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PREVALENCE AND CURRENT TREATMENT STANDARDS IN THE MANAGEMENT OF DISTURBED FUNCTION OF THE PANCREAS - A PHYSICIAN-BASED CROSS-SECTIONAL SURVEY

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ABSTRACT

Acute pancreatitis (AP), chronic pancreatitis (CP) and cystic fibrosis are frequent causes of disturbed function of the pancreas. Currently, there is insufficient data on the prevalence of disturbed function of the pancreas and its management with pancreatic enzyme replacement therapy in Indian clinical practice. A questionnaire-based survey was conducted across 8 Indian cities involving 63 gastroenterologists who provided their opinions by completing 30-question survey forms based on their experience with treating 15 patients each with disturbed function of the pancreas. Data were collected, compiled, analyzed, and presented as frequency and percentage of physicians. According to 50% of the gastroenterologists, 5%-15% of patients presented with symptoms of disturbed pancreatic function every month in their clinical practice, with common symptoms being abdominal pain (61.9%) and indigestion (38.1%). Pancreatic enzyme replacement therapy (PERT) was the most preferred treatment with 87.3% of specialists recommending it. A combination of amylase, protease, and lipase was prescribed for patients with symptoms like steatorrhea, indigestion, and abdominal pain by 30.2%, 27.0%, and 25.4% of gastroenterologists, respectively, with 46.0% of the specialists prescribing them for an average duration of 4-12 weeks. Most gastroenterologists (65.1%) opined that 15,000 units of lipase dosing were very beneficial as compared to 10,000 units. In conclusion, findings from this survey indicate that a combination of amylase, protease, and lipase may be beneficial in patients with disturbed function of the pancreas, especially in those with symptoms of steatorrhea or indigestion; nevertheless, counseling, diet, economic assistance, lifestyle modification, and regular follow-up of patients are warranted.

Keywords: Acute pancreatitis, Chronic pancreatitis, Pancreatic enzyme replacement therapy.

1. INTRODUCTION

The pancreas plays an essential role in digestion. Pancreatic function can be broadly classified as exocrine and endocrine. The exocrine function involves the release of enzymes such as lipase, amylase, and protease that help in the breakdown of fats, carbohydrates, and proteins, respectively. The endocrine function includes the release of pancreatic hormones like insulin (lowers blood sugar) and glucagon (raises blood sugar), thus maintaining glucose homeostasis [1, 2]. Pancreatic dysfunction is a condition characterized by inadequate activity of pancreatic enzymes within the intestinal lumen [3] and can be caused due to conditions such as pancreatitis, pancreatic adenocarcinoma, or post-pancreatectomy. Pancreatic dysfunction is generally associated with pancreatitis (acute as well as chronic) and exocrine pancreatic insufficiency (EPI) [4]. Acute pancreatitis (AP) is a common lethal gastrointestinal disease with a high morbidity and mortality rate, with high incidence and mortality rates in patients aged >70 years across all regions. The overall incidence of AP has been observed to increase by 3.07% per year globally, which can lead to increased burden on healthcare systems. The overall mortality of AP is 1%, but it may be as high as 30%-40% in hospitalized patients and patients with organ failure or pancreatic necrosis [5].

Findings from a recent study in India observed that the most predominant etiology of AP was alcohol with the majority of patients being young males [6].

Chronic pancreatitis (CP) is defined as irreversible pancreatic damage leading to pain and/or exocrine and endocrine insufficiency [7]. CP is widely prevalent in Asia, with a higher prevalence observed in India and Japan as compared with other western countries (10-15/100,000 population in western countries vs 125/100,000 population in India) [8]. A study from north India observed that the majority of individuals with idiopathic chronic pancreatitis (ICP) were young with a mean age of 33.0years, while the alcohol-induced CP patients were significantly older (41.5±9.9 years) [7]. Gender variation in the prevalence of AP and CP was noted, with men having higher incidence rates as compared with women (>2-fold for CP and 38.8 vs 30.6 per 100,000 for AP) [9, 10]. EPI is known as maldigestion of nutrients generally caused due to primary loss of functional parenchyma and/or secondarily impaired exocrine pancreatic function and insufficient pancreatic enzyme activity. EPI is commonly caused due to CP, cystic fibrosis, or pancreatic resection [11]. Age-related atrophy, changes in pancreatic volume and perfusion can lead to EPI and its manifestations. It was noted that 5% of people older than 70 years and 10% of people older than 80 years suffer from EPI globally as diagnosed by fecal elastase-1 (FE-1) levels [11].

Pancreatic enzyme replacement therapy (PERT) is the cornerstone in the management of disturbed pancreatic function. It involves the supplementation of pancreatic lipase, protease, and amylases. However, despite its efficacy and safety, supplementation is under-dosed or forgotten as disturbed pancreatic function can often remain underdiagnosed. Pancreatic enzyme supplements containing a combination of amylase, protease, and lipase enzymes are primarily prescribed to patients with pancreatic enzyme deficiency to aid in digestion and for stomach discomfort, loss of appetite, flatulence, or other functional gastric disorders [12]. Currently, there is a lack of data on the treatment of patients with disturbed function of the pancreas in India. Therefore, a questionnaire-based survey was conducted among a group of gastroenterologists to 1) evaluate the frequency of disturbed function of the pancreas across age, gender, and region; 2) assess the profiles of patients with disturbed function of the pancreas and its management in the real-world setting; 3) evaluate the physician-perceived efficacy and compliance advantage of 15,000 lipase units over 10,000 units in the real-world setting; and 4) evaluate the physician-perceived efficacy of the pancreatic enzyme supplement Pankreoflat HD in patients with pancreatic dysfunction.

2. METHODS

2.1. Survey design

This study was conducted across 8 Indian cities (Delhi, Lucknow, Kolkata, Indore, Mumbai, Bangalore, Hyderabad, and Chennai) and involved a total of 63 gastroenterologists. Each gastroenterologist was asked to respond to the survey questions based on their experience with treating 15 patients each in their respective clinical practice. Survey data report forms (DRFs) were completed by all gastroenterologists. The survey included questions on the frequency of disturbed function of the pancreas across age and gender, patient profile, management of patients, perceived efficacy of 15,000 units of lipase dosing, and the perceived efficacy of Pankreoflat HD (Abbott India Ltd.) (Table 1).

Table 1: Survey questionnaire

Q1	In your clinical practice, what percentage of patients comes to you with symptoms of disturbed function of the pancreas per month?			
	a) <1%	b) 1%-5%	c) 5%-15%	d) >15%
Q2	In your clinical practice, what is the most common age group which presents to you with disturbed function of the pancreas?			
	a) 18-30 years	b) 31-45 years	c) 46-60 years	d) 61-75 years e) >75 years
Q3	What is the gender-wise % break up of patients with disturbed function of the pancreas that come to you?			
	a) _____% males		b) _____% females	
Q4	Which is the most common symptom of disturbed function of pancreas that patients present to your clinic with?			
	a) Indigestion	b) Steatorrhea	c) Abdominal pain	d) Malnutrition
Q5	In what % of patients showing the above symptoms do you perform laboratory investigations?			
	a) <25%	b) 25%-50%	c) 50%-75%	d) >75%
Q6	What are the standard investigations that you advise in suspected cases of disturbed function of pancreas?			
	a) FE-1	b) CFA	c) Carbon 13 breath test	d) EUS

Q7	Out of the conditions mentioned below, select the one which you find most commonly in your patients with disturbed function of pancreas?				
	a)Chronic pancreatitis	b)Uncontrolled diabetes mellitus	c)GI surgery like gastrectomy /gastric bypass	d)Pancreatic duct obstruction due to stone, tumor etc.	
Q8	In your clinical practice, what is your line of treatment in these patients with disturbed function of pancreas?				
Q9	When do you start your patients on PERT?				
	a) Clinically confirmed symptoms of maldigestion like diarrhea, flatulence, abdominal distention etc.	b) Clinically confirmed nutritional deficiencies in your patients	c) Only after confirmed diagnosis using pancreatic function tests like fecal elastase		
Q10	What is the average dose of lipase/day that you give in your patients with disturbed pancreatic function?				
	a)<40,000 USP units/ day	b) 40,000-60,000 USP units/day	c) 60,000-1,00,000 USP units/day	d)>1,00,000 USP units per day	
Q11	Which is the preferred lipase strength in your practice?				
	a) 10K	b) 15K	c) 20K	d) 40K	e) Any other_____
Q12	Reasons for selection of the above lipase strength in your practice vs other options?				
Q13	When treating a patient with disturbed function of pancreas, which of the below statements resonate best with your practice?				
	a)Use same brand of PERT throughout therapy	b)Change brands in between therapy			
Q14	How do you rate efficacy of Pankreoflat HD in disturbed function of the pancreas?				
	a) Poor	b) Fair	c) Good	d) Very good	e) Excellent
Q15	How do you rate safety profile of Pankreoflat HD in disturbed function of the pancreas?				
	a) Poor	b) Fair	c) Good	d) Very good	e) Excellent
Q16	Do you have to use additional acid suppressive drugs like PPI or H2RA for symptom improvement?				
	a) Yes	b) No			
Q17	What is the average duration for which you prescribed Pankreoflat HD?				
	a) Up to 2 weeks	b) 2-4 weeks	c) 4-12 weeks	d) >12 weeks	
Q18	On a scale of 1 to 10 (1 being worst and 10 being best), what is the improvement in dyspepsia and abdominal discomfort with Pankreoflat HD?				
Q19	In what patient profiles would you consider using Pankreoflat HD?				
	a) Age group _____	b) Gender _____	c) Key symptoms ____	d) Comorbidities ____	
Q20	Please give your opinion on the benefit of 15,000 units lipase dosing over 10,000 units lipase dosing:				
	a) Very beneficial	b) Somewhat beneficial	c) Not beneficial		
Q21	Do you believe that even distribution of PERT across meals (e.g., 1 tablet before meal and 1 tablet at the end) is important for better patient outcomes?				
	a) Do not believe	b) Somewhat believe	c) Strongly believe		
Q22	In your clinical practice are you concerned about the economic impact of pancreatic enzyme supplements?				
Q23	In your clinical practice what percentage of patients drops out of therapy within 3 months of initiation?				
	a) >90%	b) 50%-90%	c) 20%-50%	d) <20%	
Q24	In your clinical practice what is the most common cause of drop-out in patients with disturbed function of pancreas?				
	a) Poor therapy results	b) Economic factors	c) Cumbersome nature of therapy		
Q25	Is there a patient profile that is more suited to Pankreoflat HD compared to other preparations available in market?				
Q26	Please rate your level of satisfaction with Pankreoflat HD in these patients				
	a) Very good	b) Good	c) Fair	d) Poor	
Q27	On a scale of 1 to 10 (1 being not so much and 10 quite a lot), how significantly does the formulation (tablet vs capsule vs mini-microsphere) matter to you while choosing PERT?				
Q28	Tick all the factors that you consider before selecting a pancreatin:				
	a) Safety and efficacy profile	b) Price	c) Technology used		
	d) Company name	e) Format (tablet/capsule/mini-microsphere)			
Q29	On a scale of 1 to 10 (1 being very low to 10 being very high), do you believe that 15,000 lipase units dosing will benefit your patients?				
Q30	Do you think there is a need for any specific patient support program for disturbed function of pancreas? If yes, then what do you need in the program?				

CFA, coefficient of fat absorption; EUS, endoscopic ultrasonography; FE -1, fecal elastase; PERT, pancreatic enzyme replacement therapy

2.2. Data analysis

No formal sample size calculation was performed for this survey; however, with 63 respondents and 30 questions, a respondent-to-item ratio of >2 was maintained in line with previous studies [13]. The survey questions were designed with multiple-choice responses and participants were asked to choose the single best response for majority of the questions. Data were collected, screened, and entered in Microsoft Excel. Any discrepancy in response was clarified with the respective doctor.

3. RESULTS

3.1. Profiles of patients with disturbed function of the pancreas in Indian clinical practice

Nearly half of the participating physicians (49.2%) encountered 5%-15% of patients with symptoms of disturbed function of the pancreas per month, followed by 36.5% of physicians encountering 1%-5% of patients. In contrast, only 7.9% of physicians observed >15% of such patients, and 6.3% of physicians observed <1% of such patients. Almost 70% of patients with disturbed function of pancreas were males (Table 2).

Table 2: Physicians' perceived profiles of patients with disturbed function of pancreas in Indian clinical practice

Characteristic as perceived by physicians, n (%)	N = 63
% of patients with symptoms of disturbed function of the pancreas	
<1	4 (6.3)
1-5	23 (36.5)
5-15	31 (49.2)
>15	5 (7.9)
Patient age groups with symptoms of disturbed function of the pancreas (years)	
18-30	4 (6.3)
31-45	36 (57.1)
45-60	25 (39.7)
61-75	0 (0)
>75	0 (0)
Common symptoms associated with disturbed function of the pancreas	
Indigestion	24 (38.1)
Steatorrhea	14 (22.2)
Abdominal pain	39 (61.9)
Malnutrition	4 (6.3)
% of patients undergoing laboratory investigations	
<25	7 (11.1)
25-50	20 (31.7)
50-75	13 (20.6)
>75	23 (36.5)
Standard investigations advised in suspected cases of disturbed function of the pancreas	
FE-1	42 (66.7)
CFA	7 (11.1)
Carbon 13 breath test	3 (4.8)
EUS	28 (44.4)
Conditions commonly associated with disturbed function of the pancreas	
Chronic pancreatitis	58 (92.1)
Uncontrolled diabetes mellitus	7 (11.1)
GI surgery like gastrectomy/gastric bypass	3 (4.8)
Pancreatic duct obstruction due to stone, tumor etc.	4 (6.3)

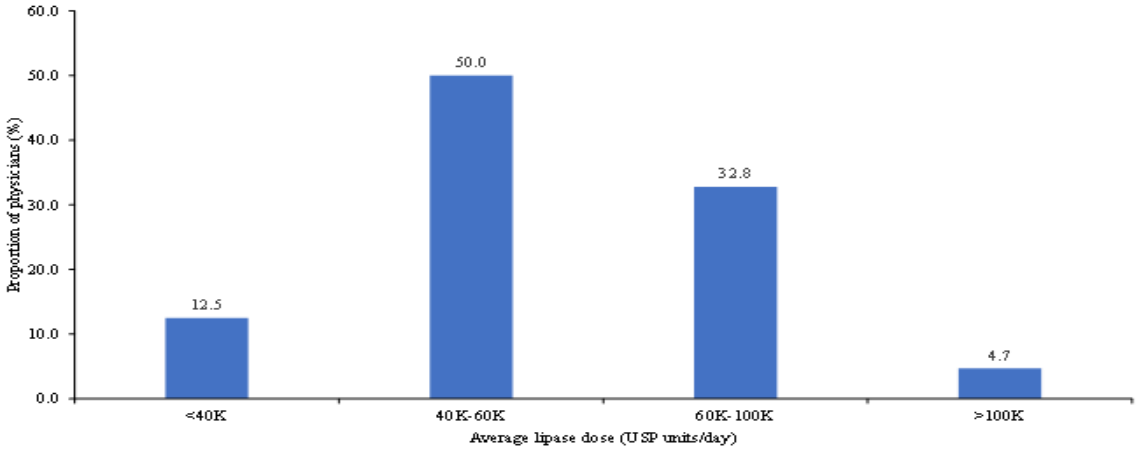
CFA, coefficient of fat absorption; EUS, endoscopic ultrasonography; FE -1, fecal elastase; GI, gastrointestinal

Symptoms of disturbed function of the pancreas were more common in patients aged 31-45 years (57.1% respondents), followed by age groups 45-60 years (39.7%) and 18-30 years (6.3%) The most common symptom associated with disturbed function of the pancreas was abdominal pain as reported by 61.9% of respondents, followed by indigestion (38.1%), steatorrhea (22.2%), and malnutrition (6.3%). When the above symptoms are observed, 36.5% of the physicians reported that they carry out laboratory investigations amongst >75% of patients, while 20.6%, 31.7% and 11.1% of physicians carry out such investigations in 50%-70%, 25%-50%, and <25% of patients, respectively. FE-1 test was the most commonly advised standard investigation in suspected cases of disturbed function of the pancreas (66.7%

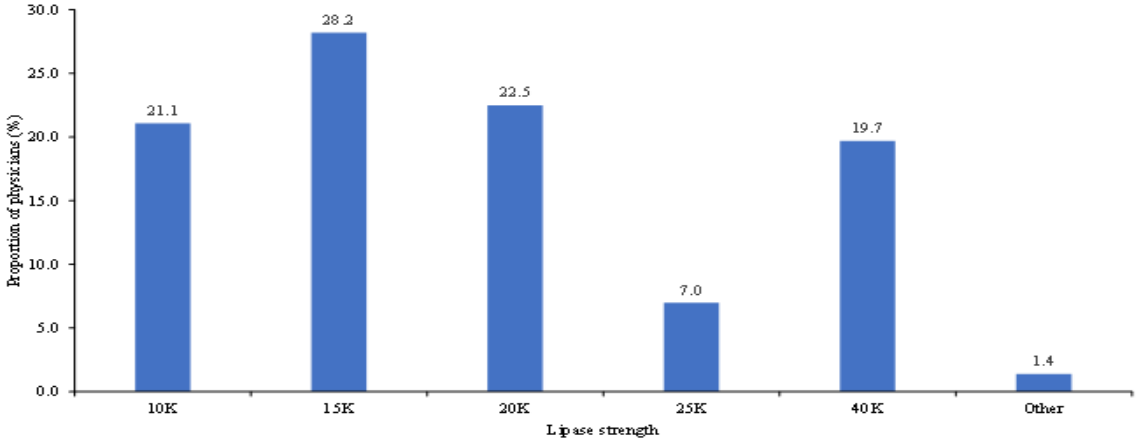
respondents), followed by endoscopic ultrasonography (44.4%), coefficient of fat absorption (11.1%), and carbon 13 breath test (4.8%). CP was the most commonly observed underlying condition according to 92.1% of the physicians in patients with disturbed function of the pancreas, followed by uncontrolled diabetes mellitus (11.1%), pancreatic duct obstruction due to stone/tumor (6.3%), and gastrointestinal surgeries like gastrectomy/gastric bypass (4.8%).

3.2. Treatment strategies for disturbed function of the pancreas

PERT was the most preferred treatment, with 87.3% specialists recommending it. Proton pump inhibitors (PPI) and analgesics were prescribed by 14.3% of physicians each. Dietary restrictions such as avoiding foods containing high fat and following a low-fat or medium-chain triglyceride (MCT) diet were recommended by 14.3% of the physicians. Inculcating antioxidant-rich foods or supplements in daily diet was also recommended by 15.9% of the participating physicians. A few physicians (7.9%) advised counselling for diabetes optimization, to seek help for abstinence from alcohol, to help such patients avoid dairy products and to ultimately bring about lifestyle modifications. Vitamin supplements, nutritional supplements, fluid management therapies, and various enzymes to improve digestion were recommended by 4.8% physicians each. Endoscopic retrograde cholangiopancreatography (ERCP) and endotherapy were preferred as first-line treatment in patients with main pancreatic duct calculi by 4.8% of physicians each. Furthermore, only 3.2% of the participating physicians prescribed non-steroidal anti-inflammatory drugs. When enquired about prescribing additional acid suppressive like PPIs or H2RA for symptom improvement, 74.6% of physicians agreed to prescribe them.



A) Average lipase dose



B) Lipase strength

Fig. 1: Physicians' preferences for lipase in the management of disturbed function of the pancreas

The majority of the respondents (69.8%) initiated treatment with PERT after clinical diagnosis of symptoms of maldigestion such as diarrhea, flatulence, or abdominal distention. Amongst the remaining physicians, 28.6% started PERT therapy after confirming the diagnosis using pancreatic function tests like FE-1 test and 15.9% started PERT after clinically confirming nutritional deficiencies. In all, 76.2% of respondents believed or strongly believed that an even distribution of PERT across meals (e.g.,1 tablet before meal and 1 tablet at the end) was important for better patient outcomes. Majority of the respondents believed that formulation plays an important role while choosing PERT (92.1%). While selecting pancreatin, physicians considered price (88.9%) followed by safety and efficacy (84.1%), type of technology used to formulate pancreatin (58.7%), brand (42.9%), and dosage form (57.1%) such as a tablet, capsule, or mini-microsphere.

The most common lipase dose prescribed per day was 40,000-60,000 USP units as prescribed by half the participating physicians, followed by 60,000-1,00,000 USP units by 33.3% of physicians (Fig. 1A), and the most preferred lipase strength was 15K units per dose as per 31.7% of the respondents, while only 7.9% of respondents preferred 25K units per dose (Fig. 1B). Convenient dosing/dosing frequency (31.7%) was considered to be the most prominent reason for selection of preferred lipase strength, followed by cost-effectiveness (27%), and good clinical response (17.5%). Majority of respondents (87.3%) preferred using the same brand of PERT throughout therapy when treating a patient with disturbed function of the pancreas, while about 9.5% claimed to change the brands and rest of them (1.6%) relied on patients' response while deciding about the brands. More than two-third of the specialists (81.0%) were of the opinion that specific patient support was needed for disturbed function of pancreas while 19% did not feel the need for specific patient support for their patients. Table 3 summarizes the treatment strategies for the management of disturbed function of pancreas.

3.3. Treatment with Pankreoflat HD

In this survey, Pankreoflat HD was commonly prescribed for the symptoms such as, steatorrhea (30.2%), indigestion (27.0%), abdominal pain (25.4%), CP (12.7%), pain (12.7%), PEI (9.5%), bloating (7.9%), diarrhea (6.3%), flatulence (4.8%), weight loss (4.8%), abdominal bloating (3.2%), abdominal distention (3.2%), disturbed function of pancreas (3.2%), malabsorption (3.2%), maldigestion (3.2%), malnutrition (3.2%), pancreatic insufficiency (3.2%), and uncontrolled diabetes mellitus (3.2%) (Table 4). Diabetes mellitus (74.6%) was the leading comorbidity for whom participating physicians recommended Pankreoflat HD, followed by hypertension (6.3%), coronary artery disease, cirrhosis, abdominal pain, and thyroid (3.2% each) (Table 4).

Most respondents (65.1%) believed that 15,000 units of lipase dose was very beneficial as compared with 10,000 units of lipase dose, while 33.3% and 1.6% found it somewhat beneficial and not beneficial at all, respectively.

Pankreoflat HD was reported to have good, very good, or excellent treatment efficacy by 90.5% of the participating physicians (Fig. 2A), whereas the safety profile was found to be good, very good, or excellent by 96.8% of physicians (Fig. 2A).

Pankreoflat HD was prescribed for an average duration of 4-12 weeks by 46.0% of respondents, whereas only 6.3% of them prescribed it for up to 2 weeks (Fig. 2B).

In all, 39.7% of respondents gave an overall rating of 8 out of 10 for Pankreoflat HD with respect to observed improvement in dyspepsia and abdominal discomfort. The ratings of 7, 9, and 6 were given by 25.4%, 20.6%, and 9.5% of the respondents, respectively, whereas ratings 5 and 10 were reported by 1.6% of the respondents each. Level of satisfaction with Pankreoflat HD was good according to 61.9% of the respondents; it was very good according to 33.3% of respondents, and fair according to 4.8% of respondents.

Cost of treatment was an important factor that was considered before prescribing pancreatic enzyme supplements in clinical practice. Majority (93.7%) of respondents were concerned about the economic impacts of Pankreoflat HD while only 3.2% were not concerned about it. Moreover, 54% of respondents observed that 20%-50% of patients drop out of the therapy within 3 months of its initiation and 25.4% observed that <20% of patients dropped out of the treatment. Dropout rates of 50%-90% were reported by nearly 16% of respondents and dropout rate of >90% was reported by only 4.8% of the respondents. Furthermore, the majority of the respondents (85.7%) pointed outeconomic factors as the most common reason for dropout in patients with disturbed function of the pancreas, whereas 15.9% reported cumbersome nature of treatment with pancreatic enzyme supplementation to have an impact on treatment compliance.

As observed by 81% of respondents, price sensitive population (20.6%), followed by CP (15.9%), diabetes mellitus (7.9%), steatorrhea (7.9%), abdominal pain or bloating (6.3%), dyspepsia (3.2%), indigestion (3.2%), flatulence (1.6%) and low weight (1.6%) population group were the patient profiles that were more suited for Pankreoflat HD recommendation compared to other preparations available in the market. Alcoholics, young patients, and males were some of the other patient profiles for Pankreoflat HD prescription according to 3.2%, 6.3%, and 1.6% of respondents, respectively.

Table 3: Physicians' treatment practices with respect to Pankreoflat HD

Treatment strategies as used by physicians, n (%)	**N = 63**
Preferred line of treatment with disturbed function of pancreas	
PERT	55 (87.3)
Surgery	3 (4.8)
Diet (Avoid fatty foods, Avoid junk food and outside food, low fat diet/MCT diet)	9 (14.3)
Counselling (Diabetes optimization/abstaining from alcohol/abstaining from milk/dairy products/bakery products/stop precipitating factor/lifestyle modification)	5 (7.9)
MRI/CT scan/EUS/ERCP/endotherapy	4 (6.3)
Antioxidants	10 (15.9)
PPI	9 (14.3)
Analgesics	9 (14.3)
Follow up	1 (1.6)
NSAIDs	2 (3.2)
Vitamin supplements	3 (4.8)
Enzymes to improve digestion	3 (4.8)
Fluid management	3 (4.8)
Nutrition supplementation	3 (4.8)
Initiation of PERT in patients	
Clinically find symptoms of maldigestion like diarrhea, flatulence, abdominal distention etc.	44 (69.8)
Clinically find nutritional deficiencies in your patients	10 (15.9)
Only after confirmed diagnosis using pancreatic function tests like fecal elastase	18 (28.6)
Average dose of lipase/day given in patients with disturbed function of pancreas	
Less than 40,000 USP units per day	8 (12.7)
40,000-60,000 USP units per day	32 (50.8)
60,000-1,00,000 USP units per day	21 (33.3)
More than 1,00,000 USP units per day	3 (4.8)
Reasons for selection of above lipase strength	
Good clinical response	11 (17.5)
Efficacy	3 (4.8)
Affordable/ost-effective	17 (27.0)
Guideline recommendation	10 (15.9)
Improve QOL/ Patient convenience	7 (11.1)
Convenient dosing / Dosing frequency	20 (31.7)
Fat digestion/absorption	9 (14.3)
Better relief/pain relief/relief of steatorrhea	4 (6.3)
Others: High content, mild symptoms, adequate for the energy, PERT for better results, to decrease feeling of fullness, uptitration, supportive studies, faith	8 (12.7)
Factors before selecting a pancreatin	
Safety and efficacy profile	53 (84.1)
Price	56 (88.9)
Technology used	37 (58.7)
Company name	27 (42.9)
Formulation (tablet/capsule/mini-microsphere)	36 (57.1)

CT scan, computed tomography; ERCP, endoscopic retrograde cholangiopancreatography; EUS, endoscopic ultrasound; MCT, medium-chain triglyceride; MRI, magnetic resonance imaging; NSAIDs, non-steroidal anti-inflammatory drugs; PPI, proton pump inhibitors; pulmonary embolism response team; QoL, quality of life

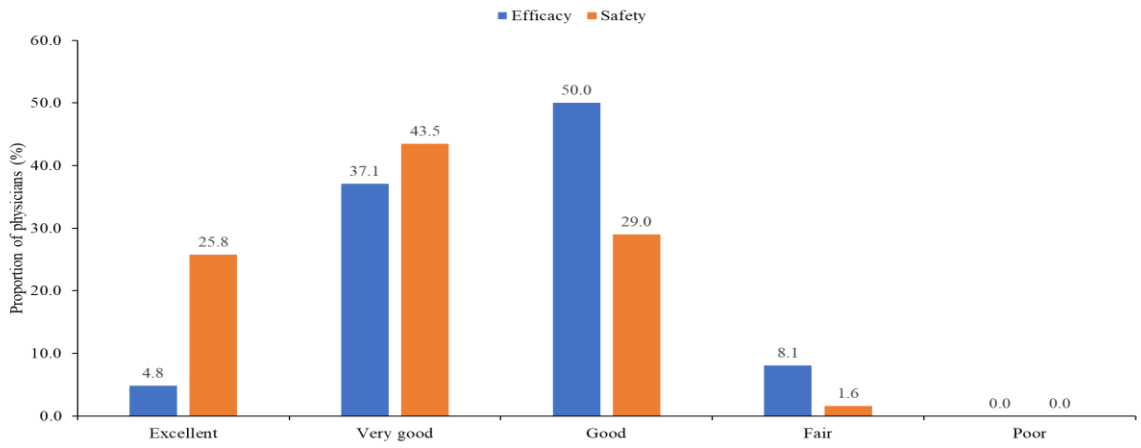
Table 4: Treatment with Pankreoflat HD

Physician response, n (%)	**N = 63**
Use of additional acid suppressives like PPI or H2RA for symptom improvement	47 (74.6)
Average duration of Pankreoflat HD	
Up to 2 weeks	4 (6.3)
2 weeks to 4 weeks	18 (28.6)
4 weeks to 12 weeks	29 (46.0)
More than 12 weeks	13 (20.6)
Patient profile for using Pankreoflat HD	
Age group	
Child (<18 years)	7 (11.1)
Adult (18-65)	60 (95.2)
Elderly (>65)	16 (25.4)
Gender	
Male	27 (42.9)
Female	0 (0.0)
Both	34 (54.0)
Not applicable	1 (1.6)
Key symptoms	
Abdominal bloating	2 (3.2)
Abdominal discomfort	1 (1.6)
Abdominal distention	2 (3.2)
Abdominal pain	16 (25.4)
Bloating	5 (7.9)
C/F of malabsorption	1 (1.6)
Chronic pancreatitis	8 (12.7)
Diarrhea	4 (6.3)
Disturbed pancreas	1 (1.6)
Disturbed functions of pancreas	2 (3.2)
Dyspepsia	5 (7.9)
Exocrine deficiency	1 (1.6)
Flatulence	3 (4.8)
Indigestion	17 (27.0)
Loose stool	1 (1.6)
Malabsorption	2 (3.2)
Maldigestion	2 (3.2)
Malnutrition	2 (3.2)
Pain	8 (12.7)
Pain and loose stool	1 (1.6)
Pancreatic insufficiency	2 (3.2)
PEI	6 (9.5)
Steatorrhea	19 (30.2)
Uncontrolled diabetes mellitus	2 (3.2)
Weight loss	3 (4.8)
Comorbidities	
Diabetes mellitus	47 (74.6)
CAD	2 (3.2)
Diabetic neuropathy	1 (1.6)
Cirrhosis	2 (3.2)
Hypertension	4 (6.3)
Abdominal pain	2 (3.2)
GERD	1 (1.6)
Celiac disease	1 (1.6)
Thyroid	2 (3.2)
ALD	1 (1.6)
Chronic kidney disease	1 (1.6)
Steatorrhea	1 (1.6)
Chronic pancreatitis	1 (1.6)
Post pancreatic surgery	1 (1.6)
Post-operative pancreatic resections	
Yes	1 (1.6)
None	1 (1.6)

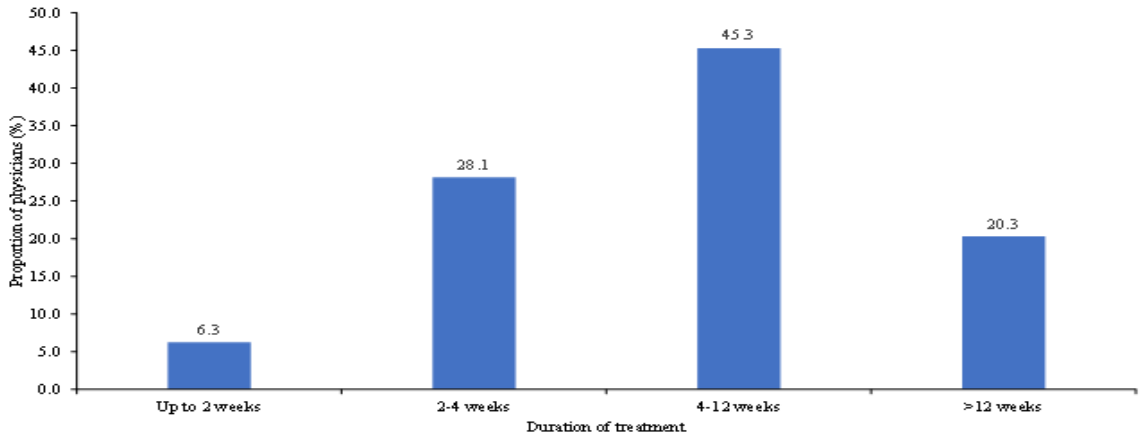
Benefit of 15,000 units lipase dosing over 10,000 units lipase dosing	
Very beneficial	41 (65.1)
Somewhat beneficial	21 (33.3)
Not beneficial	1 (1.6)
Opinion of physicians for importance of even distribution of PERT across meals (eg: 1 tablet before meal and 1 tablet at the end) for better patient outcomes	
Do not believe	15 (23.8)
Somewhat believe	27 (42.9)
Strongly believe	21 (33.3)
In your clinical practice, are you concerned about economic impacts of pancreatic enzyme supplements	
Yes	59 (93.7)
Not	2 (3.2)
Not applicable	1 (1.6)
% of patients drop out of therapy within 3 months of initiation	
<20%	16 (25.4)
20-50%	34 (54.0)
50-90%	10 (15.9)
>90%	3 (4.8)
Common cause of droup-out in patients with disturbed function of pancreas	
Poor therapy results	0 (0.0)
Economic factors	54 (85.7)
Cumbersome nature of therapy	10 (15.9)
More suited patient profile for Pankreoflat HD compared to other preparations available in the market	
Yes	51 (81.0)
None	9 (14.3)
Not applicable	3 (4.8)
Patient profile more suited to Pankreoflat HD compared to other	
Abdominal pain or bloating	4 (6.3)
CP	10 (15.9)
DM	5 (7.9)
Steatorrhea	5 (7.9)
Price sensitive population	13 (20.6)
Weight loss	1 (1.6)
Dyspepsia	2 (3.2)
Indigestion	2 (3.2)
Flatulence	1 (1.6)
Alcoholics	2 (3.2)
Young patients	4 (6.3)
Male	1 (1.6)
Physician level of satisfaction with Pankreoflat HD in patients with disturbed function of pancreas	
Very good	21 (33.3)
Good	39 (61.9)
Fair	3 (4.8)
Poor	0 (0)
Significance of formulation (tablet vs capsule vs mini-microsphere) while choosing PERT on a scale of 1 to 10 (1 being not so much and 10 being a lot)	
1-5	9 (14.3)
6	6 (9.5)
7	15 (23.8)
8	14 (22.2)
9	13 (20.6)
10	6 (9.5)
Benefit of 15,000 lipase unit dosing in patients with disturbed function of pancreas on a scale of 1 to 10 (1 being very low to 10 being very high)	

5	2 (3.2)
6	6 (9.5)
7	18 (28.6)
8	13 (20.6)
9	18 (28.6)
10	6 (9.5)
Need for any specific patient support for disturbed function of pancreas	51 (81.0)
Types of patient support	
Patient counselling	27 (42.9)
Regular follow-up	5 (7.9)
Diet	17 (27.0)
Lifestyle modification	6 (9.5)
Economical assistance	10 (15.9)
Connect them with alcoholic anonymous	1 (1.6)
Symptoms monitoring	2 (3.2)
Medicine procurement	1 (1.6)
Importance of PERT	2 (3.2)
Fecal elastase if possible/lipase content	2 (3.2)
Ensure compliance	1 (1.6)

ALD, alcoholic liver disease; CAD, coronary artery disease; CP, chronic pancreatitis; DM, diabetes mellitus; GERD, gastroesophageal reflux disease; H2RA, H2 receptor antagonists; PEI, pancreatic exocrine insufficiency; PERT, pancreatic enzyme replacement therapy; PPI, proton pump inhibitor



A) Efficacy and safety



B) Duration of treatment

Fig. 2: Physicians' perspectives on treatment with Pankreoflat HD for patients with disturbed function of the pancreas

4. DISCUSSION

Disturbed function of the pancreas can be caused due to several disorders such as AP, CP, EPI, pancreatic adenocarcinoma, or postpancreatectomy. AP is managed with fluid resuscitation, antibiotics, and enteral feeding options whereas CP is currently treated with pancreatic enzyme supplements along with PPIs and H2 blockers, dietary modifications, and surgical interventions [14, 15].

Our results demonstrated that Indian physicians encounter around 5%-15% of patients with symptoms of disturbed function of the pancreas per month, most of these patients are males, and the average age group of patients exhibiting these symptoms is 31-60 years. This finding is concurrent with that of a prospective study conducted at a tertiary care hospital in India where a higher prevalence of CP was observed in males than in females. However, most of those patients were in the age group of 11-20 years, followed by 31-40 years [16]. In the present survey, the most common symptoms associated with disturbed function of the pancreas as observed by the participating gastroenterologists were abdominal pain, indigestion, steatorrhea, and malnutrition.

The mainstay of treatment for disturbed function of the pancreas is PERT [12]. It involves the supplementation of pancreatic enzymes like amylase, lipase, and protease. It has been shown to reduce fecal fat excretion, weight improvement, alleviate abdominal pain, and thus the quality of life [17]. Improvement insteatorrhea and preservation of body weight are also suggested as key indicators of therapeutic success in patients with the disturbed function of the pancreas by the European Society for Parenteral and Enteral Nutrition 2006 Guidelines [18]. In the present survey as well, gastroenterologists preferred to prescribe Pankreoflat HD as it follows a similar line of treatment as that of PERT, in patients with symptoms like steatorrhea, indigestion, and abdominal pain. Regarding the dosage, clinical evidence demonstrated that starting doses of PERT should be between 30,000-40,000 IU with every meal and 15,000-20,000 IU with snacks [17, 19]. Brennan et al. suggested that patients should be advised to take half of their prescribed dose with their first bite of food and the remaining half either in the middle or at the end of their meal [12]. On similar lines with the above finding, in the current study, the preferred lipase strength by physicians was 15,000-20,000 IU and they were of opinion that an even distribution of PERT across meals (e.g., 1 tablet before the meal and 1 tablet at the end) was important for better patient outcomes. This survey also highlighted that most gastroenterologists had a good level of satisfaction with Pankreoflat HD as they experienced a good safety and efficacy profile during their clinical practice. However, the cost of treatment was an important factor that physicians emphasized to be considered before prescribing pancreatic enzyme supplement as it impacts compliance with the treatment and clinical outcomes. The smaller sample size is a potential limitation of our study. In future, a larger sample size is recommended to fully understand the clinical benefits of Pankreoflat HD.

5. CONCLUSION

CP is a common condition observed in patients with disturbed function of the pancreas, which is especially prominent in males. PERT was the most preferred treatment option for such patients with more than half physicians considering 15,000 units lipase dosing to be more beneficial than 10,000 units. Findings from this survey revealed that Pankreoflat HD was suitable in adults with steatorrhea and indigestion, with most physicians being satisfied with the clinical efficacy and safety of Pankreoflat HD. Despite the availability of multiple treatment options, there is a need for customized support for patients with disturbed function of the pancreas.

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Conflicts of interest

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7. REFERENCES

1. Pancreas: What is it, function and location. https://my.clevelandclinic.org/health/body/21743-pancreas. Accessed on October 11, 2022).
2. Pancreas functions, location and disease. Columbia Surgery. https://columbiasurgery.org/pancreas/pancreas-and-its-functions Accessed on October 11, 2022).
3. Adrian TE. *xPharm Compr. Pharmacol. Ref.*, 2011;
4. Jawaid S, Forsmark CE. *Dig. Dis. Sci.*, 2019; **64(7):**

1731-1733.
5. Iannuzzi JP, King JA, Leong JH, Quan J, Windsor JW, Tanyingoh D, et al. *Gastroenterology,* 2022; **162(1):**122-134.
6. Matta B, Gougol A, Gao X, Reddy N, Talukdar R, Kochhar R, et al. *Clin. Gastroenterol. Hepatol.,* 2020; **18(7):**1567-1575.
7. Bhasin DK, Singh G, Rana SS, Chowdry SM, Shafiq N, Malhotra S, et al. *Clin. Gastroenterol. Hepatol.,* 2009; **7(5):**594-599.
8. Garg PK. *Curr. Gastroenterol. Rep.,* 2012; **14(2):**118-124.
9. Lévy P, Domínguez-Muñoz E, Imrie C, Löhr M, Maisonneuve P. *United Eur. Gastroenterol. J.*, 2014; **2(5):**345-354.
10. Li C, Jiang M, Pan C, Li J, Xu L. *BMC Gastroenterol.*, 2021; **21(1):**1-12.
11. Singh VK, Haupt ME, Geller DE, Hall JA, Diez PMQ. *World J. Gastroenterol.*, 2017; **23(39):**7059-7076.
12. Brennan GT, Saif MW. *JOP.*, 2019; **20(5):**121-125.
13. Anthoine E, Moret L, Regnault A, Sbille V, Hardouin JB. *Health. Qual. Life. Outcomes.* 2014; **12:**2. doi: 10.1186/S12955-014-0176-2.
14. Siregar GA, Siregar GP. *Open Access Maced. J. Med. Sci.*, 2019; **7(19):**3319-3323.
15. Nair RJ, Lawler L, Miller MR. *Am. Fam. Physician.*, 2007; **76(11):** 1679-1688.
16. Jena C, Mohapatra M, Panda S, Sarangi A, Sarangi AK, Babu KK. *Int. J. Res. Med. Sci.*, 2022; **10(6):**1265-1270.
17. Shandro BM, Nagarajah R, Poullis A. *World J. Gastrointest. Pharmacol. Ther.*, 2018; **9(5):**39-46.
18. Meier R, Ockenga J, Pertkiewicz M, Pap A, Milinic N, Macfie J, et al. *Clin. Nutr.*, 2006; **25(2):**275-284.
19. Imrie CW, Connett G, Hall RI, Charnley RM. *Aliment. Pharmacol. Ther.*, 2010; **32(Suppl 1):**1-25.