

Original Article

Nutritional profile of patients with chronic pancreatitis

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The nutritional status of patients with chronic pancreatitis was assessed in 76 consecutive patients (63 males, mean age 35 ± 10 years; 13 females, mean age 40 ± 16 years) attending the pancreas clinic of a tertiary care hospital in India. A food frequency questionnaire was used to elicit information regarding dietary intake of food items. Nutrient intake was calculated using the 24 h recall method on a subsample of 20 patients. Anthropometric measurements were taken and haemoglobin and serum albumin were estimated. Thirty patients (45%) had made dietary modifications after they were diagnosed as having chronic pancreatitis. These changes in diet included a decrease in fat, spices and/or quantity of food consumed. Analysis of the qualitative data revealed that the majority of patients were taking wheat, lentils, vegetables, fruits, milk, curd, sugar and oils on a daily basis. The mean energy intake was 1750 ± 375 kcal in males and 1180 ± 246 kcal in females, which turned out to be 37% lower than the Recommended Dietary Allowances (RDA), both in males and females. Although most patients (86%) were in the normal range of Body Mass Index (BMI), 67% of the patients reported weight loss after onset of the disease. Biochemical parameters studied were in the normal range: haemoglobin 12.26 ± 1.99 gm% and albumin 4.05 ± 0.89 g/100 mL. We concluded that in patients with chronic pancreatitis, malnutrition occurs mainly due to a low intake of calories and protein as a result of dietary modification for symptomatic relief and pancreatic insufficiency. However, nutritional parameters such as haemoglobin and serum albumin are fairly well maintained.

Key words: nutritional profile, chronic pancreatitis, diet, India.

Introduction

Dietary restrictions are imposed on many patients with chronic pancreatitis with the intent of providing relief from pain, fat malabsorption and diabetes. Misleading instructions are often given to these patients, which further compromises dietary intake. Such dietary limitations imposed on patients with chronic pancreatitis, who might already be having maldigestion secondary to exocrine pancreatic insufficiency, is bound to lead to malnutrition, in particular to deficiencies of proteins, fats (essential fatty acids), and fat-soluble vitamins. Such nutritional deficiencies have indeed been reported to be the cause of death in some patients with chronic pancreatitis.¹ The impact of poor intake on the nutritional status of patients with chronic pancreatitis has, however, not been studied. We therefore undertook a prospective study to assess the dietary intake and nutritional status of patients with chronic pancreatitis in order to recommend appropriate guidelines for the nutrient requirements of such patients.

Subjects and methods

Subjects

This study included 76 consecutive unselected outpatients with chronic pancreatitis who were attending the Pancreas Clinic at the All India Institute of Medical Sciences, New Delhi. The diagnosis was established by demonstration of pancreatic calcification and/or pancreatic ductal abnormalities on abdominal ultrasound or computed tomograph.

The average age of the patients was 32 years; 63 were male (mean age 35 ± 10 years) and 13 were female (mean

age 40 ± 16 years). The average age at the onset of the disease was 32 years and the average duration of the disease was 4.7 years. In 31 patients (40%) the aetiology of chronic pancreatitis was alcohol. The remaining patients had non-alcoholic tropical pancreatitis. Diabetes mellitus was detected in 13 patients (17%).

Methods

Anthropometric measurements (height and weight), haemoglobin, total protein and albumin were recorded in a subset of the study patients using standard techniques.^{2–4} Height was measured to the nearest centimetre and weight to the nearest kilogram. All measurements were taken by the same person. Body Mass Index (BMI) was calculated as weight in kilograms divided by height in metres squared (kg/m^2). A BMI of 18.5–25 was considered normal as recommended by National Institute of Nutrition, Hyderabad.⁵ Body Mass Index was used as it is a good indicator of chronic malnutrition in our patients and it is an accepted indicator of nutritional status in adults; there are Indian standards available for BMI.⁵ Any weight lost after the onset of the disease was recorded. Haemoglobin and albumin are useful and well accepted laboratory parameters for assessing chronic malnutrition (in the absence of chronic blood loss).

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Dietary assessment

A detailed dietary history was obtained from each subject at the time of entry into the study by a trained dietitian through an interview using a food frequency questionnaire.⁶ The frequency of consumption of raw foodstuff prior to onset of disease was elicited. A record of all of the food consumed during the past 24 h was made using the recall method.⁷ Nutrient intake was calculated using the 24 h recall method. The results were analysed in accordance with the standard Table of Food Composition in India.⁸ The amounts of proteins, fats, carbohydrates, and the calories for these were computed. The change in dietary pattern after the onset of disease was examined using a questionnaire listing the food items.

Statistical analysis

The data are expressed as $\bar{x} \pm SD$. Paired *t*-test was used for statistical analysis wherever appropriate.

Results

The male to female ratio in the present study was 5:1. The mean age of males was 35 ± 10 years, while that of females was 40 ± 16 years (range 14–70 years).

The average per capita income was found to be Rs 1000 per month (the national per capita income is Rs 472.50).⁹ Seventy-seven per cent of the patients were non-vegetarian while the remaining 23% were lactovegetarian.

The food frequency data revealed that cereals and pulses on a daily basis were consumed by 100 and 65.8% of patients, respectively. Vegetables and fruits were eaten daily by 77.6 and 44.7% of patients, respectively. Milk was consumed daily by 73% of the patients. Meat and eggs were consumed by 9 and 14.5% of the patients, respectively (Table 1).

Thirty patients (45%) had made dietary modifications after the diagnosis of chronic pancreatitis. These changes in diet included decreased consumption of fat and spices as well as a decrease in the overall quantity of food consumed.

Table 2 shows the nutrient intake of patients with chronic pancreatitis. Macronutrient analysis showed that the energy deficit was 37% in both males and females, and the protein deficit was present in 20% of males and 28% of females when compared with RDA.¹⁰ The calorie ratio of various nutrients showed that protein accounted for 12%, carbohydrate for 62%, and fat for 26%, of daily intake.

Approximately 50% of male patients had consumed 50–60 g alcohol daily for the 10–15 years prior to the diagnosis of chronic pancreatitis. Patients were advised to stop

taking alcohol once a diagnosis was made. Almost all of the patients had given up alcohol on medical advice.

Mean haemoglobin, total protein and albumin levels of patients with chronic pancreatitis were within normal range, as shown in Table 3.

A total of 67% of the patients had significant weight loss following the onset of disease (64 ± 13 vs 56 ± 12 kg, $P < 0.001$).

Fifteen per cent of the patients were below the normal BMI (18.5–25) before the diagnosis of disease while the remaining 85% were within or above the normal range of BMI. After the onset of disease the number of patients below the normal BMI increased from 15 to 33% (Table 4).

Discussion

This study attempted to find out the quality and quantity of dietary intake of patients with chronic pancreatitis. The intake of calories and proteins in our patients with chronic pancreatitis was deficient when compared with RDA.

We attempted to compare the nutrient intake and prevalence of malnutrition in our patients with patients at other centres. According to a report by Von H Goebell JH *et al.*, in Europe, the intake of calories and fat was decreased in patients after the onset of pancreatitis.¹¹ Similarly, according to Gastard *et al.*, 67.5% of pancreatitis patients studied had a fat intake of 75–124 g, while only 11.7% of the patients had a fat intake of less than 75 g.¹² Japanese subjects with chronic pancreatitis have been reported to have calorie, protein and fat intakes of 1649 kcal, 73 g and 38 g, respectively.¹³ When these results are compared with our findings in Indian patients with chronic pancreatitis, it is apparent that Europeans and Americans have a markedly higher intake of calories and fat. The calorie intake of Indians in this study is comparable with calorie intakes of Japanese patients. Whereas protein intake is higher in Japanese, fat intake is higher in Indians.¹³ The energy ratio for Japanese pancreatitis patients showed that fat accounted for approximately 20% of the calorie intake, which is lower than for patients in this study (27%). The average protein intake in our male patients with chronic pancreatitis was 48 g, which is equivalent to that of African patients.¹⁴ Another study by Sarles *et al.* revealed that south Indian patients had low fat and protein intakes of 40 g/day and 52 g/day, respectively.¹⁵ The north Indian patients in our study consumed the same amount of protein but fat intake was higher when compared with south Indian patients (Table 5).

Problems with the quantity and quality of dietary intake have been reported as a leading cause of malnutrition in

Table 1. Frequency of consumption of food groups by patients with chronic pancreatitis (% , $n = 76$)

	Cereals		Pulses	Vegetables	Fruits	Milk	Meat	Eggs
	Rice	Wheat						
Daily	38.2	98.7	65.8	77.6	44.7	72.4	9.2	14.5
3/week	15.8	1.3	18.4	11.8	11.8	1.3	7.9	10.5
2/week	11.8	–	7.9	3.9	11.8	2.6	9.2	10.5
Weekly	13.2	–	5.3	6.6	10.5	2.6	15.8	11.8
Fortnightly	1.3	–	1.3	–	2.6	–	10.5	7.9
Monthly	6.6	–	–	–	–	–	6.6	3.9
Occasionally	1.3	–	–	–	–	–	1.3	–
Never	11.8	–	1.3	–	18.0	21.1	39.5	38.2

chronic pancreatitis.^{11,12,14,16} Sarles classified various dietary patterns in patients with chronic pancreatitis from countries of Africa, Asia (including Japan) and Europe.¹⁴ Africans and Indians have higher fat intakes, whereas other Asians eat low fat diets. Chronic pancreatitis seems to occur in two extreme nutritional states, namely over nutrition and malnutrition.

We have shown that a significant number of patients with chronic pancreatitis, irrespective of the aetiology, are mal-

nourished, possibly as a consequence of metabolic abnormalities and/or an inadequate protein and energy intake. It was observed that the serum protein was within normal limits. Guarnieri also reported that serum protein content was generally in the normal range, whereas anthropometry was generally subnormal.¹⁷

The mean BMI (21.75) of Indian patients was slightly higher than for Japanese patients (20.1).¹³

As shown in Table 4, the majority of subjects were in a normal nutritional state as indicated by BMI before the onset of disease. This was probably attributed to the fact that the quality of food consumed by subjects before the illness (Table 1) was optimal. The nutritional status of patients with chronic pancreatitis was in jeopardy from two areas. During painful exacerbations, oral intake is limited either spontaneously by the patients or as part of a therapeutic regimen. During remissions, absorption of the nutrients may be marginal to the extent that synthesis and delivery of digestive enzymes are inadequate, leading to further malabsorption and malnutrition.

Apart from malabsorption, the decreased dietary intake could possibly have contributed to lowering body weight. This suggests that more attention should be paid to total dietary intake (including calories and proteins), while treating maldigestion and malabsorption with enzyme supplements in patients with chronic pancreatitis.

Ideally, we consider that, in stable asymptomatic patients, improvement in nutritional status should be sought by increasing the fat, carbohydrates and total calorie intake, along with high potency enzymes, and H₂ receptor antagonist or proton pump inhibitors.¹⁸ Multicentric studies should be undertaken to elicit the role of nutrition in both the pathogenesis and treatment of chronic pancreatitis, and then to evolve guidelines for nutritional management.

Table 2. Nutrient intake in patients with chronic pancreatitis (*n* = 20)

	Male	Female
Calories (kcal)	1760 ± 375	1180 ± 247
Protein (g)	48 ± 13	36 ± 8
Fat (g)	53 ± 23	33 ± 17
Carbohydrate (g)	274 ± 55	184 ± 27

Table 3. Biochemical parameters of patients with chronic pancreatitis

Parameter	No. patients	Values (g/100 mL%)
Haemoglobin	43	12.26 ± 1.99
Total protein	46	7.20 ± 0.93
Albumin	45	4.05 ± 0.89

Table 4. Body Mass Index of patients with chronic pancreatitis (*n* = 60)

BMI	Before	Onset of disease		
		%	After	%
< 18.5	9	15	20	33
18.5–25	34	57	34	57
> 25	17	28	6	10

BMI, Body Mass Index.

Table 5. Intake of nutrients in patients with chronic pancreatitis

	Europe		Japan	Africa	South	India	North
	1980 ¹¹	1973 ¹²	1995 ¹³	1973 ¹⁴	1994 ¹⁵	South 1973 ¹⁴	North Present study
Calories (kcal)	2395–3270		1649	1604		2478	1435
Protein (g)		84–175	73	58	52	54	42
Fat (g)	97–117	75–124	38	28	40	58	43

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患慢性胰腺炎病人的營養狀況

摘要

在印度的一個三級保健醫院的胰腺診所，對連續就診的76名胰腺炎患者進行了營養狀態的調查(包括63名平均年齡為 35 ± 10 男性病人和13名平均年齡為 40 ± 16 女性病人)。使用食品頻數調查表索取有關進食的食品種類，用24小時回憶法對20名患者的營養攝入作了評價。同時還測量了人體測量學指標，血紅蛋白和血清白蛋白。35%的患者自從診斷為慢性胰腺炎后改變了飲食。如低脂肪和低調味料和/或是減低食物的攝入量。食物攝入資料分析表明，絕大多數患者日常攝入的食品種類為：小麥，扁豆，蔬菜，水果，牛奶，酸奶(凝乳)，糖和食油。男性患者的日平均能量攝入為 1750 ± 375 千卡，女性患者的日平均能量攝入為 1180 ± 246 千卡。男女患者的日平均能量攝入量均低於RDA。雖然大部分患者(86%)的體重指數仍在正常範圍，67%的患者報告自發病以來體重有所減輕。生化指標測定的結果顯示，血紅蛋白($12.26\text{ gm}\% \pm 1.99$)和血清白蛋白($4.05\text{ gm}\% \pm 0.89$)處於正常範圍。上述調查的結論為：慢性胰腺炎患者的營養不良狀況僅表現在低能量和低蛋白質的攝入。這一狀況也是由於針對胰液不足和緩解症狀所作的飲食調整造成的。這些患者的營養學指標如血紅蛋白和血清白蛋白還能保持得很好。

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