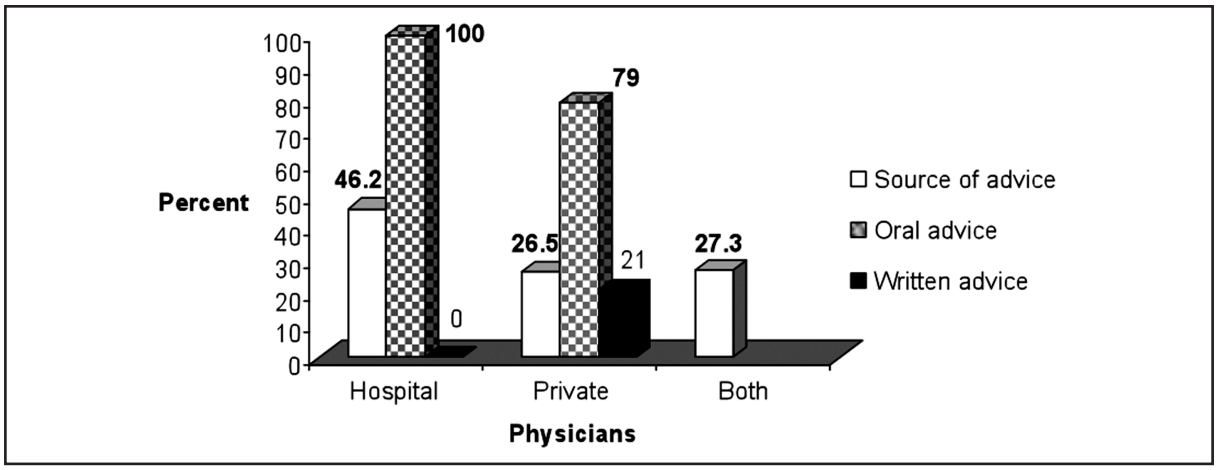
Discrepancies were detected between the statements of patients and physicians as regards the dietary advice. All physicians agreed that it was inappropriate to restrict dietary protein in hepatic disease patients without encephalopathy. Milk prescription and the type of protein (animal and plant origin) were differentiated by only 66.7% of physicians. Just over a third of physicians recommended the amount and types of carbohydrates to be assumed in the patients' diets. Of these, 26.7% reported that they recommended sugars more than complex carbohydrates. Only 20% of them specified the type of fat to be used. Over seventy percent of physicians recommended appropriate amount of fruits and vegetables. Vitamin supplements were recommended by 60% of the physicians. All physicians restricted salt intake in the case of salt and water retention conditions. Avoidance

Table 1. Percentage distribution of the studied hepatic patients by sociodemographic and clinical characteristics.

Study variable	Hepatic patients (N=60)	
	No.	%
Age		
<50	20	33.3
50-60	21	35.0
>60	19	31.7
Mean± SD	52.56 ± 10.32	
Sex		
Male	32	53.3
Female	28	46.7
Education		
Illiterate	51	85.0
Primary	4	6.7
Secondary	5	8.3
Occupation		
Unemployed	25	41.4
Agriculture	19	31.4
Unskilled	10	16.4
Skilled	5	8.3
Others	1	1.5
*****Monthly family income (L.E.)***		
<400	32	53.3
400-600	24	40
>600	4	6.7
Mean ± SD	434 ± 132	
Residence		
Urban	27	45.0
Rural	25	41.7
Squatter	8	13.3
Habits		
Smoking	17	29.3
Alcohol	None	0.0
Diagnosis:		
Liver Cirrhosis	43	71.67
Viral Hepatitis	14	23.33
Others	3	3.00
Duration of illness (Years)		
<5	38	63.33
>5	22	34.67
	No.(26)	***%****
Associated complications		
Melena	40	66.7
Ascites	39	65.0
Haematemesis	35	58.3
Hepatic coma	11	18.3

** Percent add to more than 100 due to multiple responses*
*** L.E. means Egyptian Pound & One dollar= 5.5 Egyptian*

Figure 1. Percentage distribution of physician by sources and method of dietary advice.



of preservatives and spicy foods was advised by 80% of them. Non use of alcohol and cut down of caffeine were recommended by 66.7% and 20% of the physicians respectively.

Discussion with nutrition supervisors about the implemented hospital dietary regimen revealed that the hospital policy was to provide standardized salt free meals that are modified according to the different hepatic diseases. The modifications were to restrict proteins even in patients not suffering from acute hepatic encephalopathy and increase the amount of vegetable soup or salad in patients' lunch while for, breakfast and dinner, proteins were replaced by simple carbohydrates. In addition, no snacks were provided to them.

It was found that, 80% of the studied inpatients violated the hospital regulations and brought external food during their hospital stay. Over half of the physicians were not even aware of these regulations .Reasons behind patients' misbehavior as shown in Figure 2.

Discussion

The current study findings were considerably similar to other studies that suggest that low socioeconomic level is a risk factor for CLDs especially among the adult population as it leads to unhealthy dietary habits and low quality life style. Low educational level also leads to poor knowledge, attitudes and practice regarding health issues in general, and their medical conditions in particular [16-19].

Effective physician-patient communication increases patient knowledge and provides clear instructions that can improve patient health outcomes [20]. Rosal et.al, 2001 recommended a patient-centered counseling model to help the nutritionist enhance patient adherence to dietary guidelines. This model facilitates change by assessing patient needs and subsequently tailoring the intervention to the patient›s stage in the process of change and unique challenges [21]. Hence, it is crucial that special consideration should be given to patients' economic conditions, as it will influence their compliance to dietary guidelines probably more than any other factor. Alternative foods at affordable prices should always be offered to motivate the patient's compliance [22], considering that 20% of the population live below the poverty line, and have a high rank Gini index (34.4) that coincide with high family income inequality[23].

Nutrition is actually an essential form of treatment. For instance, proper nutrition in certain liver diseases can help a damaged liver to regenerate new cells [24]. Eating small frequent meals is one of the methods to cope with the eating difficulties that frequently affect liver disease patients. In addition, prescribing a diet regimen where the number of meals is clear and considerate of the patient conditions, will promote the desired compliance [25]. In contrast, the current study showed that, the majority of cases had received insufficient nutritional dietary advice and only 16.1% of them reported that the physicians during consultations emphasized the importance of eating small frequent meals and having nutritious snacks

DeLegge, 2006, recommended an increased intake of the amount of carbohydrates and fat to contribute to the non-protein calories and prevent protein breakdown [26]. In spite of this, the amount and type of carbohydrates were not specified to 48.2% of cases in our study. Such ignoring of carbohydrates in dietary advice contributes to an underestimate of their importance, and in some cases, may lead to the over use of sugars and sweets which may put these patients under additional risk for diabetes. Specifically, hyperglycemia is common in chronic

Table 2. Contents of dietary advice as described by the studied in-patients.

Nutrition advice	tic patients paHe	
	Frequency	Valid percent *
Number of meals		
Not advised	31	51.6
Main meals only	20	33.3
Main and small frequent meals	9	16.1
Proteins amount		
Not advised	8	13.3
On daily basis	16	30.5
Every other day	14	26.8
Twice weekly	12	23.6
Once weekly	10	19.1
Milk		
Not advised	33	60.0
Restrict intake	7	25.93
intakeAllowed	20	74.07
Pulses		
Not advised	53	94.6
Advised	7	5.4
Complex carbohydrate amount		
Not advised	29	48.2
Advised	31	51.8
Sugars		
Not advised	26	44.6
Defined amount	17	50.0
Undefined amount	17	50.0
Lipids		
No fats allowed	16	28.6
Oil only	28	51.85
Ghee	3	5.55
Both	23	42.59
Vegetables amount		
Advised	25	31.7
Advised in details	35	58.3
Fruits amount		
Advised	27	45.0
Advised in details	33	55.0
Avoidance of the following:		
Salt	48	80.0
Preservatives	19	31.66
Tea or coffee	30	50.0
Spices.	47	78.33
Alcohol	24	40.0

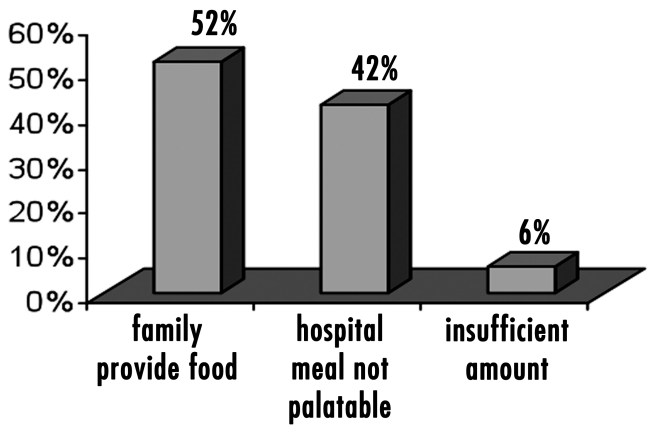
** Percent add to more than 100 due to multiple responses*

Table 3. Relation between socidemographic characteristics, method of advice and patient compliance.

Patients characteristics	Compliance				P value
	Yes (36)		No (24)		
	Frequency	%	Frequency	%	
Age					
<50	11	55.0	9	45	0.57
>50	25	62.5	15	37.50	
Sex					
Male	13	40.6	19	59.40	0.001
Female	23	82.1	5	17.90	
Education					
Illiterate	30	58.8	21	41.2	0.65
literate	6	66.6	3	33.4	
Occupation					
Unemployed	7	28.00	18	72.00	0.001
Employed	29	82.85	6	17.15	
****Family income**					
<400	19	59.4	13	30.6	0.8
400-600	14	58.3	10	41.7	
>600	3	75.0	1	25.0	
Residence					
Urban	16	59.25	11	40.75	0.91
Rural/ Squatter	20	60.06	13	39.94	
Method of advice					
Oral	23	48.93	24	51.07	0.001
Written	13	100	0	0.00	

***Egypt GDP per capita = US$ 5.349 and Gini coefficient = 34.4 [23]*

Figure 2. Reasons for bringing external food during hospital stay.



liver diseases and 20% of cirrhotic patients develop diabetes [27].

As regards dietary fat content, Hasse and Matarese, 2000, encouraged a fat intake of between 20-40% of daily caloric requirements for hepatic disease patients [28] though, Palmer, 2004, sets the percentage of dietary fat at a much lower 10-20% [29]. On the other hand, 66.7% of consultant physicians in our study did not prescribe the amount of fat to be consumed.

While, published guidelines [10] encourage high protein intakes for patients with cirrhosis, a tendency towards protein restriction by the physicians was concluded from the patients' interviews in the current study. Inadequate dietary protein intake has a very deleterious effect on hepatic encephalopathy, nutritional status and clinical outcomes [30, 31]. Patients with mild chronic hepatic encephalopathy tolerate more than 60-80 gm of protein per day in most cases [32] to be limited to 20-40 gm/day in acute hepatic encephalopathy. Even then, this limitation was on a daily basis .In the current study, the majority of patients (69.5%) were allowed to eat animal proteins once or twice per week and not on a daily basis, in spite of the fact that only 18.3% of the studied inpatients had suffered previously from hepatic encephalopathy attacks. Wolf 2007 stated that plant proteins are better tolerated than animal proteins [33]. However, more than 90% of Physicians in the current study didn't emphasize the importance of proper utilization of plant proteins, thus depriving the patient of a safer and more affordable source of protein, given that the studied population was classified as a low income group, with an average per capita income of L.E.2369 (US$ 537) [34]. This inadequacy also minimizes the versatility in the diet, which limits the patients' choices of foods, thus affecting compliance to dietary regimens.

The patients' hospital stay is a great opportunity for the patient and his care givers to learn about proper feeding habits, and the dietary regimen appropriately tailored to ones condition. Hospital meals should be a model for the patient, one that should be followed after his discharge [35]. Despite that, the current study showed that hospital nutrition was defective in this domain, and lost much of its impact as a tool for active education. The modified hospital meal did not provide balanced nutritional requirements; in addition, it was not satisfactory from point of view of patients. All of these factors contributed to patient incompliance and forced 80% of the inpatients to violate the hospital regulations and bring external food during their hospital stay.

Written information is a supporting measure to encourage patient compliance [36]. It is worth mentioning that none of the hospital physicians gave these studied patients written instructions. All of the patients who received dietary regimens or instructions in a written form were compliant, versus 48.9% of those who received oral instructions.

The study concluded that there is a major defect in the availability and accessibility of standardized hepatic disease dietary guidelines that should be tailored according to each patient's needs and condition and should be distributed to all physicians and nutrition supervisors. Finally, the observed malpractice among service providers and negative patient attitude requires proper nutrition education programs that emphasize improving communication skills so as to promote the compliance of patients.

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