



# Yoga: A tool for improving the quality of life in chronic pancreatitis

Surinder Sareen, Vinita Kumari, Karaminder Singh Gajebasia, Nimanpreet Kaur Gajebasia

Surinder Sareen, Vinita Kumari, Grantham and District Hospital, United Lincolnshire Hospitals NHS Trust, Grantham NG31 8DG, United Kingdom

Karaminder Singh Gajebasia, Nimanpreet Kaur Gajebasia, Government Medical College, Patiala, India

Correspondence to: Surinder Sareen, Grantham and District Hospital, United Lincolnshire Hospitals NHS Trust, Grantham NG31 8DG, 6, Norton Street, Grantham, NG31 6BY, United Kingdom. surinder\_sareen@yahoo.com

Telephone: +1-476-591515

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## Abstract

**AIM:** To determine the effectiveness of yoga on improving the quality of life in patients of chronic pancreatitis.

**METHODS:** The patients were randomized to two groups. The control group continued their usual care as directed by their physicians. Patients in the yoga group, in addition, received biweekly yoga sessions for 12 wk. The patients' demographic and health behaviour variables were assessed before and after the yoga programme using Medical Outcomes Short Form (SF-36) for quality of life, Profile of Mood States for assessing mood and Symptoms of Stress Inventory for measuring stress.

**RESULTS:** A total of 60 patients were enrolled, with 8 drop-outs. Thirty patients were randomized to the yoga group and 30 to the control group. Significant improvements were seen in overall quality of life, symptoms of stress, mood changes, alcohol dependence and appetite after the 12 wk period apart from the general feeling of well-being and desire to continue with the programme in future in the yoga group, while there was no difference in the control group.

**CONCLUSION:** Yoga is effective on improving the quality of life in patients of chronic pancreatitis.

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**Key words:** Yoga; Chronic pancreatitis; Quality of life

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## INTRODUCTION

The pain that develops in chronic pancreatitis is often severe, chronic, aggravated by meals and may be present continuously including at night. In some patients the pain is so severe that they develop a fear for eating and, as a consequence, they lose significant amounts of weight. The pain may begin gradually; however, in many patients over time they develop into continuous pain. The pain is usually worse in the back rather than in the front of the abdomen. The severity of the pain makes many patients into pain cripples. The worsening of the pain with meals may lead to avoidance of foods, causing severe weight loss and malnutrition of the patient.

Treatment of the pain requires familiarity with the patient's disease, an understanding of wide variations in presentation and manifestations of chronic pancreatitis and knowledge of the different treatment options available, their advantages and disadvantages. Treatment is best provided in a centre where experienced physicians from different specialties provide comprehensive approaches to the care of the patient and there is coordination of care between the different specialties.

At our center, we offer a comprehensive approach to pain from pancreatic diseases with clinical evaluation by a pain management specialist, pancreatic surgeon, gastroenterologist and psychologist as indicated. Many patients may also require treatment in a rehabilitation program prior to or after the surgery for drug dependency. The drug dependency develops on narcotic drugs due to years of over usage prior to a surgical consultation in many patients. Yoga was introduced as a tool for rehabilitation programme and to supplement the other pain relief measures being taken by the patients.

Therapy of chronic pancreatitis rests on five arms: Avoidance of alcohol, treatment of pain, replacement therapy for exocrine and endocrine insufficiency and adequate nutrition. Alcohol withdrawal improves pain and the patient's compliance. It also seems to retard the chronic inflammatory process. Therapy of pain depends on the pathomechanism of pain. There is a lack of prospective, controlled studies comparing various treatment regimens. Thus, treatment options are partly dependent on the experience of the physician taking care of the patient. Thanks to improved substitution with acid resistant porcine pancreatic extracts with high lipase activity, fat restriction is no longer of paramount importance. However, supply with sufficient calories is still difficult due

to pain and inadequate compliance<sup>[1]</sup>.

It was reported that the use of alternative therapies in the United States increased from 33.8% in 1990 to 42.1% in 1997<sup>[2]</sup>. Therapeutic recreation (TR) has traditionally provided many of approaches in their work with clients. Typically embedded in the rubric of stress management, TR professionals teach and provide complementary alimentary medicine (CAM) techniques such as aromatherapy, massage, yoga, and tai chi to clients<sup>[3]</sup>. Yoga as a clinical intervention has been associated with a variety of physical and psychological health outcomes such as improved mood and reduced symptoms of anxiety and depression<sup>[4]</sup>.

Stress reduction and anxiety management programs could be useful for any disease because they help to create a supportive environment, in which the individual may have reduced anxiety. Caroleo identified several programs that reduce stress and anxiety among AIDS patients, including "yoga, massage, acupuncture, acupressure, chiropractic services, meditation, reiki, physical and breathing exercises and visualization"<sup>[5]</sup>.

Despite yoga's wide popularity, there are limited numbers of randomized, controlled yoga studies using objective quantitative outcome measures, and these studies often have small numbers of subjects<sup>[6-9]</sup>.

## MATERIALS AND METHODS

A computer-generated random allocation sequence was prepared. The assignments were placed in serially numbered, sealed, opaque envelopes. Patients were randomized after enrolment. The study enroller screened the patient and, if the patient was qualified, obtained informed consent and completed the baseline measurement. Then the next envelope was opened and the treatment allocation discussed. No assignment was reused with another patient once the envelope had been opened. Patients completed their own assessments, and blinding was not possible.

Both treatment groups continued the standard therapy as directed by their primary physician during the 12 wk intervention period. Patients were asked to remain on the same medications and not to start new ones. A medication diary was provided to document medications for pain, and their dosages, frequencies and side effects.

### Data collection

Demographic data and patients' history were obtained using a checklist and short answer questionnaire. Demographic variables included age, ethnic background, marital status, education, employment status, and occupation.

The SF-36 questionnaire was used to assess the quality of life. SF-36 is a generic health outcome measure that is designed for use across varied populations<sup>[10]</sup>. It is comprised of 36 items across eight scales: physical functioning, role function-physical, bodily pain, general health, vitality, social functioning, role function-emotional, and mental health. Each scale is scored from 0 to 100, with higher values indicating more favourable health status. The SF-36 has been used in numerous studies of cancer

patients and has evidence of validity in both cancer and pain patient groups<sup>[11,12]</sup>.

The Profile of Mood States (POMS)<sup>[13]</sup> is a 65-item scale, which assesses six affective dimensions. It has been widely used in the assessment of mood changes resulting from a variety of interventions due to its responsiveness and has been used extensively in various populations<sup>[14]</sup>.

The Symptoms of Stress Inventory (SOSI) is designed to measure physical, psychological, and behavioural responses to stressful situations. Respondents are instructed to rate the frequency with which they experience various stress-related symptoms on a five-point scale, ranging from "never" to "frequently," during a designated time frame selected by the investigator (in this case, the past week). The SOSI overcomes the limitations of checklist measures, which assume universally valid weightings of stressful events based on normative data, by focusing on manifest symptoms of stress and obviates the need for patients to identify and rate all relevant stressful events occurring in their lives. Both predictive and concurrent validities have been demonstrated, and, in a mixed chronic-illness sample of patients with malignant melanoma and myocardial infarction, manifest symptom distress as measured by the SOSI was directly related to functional alterations due to disease and inversely related to cognitive adaptation and perceived quality of life<sup>[15]</sup>.

The yoga program was designed to complement the management of pain and anxiety based on a sequence of yoga poses by B.K.S. Iyengar<sup>[16]</sup>. Iyengar is one of the world's foremost exponents of yoga and is recognized by the medical community in India as an expert in treating medical problems with yoga. Iyengar has evolved the therapeutic application of yoga postures. Iyengar's yoga is particularly beneficial for people with chronic pain because he has researched and understood the therapeutic benefits of the poses<sup>[17]</sup>. In consultation with a certified yoga instructor, the psychiatrist, members of the interdisciplinary team and the literature on Iyengar's sequence of poses, a yoga program was designed for participants.

The yoga program was implemented, directed and evaluated by the authors. Yoga sessions were planned for thrice a week over a 12 wk period. Each session lasted approximately one hour. The sessions were held in early morning in an open park. This area provided ample space for participants to practice yoga without feeling confined.

Prior to the start of the yoga intervention, the authors consulted with the nurse manager, attending physician and psychiatrist, and reviewed the medical records to authenticate the diagnosis of chronic pancreatitis for each participant. Prior to the start of the yoga program, each participant was interviewed to determine his or her willingness to participate in the study and signed informed consent for involvement in the study.

At this time, each participant was given a brief definition of yoga and particularly a description of the sequence of poses that were to be used. Preparation and guidelines for the yoga classes were reviewed, such as to come empty stomach, not to eat anything for one hour before the session, and wearing loose and comfortable clothing. Finally, participants were told of the duration and frequency of the yoga program and that if they wish, they

**Table 1** Demographic profile of the participants, (mean  $\pm$  SD)

Variable	Yoga group	Control group	P
Age (yr)	50 $\pm$ 5.2	50 $\pm$ 6.3	0.712
Body mass (kg)	55.4 $\pm$ 17.6	56.1 $\pm$ 16.4	0.801
Education (yr)	16.0 $\pm$ 2.4	15.8 $\pm$ 3.2	0.72
Marital status (% married)	73	74	0.865
Employment (% employed)	56	57	0.928

could discontinue participation at any time.

As the participants entered the session, initial evaluation data were collected including the recording of each participant's pain levels, weight, average diet, pain relief medications.

As in many classical yoga classes, the class started with 15 min of meditation. During the meditation, the participants were instructed to breathe diaphragmatically. This breathing technique 'pranayama' allowed the participants to slow down their breathing and at the same time begin to slow down their body and mind. Further instructions were given to clear the mind of any unwanted thoughts and as the thoughts came into their mind, to allow them to flow freely out. During the meditation, the participants were instructed to concentrate on their breathing and follow each breath. After meditation, the participants completed a 10-min warm-up of various yoga arm stretches and movements to relax their muscles and circulate their blood and oxygen throughout their body. Once warm-ups were completed, each participant attempted to remain in each pose for 1 to 3 min or as tolerated. Modifications were necessary for several of the participants when the poses became too uncomfortable.

At the end of the last pose, the relaxation pose (Savasana), participants were instructed to slowly awaken the body by opening their eyes and begin to gently stretch various parts of the body such as neck, hands, and feet. Participants then completed a seated cross-leg pose with their palms together at the heart.

Suitable alterations were made in yoga programme for the participants finding some difficulty in doing the various poses (asanas).

### Analysis and observations

Out of 30 patients randomised to yoga group, 26 completed the full 12 weeks course. They ranged in age from 41 to 69 years (mean, 50). All participants were diagnosed with chronic pancreatitis and were taking pain and anxiety medications. 86% of the patients were males and 90% of them were alcoholic at some stage of their life.

### Statistical analysis

All data were analysed using the SPSS version 12 statistical software package. Descriptive statistics (frequencies, means, standard deviations, and percentages) were used to characterize the sample. An alpha level for a significant difference was set at 0.01 because of the number of variables.

**Table 2** Comparison of SF-36 score in yoga and control groups, (mean  $\pm$  SD)

SF-36 subscale	Yoga group			Control group		
	0 wk	12 wk	P	0 wk	12 wk	P
Physical functioning	62.9 $\pm$ 0.6	74.1 $\pm$ 0.5	0.0001	63.8 $\pm$ 0.8	63.6 $\pm$ 0.6	0.08
General health	66.8 $\pm$ 0.4	74.8 $\pm$ 0.3	0.001	67.7 $\pm$ 11.3	69.6 $\pm$ 12.4	0.10
Role-physical	57.9 $\pm$ 21.4	63.1 $\pm$ 19.3	< 0.01	56.3 $\pm$ 18.6	54.6 $\pm$ 16.7	0.12
Bodily pain	41.4 $\pm$ 14.1	60.4 $\pm$ 14.4	< 0.01	45.5 $\pm$ 17.4	48.0 $\pm$ 15.9	0.05
Vitality	32.1 $\pm$ 14.2	45.2 $\pm$ 16.3	< 0.01	33.2 $\pm$ 13.9	33.0 $\pm$ 12.6	0.61
Social functioning	61.4 $\pm$ 22.3	78.4 $\pm$ 20.2	< 0.01	63.8 $\pm$ 18.1	70.5 $\pm$ 15.7	0.22
Role-emotional	47.2 $\pm$ 38.8	77.7 $\pm$ 30.1	< 0.01	47.8 $\pm$ 29.7	48.6 $\pm$ 31.1	0.55
Mental health	41.3 $\pm$ 14.3	61.3 $\pm$ 13.9	< 0.01	45.9 $\pm$ 12.6	46.3 $\pm$ 15.9	0.33

Data were analysed using the intention-to-treat approach. The last-observation-carried-forward procedure was used for participants who did not complete the trial. No transformations were required for statistical analyses. Baseline comparisons between the two groups were made using independent-sample *t*-tests for continuous data and Pearson's  $\chi^2$  tests for categorical data. This adjusted statistical analysis was performed to reduce the impact of baseline differences on study outcomes (given the relatively small sample size of the trial). A two-sided *P* value of < 0.05 indicated statistical significance. No adjustments were made for multiple comparisons. Data are presented as the means  $\pm$  SD with 95% confidence intervals. As a check for the validity of the parametric test, we also made a nonparametric analysis for 2 independent groups (Mann Whitney U) and found the same variables to be significant as by the *t*-test. Formal directional hypotheses were not made a priori. However, we expected to find improvement in quality of life in participants in the yoga programme.

## RESULTS

There was no statistical difference between the demographic profile of the patients in yoga group and control group (Table 1), indicating that the participants were properly randomised and matched.

### Quality of life scores

The SF-36 results shown in Table 2 revealed a statistically significant improvement in all components of the scoring system in the participants of the yoga group, while there was no marked difference after 12 wk in the control group. Only scores of those who completed the program (*n* = 52) were included because 12 wk scores were not available for dropouts. Dropouts were eliminated from all subsequent analyses. The scores before the start of yoga programme in both groups were comparable, indicating the appropriate matching of the participants.

### Mood scores

POMS change scores for all patients (yoga and control)

**Table 3** Comparison of POMS score between yoga and control groups, (mean  $\pm$  SD)

Variable	Yoga group		Control group	
	0 wk	12 wk	0 wk	12 wk
Anxiety	11.7 $\pm$ 6.5	9.1 $\pm$ 5.4 <sup>a</sup>	11.5 $\pm$ 4.6	11.7 $\pm$ 5.3
Depression	9.7 $\pm$ 6.6	5.4 $\pm$ 5.8 <sup>d</sup>	9.6 $\pm$ 4.7	9.4 $\pm$ 6.3
Anger	9.8 $\pm$ 5.6	5.9 $\pm$ 6.6 <sup>b</sup>	9.6 $\pm$ 6.1	9.2 $\pm$ 2.6
Vigour	12.8 $\pm$ 3.8	17.1 $\pm$ 5.2 <sup>b</sup>	12.9 $\pm$ 2.6	13.6 $\pm$ 6.0
Fatigue	14.1 $\pm$ 3.4	8.6 $\pm$ 3.8 <sup>b</sup>	13.9 $\pm$ 4.1	14.2 $\pm$ 4.3
Confusion	5.5 $\pm$ 4.9	3.2 $\pm$ 2.8 <sup>b</sup>	5.7 $\pm$ 1.8	5.6 $\pm$ 2.3

<sup>a</sup> $P < 0.05$ ; <sup>b</sup> $P < 0.01$ ; <sup>d</sup> $P < 0.001$ .

who completed the study are presented in Table 3. At 12 wk (after the yoga group had completed the program), POMS scores were significantly higher in the yoga group, indicating less mood disturbance. When change scores were calculated and assessed with independent-samples *t* tests, the difference between the two groups was even clearer, with significantly more change in the direction of reduced mood disturbance in the yoga group. The treatment program resulted in a 40% reduction in Total Mood Disturbance as measured by the POMS; while the reduction in the control group was only 2%.

### Stress scores

SOSI scores for the yoga and control groups before and after the yoga programme are presented in Table 4. There were no differences between the two groups before the start of yoga programme, again indicating that the groups were initially matched in stress symptoms. There was a statistically significant decline in stress scores in the patients of yoga group after 12 wk, while there was no difference in the scores in control group. Using independent-samples *t* test, there was a greater decrease in yoga group in the subscales of depression, gastrointestinal, habitual patterns and anxiety scores.

### General well being

Interviews were conducted with participants at the end of the 12-wk yoga intervention to help determine its effectiveness. Each participant's thoughts regarding the yoga intervention were noted and all candidates claimed some benefits from the yoga programme. While each individual reported gains as a result of the yoga intervention, perhaps the best indicator of its effectiveness was found in the participant's request to continue the program. After the conclusion of the 12-wk yoga intervention, all participants expressed an interest in continuing the yoga.

## DISCUSSION

These results provided evidence that a relatively brief mindfulness meditation and exercise based stress reduction programme could effectively improve the quality of life, mood disturbance and stress related symptoms in patients with chronic pancreatitis, consistent with other investigations of similar interventions in different

**Table 4** Comparison of SOSI score between yoga and control groups, (mean  $\pm$  SD)

Variable	Yoga group		Control group	
	0 wk	12 wk	0 wk	12 wk
Peripheral manifestations	5.3 $\pm$ 3.6	3.6 $\pm$ 3.3 <sup>b</sup>	5.4 $\pm$ 4.1	5.2 $\pm$ 3.8
Cardiopulmonary	5.4 $\pm$ 5.1	4.2 $\pm$ 4.3 <sup>a</sup>	5.7 $\pm$ 4.8	5.9 $\pm$ 3.4
Central-neurological	2.1 $\pm$ 1.8	1.9 $\pm$ 1.4	2.2 $\pm$ 1.4	1.8 $\pm$ 1.7
Gastrointestinal	9.5 $\pm$ 4.6	5.3 $\pm$ 5.8 <sup>b</sup>	9.1 $\pm$ 4.3	8.9 $\pm$ 5.4
Muscle tension	11.4 $\pm$ 4.9	7.8 $\pm$ 3.4 <sup>a</sup>	12.1 $\pm$ 4.5	11.7 $\pm$ 4.4
Habitual patterns	19.2 $\pm$ 6.8	13.8 $\pm$ 7.1 <sup>b</sup>	20.1 $\pm$ 7.8	19.9 $\pm$ 6.6
Depression	9.9 $\pm$ 4.2	4.9 $\pm$ 4.7 <sup>b</sup>	10.2 $\pm$ 3.9	9.8 $\pm$ 5.2
Anxiety/fear	12.4 $\pm$ 2.7	6.5 $\pm$ 4.9 <sup>b</sup>	11.7 $\pm$ 3.1	11.9 $\pm$ 4.2
Emotional irritability	9.7 $\pm$ 6.1	6.0 $\pm$ 5.4 <sup>a</sup>	9.3 $\pm$ 5.8	9.5 $\pm$ 4.4
Cognitive disorganization	7.5 $\pm$ 5.9	5.7 $\pm$ 7.1 <sup>a</sup>	7.8 $\pm$ 6.2	7.9 $\pm$ 5.7
Total stress scores	92.4 $\pm$ 45.7	59.7 $\pm$ 47.4	93.6 $\pm$ 45.9	92.4 $\pm$ 44.8

<sup>a</sup> $P < 0.05$ ; <sup>b</sup> $P < 0.01$  vs control.

populations<sup>[18-20]</sup>. It is reasonable to conclude that even greater benefits may be obtained by participants who continue to practice over time and adopt yoga as part of their daily life. The current study was a pragmatic one, intending to study yoga as it is commonly practiced, i.e. as an adjunctive therapy to the standard therapy. The clinical question the study sought to answer was: does yoga add any benefit to patients with chronic pancreatitis in addition to the standard therapy? Our data indicate that yoga plus the standard therapy does increase quality of life in these patients compared with the standard therapy alone, in a clinically and statistically significant manner. Our protocol does not require a standardized regimen for the standard therapy, which makes it possible for baseline differences between the two treatment groups to occur. In addition, every patient followed the standard therapy protocol within defined parameters. The data from this pragmatic study also more closely resembles the clinical setting in which yoga is actually used, i.e. an adjunctive therapy to a variety of standard therapies.

It is commonly held that patients choose to use CAM because they are dissatisfied with conventional treatments that are perceived to be ineffective or have unpleasant side effects, or to be impersonal or too costly<sup>[21]</sup>. It has, however, been pointed out that disenchantment with conventional medicine is not necessarily the reason why patients turn to CAM<sup>[22]</sup>. This appears to be supported by a US study that reported users of alternative health care are no more dissatisfied with or distrustful of conventional care than non-users are<sup>[23]</sup>.

In addition, an extensive review of meta-analyses and recently published studies of mind-body therapies concluded that there is strong evidence for the efficacy of mind-body therapies for coronary artery disease, headaches, insomnia, incontinence, chronic low back pain, disease and treatment-related symptoms of cancer, and improving post-surgical outcomes<sup>[24]</sup>.

Most standard therapies for chronic pancreatitis frequently carry adverse effects, particularly in older patients, further compromising their quality of

life. NSAIDs carry a 2- to 5-fold increased risk of gastrointestinal bleeding, which increases with age<sup>[25]</sup>. NSAID-induced renal, cardiovascular, central nervous system (CNS) and hematological side effects are also more common in older individuals. Use of narcotic analgesic agents results in an increased risk of falls in patients aged 60 yr and over (odds ratio of 1.54)<sup>[26]</sup>, as does polypharmacy with CNS active medications (odds ratio of 2.37)<sup>[27]</sup>. Bed rest leads to de-conditioning and osteoporosis, especially in the elderly, who often are already at risk for these conditions<sup>[28]</sup>. The literature has shown yoga to be a safe treatment. Our study, likewise, documents its safety. When yoga was added to the standard therapy, patients tended to take fewer medications.

There has been little research on the mechanisms by which yoga practice might relieve back pain. Although Westerners often think of yoga as a form of exercise, the practice of yoga places as much emphasis on mental focus as on physical movement<sup>[29]</sup>, and considers the breath, which links the mind and the body, as the key to achieving both physical and psychological benefits<sup>[17]</sup>.

Several large follow-up studies in the past decade suggest that recurrent acute exacerbations dominate the clinical picture in the first few years after onset of symptoms, and progressive pancreatic insufficiency is the predominant feature in the late stages of the disease<sup>[30]</sup>.

Chronic pain is complex physiologically and there are many influencing factors on the pain experience. The approach to treatment therefore needs to be multimodal, often with a number of different interventions, both physical and psychological, delivered in parallel. Chronic pain differs from acute pain in that management follows a rehabilitative rather than a treatment model, though these are not mutually exclusive. Full assessment of the patient, preferably multi-disciplinarily, will improve his or her outlook. Management should be holistic, rigorous in the application of conventional therapies (including analgesics and physical therapy) and ready to admit an improved understanding of psychological and social techniques<sup>[31-33]</sup>.

Patients appreciate their surgeon's continued interest and involvement in their disease and management, and the surgeon can overcome a sense of abandonment that may accompany the discharge of a patient who is not fully healed. Patients who have chronic pain often understand that their pain will not disappear. That their surgeon will not disappear can help them to accept and live with their pain<sup>[34,35]</sup>.

Chronic pain can trigger a cycle of disabilities. Those who suffer from it often retreat into themselves, becoming inactive and minimizing contact with other people. This lack of social interaction often contributes to feelings of depression and isolation. These individuals traditionally rely on pain medications to get through the day and then to sleep, and those medications may cause side effects including dizziness, nausea, and drowsiness that immobilize them further. In addition, the severe pain commonly leads to inactivity that weakens or de-conditions muscles to make them feel even more infirm. Over time, despair may set in, and pain may seem even worse. Chronic pain is pervasive and often limits participation in desired activities.

Because pain is such a complicated problem, managing

it requires a multidimensional approach. Some patients seek alternative solutions such as yoga to relieve their pain. Because yoga is multifaceted physical exercise, breathing, relaxation and meditation is integrated into one's being when it is practiced. Such integration has a strengthening effect on the whole self, and fortifies resistance to pain. Yoga offers a very distinct approach to pain. It brings awareness to the body, especially to the parts that are in pain. Yoga helps individuals become more accepting of their body and less judgmental and reactive to pain. With time, an individual with pain will know what makes them feel worse and how to coax their body into balance. Additionally, as individuals practice various yoga poses, their attention is gently directed to other parts of the body at any given moment. In other words, attention is diverted from pain areas and focused on yoga poses. Finally, the poses themselves can ease pain. They can increase muscle strength and flexibility, improve circulation in the joints and muscles, and stimulate the brain to produce painkilling chemicals.

Studies indicate that yoga was beneficial in reducing anxiety and depression in older adults who attended a geriatric clinic and presented with a wide range of affective symptoms related to anxiety and depression<sup>[36]</sup>.

Yoga lowers heart rate, promotes deeper breathing, and induces brain wave patterns that are associated with relaxation and optimism. These effects are much like those of meditation, and it is appropriate to think of yoga as a kind of meditation to the body. A study of 22 medical patients with a defined anxiety disorder showed clinical and statistically significant improvements in objective symptoms of anxiety and panic following an eight-week outpatient physician-referred group stress reduction intervention based on mindfulness meditation and yoga stretches<sup>[37]</sup>.

Regular practice of the classical yoga postures can be quite helpful in producing a healthy immune system and proper environment for its functioning. Many of the Iyengar yoga poses are extremely effective in producing the "relaxation response" and in counteracting the negative effects of the "stress response" on the immune system<sup>[38]</sup>. These poses are useful for calming and nurturing and are especially valuable when one is too sick or too weak to perform the more vigorous, classical poses<sup>[39]</sup>.

Yoga helps lower stress hormones that compromise the immune system, while also conditioning the lungs and respiratory tract, stimulating the lymphatic system to oust toxins from the body, and bringing oxygenated blood to various organs to ensure their optimal function. The practice of specific asanas can help balance the immune system and help support the thymus and blood to the sinus.

This brief review of the literature provides preliminary support for considering yoga as a CAM intervention in patients who are experiencing pain and anxiety. The literature, while limited, indicates that yoga has been shown to be effective in minimizing pain and anxiety in some populations, specifically the elderly and individuals with behavioural health diagnoses, and that it is effective in minimizing stress in cancer patients. The literature also indicates that pain and anxiety are frequent and distressing

co-occurring disorders in patients of chronic pancreatitis that significantly detract from their health and well-being. Based on this review, yoga may be a beneficial intervention for managing patients with chronic pancreatitis.

Future yoga intervention studies will be needed to carefully control for the class aspect that may be beneficial to everyone, especially seniors. There is also likely some placebo effect related to the yoga intervention. One group has already shown that psychological benefits of an aerobic exercise intervention in a group of healthy young adults could be increased simply by telling subjects that the exercise program was specifically designed to improve psychological well being<sup>[40]</sup>.

Further studies should be emphasized to examine the long-term effects of yoga in terms of management for patients of chronic pancreatitis. In our study, the participants self-reported a decrease in pain and anxiety frequently after each yoga session; however, this study did not examine how long these reductions were maintained. Besides, we did not compare the biochemical data of the patients before and after the yoga programme, which can be researched in future studies. While findings from the current study provide preliminary results, indicating that yoga can be used as an intervention to reduce stress and anxiety in patients of chronic pancreatitis, proper training and knowledge of the principles that guide the practice of yoga must be thoroughly understood and demonstrated by any recreation therapist who would like to use this intervention with clients.

As the use of CAM techniques continues to become more common in many health care facilities, it will only benefit recreation therapists to take advantage of a modality such as yoga to assist in the self-management of illness and disease. Nonetheless, there is room for more education of patients and professionals, and for more research in order to establish the effectiveness of the wide range of management options available.

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