

# Cancer Survivors' Perspectives of Virtual Yoga for Chronic Chemotherapy-Induced Peripheral Neuropathy Pain During the COVID-19 Pandemic

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With the rise in telehealth due to the COVID-19 pandemic, further research is needed to determine how to optimize virtual delivery of existing integrative oncology interventions for cancer treatment-related symptoms. The purpose of this qualitative analysis was to explore cancer survivors' perspectives of the acceptability and satisfaction of an 8-week, virtual yoga intervention for cancer survivors with chronic chemotherapy-induced peripheral neuropathy pain. Fourteen participants with chronic chemotherapy-induced peripheral neuropathy pain who completed the virtual yoga intervention were interviewed using a semistructured interview guide. Themes were derived from the data using inductive content analysis methods. Main findings from the interviews included the following: (1) participants were willing to try new nonpharmacological treatments for chemotherapy-induced peripheral neuropathy due to the high symptom burden and prior lack of success with medications; (2) participants highly rated the flexibility offered by the virtual format, but desired the social support potentially offered by practicing in-person yoga; and (3) the impact of virtual yoga on chemotherapy-induced peripheral neuropathy severity was unclear. There were several barriers to participants' use of virtual yoga for chronic chemotherapy-induced peripheral neuropathy pain (eg, technology, lack of space/equipment). The results may be used to improve the design and delivery of future trials testing virtual yoga for chronic chemotherapy-induced peripheral neuropathy pain.

**KEY WORDS:** Cancer survivors, Neoplasms, Peripheral nervous system diseases, Qualitative research, Yoga

Cancer survivors with chemotherapy-induced peripheral neuropathy (CIPN) following neurotoxic chemotherapy administration (eg, platinum or taxanes) experience numbness, tingling, shooting pain, or burning in the hands or feet<sup>1</sup> that may negatively affect physical functioning years after chemotherapy completion.<sup>2</sup> Yet, there are no recommended nonpharmacologic treatments for cancer survivors with chronic CIPN pain.<sup>3</sup>

With the recent rise in telehealth due to the onset of the COVID-19 pandemic,<sup>4</sup> an increasing number of integrative oncology treatments have been offered virtually (eg, fitness, meditation, yoga, or music therapy).<sup>5,6</sup> Preliminary findings suggest that the virtual delivery of integrative oncology interventions during the COVID-19 pandemic is feasible based on usage rates and high ratings of satisfaction among participants.<sup>5,6</sup>

Yoga is an integrative oncology intervention that is emerging as a promising modality to improve quality of life in cancer survivors.<sup>7</sup> In particular, preliminary data suggest that yoga may positively impact CIPN and other cancer treatment-related symptoms among cancer survivors with chronic CIPN. For example, Bao et al<sup>8</sup> randomized 41 cancer survivors with moderate-severe CIPN to 8 weeks of yoga (ie, two 60-minute in-person, yoga teacher-guided group classes per week plus home practice using videos) or usual care. Yoga group participants experienced significant improvements in sensory CIPN ( $P = .035$ ) and functional reach ( $P = .013$ ) from baseline to 8 weeks relative to controls.<sup>8</sup> However, to our knowledge, little is known surrounding the facilitators and barriers to virtual yoga delivery among cancer survivors with chronic CIPN. The development and testing of virtual yoga interventions for CIPN management that can be broadly implemented into diverse communities have the potential to overcome travel barriers associated with in-person integrative oncology treatment delivery (eg, travel)<sup>9</sup> and future in-person yoga delivery disruptions due to the ongoing pandemic.<sup>6</sup>

Using semistructured interviews, the purpose of this qualitative analysis was to explore cancer survivors' perspectives of the acceptability and satisfaction (eg, appropriate, helpful, or enjoyable) of an 8-week, virtual, yoga program for chronic CIPN pain. The qualitative findings will be used to improve the design and delivery of future trials testing virtual yoga for chronic CIPN pain.

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## METHODS

### Design, Sample, and Setting

The qualitative aim was a component of an explanatory-sequential mixed-methods study. The purpose of the primary pilot study was to determine the feasibility of implementing an 8-week yoga intervention for individuals with chronic CIPN pain.<sup>10</sup> Participants were eligible for the primary study if they were experiencing chronic CIPN pain (eg, adults with  $\geq 4/10$  worst CIPN pain intensity in the last week) for at least 3 months after the completion of neurotoxic chemotherapy. Fifty participants were enrolled from the breast, gastrointestinal, and gynecological disease centers at Dana-Farber Cancer Institute. Participants were randomized (2:1 allocation ratio) to participate in the yoga intervention or treatment as usual for 8 weeks. The yoga prescription was as follows: attend one or more 45-minute group, gentle Vinyasa yoga session per week at Dana-Farber, and practice self-guided yoga using prerecorded videos for  $\geq 45$  minutes per week at home, although 21 of the enrolled participants participated in a virtual video conferencing format of the yoga intervention because of the need for social distancing related to the COVID-19 pandemic. Yoga classes consisted of mindfulness, breathing exercises, and postures to connect breath with movement. The study protocol and procedures were approved and regulated by the Dana-Farber/Harvard Office for Human Research Studies (18–578).

Participants were eligible to participate in the interviews if they were enrolled into the virtual yoga intervention and completed the baseline and end-of-study measures. At least 10 cross-sectional, individual, semistructured interviews with yoga group participants who completed the 8-week virtual yoga intervention were planned, although we attempted to interview all virtual yoga group participants regardless of data saturation. The following methods, procedures, analyses, and results pertinent to the qualitative analysis are presented in accordance with the COREQ (Consolidated Criteria for Reporting Qualitative Research) guidelines.<sup>11</sup>

### Semistructured Interview

All the interviews were facilitated using the Semistructured Interview Guide (Table 1). The Semistructured Interview Guide consisted of interview questions that were thought to be important to participants' perceptions of the acceptability and satisfaction with the yoga intervention. All interview questions and probes were developed and refined by the principal investigator and his mentor, D.L.B. Specifically, the guide contains questions that ask participants about (1) self-perceptions of nonpharmacological treatments for chronic pain, (2) prestudy expectations for the yoga intervention, (3) satisfaction with the yoga intervention, (4) the effects of yoga on CIPN and associated symptoms, (5) motivating

factors for continued yoga practice, (6) recommendations for future yoga interventions, and (7) frequency of yoga practice at home. Although not specifically stated in the guide, following the onset of the COVID-19 pandemic, the interviewer asked virtual yoga group participants to describe how their willingness to participate may have differed if the yoga intervention was offered in-person.

### Data Collection

Following the completion of the yoga intervention, study staff contacted yoga group participants to inquire about interview participation. If a participant agreed to the interview, study staff arranged for a time for the participant to meet with the principal investigator to conduct the interview. The principal investigator was a male, PhD-prepared nurse scientist at Dana-Farber Cancer Institute. Before the interview, most participants had previously met the principal investigator (eg, telephone screening or consent) and were aware that the purpose of the interview was to provide feedback about the yoga program. In addition, the principal investigator has a strong interest in CIPN research and was generally aware of how often the participants attended the yoga sessions during the study period (no other biases or assumptions noted). All interviews were via telephone and audio recorded. Only the principal investigator and participant were present during the interview, and no repeat interviews were conducted. All field notes, if any, were written by the principal investigator after the interview was conducted. Participants were identified by first name only to preserve confidentiality during each interview.

### Qualitative Analysis

Audio-recorded interviews were transcribed verbatim by a professional transcription company and subsequently verified for accuracy by two clinical research assistants (E.F. and J.B.). The transcripts were not returned to the participants for comments or corrections. The finalized transcripts were imported into NVivo 12 (QSR International Pty Ltd, Melbourne, Australia). Inductive content analysis was used to analyze the interview transcripts.<sup>12,13</sup> The principal investigator reviewed the transcripts and Semistructured Interview Guide to create a list of initial codes. The initial list of codes was reviewed by the clinical research assistants before the codes were applied to the transcripts. Three transcripts were independently coded using the initial codebook by the clinical research assistants. After three interviews were coded, the principal investigator and the clinical research assistants met to resolve any coding discrepancies and to revise the codebook further. The same process was repeated after three more interviews were coded. After the codebook was finalized, one of the clinical research assistants coded the remaining interviews. Members of the study team reviewed

**Table 1. Semistructured Interview Guide**

Questions	Minutes
To begin, I would like to learn a little more about you. Tell me your name and what you do or did for a living?	
I would like to now learn more about your experience with CIPN Tell me what it has been like for you having to live with CIPN. Probe: How has it affected your everyday life? Probe: Can you give me an example of [...]	5
The next questions have to do about why you decided to join the yoga study and what kept you motivated to continue to participate. Yoga is not a usual treatment for chronic pain. What made you want to participate in the yoga study? Probe: Think back to the beginning of the study. What were your expectations for the yoga program when you started the study? Probe: What do you think would make people uninterested in participating in a yoga study? Probe: Was [...] aspect appealing/unappealing to you when deciding to participate?	10
Now that you have completed the 8-wk yoga program, how would you describe your overall experience with the yoga program? Probe: What kept you motivated to practice yoga? Probe: What prevented you from wanting to practice yoga? Probe: How did you like the in-person classes vs the online yoga videos?	10
How did participating in the yoga sessions affect your CIPN? Probe: How did participating in the yoga sessions affect other symptoms that some people with CIPN also say they experience, such as fatigue, anxiety, depression, sleep problems, or problems with activities? Probe: You mentioned also experiencing [...], how did participating in yoga affect those things? Probe: What specific aspects of the yoga program (such as breathing, postures, etc.) were most helpful in improving [...] symptom?	10
What was your experience practicing yoga outside of the scheduled program? Probe: If a doctor prescribed yoga for CIPN, would you follow his/her advice? Probe: How often did you practice yoga outside of the classes? Probe: What are the biggest barriers to practicing yoga on your own? How can we make it easier for participants to practice yoga on their own? Probe: Have you continued to use yoga on your own after the study?	10
Now looking forward to the future. What changes should we make to the yoga program? Probe: What did you like most about the program? Probe: Give me an example of how [...] aspect was helpful for you Probe: Give me an example of how [...] aspect was least helpful for you Probe (after several interviews): Some people have mentioned that we should [...]. What do you think about that?"	10
What other any final comments do you have regarding this yoga intervention? What did we miss that might be important?	5
	Total: 60

The table lists the interview questions posed to cancer survivors who participated in the semistructured interviews at the conclusion of the study.

the data in a framework matrix (rows = participants, columns = interview guide topics) to derive major themes and subthemes from the data. The participants did not provide feedback on the findings.

## RESULTS

### Sample Characteristics

Of the 15 participants who completed the virtual yoga intervention, 14 (93%) agreed to participate in the semistructured interviews. Table 2 describes the demographic characteristics of the interviewed participants. Briefly, participants were female (100%), White (79%), and diagnosed with breast (43%), gynecological (43%), or gastrointestinal (7%) malignancies. The telephone interviews were a median of ~29 minutes in length (range, 17–53 minutes) and conducted from September 2, 2020, to February 2, 2021. Themes related to cancer survivors' participation in the virtual yoga program are presented in Table 3.

### Theme 1: Cancer Survivors With Chronic Chemotherapy-Induced Peripheral Neuropathy Pain Desire New Treatments

Cancer survivors with CIPN pain described neuropathy as pins and needles, numbness, cramping, and painful (eg, shooting or electric). Most cancer survivors reported difficulties completing activities of daily living due to CIPN pain, including, fastening hooks, washing dishes (eg, difficulty distinguishing between hot and cold), driving, opening doors, or opening jars. Several participants also described difficulty falling asleep at night due to CIPN pain. To help manage CIPN pain and associated functional limitations, cancer survivors reported trying a variety of pharmacological and nonpharmacological (eg, vitamins/supplements, massage) treatments prior to joining the study. Many participants had tried gabapentin previously, with most discontinuing the medication because of adverse effects, lack of efficacy, or general unwillingness to be on medications. Other treatments attempted with mixed effects included massage, vitamin B<sub>6</sub>, physical therapy, naproxen sodium (Aleve),

**Table 2. Demographic Characteristics of the Interviewed Sample**

Characteristic	Participants (N = 14)
Age at enrollment	
Median (range)	59.5 (39–74)
Gender	
Female	14 (100%)
Race	
Missing	1 (7%)
Asian	1 (7%)
Black or African American	1 (7%)
White	11 (79%)
Ethnicity	
Missing	1 (7%)
Not Hispanic or Latino	13 (93%)
Cancer type	
Breast	6 (43%)
Gastrointestinal	1 (7%)
Gynecological	6 (43%)
Multiple	1 (7%)
Cancer stage	
Stage I	3 (21%)
Stage II	1 (7%)
Stage III	6 (43%)
Metastatic	3 (21%)
Unknown or missing	1 (7%)
Chemotherapy type	
Oxaliplatin	1 (7%)
Taxanes	6 (43%)
Taxanes and platinum	7 (50%)
Days since last neurotoxic chemotherapy infusion	
Median (range)	242.5 (100–1051)

The table describes the demographic characteristics of the cancer survivors who participated in the semistructured interviews at the conclusion of the study.

pregabalin, and duloxetine hydrochloride (Cymbalta). Participants were hopeful that yoga would help CIPN pain and willing to try any nonpharmacological treatments. Participants were also interested in helping other cancer survivors with CIPN pain by participating in research.

**Theme 2: The Impact of Yoga on Chemotherapy-Induced Peripheral Neuropathy Is Unclear**

Approximately half of the participants reported some benefits of yoga for CIPN. Some participants reported short-term improvements with numbness, tingling, or pain directly after engaging in yoga practice, but the improvements were not always sustained long term. In particular, almost all participants reported positive short-term improvements in neuropathy when they self-massaged their hands or used a yoga ball

to massage their feet, as prescribed by the yoga instructor. Other participants also found the postures to be helpful for neuropathy in general. Although the impact of yoga on neuropathy was unclear, all participants reported that they would follow their doctor's advice if the doctor prescribed yoga for neuropathy, and more than half of participants reported continued yoga practice after the study. Beyond CIPN, some participants also reported that yoga positively impacted mental well-being, anxiety, sleep, and/or balance.

**Theme 3: Acceptability and Satisfaction With Virtual Yoga Practice**

*Flexibility and Structure of Virtual Yoga Delivery*

Overall, virtual yoga participants found the virtual format convenient as they could practice yoga at any time of the day and squeeze in yoga practice before or after their daily activities. Positives of the virtual yoga format included the following: (1) the videos were easy to follow along, (2) privacy (eg, not in-person with other people practicing yoga), (3) could practice yoga with other family members in the home, (4) the instructor was positive and helpful in learning the yoga postures, and (5) the self-guided videos were well produced and easy to follow along. Virtual yoga participants reported higher satisfaction with the synchronous, video-conference sessions than the recorded, self-guided videos because they knew that the instructor and other cancer survivors were present during the video-conference sessions. In addition, the video-conference classes felt more personal (eg, the instructor would say “Hello”), and the instructor would guide participants through a wider variety of yoga activities than the self-guided videos. However, the video-conference sessions were more difficult to attend than practicing the recorded videos due to scheduling. The video-conference sessions were offered only in the morning and/or afternoon during the weekdays.

*Barriers to Virtual Yoga Practice*

Barriers to practicing yoga at home included the following: (1) distractions or other commitments in the home made it more difficult to stay motivated to practice yoga consistently; (2) lack of equipment (eg, yoga mat) or space to practice yoga or (3) technology barriers prevented an optimal practice environment (eg, could not open videos or had only an iPad to view the videos), (4) yoga postures presented within the pre-recorded videos were redundant over time (eg, same poses/stretching and did not offer options for more challenging postures), and (5) difficulty keeping up with the pace of the class/videos.

*Recommendations to Improve the Virtual Yoga Intervention*

Participants suggested several improvements to the virtual yoga program: (1) post recorded video-conference yoga sessions



**Table 3.** Summary of Themes From the Semistructured Interviews With Cancer Survivors Experiencing Chronic Chemotherapy-Induced Peripheral Neuropathy Pain

Themes	Subthemes	Exemplar Quotes
Cancer survivors with chronic CIPN pain desire new treatments		Participant: <i>I had tried gabapentin prior to this study but saw no positive effects from it, which may or may not have been associated, but had some digestive side effects that I was unhappy about, so I discontinued it.</i> Participant: <i>I am reluctant to take medication, but the Zoom ones were nice, so I thought this would be a good alternative, something that would help that was not a medication.</i> Participant: <i>I figured I'd try anything that might have a possibility of helping.</i>
The impact of yoga on CIPN is unclear		Participant: <i>I found that it did not help my neuropathy symptoms, but I did enjoy the peacefulness of it.</i> Participant: <i>It did not fix it, of course, but I noticed on days where I could not get to it or do something, I definitely could see a difference.</i>
Acceptability and satisfaction with virtual yoga practice	Flexibility and structure of virtual yoga delivery	Participant: <i>I was happy with the flexibility. The video (self-guided) ones were great because you could do them whenever you wanted, but the Zoom ones were nice, too, because it was more variety of things that the instructor did because the videos were not pre-recorded.</i> Participant: <i>When this program started, I started going back to work, so I don't think it would have been possible for me to take part in the sessions that would happen during the day in Boston because that's like an over three hour commute plus or minus.</i>
	Barriers to virtual yoga practice	Participant: <i>The instructor had live classes, which I could not attend because I am working full time, and so I was reliant on her recorded classes, which were fine, but it gets, you know, the redundancy of it.</i> Participant: <i>I think the videos are a little bit more challenging because you do not have an instructor that you can just kind of turn your head and look at her. You have to set up a computer. You have to make sure it is at the right angle, and if you are standing and doing something, you have to re-angle it so that the monitor is not distorted.</i> Participant: <i>I think I didn't quite know how to place the chair, how much arm extension room I'd need or whatever and kept hitting the dishwasher</i>
	Recommendations to improve the virtual yoga intervention	Participant: <i>Some more flexibility in the timing or offering other sessions would be helpful.</i> Participant: <i>[someone to tell you] "Three weeks before, you need to be ordering this, or you've got to have this ready," and "You've got to have your TV set up," and, "If you can't get your TV or computer set up, call this number and you're going to talk to a live person."</i>
Virtual yoga lacks key features of in-person yoga		Participant: <i>I want to say it made it a little bit more difficult (the change to online only classes after COVID). I think once you know your scheduled to be somewhere, it makes it easier to keep up with it but because I knew I could always do it at home later, I didn't really force, you know, myself to do it throughout the day. I would just wait until I was home or here and there, I would try to do it during my lunchtime.</i> Participant: <i>In-person I think would be a lot better when you can have an instructor showing you, "Oh, you're really not doing yourself any favors by bending that way, let me show you a better way to do it.</i>

The table describes the themes and subthemes associated with cancer survivors' perspectives of the acceptability and satisfaction of an 8-week, virtual yoga intervention for chronic CIPN pain. In addition, exemplar quotes that represent the identified themes and subthemes are listed.

online to provide more variety of yoga postures, (2) provide instructions about how to set up the home to optimize yoga practice (eg, chair positioning, amount of space required, whom to call for technical support, visual board of yoga postures), (3) provide instructions about yoga modifications based on preexisting conditions, (4) increase the frequency and scheduling flexibility of the video-conference classes (eg, offer in early morning, evening, or on weekends), (5) provide a yoga mat and straps to all participants to facilitate yoga practice at home, (6) offer a variety of yoga videos based on skill levels, (7) use technology to notify participants that others are practicing yoga simultaneously when viewing the recorded video-conference sessions, and (8) provide yoga CDs/DVDs and/or

Internet access to overcome potential barriers to accessing the yoga videos online.

#### Theme 4: Virtual Yoga Lacks Key Features of In-Person Yoga

Although virtual yoga participants enjoyed the flexibility of the virtual format, participants were open to practicing in-person yoga because it would offer several components that were lacking within the virtual yoga format. Participants consistently noted that an in-person yoga class would be appealing because they would be able to follow along with the instructor and ask questions of the instructor in real time. Participants also thought that practicing in-person yoga would increase motivation and accountability because they would

have to schedule a time to be present at a yoga studio. Further, participants valued the potential sense of community that in-person classes may offer, especially if it was a class for people with cancer or neuropathy. However, several participants reported that they would have declined study participation if they had to travel to Boston to practice yoga in-person at the cancer center. Instead, participants stated that in-person yoga for CIPN would be more appealing if it was offered at a convenient location (eg, nearby town) and time (eg, evening). Another drawback to in-person yoga participation was that the media perceptions of yoga (eg, beautiful people practice yoga, complex poses) may make a cancer survivor intimidated to practice yoga in-person.

## DISCUSSION

The results of this qualitative analysis revealed cancer survivors' perspectives of the acceptability and satisfaction of virtual yoga for chronic CIPN pain. Virtual yoga group participants highly rated the flexibility offered by the virtual format, but desired the accountability and social support potentially offered by practicing yoga in-person with other cancer survivors.<sup>14,15</sup> Evidence suggests that 41.5% of cancer survivors would prefer to practice yoga at a cancer center and at a studio close to home in comparison to 5.8% of cancer survivors who would prefer to practice at home only.<sup>16</sup> Although it is unclear if in-person yoga practice is more feasible/desirable than virtual yoga practice as several participants reported that they would have declined study participation if the yoga classes were offered in-person at a cancer center, it is possible that the most accessible yoga delivery format may consist of in-person group yoga at convenient locations (eg, gyms or yoga studios) near participants' houses plus self-guided yoga.

Barriers to practicing virtual yoga (eg, technology, lack equipment or space, lack of time) were largely consistent with prior qualitative research exploring virtual yoga delivery among patients with cancer<sup>17,18</sup> or heart failure.<sup>19</sup> Previously reported barriers to cancer survivors beginning a yoga practice include (1) unaware of the benefits of yoga, (2) lack of motivation, (3) high symptom burden, and (4) and lack of time.<sup>16</sup> Evidence also suggests that cancer survivors would be more likely to participate in yoga if the classes were offered between 3 and 8 PM or 6 to 11 AM.<sup>16</sup> Our study builds upon this evidence in that cancer survivors with CIPN pain suggested that classes should be offered outside of work hours (eg, after 5 PM or before 9 AM). Future studies may also provide participants with yoga supplies (eg, mat, blocks, and straps), a streaming device, and a dedicated research assistant to help with Internet connectivity concerns to overcome barriers related to equipment and technology. Lastly, to address the lack of perceived social support, future virtual yoga interventions may allow for two-way communication on the video conference to allow participants to interact with one

another and the instructor, although some participants reported that they enjoyed the virtual yoga format because no one was watching their yoga practice.

## Implications for Nursing

Cancer survivors with chronic CIPN pain were largely willing to try yoga because of the high symptom burden associated with chronic CIPN pain and the lack of success with prior pharmacological treatments for CIPN (eg, gabapentin). Nurses should discuss the availability of yoga and/or virtual yoga services at the cancer center or in the community with cancer survivors suffering from chronic CIPN pain to increase cancer survivors' awareness about yoga as a potential CIPN management strategy. Although the impact of virtual yoga on CIPN was mixed among participants, yoga may still be recommended by nurses because some cancer survivors may derive benefit for CIPN, and there are minimal safety risks.<sup>8,10</sup>

## Limitations

There are several limitations to this qualitative analysis. The generalizability of our findings is limited as we recruited a mainly White, non-Hispanic, and female sample from one institution. Only cancer survivors who completed the virtual yoga intervention were interviewed. We may have obtained additional perspectives regarding barriers to virtual yoga practice if we interviewed cancer survivors who dropped out of the study early. Finally, the principal investigator conducted the interviews, which may have decreased cancer survivors' likelihood to share overly negative information about the virtual yoga program.

## CONCLUSION

The results of this qualitative analysis highlighted cancer survivors' perspectives of the acceptability of, satisfaction with, barriers to virtual yoga for chronic CIPN pain. Overall, although cancer survivors enjoyed the flexibility and structure of the virtual classes, there were several barriers to engaging in virtual yoga (eg, accessing video conferences and pre-recorded videos or distractions at home decreased motivation to practice). The qualitative findings may be used to guide and optimize the design of future virtual yoga interventions for chronic CIPN pain. By using video conference technology for yoga delivery, virtual yoga has the potential for broader dissemination than an in-person modality, given that 93% of Americans use the Internet.<sup>20</sup>

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