


# Exploring Patient Perspectives on a 12-Week Online, Stress Reduction Intervention in Inflammatory Bowel Disease

Makayla Watt, MSc, Farhad Peerani, MD, FRCPC, Karen Madsen, PhD, Jesse Siffledeen, MD, FRCPC, Karen Kroeker, MD, FRCPC, Allen Lim, MD, FRCPC, Puneeta Tandon, MD, FRCPC,\* and Ashley Hyde, RN, PhD\*

Division of Gastroenterology, Department of Medicine, University of Alberta, Edmonton, Alberta, Canada

\*Co-senior authorship.

Address correspondence to: Puneeta Tandon, MD, MSc, FRCPC, University of Alberta, Division of Gastroenterology, 130 University Campus NW, Edmonton, Alberta T6G 2X8, Canada ([ptandon@ualberta.ca](mailto:ptandon@ualberta.ca)).

**Background:** Online stress reduction interventions may be useful adjuncts to standard medical therapies for inflammatory bowel disease (IBD). As part of the evaluation of a 12-week randomized control trial (RCT) of an online multicomponent stress reduction program, our aim for the current study was to use qualitative methods to more deeply explore the patient experience with the online programming.

**Methods:** Upon completion of the 12-week RCT, all intervention participants were invited to participate in semistructured interviews. A qualitative descriptive approach was used. Interviews were analyzed through a theoretical thematic analysis process, whereby transcripts were coded, and codes then grouped into larger categories and themes.

**Results:** A total of 56 interviews were analyzed with the emergence of 3 main themes: (1) IBD as a source of stress and uncertainty, (2) understanding the positive impacts of the stress reduction program, and (3) suggested strategies to enhance program desirability. IBD was described as causing uncertainty, significant disruptions to daily activities, and stress, which in turn worsened symptoms. The online program was associated with a perceived reduction in IBD symptom burden, an increased ability to manage daily and disease-associated stressors, and a more positive mindset. Variation in program content and fostering connections with others in the IBD community were identified as potential strategies to enhance future programming.

**Conclusions:** This qualitative companion study highlights the power of the patient voice to deepen our understanding of the impact of IBD, and the potential benefit of an online stress reduction program including suggestions for iterative refinement.

## Lay Summary

Findings of our qualitative study indicated that IBD was a significant source of stress, with participation in a novel 12-week online mental wellness program serving to decrease participants' symptoms and increase their perceived ability to manage stress.

**Key Words:** stress reduction, online intervention, inflammatory bowel disease

## Introduction

Inflammatory bowel disease (IBD) which includes Crohn's disease (CD) and ulcerative colitis (UC), is a chronic relapsing–remitting or progressive inflammatory condition.<sup>1,2</sup> IBD can affect individuals of all ages,<sup>3</sup> with symptoms typically including diarrhea, abdominal pain, and rectal bleeding.<sup>4</sup> In addition to physical symptoms, individuals experience uncertainty about their future, social isolation, and an overall increase in psychological distress symptoms including depression and anxiety.<sup>5,6</sup> In keeping with the suggestion of a gut–brain connection in IBD,<sup>7</sup> these increases in psychological distress have been associated with a worsening of IBD symptoms<sup>8,9</sup> in up to 75% of patients.<sup>10</sup>

IBD treatment centers around medical therapy, with surgery reserved for managing refractory disease or complications.<sup>11,12</sup> The impact of psychological distress often remains under-addressed.<sup>13,14</sup> To fill this gap, researchers have explored interventions to reduce stress, including cognitive behavioral therapy (CBT), mindfulness-based stress reduction, patient education, and mind–body practices including breathwork,

yoga postures, and meditation.<sup>13,15–25</sup> To-date, the results of these studies have been promising, but mixed, with the impact of the intervention evaluated solely with quantitative measures (as opposed to mixed quantitative and qualitative inquiry).<sup>13,15–25</sup> Qualitative methodology is powerful because it allows investigators to more deeply explore the patient perspective and obtain explicit feedback for iterative refinement of an intervention.<sup>26–30</sup> It directly involves the patient voice and fits well with the long-standing patient-centered care adage of “nothing about me without me.”<sup>31</sup>

In this study, we conducted interviews with individuals with IBD who had participated in a multicomponent 12-week randomized control trial (RCT)<sup>32</sup> involving a stress reduction intervention, termed the Peace Power Pack (PPP). The PPP was made up of 2 core program components: (1) a progressive weekly follow-along yoga, breathwork, and guided meditation video (20–30 minutes per session), which patients were asked to complete 2–3 times/week, and (2) a behavior-change skills facilitation video with accompanying activity informed by CBT or positive psychology (10–20 minutes per session), which patients were asked to complete weekly. The PPP also

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included supplementary content to provide variety including a weekly video introducing the theme of the week (3–5 minutes) and a weekly IBD nutrition tip video (3–5 minutes). A summary of the online programming can be found in [Table 1](#). The online programming was accompanied by a brief (10–15 minute) once weekly check-in phone call to participants from a member of the research team. The quantitative data results will be reported in a separate manuscript.<sup>32</sup> In brief they demonstrated significant between-group improvements in perceived stress, psychological well-being, resiliency, anxiety, depression, and health-related quality of life.

Through a qualitative lens, the research questions guiding this study were:

1. What is the daily experience of living with IBD?
2. What are the impacts of participating in an online wellness program?
3. What are participant's perceptions of the PPP online wellness program and how can we enhance program desirability?

## Methods

### Sampling and Recruitment

The PPP trial<sup>32</sup> enrolled 101 patients  $\geq 18$  years of age seen at 4 gastroenterology tertiary care centers across Edmonton, Alberta, Canada between February 2019 and March 2020 with an endoscopically and histologically confirmed diagnosis of either UC (48%) or CD (52%). Patients were excluded if they had a Hospital Anxiety and Depression Scale (Depression subscore)  $> 10$ , a Perceived Stress Scale score  $< 7$ , *Clostridioides difficile* diagnosed within 1 month of baseline, steroid use within 1 month of baseline, new onset of treatment for anxiety or depression within the past 3 months, psychosis, or inability to provide informed written consent in English. In order to increase generalizability to a real-world population, a preexisting diagnosis of depression or anxiety were not considered exclusion criteria. Seventy-five percent

of participants in the main RCT were female with a mean age of  $42.5 \pm 14.1$  years. For the qualitative interviews, we used a convenience sample of participants who completed the 12-week PPP trial. The initial 75 participants were invited to participate to share their experiences and program feedback via email, with 56 interviews completed. Participants who elected to not participate in the qualitative interview portion of the study most frequently cited lack of time and scheduling conflicts. We used a qualitative description approach to guide this study.<sup>33</sup>

### Data Collection

Semistructured interviews were conducted via telephone from June 2019 to June 2020. All interviews were audiorecorded and transcribed verbatim. Development of the interview guide ([Table 2](#)) was informed by a consideration of published research on IBD, including notable gaps in qualitative inquiry,<sup>5,34–39</sup> a desire to explore the participant experience with a wellness intervention, and need for feedback on program acceptability. The interview guide was pilot tested prior to commencing participant interviews. Interviews were conducted primarily by M.W. with guidance from A.H., a postdoctoral fellow with expertise in qualitative methods, and lasted between 30 and 45 minutes. Each participant was interviewed once, with only the interviewer(s) and participant present. Following each interview, field notes were recorded that detailed the interviewer's preliminary impressions. Researchers (M.H. and A.H.) iteratively reviewed data to ensure quality and completeness.

### Data Analysis

An inductive “theoretical” thematic analysis approach was used for this qualitative descriptive study. Codes, categories, and themes were identified in the data based on an a priori desire to understand participant's experiences of living with IBD, the impacts of the PPP, and identify potential improvements to the program.<sup>40,41</sup> Analysis was primarily conducted by 2 members of the research team (M.W. and A.H.) who coded transcripts independently, then came together to develop a

**Table 1.** Description of the online intervention.

Week	Weekly intro, behavior-change skills, and meditation theme	Breathing exercises introduced	Yoga postures introduced
Week 1	Connecting with your breath	Diaphragmatic breathing, alternate nostril breathing	Cat cow, yoga namaskar, tree, thunderbolt
Week 2	Connecting with your body		
Week 3	Grounding	Sitali	Yogi squat, yoga namaskar in goddess
Week 4	Managing your thoughts		Triangle
Week 5	Personal power		Seated twist
Week 6	Social connectedness and gratitude		Happy baby, reclining twist, wind removing pose
Week 7	Self-expression		Beauty pose
Week 8	Letting go		
Week 9	Forgiveness		Locust pose
Week 10	Visualization for health		
Week 11	Visualization for other life goals		
Week 12	End of program review—sustaining change		

**Table 2.** Interview guide.

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1. Can you tell me what it means to you to have inflammatory bowel disease? How has it impacted your daily life?
  2. Can you tell me why you wanted to be a part of this study?
  3. In your opinion, what was the best part of being a part of this study? Why?
  4. What stress reduction techniques that were presented in the study did you find the most helpful?
  5. What part(s) of the study would you change? Were there any stress reduction techniques that didn't work for you? Why?
  6. What stress reduction techniques that you learned in the study will you continue to use going forward? (Probe: How have these practices impacted the way that you cope with stress every day?)
  7. How has being a part of this study generally affected your life? (Probes: Relationships, employment, leisure)
  8. What impact do you think this study has had on your overall health and wellbeing? (Probes: Inflammatory bowel disease symptoms, strength)
  9. How might you suggest improving the program? (Probes: Simpler, shorter, longer, have a focus on different materials, would you want short 5 minute breathwork and meditations)
  10. What is the ideal daily length of time that you could devote to a program like this?
  11. What content might be helpful to you in a second program
    - a. Do you see yourself continuing the practices?
    - b. Would it be helpful to have access to a community forum to share and learn new things with other patients?
  12. Is there anything else that you'd like to share with us?
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codebook. Emerging codes and themes were discussed at weekly meetings with the study primary investigator (P.T.). Data analysis was guided by principles of saturation, specifically code and meaning saturation.<sup>42</sup> The research team noted codebook stability (>80% of codes identified with no change in meaning) after 55% of the interviews were analyzed. Data collection and analysis were largely a concurrent, iterative process with meaning saturation (a comprehensive understanding of the participant's experiences) achieved after analysis of 35 transcripts.<sup>42</sup> However, given the importance of understanding the continuum of participant experiences and perceptions of the program the remainder of interested participants were interviewed with these data incorporated into our analysis. Quirkos (version 2) was used for data management.<sup>43</sup>

### Ethical Considerations

This study was approved by the Health Research Ethics Board at the University of Alberta (Pro00082125 and Pro00079377). The PPP trial was registered with ClinicalTrials.gov (Identifier NCT03831750). Participants provided informed consent prior to commencing the qualitative interviews. Audio recordings were stored securely on a password-protected server.

### Results

Of the 56 individuals who consented to being interviewed, 29 (52%) had CD and 27 (48%) had UC. Participants ranged in age from 23 to 73 years ( $43.6 \pm 12.9$  years), were predominantly female ( $n = 39$ ; 70%) and had been diagnosed with IBD 14.3 years ago ( $\pm 11.0$  years). These were similar to the main study characteristics. Further demographic details

can be found in Table 3. We found 3 main themes: (1) IBD as a source of stress and uncertainty, (2) understanding the positive impacts of the stress reduction program, and (3) enhancing program desirability. Findings are presented narratively below and summarized in Table 4 with supporting quotes.

### Theme #1: IBD as a Source of Stress and Uncertainty

Participants associated their IBD diagnoses with uncertainty. Specifically, they associated this uncertainty with the often unknown origins of their disease, the unpredictable nature of the disease course and the lack of a cure. One participant reflected on this uncertainty:

I think it's stress from the fact that this is a chronic illness. No one really knows the cause. No one really knows the cure ... and it's maybe going to get worse over time unless they find a cure or they find enough drugs to keep maintaining a certain level of remission. (Participant 35, UC)

This uncertainty was ongoing as participants struggled to "eliminate or figure out" what was causing abdominal pain on a "daily basis" and to understand "why this was happening." Another participant reflected on her course with IBD "... it's just been a lot of uncertainty for me because I never really knew what it was all about or how to help myself."

Participants described that this uncertainty resulting in them living a disease-centric life whereby their IBD diagnosis impacted nearly all facets of their being. They described planning routine activities like running errands or eating at a restaurant around IBD flare ups. One participant stated "It [Crohn's disease] rules my life. I have to think about what I'm going to do for the day, what I'm going to eat ... everything." Similarly, another reflected on the stark impact of IBD exacerbations "when you have to relieve yourself it's an emergency situation...accidents can happen...and it's everything you can think of as to why you don't want to attend a function." Similarly, another participant reflected on the challenges he experienced when planning simple tasks outside of the home "I can't go certain places because there's too many people. I need the bathroom for 45 minutes ... and it makes it harder to travel."

Beyond the uncertainty of the physical symptoms of IBD including pain, unpredictable bowel routines, and fatigue, participants described the "profound" impact the disease had on their daily lives. One participant reflected on her diagnosis with IBD "I feel it means that I may not have been as full of life as I could've if I didn't have it." Others reported significant disruptions to their work lives as well as family and social interactions. While the physical symptoms of IBD "changed their way of life," others pointed to the ongoing burden of medical appointments and hospitalizations. One participant stated:

I have to go to appointments all of the time or do blood tests or stool samples. I feel like it takes up a large part of my life time-wise and I think about it a lot more too. (Participant 91, CD)

For many participants, the ongoing vigilance required for management of their IBD resulted in their disease

becoming a central part of their identity. For some, this had a negative “psychological impact” where they viewed this part of themselves as “degrading” and “embarrassing.” However, for others their disease prompted a “different attitude towards health” and generally more caution in their day-to-day life. This shift in self-image extended to a fear of how others would perceive their disease. Many participants conveyed perceptions that their disease would make others uncomfortable. One participant spoke about fear of making their friends uncomfortable during social events:

I call it the social barrier disease ... even interacting with close friends, you can't sit around the table having coffee

**Table 3.** Patient baseline characteristics.

	Total (n = 56)
IBD type	
Ulcerative colitis	27 (48.2%)
Crohn's disease	29 (51.8%)
Age (years)	43.6 ± 12.9
Female sex	39 (69.6%)
BMI	25.9 ± 4.5
Years since IBD diagnosis	14.4 ± 11.0
Time since last IBD flare (months)	35.6 ± 69.3
IBD hospitalization within 1 year prior to baseline	8 (14.3%)

Abbreviations: BMI, body mass index; IBD, inflammatory bowel disease.

**Table 4.** Thematic findings and sample interview quotes.

Theme	Description of theme	Sample interview quotes
IBD as a source of stress and uncertainty	Participants experienced uncertainty related to the unknown origin of IBD, the unpredictable nature of the disease course, and the lack of a cure for IBD.	<i>I think it's stress from the fact that this is a chronic illness. No one really knows the cause. No one really knows the cure ... and it's maybe going to get worse over time unless they find a cure or they find enough drugs to keep maintaining a certain level of remission.</i>
	IBD causes significant disruptions to daily routine.	<i>It [Crohn's disease] rules my life. I have to think about what I'm going to do for the day, what I'm going to eat ... everything.</i>
	Having IBD is associated with increased stress, which noticeably worsens disease symptoms.	<i>I have a lot of stress in my life and I know that stress is definitely a factor for my Crohn's symptoms so I went into this study to do a few lifestyle changes to potentially reduce stress and improve symptoms.</i>
Understanding the positive impacts of the PPP program	Participants became more aware of their stress, and how they manage it.	<i>I catch myself ... I'm much more mindful of what's going on stress wise ... it [the PPP program] changed how I look at it [stress] and how I cope with it.</i>
	Participants enhanced their ability to manage their mood, and cope with setbacks.	<i>The program has given me mental fortitude to combat when things go bad.</i>
Enhancing program desirability	Weekly check-ins with program facilitators increased participants' accountability to the program.	<i>I've known for a long time the benefits of meditation, affirmations, and keeping a journal, even yoga and exercise in general. Everybody's busy, it's nice to have that check-in that I have to make this a part of my routine.</i>
	Establishing connections with fellow study participants would enhance program participation.	<i>I wanted to talk to other people in the program who had similar life situations to me. Like working full-time, having young children at home ... to share strategies they were using to make time to do this [program activities].</i>
	Having continued access to the program after the study allows participants to maintain the practice that they built during the study.	<i>Meditation and mindfulness are not always easy when you're not feeling well. It's easy to know what you're supposed to do, but it's also nice to have the tools to make you continue doing it. I think that having access to the website and the emails is something that should continue.</i>

Abbreviations: IBD, inflammatory bowel disease; PPP, Peace Power Pack.

fee with your girlfriends because you have gas and you're having to run to the bathroom every few minutes. It makes other people uncomfortable, and it makes me uncomfortable. (Participant 1, CD)

Participants also expressed concern that others would not believe their disease experience. One participant attributed this to the silent manifestation of the disease: “I think having a chronic illness that's invisible people don't usually believe you anyways.”

The uncertainty associated with having IBD, daily disruptions imposed by IBD, and the implications associated with a disease-centric identity all contribute to an increase in stress level. One participant reflected on the stress associated with the uncertainty of disease: “You're always looking I guess for potential flares ... keeping an eye on things all of the time.” Another participant spoke of the stress related to a disease-centric life: “I think I have a lot of anxiety maybe because of my illness. I'm always wondering where the closest washrooms are or worried about eating certain things I guess.” Of the stress associated with a disease-centric identity, 1 participant said:

I think it's the stress of having difficulties talking about it with people. I think that's a huge stressor. There is a lot of anxiety around you know, having a chronic illness and just like how it impacts you as a human basically as a person. (Participant 37, UC)

Furthermore, participants acknowledged that stress worsens their disease symptoms, creating a vicious cycle. Many participants expressed that this recognition motivated them



to enroll in the PPP. One participant spoke of this awareness in the following manner:

I have a lot of stress in my life and I know that stress is definitely a factor for my Crohn's symptoms so I went into this study to do a few lifestyle changes to potentially reduce stress and improve symptoms. (Participant 5, CD)

## Theme #2: Understanding the Positive Impacts of the PPP Program

Participants were acutely aware of the impacts of stress on IBD, with some sharing instances where stress brought on exacerbations of their disease. They recognized the positive effects of their participation in the PPP program, one of which included becoming more "self-aware":

I catch myself ... I'm much more mindful of what's going on stress wise ... It's changed how I look at it [stress] and how I cope with it. (Participant 67, CD)

For some, this increased awareness of stress enabled them to draw upon techniques that they learned in the PPP program to cope with stress when it arose. One participant said the following of learning to manage day to day, and disease-related stress:

I get into an emotional situation and it's like, okay, you can breathe through this. Or my stomach would cramp up and I would be like okay, this is not a flare up this is just a little set back. (Participant 11, CD)

Participants described that having tools to manage their stress allowed them to "take a step back" and "assess a situation" before reacting, which caused them to feel more "even keel." Some participants noted that this was beneficial to their relationships. Of this, 1 participant recalled, "I sit and think about what was actually said and not make that first knee-jerk reaction." Similarly, another participant acknowledged how maintaining a more even mood impacted the people he interacted with:

[The program] made me an all-around more pleasant person. It grounded me and there is not so much rollercoaster ... I think everyone reaps the benefits of that, not just me but everyone I have to interact with. (Participant 8, UC)

Other participants expressed that the program techniques allowed them to be less reactive in their professional lives. One participant commented:

My work has a volatile environment at times ... it's been really good to have [the program techniques] so that I don't react as much, I don't let it change my focus and my day. (Participant 67, CD)

For many, these coping strategies were associated with an increase in self-described resilience. Participants described that this resilience allowed them to "reorient to a better mood" and "regain perspective" during difficult times. Another participant furthered this, describing that the

program gave them the "mental fortitude to combat when things go bad." Other participants recognized the "holistic" nature of the program and the development of an awareness of the "mind-body connection." One participant shared "I appreciate that there are [researchers] encompassing the whole instead of just looking at the disease in terms of the gastrointestinal tract...." Through the program they understood the role that "stress" had in their disease experience and how "raising awareness and consciousness" impacted their physical well-being. Many participants were also able to use the optional evening program techniques to improve their sleep. One participant described that evening meditation allowed her to "clear her head" so that she could "rest properly," with another participant describing that the evening yoga "loosened her up" so that she could get "comfortable" enough to sleep. As a result, participants described that they had enhanced "focus" and "energy" throughout their day, felt more "refreshed," and noticed improvements to their overall mental health.

Some participants noted the profound impacts the program had on their overall health and well-being and expressed interest in maintaining the practices beyond the study. They recognized that they "still had things to learn" and that the "yoga" and "meditation" practices would help them manage the dynamic stresses of everyday life. One participant reflected on their desire for access to the PPP program beyond the study:

I really enjoyed the values exercise and having access to the program is something that should continue on...things happen in life like anger, sadness and guilt, and [the value exercises] help me to deal with them in a more positive way. (Participant 2, CD)

## Theme #3: Enhancing Program Desirability

While participants largely acknowledged the positive impacts of the PPP and the aspects of the program that enhanced their motivation to participate, they also identified potential areas for improvement which could guide a future version of the program. For instance, many participants described enjoying the weekly check-ins from program facilitators as they felt it motivated them to "take the time to complete the program," in part because they felt "accountable to the study team." For others, the check-ins promoted a more internal sense of accountability as it required them to build a routine that incorporated the program activities. One participant reflected on this:

I've known for a long time the benefits of meditation, and affirmation and keeping a journal, even yoga and exercise in general. Everybody's busy, it's nice to have that check-in that I have to make this a part of my routine. (Participant 5, CD)

Participants felt that this motivation could be further enhanced through contact with other study participants. They felt that the extended social interaction could provide encouragement, an opportunity to exchange "suggestions during times of struggle." They also felt that this contact could provide social support from those experiencing similar life circumstances. One participant shared:

I wanted to talk to other people in the program who had similar life situations to me. Like working full-time, having young children at home ... to share strategies they were using to make time to do this [program activities]. (Participant 11, CD)

Participants appreciated the accessible nature of the program, with the layout being “easy to follow” and “quick and easy to do.” One participant reflected on the meditation component of the program and how options for different lengths of meditations allowed him to “...make it work for whatever time I had that day.” Others appreciated the online format of the program, with this making it easier to integrate the program into their everyday routine than attending an in-person fitness class. However, participants also expressed a desire for greater variation in program content with “more levels of exercise that would be more suitable for older participants” or participants experiencing a disease exacerbation. One participant recalled:

When I was sick [with a flare of UC], before I was in remission like I am now, some yoga poses would have been impossible. I had a lot of inflammation ... There were days where I couldn't bend over and do up my shoes because I was in so much pain. (Participant 34, UC)

Similarly, some participants suggested expanding on the yoga portion of the program with more adaptations that would make the routines accessible to those less familiar with yoga. Several participants described yoga as being “out of their comfort zone” and finding challenge because they were “so badly out of shape.” They viewed the program as a starting point to engaging in physical activity on a more routine basis and an opportunity to “push the boundaries.”

Participants also suggested enhancements to the nutrition portion of the program. Specifically, they wanted the program to reflect the different dietary sensitivities associated with IBD. For instance, 1 participant stated:

I really enjoyed it [the nutrition] and I found it interesting but I did find a lot of it was familiar to me and that because I had these different sensitivities, I couldn't take advantage of some of it. (Participant 78, UC)

Some participants felt that the program could do more to acknowledge common food sensitivities like “dairy” and “cereal grains” and provide more substitutions. However, they also recognized that tailoring the nutrition content would be more challenging than the yoga and mindfulness content. Others said they were already on a “tailored diet” and were “leery of making adjustments” but suggested that the nutritional content would be helpful for those who received a new IBD diagnosis.

Finally, participants expressed that having continued access to the program after the study provided them with the ability to maintain the practice that they built during the study. One participant spoke of feeling that continued access to the program would provide them with a tool to maintain their practice during difficult times:

Meditation and mindfulness are not always easy when you're not feeling well. It's easy to know what you're sup-

posed to do, but it's also nice to have the tools to make you continue doing it. I think that having access to the website and the emails is something that should continue. (Participant 2, CD)

Another participant recognized the fluctuations in wellness that occurred in day-to-day life and the benefit that ongoing access to the program would have “...as things happen in our life, we can repeat those meditations or wellness exercises... we still have things to learn.”

## Discussion

Through interviews with participants of the PPP trial, we identified themes relating to the experience of living with IBD and participating in a stress reduction intervention. Notably, our study highlighted the stress and uncertainty faced by people diagnosed with IBD. Our participants shared that IBD impacted nearly every facet of their lives. Previous research has suggested that this uncertainty is related to the unpredictable nature of active flares of the disease,<sup>38</sup> a sense of “disrupted normality” resulting from the heavy demands of disease on daily life,<sup>34,35</sup> and internalization of disease displayed through feelings of shame and embarrassment.<sup>35</sup> Collectively, these factors can contribute to an increase in psychological distress which in turn leads to an exacerbation of physical symptoms.<sup>39</sup> While the perceived link between stress and disease symptoms has been established in other nonintervention-based qualitative studies,<sup>36,37,39</sup> our study is the first in IBD to use qualitative methodology to explore the impact of an online stress reduction intervention.

Participants of this study shared how involvement in the PPP trial positively impacted their ability to self-manage their IBD. They developed an increased awareness of the effects of stress on exacerbation of their disease (“the mind-body connection”) and learned of techniques they could employ to decrease this stress and increase their physical well-being. They reported feeling more resilient. These findings echo the results of the larger RCT<sup>32</sup> which noted significant improvements in stress, resiliency, anxiety, and depression (submitted for publication). Other studies have explored the effects of behavioral interventions such as CBT, hypnotherapy, and behavioral self-management, with measurement of outcomes focused on quality of life and self-efficacy.<sup>15,44,45</sup> Only the study by Schoultz et al reported qualitative results.<sup>45</sup> Similar to the current study, participants noted that the program enabled them to develop an awareness of the impact of stress on the disease process and provided them “tools” to counteract the stress they encountered on a daily basis. However, participants of that study noted time constraints and travel as barriers to participation in the stress reduction program. This limitation was mitigated by the virtual nature of our program.

Increasingly, researchers are conducting qualitative studies alongside RCTs in order to explore contextual issues that influence uptake of complex interventions, refine the intervention, and ensure the interventions are sensitive to the unique needs of participants.<sup>30,46</sup> The need for methodological rigor in these companion qualitative studies has been highlighted.<sup>30,46</sup> By undertaking this companion study, we were able to explore the participant's rich experiences of having IBD as well as gain insight into the impacts of our stress reduction intervention on their health and well-being. Furthermore, we were

able to gather feedback both on individual experiences and on the specific components of the intervention in more explicit detail than what is possible through the use of aggregated surveys or Likert-type satisfaction questions. For example, while no significant improvements to sleep were noted in the Pittsburgh Sleep Quality Index evaluated in the larger RCT, many participants in the qualitative study discussed that the program techniques helped them to improve their sleep. Moreover, we learned that social interaction with others suffering from IBD was important to many participants, and ideally could be addressed in a future version of the program. This feedback enables refinement and application of future versions to participants with IBD and to other disease populations.

It is important to note that this study was started prior to the COVID-19 pandemic and the necessary rise in popularity of virtual care for chronic disease management. Many jurisdictions have experienced disruption to conventional in-person chronic disease care, with healthcare providers noting significant worsening of these patients' mental health.<sup>47</sup> These impacts have also been experienced by patients living with IBD who associated the COVID-19 pandemic with negative effects on well-being, specifically quality of life, perceived stress, and anxiety.<sup>48</sup> The stress reduction program outlined in the present study and accompanying RCT offers a promising solution to disruptions in both conventional in-person care and stress reduction programming which have traditionally been delivered face-to-face. Recent studies indicate that this type of virtual programming may be preferable even after the pandemic has ended.<sup>48,49</sup>

### Limitations

Our study has several limitations. First, the participants of this qualitative study were primarily female. Though this was proportional to the female participants (75%) of the larger PPP RCT, it is not representative of the female to male ratio in the greater IBD patient population in North America.<sup>50</sup> Other studies have similarly reported a higher prevalence of females compared to males participating in wellness practices such as yoga and meditation.<sup>51,52</sup> Second, prior to joining the study, the majority of participants in this study were unfamiliar with yoga (65%) and mediation (74%). We recognize that an increased receptiveness for stress reduction interventions may have influenced willingness to participate and estimates of its impact on their daily lives. Third, the participants in our study were generally well when enrolling in the trial, with an average length of time since they last experienced an IBD flare being 35.6 months. Our results, particularly those that described the positive impacts of the program on participants' daily lives should be considered in the context of their pre-enrollment health status. It is possible that the experience and impact of participation in the trial with poorer health and a more recent flare may have elicited different results.

### Conclusion

Our study highlights the relevance of qualitative research in GI. The findings complement the primary RCT by enabling the patient voice to articulate the unique experience of living with IBD, inform clinicians about the positive impacts of the PPP program, and allow for a means to enhance desirability of the PPP stress reduction intervention. The findings of this

study support that the intervention was highly valued by participants in the study. Data obtained from this qualitative work will be used to iteratively refine subsequent versions of the PPP program.

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### Authors' Contributions

Study concept and design: P.T., F.P., M.W., and A.H. Acquisition of data: P.T., F.P., M.W., and A.H.). Analysis: A.H. and M.W. Drafting of manuscript: A.H., M.W., and P.T. Contribution to patient recruitment: F.P., M.W., K.K., A.L., J.S., and P.T. Critical revision of the manuscript for intellectual content and final approval of the submitted draft: all.

### Ethical Approval

The University of Alberta's human research ethics board approved this study on April 15, 2018.

### Conflicts of Interest

None declared.

### Data Availability

Data from this study are available upon reasonable request.

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