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ASHTANGA FOR ADDICTION: A QUALITATIVE WEB-BASED OPEN-ENDED SURVEY TO ASSESS OUTCOMES FROM ASHTANGA YOGA PRACTICE IN INDIVIDUALS IN LONG-TERM RECOVERY FROM SUBSTANCE ABUSE DISORDER

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2019

DEDICATION

To Harvey L. Jones

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BA, University of Texas at San Antonio, 2017

Presented to the Faculty of The University of Texas

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School of Public Health, 2019

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Over 72,000 people die from overdose or secondary health issues related to substance use disorder (SUD) annually. Studies support mind-body interventions in reducing stress, anxiety, depression, and craving symptoms. There is a growing body of literature supporting yoga as a mind-body intervention for individuals recovering from SUD. These interventions promote improved physical awareness, greater awareness of mental states, non-reactivity, and reduced perception of pain, allows for more successful coping with cravings.

Ashtanga yoga (AY) is a tradition of yoga wherein students work on a one-on-one basis with highly qualified teachers following an invariant sequence of yoga postures. AY is characterized by intense physical exercise, controlled breathing, and a focused gazing point which combined create a concentrated mindfulness practice. Because research supports reduction in depression, anxiety, stress, and addictive behaviors from mindfulness interventions, AY may be a highly effective intervention for individuals recovering from SUD.

Currently, no research has investigated AY interventions for individuals with SUD. This study identified measurable outcomes from individuals with SUD who use AY as a tool for their recovery. The objectives of this qualitative investigation were to identify domains worthy of further investigation including appeal of AY, change in underlying symptoms, transfer of mindfulness skills to daily life, and leadership.

31 participants, age 18 or older, who have practiced AY for at least 3 months completed an open-ended web-based survey. Qualitative content analysis revealed that the participants shared common themes of physical appeal, giving explicit credit to AY for their sobriety, and improvements to stress, anxiety, depression, confidence, and self-image. They also noted transformation of their daily lives through improved routine and the use of mindfulness skills and breathing exercises. Additionally, participants noted new roles as leaders in their communities.

These domains will inform future study of AY interventions for SUD. Additionally, they will inform recruitment and design for SUD public health interventions. Limitations include an inability to expand upon participants' responses, and because of the rigidity of AY, limited transferability of findings to less structured yoga styles. This study employed a novel use of web-based qualitative data collection and social media based, peer-to-peer recruitment.

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BACKGROUND

Literature Review

The United States Centers for Disease Control and Prevention estimates that over 72,000 people died from overdose or other health issues related to substance use disorders (SUD) in 2016 (2017). Additionally, 2.6 million were admitted into recovery programs. Less than 60% percent of individuals seeking treatment successfully recover from SUD (National Institute on Drug Abuse, 2012). Secondary health issues related to SUD include unwanted pregnancy, HIV, Hepatitis C, skin infections, domestic violence, auto accidents, crime, and suicide. The cost of treating SUD and its side effects costs approximately \$4,700 per person annually whereas untreated addiction costs society an estimated \$24,000 per person annually (NIH, 2018).

Often, individuals use SUD to cope with negative affective states such as symptoms of depression, anxiety, and stress. A study by Witkiewitz and Bowen demonstrated that a Mindfulness-Based Relapse Prevention intervention influenced responses to these symptoms and reduced substance use post intervention (2010). A recent review and meta-analysis revealed that mindfulness-based interventions can be effective at reducing substance cravings and stress-induced misuse behaviors; mindfulness cultivates self-awareness, acceptance, and non-reactivity to stress events and substance cravings (Li, Howard, Garland, McGovern, & Lazar, 2017).

General Support for Yoga Interventions for Addiction

Empirical findings support reduced symptoms of anxiety and depression from yoga (Cramer Holger, Lauche Romy, Langhorst Jost, & Dobos Gustav, 2013). Commonly, yoga

classes focus on teaching postures which build both strength and flexibility and deep breathing exercises. Findings suggest that yoga induces a state of mindfulness, or focused attention on the present experience (Kabat-Zinn Jon, 2006; Mackenzie et al., 2014). This may be in part due to the role movement has in occupying working memory thus reducing mind wandering (Russell & Arcuri, 2015). The physical benefits of yoga include improved cardiovascular health, reduction in pain and inflammation, and reduction in symptoms of osteoarthritis and carpal tunnel syndrome, bronchitis and asthma, as well as type 2 diabetes (Raub, 2002). Psychologically, yoga is associated with reduced symptoms of anxiety, depression and perceived stress, (Cramer, et al, 2013; Jarry, Chang, & Civita, 2017), and disordered eating (Carei, Fyfe-Johnson, Breuner, & Brown, 2010). The latter is cogent as a recent review of literature notes that eating disorders often overlap with SUDs (Schreiber, Odlaug, & Grant, 2013).

Yoga interventions benefit individuals with SUD. A growing body of research supports yoga as a successful mindfulness intervention for individuals recovering from SUDs (Khanna & Greeson, 2013). An Iyengar yoga-based intervention demonstrated an increase in smoking abstinence (Bock et al., 2014). Additionally, a Hatha yoga-based intervention reduced alcohol and drug abuse risk factors in individuals with post-traumatic stress disorder (Reddy, Dick, Gerber, & Mitchell, 2014).

Specific Support for Ashtanga Yoga in Addiction Interventions

Ashtanga yoga (AY) specifically has unique benefits over other yoga practices that may make it more beneficial to individuals with SUDs. AY accommodates individuals of all ages and physical abilities. Individualized instruction and attention from the teacher increase

the students' strength and flexibility, often very rapidly (Freeman & Taylor, 2016). AY is characterized by its set series of postures (asana) and fluid transitions (vinyasa) practiced in an invariant order. This is especially useful to research studies because this practice is taught this same way regardless of the location. Additionally, teachers are trained in a traditional Indian system where one individual, referred to as the Pramaguru, or lineage holder, instructs and authorizes all new teachers personally (Jois, 2010). What one student learns in the United States, for instance, is exactly the same as what is taught in India thus removing any differences in how a yoga intervention might be implemented from site to site or over time (Jois, 2010). Because the practice is invariant, students also quickly learn the series, and know what posture is next. This allows cognitive resources to be occupied by focus on the present experience. Students traditionally learn AY systematically: one asana at a time until it is mastered. This constantly pushes students to the edge of their abilities, each new posture building on skills, strengths, flexibility, and mental focus gained by the previous one. Thus, the student may gain increasing self-esteem by repeatedly overcoming challenges (Jarry et al., 2017).

AY combines intense aerobic exercise with a focused mindfulness practice. AY employs a three-part approach to mindfulness. First, AY consists of intensive physical exercise that requires deep focus on physical postures (asana). Aerobic exercise is shown to improve symptoms of depression, anxiety, and stress (Knapen, Vancampfort, Moriën, & Marchal, 2015). Second, each asana and vinyasa has an assigned count and breath (Jois, 2010). Yogic breathing improves nervous system function and reduces stress reactivity (Bhimani, Kulkarni, Kowale, & Salvi, 2011; Sharma et al., 2013). Third, each asana also has

a set gazing point (drishti). Use of a gazing point in yoga and meditation allows individuals to draw their awareness away from distraction and towards their internal experience (Jois, 2010). The asana, intentional breath, and drishti form the “tristana.” Tristana focuses attention within to the present experience allowing the practitioner to enter a deep state of focused awareness, making AY a moving meditation (Freeman & Taylor, 2016).

Because research supports reduction in depression, anxiety, stress, and addictive behaviors from mindfulness interventions, AY may be a highly effective yoga intervention for individuals recovering from SUDs. Previous research suggests that AY can significantly improve depression, anxiety, body image, and interpersonal functioning in a non-clinical sample in a 9-week period (Jarry et al., 2017). While the effects of AY specifically on individuals with SUDs are unknown, these results show that AY may be a promising intervention for the affected population.

Communities of Support and Peer Leadership in Recovery

Although not a yoga practitioner, Paul Schmitz used his recovery from SUD as a platform to teach leadership skills to others beyond the recovery community, noting that leadership can be attained by anybody regardless of their position, and this leadership extends to all aspects of life, from their family to their workplace to the community at large (Schmitz, 2011). Schmitz is currently an author, public speaker, and corporate leadership consultant. This illustrates an important principle in SUD recovery which is practiced in 12-step groups and evidence-based interventions as well; the most effective leaders may rise above the same challenges faced by others in recovery showing that there is a way through (Borkman, 2006). SUD recovery interventions that utilize peer mentors and leaders are

highly effective at supporting long term recovery (Bhimani et al., 2011; Boisvert, Martin, Grosek, & Clarie, 2008; Collins, Whitters, & Braithwaite, 2007; Ford & Russo, 2006; McAuliffe & Ch'ien, 1986; Sylvestre & Zweben, 2007). Additionally, many participants from the Trini Foundation's program have trained with the foundation to become yoga teachers, and now teach yoga to other people in recovery from SUD (Trini Foundation, 2017).

Public Health Significance

Across the United States, many individuals use AY as a tool in their sustained recovery. The Trini Foundation is a non-profit organization that promotes AY as a tool for recovery and provides scholarships for individuals recovering from SUDs to practice AY at partner yoga studios nationwide (Trini Foundation, 2017). AY is a challenging practice that is adopted by relatively few yoga practitioners because of its physical challenge and the perceived monotony of practicing the same series six days a week (Freeman & Taylor, 2016). Trini Foundation's founder, Taylor Hunt, is a recovering heroin addict and notes that people in recovery are drawn to and benefit from this routine and challenge (Hunt, 2016). There are currently no studies of the impact of AY on individuals in recovery from SUDs, and themes identified in this study may inform future quantitative research on AY as a tool for SUD recovery by identifying the underlying psycho-social mechanisms that make it effective, as well as providing initial evidence for who is most likely to benefit from this practice.

Objectives

This study identified domains that are worthy of future study as well as informing future interventions for SUD. The objectives of this qualitative investigation were to:

1. Document how individuals recovering from SUDs were drawn to this practice and how they found it beneficial in their own words (Appeal).
2. Determine if these individuals noticed a change in anxiety and depression symptoms, an increase in social skills, or a greater resistance to substance use cravings (Change in Symptoms).
3. Document if these individuals experienced a transfer of mindfulness skills learned from yoga to their daily lives (Transformation of Daily Life).
4. Explore how this practice has improved their lives and made them leaders in their jobs, households, and communities (Leadership).

METHODS

Participants

Participants were recruited from Trini Foundation current students. A link to the online survey was distributed by Trini Foundation staff via email. Additional participants were recruited through posts in Facebook groups for AY practitioners and through Instagram posts, both providing a link to the online survey. All participants agreed to an information page, acknowledging that they understood their responses were completely anonymous, no identifiable information would be recorded, and that they were at least 18 years of age, in recovery from SUD, and practicing AY for at least three months. A total of 93 participants began the survey. 31 participants completed the entire qualitative survey and demographic survey. Incomplete records were not included in analysis.

Data Collection

Open-ended questions were designed to elicit responses regarding the participants' initial and ongoing interest in AY (Appeal); any perceivable changes in anxiety and depression symptoms, self-image, social skills, and substance use cravings (Change in Symptoms); transfer of yoga and mindfulness skills to daily life (Transformation of Daily Life); and leadership roles (Leadership) (See Appendix A for survey items). Participants responded to these questions on a web-based open-ended survey built in REDCap, a secure application designed to capture data for research purposes. Additionally, the survey contained quantitative socio-demographic and background questions (See Appendix B for Sociodemographic and background items).

Data Analysis

Survey data was analyzed using a qualitative content analysis. Qualitative content analysis utilizes themes and categories that are derived from the data in the context of pre-determined research objectives (Forman & Damschroder, 2008). Coding and analysis were conducted in three phases: immersion, reduction, and interpretation (Forman & Damschroder, 2008). Immersion consisted of repeated reading of survey responses to recognize themes. Reduction consisted of creating codes and a coding scheme, as well as coding the interviews. Interpretation consisted of organizing the data into categories that address the research questions so that conclusions could be drawn from the data (Forma & Damschroder, 2008). Qualitative data were analyzed with ATLAS.ti CLOUD qualitative analysis software. Demographic and background data were analyzed with SPSS version 25.

A secondary analysis was performed to compare differences between age group (18-39 and 39+) and gender (Female and Male).

Human Subjects Considerations

This study was reviewed and approved by the University of Texas Health Science Center Houston Committee for the Protection of Human Subjects. Participants were provided with an information sheet informing them that their responses would be anonymous, and that no identifiable information would be recorded.

RESULTS

Participants were 58.1% (n=18) female, 80.6% (n=25) were white, and 64.5% (n=20) were aged 18-39. Most participants had a bachelor’s degree or higher (64.5%, n=20). Most were employed at least part-time (80.6%, n=25). Most participants reported alcohol as the substance they were in recovery from (67.7%, n=21), being sober for more than two years (61.3%, n=19), and having practiced AY for 1-5 years (71.0%, n=22). See Table 1 for complete demographic and background information.

Table 1: Demographic and Background
N=31

		n (%)
Gender	Female	18 (58.1%)
	Male	12 (38.7%)
	No Answer	1 (3.2%)
Age	21-29	6 (19.4%)
	30-39	14 (45.2%)
	40-49	6 (19.4%)
	50-59	3 (9.7%)
	60+	2 (6.5%)

Education	High School/GED	2 (6.5%)
	Some College	9 (29.0%)
	Bachelor's degree	13 (41.9%)
	Graduate Degree	7 (22.6%)
Employment	Full-time	18 (58.1%)
	Part-time	7 (22.6%)
	Unemployed	3 (9.7%)
	Retired	3 (9.7%)
Household Income	\$0-\$24,999	8 (25.8%)
	\$25,000-\$74,999	12 (38.7%)
	\$75,000-\$124,999	5 (16.1%)
	\$125,000+	3 (9.7%)
	No Answer	3 (9.7%)
Race	American Indian or Alaskan Native	1 (3.2%)
	Hispanic	3 (9.7%)
	White	25 (80.6)
	No Answer	2 (6.5%)
Substance in Recovery From	Alcohol	21 (67.7%)
	Opioids	7 (22.6%)
	Cocaine/Crack	7 (22.6%)
	Amphetamines	9 (19.4%)
Length of Current Sobriety	<3 months	5 (16.1%)
	3 months-1 year	5 (16.1%)
	1-2 years	2 (6.5%)
	2-5 years	10 (32.3%)
	5+ years	9 (29.0%)
Yoga Practice Duration	<3 months	1 (3.2%)
	3 months-1 year	2 (6.5%)
	1-2 years	10 (32.3%)
	2-5 years	12 (38.7%)

5+ years

6 (19.4%)

Qualitative Analysis

The following section describes the results of the qualitative content analysis. Results are organized under the research objective they answer by theme and sub-theme. Example quotes from the data are included with each sub-theme. Please see Table 2 for a matrix of qualitative findings.

Appeal

Themes relating to this concept represent dimensions that attracted participants to the practice and continues to keep them engaged.

Theme 1: Physicality

Participants described an affinity to the intense physicality of the practice. Often it was this physical experience that got them immediately “hooked.”

My body felt amazing after and I was enchanted by the depth of what the practice could be (15).

This also can be said of the rigidity and routine of the practice--the same postures practiced daily.

I just knew something about the poses and the order of them, the rigidity, spoke to me (78).

Participants also shared the common experience that the physical practice “stirred up” emotion. Many described having emotional breakdowns or events where the practice both brought up intense emotions and helped them process those feelings.

I frequently find myself reliving trauma on my mat. But the practice has helped me learn to sit with the emotions I feel, to be gentle with myself, and heal (11).

Additionally, participants reported the ongoing physical appeal of the practice noting that achieving physical goals provided them with metrics of success.

I felt very compelled to come back because of the clear metrics of success (do well, get a new posture) (15).

Theme 2: Sustaining Sobriety

Many participants explicitly credited their AY practice for sustaining their sobriety. Some even credited it with saving their lives.

I've been studying Ashtanga ever-since that first class, almost a year and a half now, and it has been key to my continued sobriety (58).

Also, when asked what they thought would happen if they stopped practicing yoga, participants shared a common theme that if they were to stop practicing yoga, their anxiety and depression symptoms would worsen, they would experience more cravings, and they would likely lose their sobriety.

I honestly believe my emotional state would change dramatically. I think I would be on a roller coaster and that is a dangerous place for my addiction (80).

8 of 11 (72.7%) older and 8 of 13 (61.5%) male participants noted that their symptoms would worsen, or they would likely relapse if they stopped practicing AY compared to only 4 of 20 (20.0%) younger and 4 of 18 (22.2%) female participants.

Change in Symptoms

Themes relating to this concept reveal participants' perceived change in mental well-being.

Theme 3: Changes in Stress, Anxiety, Depression, Confidence, and Self-image.

Participants credited a reduction in anxiety, stress, and depression symptoms to their yoga practice.

My depression levels and again my ability to handle anxiety and stress since I began my Ashtanga practice are quite astounding (58).

Second, participants credited their practice for an improvement in confidence and self-image.

I realized I deserve to treat myself better. I radically love myself now and it's such an amazing transition after 10 years of disordered eating and body dysmorphia (15).

Theme 4: Spirituality

Participants noted a connection to spirituality or the divine through their practice. For those in a 12-step program, the yoga practice became part of the third and eleventh of the twelve steps. The third being a surrender to a higher power, and the eleventh being seeking guidance through prayer and meditation.

I am just beginning to see glimpses of God inside myself through the practice, and this has renewed my desire to keep practicing (24).

Theme 5: Community of Support

Participants noted becoming involved in a community of support. Participants who identified as outgoing before they began practicing AY reported no change in their

ability to make friends, while participants who noted having difficulty before they began to practice yoga saw modest improvements to their ability to make and keep friends. A common theme among them all was an improved quality to their relationships. They built stronger, more trusting friendships within their yoga and recovery communities. They reported these groups as being highly supportive and instrumental in their sustained recovery.

I highly value the yoga community, and the Ashtanga community has its own niche. My feelings of connection, grounding, and safety have increased since I became a part of this community (52).

Transformation of Daily Life

Themes relating to this concept reveal how participants experienced changes to their daily life from their AY practice.

Theme 6: Routine

Participants reported that having the routine of a daily morning yoga practice encouraged them to make healthier choices throughout their day. Some even noted that knowing they were going to get up early for yoga prevented them from choosing to overeat or use substances.

Having a daily practice helps because I tell myself if I decide to drink I won't feel well enough to practice tomorrow (80)

Theme 7: Mindfulness

Participants reported using mindfulness techniques and mind-body awareness cultivated in their yoga practice to reduce stress, anxiety, and depression symptoms that occur throughout the day.

When my mind wanders I try to observe where it's gone to and then gently bring it back, like getting momentarily loss and simply turning yourself around (36).

Theme 8: Breath

Most significantly, a common theme was the use of intentional breathing to reduce these symptoms. Intentional breathing is a foundation of the AY practice.

It's second nature now to stop and take a few breaths and come into my body when I notice myself being scattered (11).

Both younger (15 of 20; 75.0%) and female participants (16 of 18; 88.9%) expressed the importance of using breathing techniques to mitigate stress, anxiety, depression, and cravings more often than older (5 of 11; 45.4%) or male (5 of 13; 38.5%) participants.

Leadership

Themes in relating to this concept describe how participants perceived a change in their leadership qualities.

Theme 9: Role Modelling

Participants noted that other practitioners, friends, family, and co-workers began to see them as role models for physically and mentally healthy choices.

I've been able to help and inspire many women I work steps with to begin practicing Ashtanga along with me, so that has been a huge blessing to watch unfold (21).

Theme 10: Leadership Roles

Finally, many participants noted finding new roles as leaders in their communities as yoga or meditation teachers, 12-step sponsors, and a few cases as licensed counselors.

I am an active member of my recovery community, and I am an Ashtanga teacher in my town (21).

DISCUSSION

This study provides new and important insights into a unique population of people in recovery from SUD and their perceived benefit from a disciplined AY practice. This is a specific group of people in recovery who share common experiences of stress, anxiety, depression, and often isolation who are drawn to an intense physical activity that gives them the perception of modest relief from many of their symptoms. This study focused on the perceived benefits of AY and all the participants of this study had overall positive comments about AY.

AY for SUD has a narrow breadth in literature currently. The results of this qualitative studies are consistent with the modest findings of the available literature. AY appears to support reduction of anxiety and depression symptoms and the improvement of self-image (Jarry et al., 2017). Additionally, this study is consistent with the literature that supports yoga as a tool for recovery (Khanna & Greeson, 2013).

Qualitative themes discovered in this study can help in the development of research protocols and measurable outcomes for intervention and experiment design. Understanding the physical appeal of the AY may aid in recruitment to AY studies and interventions. the development of SUD interventions that could be attractive to physically active groups. Physical fitness markers may be measured to determine correlation with improved SUD outcomes as well.

Age group and gender were selected for the secondary qualitative analysis because of the demographic data collected, these were identified as the most logical to be divided into discrete pairs for comparison. Female and male are easily distinguished. Age groups were combined to make the closest to equal-sized groups as possible: 18-39, and 39 and older. Other demographic groups were not able to be combined logically or had too great a difference in size. This qualitative study intended to identify domains worthy of further investigation. Because the sample size was small statistical testing would have been inconclusive. However, differences between gender and age group may warrant further study to identify disparities, and larger sample sizes may provide more insight into differences by ethnicity and socio-economic status.

Because participants indicated that AY provided them with a physical means to process trauma and emotion, future research may provide insight into somatic processing of emotion. Future study should also measure changes in symptoms noted by participants of this study, controlling for other treatments such as medication, psychological therapy, and 12-step work. This line of work could also inform the effectiveness of existing yoga-based interventions. Additionally, this insight shows the need for interventions to provide

counseling resources to those who experience extreme emotion or triggers to past traumas by their AY practice.

Mindfulness is a growing topic of interest, and empirical study supports mindfulness as being beneficial to many populations including those with SUD (Khanna & Greeson, 2013). Yoga interventions are promising delivery methods for mindfulness instruction. Mindfulness measures in experimental design can help determine the extent to which mindfulness skills transfer to daily life experience. One topic of note from this study is how frequently participants noted using breathing techniques in stressful situations or to mitigate cravings. Intentional breathing is a key component of AY instruction. Yoga-based breathing techniques show promise in effective treatment of stress, anxiety, depression, and SUD symptoms (Lalande, Bambling, King, & Lowe, 2012). Future study utilizing AY may inform efficient and systematic interventions for teaching therapeutic breathing techniques.

Finally, participants noted a strengthening in their community of support as well as finding leadership roles with these spheres of influence. Understanding how this practice develops leadership in this population may inform the development of peer mentors as effective leaders and teachers in future AY-based interventions. One model may be Urban Yogis, a New York City based yoga intervention aimed at reducing gun violence by encouraging personal transformation in at risk youth (Urban Yogis, n.d.). Urban Yogis teaches an adapted form of AY. In addition to teaching yoga and meditation in community centers, Urban Yogis teaches public schools and correctional centers. Urban Yogis trains its students to be teachers, mentors, and ambassadors in their communities, creating peer influencers, an effective component of Social Cognitive theory (Bandura, 1925). Applying

this model to recovery from SUD, individuals in recovery can be recruited as leaders, mentors, and teachers, teaching classes in recovery centers, schools, and correctional facilities. Identifying motivations and mechanisms that make AY a successful tool in recovery will aid in developing this impactful intervention or improving on existing programs.

Strengths and Limitations

This study was a novel use of an open-ended web-based qualitative survey that involved no direct contact with the participants. As such it required a minimal budget and a small research team. This online survey was made available to qualifying participants across the nation and was marketed using social media. This approach essentially made recruitment a word-of-mouth process with participants spreading the reach of the study to their own sphere of influence. Additionally, because the study involved no face to face or even telephone interviews, this population, often faced with stigma concerning their diagnosis, may have answered more candidly (Smith, Earnshaw, Copenhaver, & Cunningham, 2016).

This study has notable limitations. Because there was no interaction with participants, we could not ask for clarification or expansion on participants' responses. As such, 5 of the 31 complete responses to this survey responded with short responses of one sentence or less. Because this study focused on individuals who had a positive experience with AY, it does not capture the experience of people who practiced less than three months but had negative experiences with AY and discontinued the practice. Also, participants may utilize different treatment modalities in addition to AY such as medication assisted treatment, various talk therapy modalities, and 12-step programs. Additionally, because AY is a highly

structured and disciplined yoga practice, these findings may not be transferable to other types of yoga that are more casual or loosely structured.

CONCLUSION

Untreated, the estimated cost of SUD is \$24,000 per person annually (NIH, 2018). Ashtanga yoga shows promise as a low-cost supplement to SUD treatment. As revealed by this study, it may provide the tools to alleviate underlying stress, anxiety, and depression symptoms that trigger relapse. This study also reveals that AY shows promise in improving the physical well-being and lifestyle choices of people in recovery. Additionally, it may provide those in recovery with a community of support, eliminating the isolation often face by people struggling with SUD.

APPENDICES

Appendix A: Qualitative Survey Items

1. Who introduced you to Ashtanga yoga, and how do you know this person?
2. What were your first impressions of Ashtanga yoga?
3. How do you feel about Ashtanga yoga now, and why do you keep showing up to practice?
4. Do you have any prior experience with yoga, Ashtanga or otherwise? Please describe.
5. Is your practice physically demanding and/or emotionally taxing? Please explain.
6. Has it been easy for you to make friends in the past, or has this changed since you started practicing yoga?
7. How are your moods, stress, anxiety, and depression symptoms now that you practice Ashtanga yoga? How is this different than before you started practicing Ashtanga yoga?
8. Have friends, family, and coworkers noticed any changes in you since you started?
9. Do you feel like you have more tools to handle drug/alcohol cravings? How do you handle cravings?
10. What do you think would happen if you stopped practicing yoga?
11. What happens when you are stressed out, in a conflict, or bad mood? How do you cope with these situations?
12. How has your ability to focus on work or other tasks changed since you started practicing yoga? When your mind wanders, what do you do to come back to focus?
13. How easy is it for you to fall asleep at night? Please describe any difficulty and how you handle it?
14. Compared to before you started practicing yoga, have you noticed a change in your confidence or self-esteem?

15. Do other yogis, your family, co-workers, or community members look to you as an example or for guidance? Please describe.

Appendix B: Demographic Survey Items

1. What is your gender?
 - a. Female
 - b. Male
 - c. Other _____
 - d. I choose not to answer

2. What is your age?
 - a. 18-20
 - b. 21-29
 - c. 30-39
 - d. 40-49
 - e. 50-59
 - f. 60+

3. What is the highest level of school you have completed?
 - a. Some high school
 - b. Highs School or GED
 - c. Some College
 - d. Bachelor's degree
 - e. Graduate Degree

4. Which of the following best describes your employment status?
 - a. Full time
 - b. Part time

- c. Unemployed, not currently seeking employment
 - d. Unemployed, seeking employment
 - e. Retired
 - f. Disabled
5. What was your total household income last year?
- a. \$0 - \$24,999
 - b. \$25,000 - \$74,999
 - c. \$75,000 - \$124,999
 - d. \$125,000+
 - e. I choose not to answer
6. What is your race?
- a. American Indian or Alaskan Native
 - b. Asian
 - c. Black or African-American
 - d. Hispanic
 - e. Native Hawaiian or Pacific Islander
 - f. White
 - g. Other _____
 - h. I choose not to answer
7. What substances are you in recovery from?
- a. Alcohol
 - b. Opioids (Heroin, morphine, oxycontin)

- c. Cocaine/Crack
- d. Amphetamines
- e. Other _____
- f. I choose not to answer

8. How long have you been sober?

- a. Less than three months
- b. 3 months – 1 year
- c. 1 – 2 years
- d. 2 – 5 years
- e. 5+ years

9. How long have you practiced AY?

- a. Less than three months
- b. 3 months – 1 year
- c. 1 – 2 years
- d. 2 – 5 years
- e. 5+ years

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Table 2: Matrix of Qualitative Findings

Research Objective	Theme	Description	Quotes of Interest
Appeal	Hooked	Participant describes an immediate resonance with the Ashtanga yoga practice.	<p>“My body felt amazing after and I was enchanted by the depth of what the practice could be” (15).</p> <p>"I immediately loved it" (80).</p> <p>"I was immediately hooked but unsure of why" (78).</p>
	Structure and Rigidity	Participants describe that the discipline required by the unchanging series of postures and daily practice was both appealing but helped them build structure and routine into their lives	<p>"Gives me structure, give me life, gives me connection" (18).</p> <p>"I just knew something about the poses and the order of them, the rigidity, spoke to me" (78).</p>
	Metrics of Success	Participants note that the structure of the practice gave them physical goals.	"I felt very compelled to come back because of the clear metrics of success (do well, get a new posture)" (15).
	Physicality	Participants were drawn to the physicality of the practice and continue to find value in this aspect.	<p>"Ashtanga challenges my body in every time in different ways. Sometimes it's going a little further on a bend, and other times it's just keeping up with breathing" (53).</p> <p>"The practice is physically demanding and that's partly why I feel drawn towards it" (88).</p> <p>"I feel good about my body, I am strong. When I find myself in a difficult place I know I can make it through by breathing and staying strong in my mind and body" (18).</p>

Processing Emotions	Participants note that they process emotions through the challenging physical practice	<p>"When I have emotions boil to the surface, I break down and cry on my mat. I also get angry. My teacher had to stop me one day and tell me I was showing old behavior by my anger with myself. It really checked me in that moment" (22).</p> <p>"Emotionally, almost more demanding. I frequently find myself reliving trauma on my mat. But the practice has helped me learn to sit with the emotions I feel, to be gentle with myself, and heal" (24).</p>
Sustaining Sobriety	Participants explicitly credit Ashtanga yoga for their sobriety.	<p>"Ashtanga has saved me" (15).</p> <p>"I show up because I'm a better person because of Ashtanga yoga" (12).</p> <p>"The Ashtanga method brought me to an awareness I didn't know I could achieve doing yoga, almost like a moving meditation. I've been studying Ashtanga ever-since that first class, almost a year and a half now, and it has been key to my continued sobriety" (58).</p>
Stopping	Participant describes negative affects if they were to stop practicing	<p>"I have no answer since I intend not to stop" (67).</p> <p>"I honestly believe my emotional state would change dramatically. I think I would be on a roller coaster and that is a dangerous place for my addiction" (80).</p> <p>"When I have slowed my practice I have felt more depression symptoms, some severe. My anxiety level also goes up" (9).</p>

Symptom Changes

Anxiety & Depression	Participant describes changes in anxiety and depression symptoms from practicing yoga	"Ashtanga yoga has cured my many chronic symptoms with years of deep depression, anxieties, panic attacks and seasonal mood swings in the past." (88) "My depression levels and again my ability to handle anxiety and stress since I began my Ashtanga practice are quite astounding" (58). "I feel more grounded and stable in my emotions. Before I was a slave to my moods and mental health. And it is not that they aren't there it's that I have built resilience on the mat. Therefore off the mat" (72).
Confidence & Self Image	Participant describes changes confidence and self-image/self-esteem	" I still have body confidence issues but I'm working through them and not obsessing about how I look every day" (12). "I love myself now, I love my true self" (76). "I have more confidence and self esteem but I'm also more aware of my shortcomings and poor traits" (86). "I realized I deserve to treat myself better. I radically love myself now and it's such an amazing transition after 10 years of disordered eating and body dysmorphia" (15).
Social Skills	Participants note improved improved social skills after practicing yoga.	"Yoga has increased my self-confidence and it's easier to make friends" (12). "I still find it hard to maintain friendships but it's getting easier" (36). "Easier after starting yoga and my circles widened" (26).

Community of Support	Participants describe finding a supportive community through yoga.	<p>"I highly value the yoga community, and the Ashtanga community has its own niche. My feelings of connection, grounding, and safety have increased since a became a part of this community" (52).</p> <p>"I became a part of community so I have people around who support and understand me" (30).</p>
Quality of Friendships	Participants note that quality of friendships has improved after practicing yoga	<p>"I have never been a very socially engaged person, though I am compassionate and caring. While the range of my relationships might not differ now, the depth of these surely do." (25). "what's changed is the kinds of people and behaviours I want to have in my life and be close to" (16).</p>
Spirituality	Participants describe finding Ashtanga to be a spiritual practice.	<p>"I am just beginning to see glimpses of God inside myself through the practice, and this has renewed my desire to keep practicing" (24).</p> <p>"I have made Ashtanga study and practice the central feature of my spiritual daily routine" (67).</p> <p>"It helps me take better care of myself on my mat and helps me stay connected to my higher power" (11).</p>

**Transformation
of Daily Life**

Breath

Participants describe using breathing techniques as a tool in their daily lives to manage symptoms and cravings

"When I notice I'm struggling with focus, I can turn my awareness to my breath to calm myself and improve mental function" (10).

"I no longer crave nicotine, though I did for a while. Breathing helped a lot with that, as it does with alcohol cravings" (16).

"If I get a strong craving I sit and breath and think what will happen if I decide to cave into my craving" (80).

"It's second nature now to stop and take a few breaths and come into my body when I notice myself being scattered" (11).

Awareness, Focus, &
Mindfulness

Participants describe increased focus and use of mindfulness skills in daily life.

"Focus has definitely improved. The more aware I become on my mat the more in my life. Breathing is the key" (72).

"My ability to focus on the work I do has developed with the practice more to the way that it used to be in my early years when I was able to concentrate very deeply for long times without interruption" (88).

"I am still stressed and anxious and depressed but I now have the tools to mindfully and healthily process these emotions" (15).

"When my mind wonders I try to observe where it's gone to and then gently bring it back, like getting momentarily loss and simply turning yourself around" (36).

Routine

Participants note how the practice requires them to practice better self-care and forethought throughout their day.

"But the practice also gives you a very intimate relationship with your self. I'm getting better at listening to exactly what my body needs each day" (12).

"having a daily practice helps because I tell myself if I decide to drink I won't feel well enough to practice tomorrow." (80).

Leadership	Noticeable Change	Participants report how others noticed changes in them after practicing yoga.	<p>"my teacher has expressed that I have a steadier focus and grasp on my mental chatter" (21).</p> <p>"My family and friends have for sure. I am not sure I can credit it all to yoga. However doing yoga and working a solid program in recovery I'm definitely a different person" (80).</p>
	New Roles	Participants describe taking on leadership and/or teaching roles	<p>"I am an active member of my recovery community, and I am an Ashtanga teacher in my town" (21).</p> <p>"I lead/teach Buddhist meditation" (9).</p> <p>"I teach yoga at the rehab I work" (80).</p> <p>"I'm also a counselor now " (11).</p>
	Role Modeling	Participants note how they have become role models to people in recovery or otherwise	<p>"Because of my thoughtfulness, willingness to listen, faith practice, and diligence at work, many people have looked to me as an example or for guidance." (53).</p> <p>"I'm one if the only obese yogis in the Shala and probably the only one with a daily practice so I hope that inspires other far people to believe in themselves! I know my fellow yogis admire my devotion to practice while recovering." (15).</p> <p>"I've been able to help and inspire many women I work steps with to begin practicing Ashtanga along with me, so that has been a huge blessing to watch unfold" (21).</p>
