Dietary intake in patients with chronic pancreatitis compared to controls

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Background

Malnutrition is common in chronic pancreatitis (CP), exacerbated by poor dietary intake, excess alcohol, heavy smoking, complications, and abdominal symptoms. Common symptoms in CP include severe pain, bloating, wind, flatulence, nausea and vomiting. Despite the risk of malnutrition, little is known about dietary intake in CP[1].

Aims

To determine dietary intake in patients with CP versus controls and among CP subgroups

Methods

Participants completed a **3-day food diary**, and a food atlas provided pictorial estimates of portion size.
Data were entered into software **Nutritics** (v5.7, Ireland) and the following variables were analysed:

Energy, alcohol, carbohydrate, protein, fat, fibre, iron, copper, zinc, sodium, potassium, magnesium, and vitamins A, B1, B12, folate, C, D, E, and K

The Nutritics software generated daily intake of nutrients which allowed comparison between groups.

Characteristics	Variable	N	Calories Kcal/d Mean (SD)	Carbohydrate g/day Mean (SD)	Protein g/day Mean (SD)	Fat g/day Mean (SD)	Fibre g/day Mean (SD)
Aetiology	*Alcohol- related*	14	1,121 (828)	133 (96)*	51.5 (68)*	43 (36)	10.4 (7.0)*
	Non- alcohol related	23	1,499 (453)	188 (71)*	68 (24)*	52 (21)	15.6 (8.0)*
BMI	*Under weight*	2	1,504 (445)	186 (58)	60.5 (27)	58 (12)	8.2 (1.4)
	Overweight	16	1,345 (522)	171 (70)	64 (28)	44 (25)	15 (8.5)
Smoking	*Smoker*	14	1,070 (458)*	126 (62)*	50 (18)	41 (19)	9.6 (4.9)*
	Non-smoker	23	1,531 (678)*	193 (87)*	69 (33)	54 (31)	16.2 (8.6)*

Table 1: Chronic Pancreatitis sub-group analysis: Macronutrient intake compared by aetiology, BMI and smoking status
*Significantly different ; Compared using Fisher's Exact or Chi-squared test

Characteristic	Variable	N	Minerals Mean (SD)				Vitamins Mean (SD)							
			Sodium (mg)	Potassium (mg)	Magnesium (mg)	Copper (mg)	A (mcg)	B1 (mcg)	Folate (mcg)	B12 (mcg)	C (mg)	D (mcg)	E (mg)	K (mcg)
Aetiology	*Alcohol related*	14	1,143* (965)	1,977 (1,295)	177 (117)	0.7* (0.4)	374 (332)	0.9 (0.6)	128* (84)	2.9 (2.9)	30* (22)	1.1* (1.4)	4.1 (3.0)	15.8 (16)
	Non-alcohol related	23	1,657* (666)	2,308 (789)	225 (63)	1.1* (0.5)	615 (516)	1.2 (0.4)	216* (83)	3.4 (2.6)	67* (60)	2.7* (3.1)	6.1 (3.0)	32.7 (42)
Smoking status	*Smoker*	14	1,168 (576)	1,684* (637)	169 (73)	0.78 (0.45)	402 (292)	0.94 (0.5)	157 (81)	2.9 (2.1)	31.7* (26)	2.6 (3.6)	4.4* (3.6)	18 (21)
	Non-smoker	23	1,643 (1,079)	2,486* (1,078)	230 (92)	1.1 (0.5)	599 (538)	0.4 (0.5)	198 (98)	3.5 (2.9)	67* (60)	1.8 (1.9)	5.9* (2.7)	31 (41)

Table 2: Chronic Pancreatitis sub-group analysis: Micronutrient intake compared by aetiology and smoking status
*Significantly different ; Compared using Fisher's Exact or Chi-squared test

Participants

Of a database of >n=300 patients with confirmed CP, n=200 patients were eligible (diagnosed >5y prior, >18y, free-living in community, managing oral diet, no pancreatic cancer, no IBD/coeliac disease.)
Patients were invited to participate by post or in clinic, and were accept in turn with an aim of n=40.

N=**37 patients** were ultimately recruited (76% male, mean (standard deviation (SD)) time since diagnosis 10 (6.4) years, mean (SD) BMI 26 (6.6) Kg/M^2. Of them, 40% had an alcohol aetiology.
N=40 controls were recruited and groups were matched for age, sex, BMI and ethnicity.

Results

Patients versus controls:

→ Compared to controls, CP patients consumed **less fibre, alcohol, potassium, iron and vitamin K**, with no difference in the intake of other nutrients. Patients did not consume *more* of any nutrient versus controls.

Subgroup analysis: (Tables 1 and 2)

→ Patients with an **alcohol-related aetiology** consumed less protein, fibre, folate, sodium, copper, calcium, phosphorus, magnesium, iron, zinc, vitamin D, and vitamin C compared to those with 'other' aetiology. There was no difference for other nutrients, but those with an alcohol-related aetiology did not consume *more* of any nutrient.

→ **Current smokers** consumed fewer calories, carbohydrate, fibre, polysaturated fat, potassium, magnesium, vitamin C, and vitamin E compared to non-smokers or ex-smokers. There was no statistical difference for any other nutrient, and smokers did not consume *more* of any nutrient.

→ Patients with **higher pain scores** (>5 on Likert scale) consumed fewer calories (P=0-.05) and carbohydrate (p=0.04) than those with lower pain scores.

→ Patients with a **sedentary lifestyle** consumed less fibre and poly-saturated fat (n-6) versus those who were 'active', with no difference in any other nutrient.

→ There was no statistical difference in dietary intake relating to sex, BMI, diabetes status, or when comparing those living alone to those living with others.

Conclusions

This was the **first such study** in CP in the UK/Ireland. Compared to controls, patients consumed lower amounts of some important nutrients.

Analysing subgroups, those with an alcohol-related aetiology, smokers, and those with higher pain scores reporting consuming a lower quality diet than their respective counterparts.

Certain subgroups are at higher risk of suboptimal dietary intake and subsequent malnutrition, and should be prioritised for dietetic intervention.

References: Ul Ain Q, Bashir Y, Kelleher L, Bourne DM, Egan SM, McMahon J, Keaskin L, Griffin OM, Conlon KC, Duggan SN. Dietary intake in patients with chronic pancreatitis: A systematic review and meta-analysis. *World J Gastroenterol* 2021; 27(34): 5775-5792 .

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