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# Research

## Assessing the Acceptability of Yoga Among Patients with and without Chronic Pain Enrolled in a Licensed Opioid Treatment Program

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### Abstract

There is a pressing need to identify non-opioid, evidence-based treatments to address the high prevalence of chronic pain in licensed opioid treatment programs (OTP). Yoga is an effective pain coping strategy but is not widely used by OTP patients. Few studies have examined underlying factors related to poor yoga utilization in this population. Seventy-one participants with and without chronic pain enrolled in a hospital-based OTP completed an acceptability survey assessing pain, current pain coping strategies, prior yoga experience, willingness to try yoga, and beliefs about yoga. Participants with and without chronic pain were compared, as were participants with and without prior yoga experience. The relationships between primary study variables in the chronic pain group were also explored. Participants reported using over-the-counter medications, meditation, stretching, and exercise to manage chronic pain, but yoga was not commonly used. Participants with prior yoga experience reported higher willingness to try yoga and more favorable beliefs about yoga than participants without prior yoga experience. There were no significant differences in willingness to try yoga between participants with and without chronic pain. Among participants with chronic pain, there was a positive association between total number of pain coping strategies used and willingness to try yoga. This study adds to the existing literature on the implementation of yoga programs into OTPs by demonstrating the acceptability of yoga in patients with opioid use disorder, including those experiencing chronic pain, and encourages additional research exploring implementation. *Ahmadi et al. Int J Yoga Therapy 2022(32). doi: 10.17761/2022-D-21-00055.*

**Keywords:** yoga, chronic pain, opioid treatment program, opioid use disorder, pain coping strategies

### Abbreviations Used

BAYS = Beliefs About Yoga Scale  
OTOP = Opiate Treatment Outpatient Program  
OTP = opioid treatment program  
OUD = opioid use disorder  
VAS = visual analog scale

### Introduction

Opioid use disorder (OUD) and associated opioid-related overdose deaths are public health concerns of increasing severity in the United States. An estimated 1.6 million people in the United States had an OUD in 2019.<sup>1</sup> U.S. licensed opioid treatment programs (OTP) provide medications, individual and group psychosocial counseling, and case management to roughly 480,550 people with OUD.<sup>2</sup> OTP patients are typically administered medication for OUD, including opioid-agonist medication, such as methadone or buprenorphine, in conjunction with counseling to help reduce opioid cravings and withdrawal symptoms.

Although methadone and buprenorphine are effective for the treatment of OUD, these medications in once-daily dosing have shown little efficacy in treating chronic pain, which is present in up to 60% of patients with OUD.<sup>3-5</sup> Co-occurring chronic pain is associated with poorer substance use treatment outcomes, including misuse of illicit substances and low treatment retention.<sup>6</sup> This patient population tends to use few evidence-based pain-coping strategies, which may be the result of treatment barriers such as lack of availability, accessibility, or financial resources to engage in pain treatment.<sup>6,7</sup> For this reason, identifying alternative and effective treatment modalities, such as yoga, that are financially, physically, and geographically accessible may help to improve pain-related outcomes within this population.

Yoga may be an effective treatment for chronic pain among patients with OUD. Although yoga originated in

India thousands of years ago as a system of philosophy and practice, it has grown in popularity in the West in recent years.<sup>8</sup> Yoga focuses on a combination of physical poses and stretches, conscious breathing, and meditation, and is typically conducted in group settings with a trained yoga instructor. Evidence suggests that yoga may be effective in the treatment of chronic pain, not only in reducing pain severity, but also in decreasing pain-related disability.<sup>9</sup> For instance, one study found that yoga was effective in improving function and reducing chronic low-back pain, with benefits that persisted for at least several months.<sup>10</sup> Another study had similar findings, with a decrease in pain severity, pain-related disability, and pain medication use in those with chronic low-back pain.<sup>11</sup> Other studies have explored the efficacy of yoga in reducing pain symptoms related to migraines and osteoarthritis, among other medical conditions, with medium to large effect sizes.<sup>9</sup> For example, one study found that a 6-week yoga therapy intervention reduced the frequency and intensity of migraine headache compared with treatment as usual.<sup>12</sup> Another study found that an 8-week yoga intervention improved knee arthritis in older women compared with a waitlist control condition.<sup>13</sup> The positive effects of yoga on chronic pain may be mediated by increases in mindfulness, muscle strength, flexibility, and endurance from poses.<sup>14</sup> These preliminary data suggest that yoga as a complementary treatment modality holds promise in treating chronic pain-related conditions, but further research is needed to determine whether these effects generalize to a population of patients with OUD.

A small but growing body of evidence suggests that yoga can be effectively integrated into OTPs.<sup>15–20</sup> One study established a yoga program for clients enrolled in outpatient methadone maintenance treatment, while also discussing how to address staff issues complicating the integration of alternative and traditional treatment strategies.<sup>15</sup> Another recent study established a yoga program at two separate clinic locations, a methadone maintenance clinic and a primary care clinic prescribing buprenorphine<sup>16</sup>; this was the only study that limited the sample to chronic pain patients. Of these six studies, five found superior outcomes for patients with OUD randomized to a yoga group versus a control group,<sup>16–20</sup> including greater decreases in pain, anxiety, and perceived stress; increased likelihood of remaining abstinent from illicit substances; and improved quality of life. These studies were generally pilot studies with small samples, however, so results remain to be confirmed. Additionally, few studies have examined the specific factors influencing attitudes toward yoga inside or outside OTP settings.

Enhancing our understanding of patients' perceptions of yoga may help promote improved OUD treatment outcomes, such as chronic pain,<sup>21</sup> by implementing yoga programs in OTP settings and sustaining the development of

yoga programs tailored specifically for this population.<sup>22</sup> Therefore, the aim of the present exploratory study was to examine the beliefs about yoga and willingness to participate in a yoga intervention among patients enrolled in an OTP (1) with and without chronic pain, and (2) with and without prior yoga experience.

## Methods

### Study Design and Procedures

This was a cross-sectional acceptability study of the familiarity with and willingness to participate in yoga among patients enrolled in the Opiate Treatment Outpatient Program (OTOP) at Zuckerberg San Francisco General Hospital. The University of California, San Francisco, Institutional Review Board provided ethics review and safety monitoring for this study.

All participants were currently enrolled at OTOP at the time of survey completion according to self-report and were willing and able to read English. There were no exclusion criteria.

Participants were recruited by study staff situated in the OTOP waiting area during normal business hours or at a yoga open house specifically designed to educate current patients about yoga, organized by OTOP clinical staff in a common space at the clinic. Participants provided written informed consent prior to survey completion. A convenience sample of 71 participants completed the survey between January 11 and February 25, 2019. Three participants completed the survey at the yoga open house, and the rest completed the survey in the waiting area during normal business hours.

OTOP is an OTP that provides methadone and buprenorphine maintenance treatment to approximately 550 enrolled patients and does not currently provide any additional treatment programs that may address chronic pain. OTOP is a not-for-profit program run by the City and County of San Francisco in collaboration with the University of California, San Francisco. The patient population at OTOP has an average age of 49 years and is 32% female and 54% non-White; 95% of patients are prescribed methadone, with only 5% prescribed buprenorphine.

Study participation involved completion of an acceptability survey with questions regarding demographics, chronic pain, current chronic pain coping strategies, beliefs about yoga, and familiarity with and willingness to try yoga. The term *yoga* was not defined for participants. Surveys were completed through Qualtrics on Apple iPads (iOS v. 13.4.1) or on paper, depending on participant preference. Survey completion took approximately 15–30 minutes, and participants received a \$5 gift card for completing the survey.

## Study Measures

### Demographics

Participants completed questions on demographics, current opioid maintenance treatment, OUD treatment history, health, and chronic pain. Chronic pain was defined as pain that had been present most days for at least 3 months and was not related to opioid withdrawal. Current pain severity and pain interference were assessed using a modified version of the Brief Pain Inventory,<sup>23</sup> which has been extensively validated and demonstrated to be reliable.

### Coping Checklist

The Coping Checklist, developed by Barry and colleagues,<sup>24,25</sup> is a self-report checklist that presents 20 common coping strategies for chronic pain. Although reliable and face-valid, the Coping Checklist has not been formally validated. Participants were asked to select all the strategies they used in the previous 3 months to treat chronic pain, defined as ongoing pain not related to opioid withdrawal. For each chronic pain coping strategy, the number of participants with chronic pain who endorsed using that strategy was summed.

### Beliefs About Yoga Scale

The Beliefs About Yoga Scale (BAYS) is an 11-item instrument measuring current beliefs about yoga.<sup>26</sup> The BAYS has been validated and is a reliable measure of beliefs about yoga. Participants were asked to respond to each item on a 7-point Likert scale. The BAYS has three subscales: (1) expected benefits (e.g., “It would improve my overall health”); (2) expected discomfort (e.g., “I would be embarrassed in class”); and (3) expected social norms (e.g., “I would have to be more flexible to take a class”). Scores for each subscale as well as a total score were calculated for each participant.

### Familiarity with and Willingness to Try Yoga

Participants were asked about lifetime and previous 12-month use of yoga. Additionally, participants were asked questions to assess familiarity with and willingness to try yoga. Participants responded to these questions on a 0–100 visual analog scale (VAS). Participants were not asked to provide the context in which they used yoga.

### Statistical Analysis

Descriptive statistics were used to summarize the final study sample. A *t* test for continuous variables and Fisher’s exact or chi-square analyses for categorical variables were used to compare patients with and without chronic pain. Additionally, a *t* test was used to compare willingness to try yoga ratings and BAYS scores in participants with and without prior yoga experience. Pearson’s correlations were used

to explore the relationships between variables in the chronic pain group. A median split was performed on the current pain intensity scores in the chronic pain group to create a dichotomous variable consisting of “low pain” and “high pain.” A chi-square test was then conducted to test the frequency of prior yoga experience (yes/no) across the low and high pain groups. Significance level was set at  $p < 0.05$  for all tests.

## Results

### Participant Demographics

After providing written informed consent, 75 participants began the survey. A total of 71 participants completed the survey and were included in data analysis (14% of the clinic population). Four participants began the survey but did not complete it. For an overview of participant demographics, see Table 1. Although this was a convenience sample, it was representative of the overall clinic population. The mean age of the study population was  $46.6 \pm 11$  years; 30% of participants were female, and the majority (63%) identified as non-White. Three-fourths of participants had at least a high school diploma/GED, and 49% identified as Christian. Most participants had been enrolled in the clinic for at least 1 year. Only one participant was on buprenorphine, with the rest prescribed methadone.

Slightly more than half of the sample reported chronic pain (54%). Participants with chronic pain reported average current pain levels as moderate ( $6.1 \pm 2.1$ ) on a 0–10 VAS. Although participants with chronic pain were on a higher mean methadone maintenance dose (103 mg) compared to participants without chronic pain (88 mg), this difference was not statistically significant. The only significant difference between groups was on ratings of general health, as participants with chronic pain had worse ratings compared to participants without chronic pain (Table 1).

### Chronic Pain Coping Strategies

The most commonly endorsed chronic pain coping strategies were over-the-counter medications, stretching, prayer, and meditation (Fig. 1). Opioids (both licit and illicit) and benzodiazepines were endorsed but less frequently. Despite being in a treatment program that requires individual counseling for all patients and offers drop-in group therapy, relatively few participants reported using these treatment modalities for pain coping. Although participants endorsed using exercise, stretching, and meditation frequently for pain coping, relatively few endorsed yoga. Only 21% of participants with chronic pain reported using yoga as a coping strategy. Relatively few participants endorsed using physical therapy, massage, or chiropractic, despite evidence that these non-pharmacological strategies can reduce chronic pain.<sup>27,28</sup>

**Table 1.** Participant Demographics

	<b>Chronic Pain (n = 38)</b>	<b>No Chronic Pain (n = 33)</b>	<b>Total (n = 71)</b>
Age (SD), in y	47.9 (11)	45.1 (10)	46.6 (11)
Female (%)	39	18	30
Race (%)			
African American/Black	29	21	25
White	37	36	37
Other	34	42	38
Hispanic (%)	16	15	15
Education (%)			
< HSG	21	27	24
HSG/GED	37	30	34
> HSG	42	43	42
Religion (%)			
None	16	24	20
Christian	50	49	49
Jewish	0	3	1
Muslim	5	0	3
Other	29	24	27
Methadone dose (SD), in mg	103 (44)	88 (39)	96 (42)
Time in treatment (%)			
< 30 d	11	18	14
1–6 mo	13	21	17
7–11 mo	8	6	7
≥ 1 y	68	55	62
General health rating* (%)			
Poor	18	0	9
Fair	32	27	30
Good	32	42	37
Very good	18	24	21
Excellent	0	6	3
Current pain VAS (0–10) (SD)	6.1 (2.1)	—	—
Prior yoga experience (% Yes)	58	40	49
Familiarity with yoga VAS (0–100) (SD)	33 (30)	28 (30)	31 (30)
BAYS score (11–77) (SD)			
Expected benefits	26.6 (5.8)	24.9 (7.3)	25.7 (6.7)
Expected discomfort	16.2 (4.6)	17.2 (3.9)	16.7 (4.2)
Expected social norms	15.7 (4.6)	15.3 (4.2)	15.5 (4.4)
Total	58.4 (10.2)	57.4 (10.5)	57.9 (10.3)
Willingness to try yoga VAS (0–100) (SD)	74 (31)	75 (29)	74 (29)

\* $p < 0.05$ .

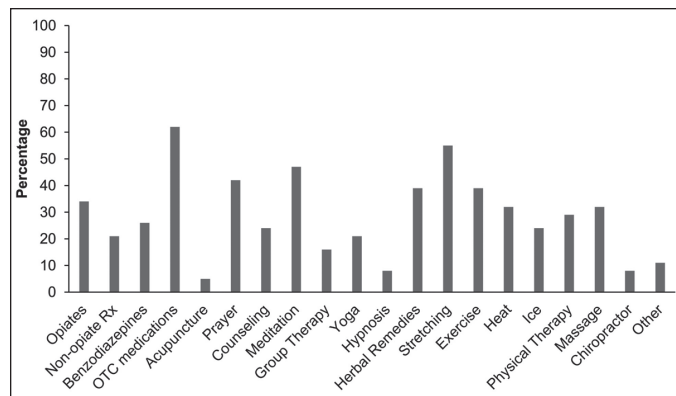
BAYS = Beliefs About Yoga Scale; HSG = high school graduate; SD = standard deviation; VAS = visual analog scale.

## Yoga

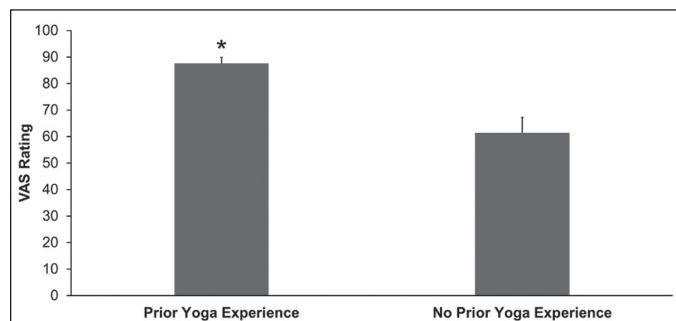
Approximately equal numbers of participants reported having tried yoga and not having tried yoga in their lifetimes (49% and 51%, respectively). Of those with lifetime yoga experience, 38% reported using yoga at least once in the prior 12 months, whereas 62% had not used yoga in the prior 12 months. Prior yoga experience did not differ by age, gender, race, or religion, but it did differ by education, in that participants with a relatively higher level of education were more likely to have tried yoga. Participants with chronic pain were more likely to self-report having ever

tried yoga compared to participants without chronic pain (58% vs. 40%), but this difference was not statistically significant. Although many participants had tried yoga, the mean rating of yoga familiarity was  $31 \pm 30$  on a 0–100 VAS. This finding is consistent with data from the Coping Checklist, which found that components of yoga were endorsed more frequently than yoga itself. Across participants with and without chronic pain, there were high ratings of willingness to try yoga if offered at the clinic. Willingness to try yoga did not differ by age, gender, race, religion, or education. The mean willingness rating was

**Figure 1.** Common Chronic Pain Coping Strategies Among Participants with Chronic Pain

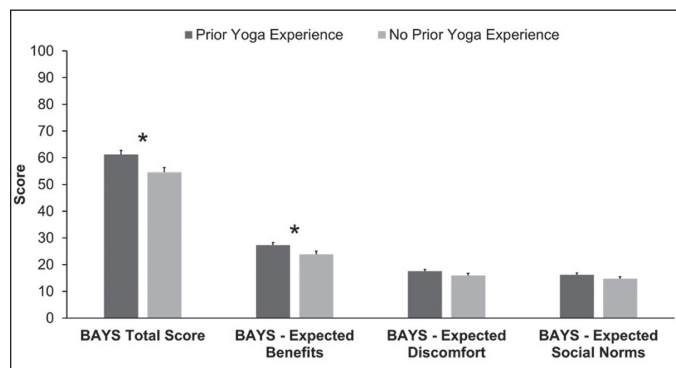


**Figure 2.** Willingness to Try Yoga Visual Analog Scale (VAS)



\**p* < 0.05.

**Figure 3.** Beliefs About Yoga Scale (BAYS)



\**p* < 0.05.

74.3 ± 29.5. Participants reporting prior yoga experience had significantly higher ratings of willingness to try yoga if offered at the clinic (87.6 ± 12.9 vs. 61.4 ± 35.0, *p* < 0.001; Fig. 2).

BAYS responses reflected generally favorable beliefs about yoga across participants with and without chronic pain. The mean total BAYS score was 57.9 ± 10.3, with no significant difference between those with and without chronic pain (57.4 ± 10.5 vs. 58.4 ± 10.2, *p* = 0.69). Among participants with prior yoga experience, the total BAYS

score was significantly higher (61.3 ± 10.5 vs. 54.6 ± 8.4, *p* < 0.05; Fig. 3). There were no differences in expected discomfort or expected social norms subscale scores across participants with and without prior yoga experience. There was no difference on the BAYS among participants of differing genders, religious backgrounds, or race.

A Pearson correlation matrix (Table 2) was computed to assess the associations between scores on prior yoga experience, current pain intensity, BAYS, willingness to try yoga, and chronic pain coping strategies among participants in the chronic pain group. There were significant positive correlations between total number of pain coping strategies used in the prior 3 months and willingness to try yoga (*r* = 0.31, *p* = 0.02), as well as between number of coping strategies and prior yoga experience (*r* = 0.48, *p* < 0.001). There were also positive correlations between prior yoga experience and willingness to try yoga (*r* = 0.48, *p* = 0.002) and favorable beliefs about yoga and willingness to try yoga (*r* = 0.50, *p* < 0.001). There was no statistically significant association between current pain intensity and prior experience with yoga ( $\chi^2(1) = 0.102$ , *p* = 0.749).

### Discussion

The aim of the present study was to examine the beliefs about yoga and willingness to participate in a yoga intervention among patients enrolled in an OTP (1) with and without chronic pain, and (2) with and without prior yoga experience. We found that meditation, stretching, and exercise were among the most used current chronic pain coping strategies, although yoga itself was not. Participants with prior yoga experience reported higher willingness to try yoga if offered at the clinic than participants without prior experience. Participants with prior yoga experience reported higher expected benefits and more favorable beliefs about yoga overall than participants without prior experience.

For participants with chronic pain, meditation, stretching, and exercise were among the most used pain coping strategies. Meditation, stretching, and exercise comprise core components of the practice of yoga; however, yoga itself was not reported to be a commonly used pain coping strategy. This apparent inconsistency in findings may be due to a limited understanding regarding the core components of yoga as a result of unfamiliarity, a belief that yoga may not improve or may in fact worsen chronic pain, or a lack of financial resources to engage in yoga classes outside of the clinic setting.<sup>9,10</sup> However, the use of meditation, stretching, and exercise further supports the idea that yoga may be acceptable to this population. Previous research suggests that yoga may serve as a useful strategy in the treatment of chronic pain,<sup>12-14,16</sup> and therefore additional research should address this gap in coping strategies employed. It is

**Table 2.** Pearson's Correlation Between Primary Variables

Variable	Prior Yoga Experience	Pain Intensity	BAYS	Willingness to Try Yoga	Coping
Prior yoga experience					
Pain intensity	-0.02				
BAYS	0.22	0.06			
Willingness to try yoga	0.48**	0.08	0.50**		
Coping	0.48**	0.01	0.17	0.31*	

\* $p < 0.05$ .\*\* $p < 0.01$ .

BAYS = Beliefs About Yoga Scale.

also worth noting that over-the-counter medications were the most used coping strategy. Although these medications, such as non-steroidal anti-inflammatory drugs, can be effective for acute pain and some types of chronic pain, they may have deleterious effects when taken in large quantities or over extended periods.<sup>29,30</sup> Herbal remedies and prayer were also among the most used coping strategies, highlighting an imperative to increase access to and utilization of safe, alternative methods for managing pain, which may include yoga.

Participants who indicated prior yoga experience reported significantly higher willingness to try yoga if introduced in an OTP than patients without prior yoga experience, suggesting that familiarity with yoga may increase willingness to try yoga. Similarly, we found that participants who indicated having prior yoga experience had significantly higher expected benefits and favorable beliefs about yoga. There were no significant differences in willingness to try yoga among those with and without chronic pain. However, among the participants with chronic pain, there was a moderate positive association between total number of chronic pain coping strategies used in the prior 3 months and willingness to try yoga. There was no significant association between number of coping strategies used and favorable beliefs about yoga. This pattern of findings suggests that patients with chronic pain who have explored several different coping strategies, and who have presumably been unsuccessful in managing their pain, may be more motivated to try yoga even if they do not carry particularly favorable preexisting beliefs about yoga. Interestingly, willingness to try yoga did not differ by race, although previous research has demonstrated that non-Hispanic White adults are more likely to use yoga compared with Hispanic and non-Hispanic Black adults.<sup>31</sup>

Our findings indicate that OTP patients with chronic pain may benefit from additional education about the benefits of yoga and the potential modifications that can be made to address chronic pain and any associated physical restrictions, as well as from addressing perceived barriers such as financial inaccessibility of yoga classes in the community. Additional education about yoga and its accessibility to more economically disadvantaged groups, such as the

existence of donation-based classes in the community, may positively influence attendance and engagement in yoga interventions and facilitate the integration of yoga into everyday life.<sup>32</sup> Given that only approximately half of participants reported having ever practiced yoga in their lifetimes, such an effort to educate patients may be especially important for those who have never tried yoga. Previous research has demonstrated that experience influences beliefs.<sup>26,33</sup> Therefore, greater familiarity with yoga or brief exposure to yoga may increase willingness to engage in an OTP-based yoga program or accessible yoga classes in the community. Educational efforts for patients may not only establish familiarity but may also serve to dispel erroneous or unfounded beliefs about yoga, as captured in the responses to the BAYS expected discomfort and expected social norms subscales. This education may be accomplished in a number of ways, including informational sessions held at the clinic, fliers posted around the clinic, and educating counselors and nursing staff who regularly meet with patients.

Our study has several limitations. First, given our small convenience sample, it is possible that our findings are not generalizable to the larger clinic population or to other OTPs. Second, the Coping Checklist has not yet been validated, and BAYS has not yet been validated in OUD populations. Third, all data were based on self-report. However, results across different sections of the survey were reliable and consistent (i.e., participants who demonstrated high willingness to try yoga also demonstrated generally favorable beliefs about yoga). Our study was also cross-sectional, and therefore these data do not provide information about how attitudes toward yoga may change over time in this population. Additionally, although providing education about financially accessible yoga options may facilitate the use of yoga for economically disadvantaged populations, these populations may nevertheless face other barriers, such as limited time and lack of access to childcare, that may prohibit their participation.<sup>32</sup>

Given its exploratory nature, this study aimed to assess the familiarity with and willingness to try yoga to establish whether there would be sufficient interest to develop a pilot yoga program. Few studies thus far have explored the acceptability of yoga in patients with OUD to address a

range of health outcomes, and even fewer have explored the acceptability of yoga in patients with OUD and chronic pain. None of these studies have also assessed the current use of chronic pain coping strategies or beliefs about yoga with the BAYS.

This study adds to the existing literature on the implementation of yoga programs into OTPs by demonstrating the acceptability of yoga in patients with OUD, including those experiencing chronic pain who report trying pain coping strategies, and encourages additional research exploring implementation. The next steps in this line of research should include implementation of feasibility pilots for yoga programs to determine what would be the most effective format for a yoga program integrated into an OTP (e.g., frequency, time, and location of classes), as well as the potential utility of a yoga educational program. Future feasibility studies should also ensure that socioeconomic status, income, and access are not barriers to participation in these studies, so that the patients for whom yoga interventions are intended are able to take part in this research. Additional research should explore the barriers patients may face in deciding to take part in a yoga program and how these barriers may be overcome.

## Conclusions

The findings of our study suggest that patients with OUD and chronic pain who have explored different coping strategies and been unsuccessful in managing their pain are more likely to be interested in participating in a yoga program if offered at an OTP. This acceptability study serves as a first step in the line of research exploring how to increase access to and utilization of effective pain coping strategies. Yoga shows promise as an effective chronic pain coping strategy. It is hoped that the present study will promote future research on the knowledge, beliefs, and perceived barriers that patients with chronic pain in OTPs carry regarding yoga, and that it will inform the design and implementation of yoga programs in OTPs.

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## Conflict-of-Interest Statement

The authors report no conflicts of interest.

## References

1. Substance Abuse and Mental Health Services Administration. (2020). *Key substance use and mental health indicators in the United States: Results from the 2019 National Survey on Drug Use and Health* (HHS publication No. PEP20-07-01-001, NSDUH series H-55). U.S. Department of Health & Human Services.
2. Substance Abuse and Mental Health Services Administration. (2021). *National Survey of Substance Abuse Treatment Services (N-SSATS): 2020. Data on substance abuse treatment facilities*. U.S. Department of Health & Human Services.
3. Jamison, R. N., Kauffman, J., & Katz, N. P. (2000). Characteristics of methadone maintenance patients with chronic pain. *Journal of Pain and Symptom Management, 19*(1), 53–62. [https://doi.org/10.1016/s0885-3924\(99\)00144-x](https://doi.org/10.1016/s0885-3924(99)00144-x)
4. Ilgen, M. A., Trafton, J. A., & Humphreys, K. (2006). Response to methadone maintenance treatment of opiate dependent patients with and without significant pain. *Drug and Alcohol Dependence, 82*(3), 187–193. <https://doi.org/10.1016/j.drugalcdep.2005.09.005>
5. Dunn, K. E., Brooner, R. K., & Clark, M. R. (2014). Severity and interference of chronic pain in methadone-maintained outpatients. *Pain Medicine, 15*(9), 1540–1548. <https://doi.org/10.1111/pme.12430>
6. Dunn, K. E., Finan, P. H., Tompkins, D. A., Fingerhood, M., & Strain, E. C. (2015). Characterizing pain and associated coping strategies in methadone and buprenorphine-maintained patients. *Drug and Alcohol Dependence, 157*, 143–149. <https://doi.org/10.1016/j.drugalcdep.2015.10.018>
7. Simonton, A. J., Young, C. C., & Brown, R. A. (2018). Physical activity preferences and attitudes of individuals with substance use disorders: A review of the literature. *Issues in Mental Health Nursing, 39*(8), 657–666. <https://doi.org/10.1080/01612840.2018.1429510>
8. Desikachar, T. K. V. (1999). *The heart of yoga: Developing a personal practice*. Inner Traditions.
9. Lee, C., Crawford, C., Schoemaker, E., & Active Self-Care Therapies for Pain (PACT) Working Group. (2014). Movement therapies for the self-management of chronic pain symptoms. *Pain Medicine, 15*(Suppl. 1), S40–S53. <https://doi.org/10.1111/pme.12411>
10. Sherman, K. J., Cherkin, D. C., Erro, J., Miglioretti, D. L., & Deyo, R. A. (2005). Comparing yoga, exercise, and a self-care book for chronic low back pain: A randomized, controlled trial. *Annals of Internal Medicine, 143*(12), 849–856. <https://doi.org/10.7326/0003-4819-143-12-200512200-00003>
11. Saper, R. B., Sherman, K. J., Cullum-Dugan, D., Davis, R. B., Phillips, R. S., & Culpepper, L. (2009). Yoga for chronic low back pain in a predominantly minority population: A pilot randomized controlled trial. *Alternative Therapies in Health and Medicine, 15*(6), 18–27.
12. Kisan, R., Sujan, M., Adoor, M., Rao, R., Nalini, A., Kutty, B. M., . . . Sathyaprabha, T. (2014). Effect of yoga on migraine: A comprehensive study using clinical profile and cardiac autonomic functions. *International Journal of Yoga, 7*(2), 126–132. <https://doi.org/10.4103/0973-6131.133891>
13. Cheung, C., Wyman, J. F., Resnick, B., & Savik, K. (2014). Yoga for managing knee osteoarthritis in older women: A pilot randomized controlled trial. *BMC Complementary and Alternative Medicine, 14*, 160. <https://doi.org/10.1186/1472-6882-14-160>
14. Beazley, D., Patel, S., Davis, B., Vinson, S., & Bolgla, L. (2017). Trunk and hip muscle activation during yoga poses: Implications for physical therapy practice. *Complementary Therapies in Clinical Practice, 29*, 130–135. <https://doi.org/10.1016/j.ctcp.2017.09.009>
15. Shaffer, H. J., LaSalvia, T. A., & Stein, J. P. (1997). Comparing hatha yoga with dynamic group psychotherapy for enhancing methadone maintenance treatment: A randomized clinical trial. *Alternatives Therapies in Health and Medicine, 3*(4), 57–66.
16. Uebelacker, L. A., Van Noppen, D., Tremont, G., Bailey, G., Abrantes, A., & Stein, M. (2019). A pilot study assessing acceptability and feasibility of hatha yoga for chronic pain in people receiving opioid agonist therapy for opioid use disorder. *Journal of Substance Abuse Treatment, 105*, 19–27. <https://doi.org/10.1016/j.jsat.2019.07.015>



17. Lander, L., Chiasson-Downs, K., Andrew, M., Rader, G., Dohar, S., & Waibogha, K. (2018). Yoga as an adjunctive intervention to medication-assisted treatment with buprenorphine+naloxone. *Journal of Addiction Research & Therapy*, 9(1), 354. <https://doi.org/10.4172/2155-6105.1000354>
18. Dhawan, A., Chopra, A., Jain, R., Yadav, D., & Vedamurthachar. (2015). Effectiveness of yogic breathing intervention on quality of life of opioid dependent users. *International Journal of Yoga*, 8(2), 144–147. <https://doi.org/10.4103/0973-6131.154075>
19. Mallik, D., Bowen, S., Yang, Y., Perkins, R., & Sandoz, E. K. (2019). Raja yoga meditation and medication-assisted treatment for relapse prevention: A pilot study. *Journal of Substance Abuse Treatment*, 96, 58–64. <https://doi.org/10.1016/j.jsat.2018.10.012>
20. Zhuang, S., An, S., & Zhao, Y. (2013). Yoga effects on mood and quality of life in Chinese women undergoing heroin detoxification: A randomized controlled trial. *Nursing Research*, 62(4), 260–268. <https://doi.org/10.1097/NNR.0b013e318292379b>
21. MacLean, R., Spinola, S., Garcia-Vassallo, G., & Sofuoglu, M. (2021). The impact of chronic pain on opioid use disorder treatment outcomes. *Current Addiction Reports*, 8, 100–108. <https://doi.org/10.1007/s40429-020-00352-6>
22. Varley, A. L., Lappan, S., Jackson, J., Goodin, B. R., Cherrington, A. L., Copes, H., & Hendricks, P. S. (2020). Understanding barriers and facilitators to the uptake of best practices for the treatment of co-occurring chronic pain and opioid use disorder. *Journal of Dual Diagnosis*, 16(2), 239–249. <https://doi.org/10.1080/15504263.2019.1675920>
23. Cleeland, C. S., & Ryan, K. M. (1994). Pain assessment: Global use of the Brief Pain Inventory. *Annals of the Academy of Medicine, Singapore*, 23(2), 129–138.
24. Barry, D. T., Beitel, M., Cutter, C. J., Joshi, D., Falcioni, J., & Schottenfeld, R. S. (2010). Conventional and nonconventional pain treatment utilization among opioid dependent individuals with pain seeking methadone maintenance treatment: A needs assessment study. *Journal of Addiction Medicine*, 4(2), 81–87. <https://doi.org/10.1097/ADM.0b013e3181ac913a>
25. Barry, D. T., Savant, J. D., Beitel, M., Cutter, C. J., Moore, B. A., Schottenfeld, R. S., & Fiellin, D. A. (2012). Use of conventional, complementary, and alternative treatments for pain among individuals seeking primary care treatment with buprenorphine-naloxone. *Journal of Addiction Medicine*, 6(4), 274–279. <https://doi.org/10.1097/ADM.0b013e31826d1df3>
26. Sohl, S. J., Schnur, J. B., Daly, L., Suslov, K., & Montgomery, G. H. (2011). Development of the Beliefs About Yoga Scale. *International Journal of Yoga Therapy*, 21, 85–91.
27. Chou, R., Deyo, R., Friedly, J., Skelly, A., Hashimoto, R., Weimer, M., . . . Brodt, E. D. (2017). Nonpharmacologic therapies for low back pain: A systematic review for an American College of Physicians clinical practice guideline. *Annals of Internal Medicine*, 166(7), 493–505. <https://doi.org/10.7326/M16-2459>
28. Qaseem, A., Wilt, T. J., McLean, R. M., Forcica, M. A., & Clinical Guidelines Committee of the American College of Physicians. (2017). Noninvasive treatments for acute, subacute, and chronic low back pain: A clinical practice guideline from the American College of Physicians. *Annals of Internal Medicine*, 166(7), 514–530. <https://doi.org/10.7326/M16-2367>
29. Ussai, S., Miceli, L., Pisa, F. E., Bednarova, R., Giordano, A., Della Rocca, G., & Petelin, R. (2015). Impact of potential inappropriate NSAIDs use in chronic pain. *Drug Design, Development and Therapy*, 9, 2073–2077. <https://doi.org/10.2147/DDDT.S80686>
30. Shah, S., & Mehta, V. (2012). Controversies and advances in non-steroidal anti-inflammatory drug (NSAID) analgesia in chronic pain management. *Postgraduate Medical Journal*, 88(1036), 73–78. <https://doi.org/10.1136/postgradmedj-2011-130291>
31. Clarke, T. C., Barnes, P. M., Black, L. I., Stussman, B. J., & Nahin, R. L. (2018). Use of yoga, meditation, and chiropractors among U.S. adults aged 18 and over. *NCHS Data Brief*, (325), 1–8.
32. Bertisch, S., Zhou, E., Qiu, X., Spadola, C., Rottapel, R., Guo, N., . . . Redline, S. (2019). Adapted behavioral sleep and yoga interventions for adults in low-income and racial/ethnic minority communities. *Sleep*, 42(Suppl. 1), A158. <https://doi.org/10.1093/sleep/zsz067.389>
33. Green, J. P. (2003). Beliefs about hypnosis: Popular beliefs, misconceptions, and the importance of experience. *International Journal of Clinical and Experimental Hypnosis*, 51(4), 369–381. <https://doi.org/10.1076/iceh.51.4.369.16408>