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Yoga, quality of life, anxiety, and trauma in low-income adults with mental illness: A mixed-methods study

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ABSTRACT

We used a mixed-methods convergent parallel design to explore the effect of yoga on quality-of-life, trauma, and anxiety in low-income adults with mental illness. Participants included a convenience sample (N = 18) of parents at a community mental health agency who participated in a six-week yoga intervention. Participants completed standardized measures of quality-of-life, anxiety, and post-traumatic stress disorder (PTSD) pre- and post-intervention. Focus groups were conducted to further explore barriers to and the effects of participation in the yoga intervention. Wilcoxon Signed Ranks Tests indicated a statistically significant decrease in anxiety and PTSD after the yoga intervention, but no significant changes in quality of life or trait anxiety. Qualitative results reveal five themes related to participation in yoga classes, including barriers to participation and ways to improve the class. Qualitative results corroborate quantitative findings, suggesting improved relaxation and anger management for participants who strongly endorsed the benefits they experienced.

KEYWORDS

Anxiety; mixed methods; quality of life; trauma; yoga

Yoga is one of the most widely practiced complementary or alternative treatments to Western medicine in the United States, with an estimated 21 million adult users annually (Clark, Black, Stussman, Barnes, & Nahin, 2015). The practice is used as intervention for numerous medical conditions, including breast cancer (Constantine Brown, 2012; Harder, Parlour, & Jenkins, 2012), asthma (Sabina, Williams, Wall, Bansal, Chupp, & Katz, 2015), and depression (Javnbakht, Hejazi Kenari, & Ghasemi, 2009), and researchers have found yoga may successfully reduce the medical and mental health symptoms caused by chronic disease management (Harder et al., 2012; Lin, 2006; Tekur, Nagarathna, Chametcha, Hankey, & Nagendra, 2012).

The benefits of yoga in the alleviation of symptoms associated with mental health diagnoses have been increasingly studied (Balasubramaniam, Telles, & Doraiswamy, 2013; da Silva, Ravindran, & Ravindran, 2009; Louie, 2014; van der Kolk et al., 2014). Much of the theory behind yoga supports its popularity

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as an intervention for symptoms related to mental illness. Specifically, yoga encourages acceptance of one's present situation in order to reduce negative self-judgment (Khalsa, 2013) while promoting self-acceptance and contentment, and encourages finding meaning and purpose (Uebelacker, Epstein-Lubow, Gaudiano, Tremont, Battle, & Miller, 2010).

Despite this potential as a behavioral intervention, yoga remains primarily segregated to communities of privilege. As a practice, in the United States yoga is accessed primarily by white, college-educated women (Birdee, Legedza, Saper, Bertisch, Eisenberg, & Phillips, 2008; Quilty, Saper, Goldstein, & Khalsa, 2013), with the effects of yoga on the quality of life of individuals with a mental health diagnosis having been only minimally examined. Generalizing to a more diverse or low-income population requires explicit focus on samples representative of other groups.

Socioeconomic status, stress, and health are widely studied interrelated concepts, with literature pointing to a positive correlation between poverty and stress, and an inverse relationship between poverty and health and stress and health (Chen, Matthews, & Boyce, 2002; Evans & Kim, 2007). Parents, particularly low-income, single mothers, are at considerable risk for adverse mental health issues such as depression (Lyons-Ruth, Wolfe, Lyubchik, & Steingard, 2000) and anxiety. Mistry, Stevens, Sareen, De Vogli, and Halfon (2007) found social and financial parenting stressors highest among low-income, non-white families.

The purpose of this study is to use a convergent parallel mixed-methods design to (1) explore a six-week yoga intervention on the quality of life, anxiety, and post-traumatic stress disorder (PTSD)/trauma symptomatology of low-income adult parents with mental illness using quantitative self-report surveys and (2) explore client experiences of yoga practice using qualitative focus groups.

Literature review

Yoga and quality of life

Literature examining the effect of yoga using quality of life measures uses widespread populations and measures. Individuals seeking treatment for alcohol dependence reported improved motivation for sobriety and increased quality of life scores (Hallgren, Romberg, Bakshi, & Andréasson, 2014), suggesting that yoga as an adjunctive intervention can support treatment completion and long-term recovery. Even with a lack of statistical change in symptoms, after a yoga intervention, improvements in quality of life and social relations were seen in individuals subjected to a traumatic event (Thordardottir, Gudmundsdottir, Zoëga, Valdimarsdottir, & Gudmundsdottir, 2014). The benefits of yoga also extend to other difficult-to-treat diagnoses and populations. Individuals with

schizophrenia have scores indicating a higher quality of life after a yoga intervention (Duraiswamy, Thirthalli, Nagendra, & Gangadhar, 2007). Yoga classes may support participation and retention of clients to treatment and may also reach clients who do not respond strongly to traditional talk therapy (Mitchell et al., 2014).

Yoga's effects on anxiety and PTSD/trauma symptomatology

As many mental health diagnoses can be lifelong in duration (Chaneb, Meeks, & Burton, 2007; Patton et al., 2014), implementing a disease management intervention can potentially bring relief and coping strategies to diagnosed individuals. Although largely treatable, the costs of mental illness are high, including hospitalization, suicide, and disability (Parks, Svendsen, Singer, & Foti, 2006) as well as the added economic burden in lost wages, health care, and benefit costs (Insel, 2008).

Increasingly, yoga is perceived as a potential intervention for reducing PTSD, trauma symptomatology, and anxiety, providing sufferers with the opportunity to improve their day-to-day functioning. Yoga has been found to lower PTSD and trauma symptomatology in survivors of natural disasters (Descilo et al., 2010; Telles, Singh, Joshi, & Balkrishna, 2010) and war veterans (Brown & Gerbarg, 2005), and has been found beneficial for reducing anxiety in women with depression (Javnbakht et al., 2009), PTSD symptomatology in women (van der Kolk et al., 2014), adults reporting high stress (Smith, Hancock, Blake-Mortimer, & Eckert, 2007), young adult professional musicians (Khalsa, Shorter, Cope, Wyshak, & Sklar, 2009), prisoners (Bilderbeck, Brazil, Wikholm, Farias, & Jakobowitz, 2013; Harner, Hanlon, & Garfinkel, 2010), and people diagnosed with schizophrenia (Vancampfort et al., 2011).

Although low-income adults with mental illness are at risk for PTSD, trauma, and anxiety due to life stressors, few studies to date have explored the effects of yoga on this population. Do and Saper (2014) implemented a 12-week yoga program with low-income minority adults with nonspecific chronic low back pain, finding that anxiety was reduced as measured using the GAD-7. Streeter, Gerbarg, Saper, Ciraulo, and Brown (2012) posit a medical hypothesis for the benefit of yoga on the nervous system to ultimately reduce allostatic load, but do not test their hypothesis using a specific population.

Previous literature exploring the effects of yoga on anxiety reveals generally positive results across methods and measures. Interventions range from as short as three days (Broota & Sanghvi, 1994) to as long as three months (Shannahoff-Khalsa, Ray, Levine, Gallen, Schwartz, & Sidorowich, 1999) with measures including the State-Trait Anxiety Inventory (STAI) (Broota & Sanghvi, 1994; Gupta, Khera, Vempati, Sharma, & Bijlani, 2006; Javnbakht

et al., 2009), the Generalized Anxiety Disorder Scale (GAD-7) (Do & Saper, 2014), and the Hamilton Anxiety Scale (Sharma, Azmi, & Settiwar, 1991). The positive outcomes attributed to yoga may make it a cost-effective, simple intervention that could be easily implemented in community-based agencies serving vulnerable populations.

Yoga and community agencies

Researchers disagree about the applicability of yoga to a community mental health setting (e.g., Carter et al., 2009; Khalsa, 2013). Some argue yoga is a cost-effective and simple addition to services (Khalsa, 2013), whereas others argue that yoga requires a specialized instructor skilled in mental health issues, group therapy, and yoga to provide safe and effective treatment (Carter et al., 2009). Further, logistical issues such as barriers to regular attendance and treatment completion pose challenges to the implementation of intervention (Varambally et al., 2013).

Method

This article describes a mixed-methods study that explores the effects of yoga with low-income adults with mental illness receiving services in a community-based agency. To determine the effectiveness of yoga classes and explore participants' experiences with yoga, we used a mixed-methods convergent parallel design to integrate findings from quantitative and qualitative methods (Curry & Nunez-Smith, 2015), which included a quasi-experimental test of the intervention followed by focus groups. The study process began with the implementation of a yoga intervention during which quantitative data were collected via self-report survey prior to intervention and immediately after intervention. Following the conclusion of the yoga intervention and quantitative data collection, focus groups were conducted to further explore client experiences with the yoga intervention. The California State University Standing Advisory Committee for the Protection of Human Subjects approved this study.

Agency site

This research was conducted at a community mental health clinic that serves low-income families in the San Fernando Valley, California. Approximately 30 miles north of Los Angeles, 1.8 million people call the San Fernando Valley home. The majority of the population identifies as Hispanic (42%) or Caucasian (41%) (Census Bureau, 2012) with approximately 30% of households earning less than $35,000 per year, including 10% who made less than $15,000 annually (Villacorte, 2011). Residents do not have easy access to

yoga. The closest yoga studio is more than two miles away from the community mental health clinic, with the price of one 90-minute class listed at $20 and a one-month unlimited access membership costing $150—far beyond the reach of agency clients.

Population and participant recruitment

All adult agency clients were invited to participate in the yoga classes and research study. The agency serves children and their families who have behavioral, emotional, and/or mental health challenges. Families receiving services at the agency site are primarily Hispanic or Caucasian, reside in impoverished neighborhoods, and require comprehensive mental health interventions. The agency is funded primarily through Medi-Cal (the Medicaid program specific to the State of California) and all clients must meet certain income standards to qualify for services. Additionally, the agency works closely with the Los Angeles Department of Rehabilitation to assist with joblessness and skills training. Thus, agency clients generally had financial stressors in addition to parenting responsibilities and environmental stressors.

Low-income adults with mental illness receiving services at the community mental health clinic were recruited for the study in July and August 2014. Flyers in English and Spanish were posted promoting a six-week yoga class, informing potential participants that these classes were part of a university study and providing information about a small gift card incentive. Therapists and case managers were provided information about the intervention in order to direct interested clients to the flyers. The yoga instructor also served as a licensed clinical social worker and director of adult services for the agency; she requested therapists promote the classes with their individual clients and direct interested individuals to the flyers to pursue registration.

Sample

All study participants (N = 18) were women diagnosed with depression, anxiety, or PTSD who had been receiving services at the agency for fewer than three months. All of the women who chose to participate in the study were parents in low-income families. Two interested women were excluded from the study because they did not meet the Physical Activity Readiness Questionnaire (PAR-Q) criteria for participation in a physical study. The majority of participants identified as Latina or Hispanic (67%), more than a quarter were Spanish-speaking only (28%), and fewer than half had completed high school (39%) (see Table 1). Attrition between pre- and post-test resulted in analyses being performed using twelve (12) women.

Table 1. Participant characteristics.

Characteristic		Quantitative surveys N = 18*(%)	Qualitative focus groups N = 9*(%)
Ethnicity	Hispanic	12 (67%)	4 (44%)
	Caucasian	4 (22%)	3 (33%)
	Black	1 (5%)	1 (11%)
	Multiple ethnicities (Black & Hispanic)	1 (5%)	1 (11%)
Education	Middle school	1 (6%)	1 (17%)
	Some high school	5 (33%)	0
	High school graduate	3 (20%)	2 (33%)
	Some college	4 (27%)	2 (33%)
	Certificate (cosmetology; pharmaceutical technician)	2 (13%)	1 (17%)
	College graduate	0	0
Age	Ranges from 19–60 years old	M = 36.17 (SD = 10.07)	M = 34.22 (SD = 11.37)
QOL Pretest	Ranges from 45–100	M = 67.78 (SD = 15.58)	M = 67.44 (SD = 15.37)
PTSD Pretest	Ranges from 13–84	M = 47.06 (SD = 19.06)	M = 46.00 (SD = 17.48)
State Anxiety Pretest	Ranges from 36–73	M = 52.48 (SD = 10.10)	M = 52.90 (SD = 10.07)
Trait Anxiety Pretest	Ranges from 39–70	M = 53.56 (SD = 8.90)	M = 55.53 (SD = 9.20)

*For education, n = 15 for quantitative and n = 6 for qualitative.

Study design

The quantitative portion of the study used a one-group pretest/post-test design. All participants completed standardized instruments prior to the first yoga class and again at the end of the sixth and final yoga class. The researchers selected this design because it did not exclude any interested participants from attending the yoga classes, and no clients were denied their usual course of treatment at the agency.

Instruments

For the quantitative portion of the study, three standardized instruments available in English and Spanish were used to collect self-reported information from participants about their Quality of Life, Anxiety, and PTSD symptoms. Three out of 18 participants elected to complete their forms in Spanish.

Flanagan's Quality of Life Scale (QOLS)

The QOLS is a 16-item instrument that measures six conceptual domains of quality of life: material and physical well-being; relationships with other people; social, community, and civic activities; personal development and fulfillment; recreation; and independence (Burckhardt, Anderson, Archenholtz, & Hagg, 2003). Examples of questions include "Material comforts home, food, conveniences, financial security" and "Socializing—meeting

other people, doing things, parties, etc." Participants rank their satisfaction with each item or activity on a 7-point Likert scale, where 1 = Terrible and 7 = Delighted. The QOLS has been widely used and has demonstrated reliability in the current sample (α = 0.90), validity (Burckhardt et al., 2003), and "high test-retest reliability over 3-weeks in chronic illness groups" (Burckhardt & Anderson, 2003, sec. 5).

UCLA PTSD Index for DSM IV (UPID)—Short Form—Adult

The UPID is a 22-item self-report checklist of PTSD symptoms. Questions refer to a stressful experience or "bad thing" from the past and indicate the degree to which respondents have been bothered by a particular symptom over the past two weeks, using a scale from 0 to 4 where 0 = None and 4 = Most. Examples of questions include "I watch out for danger or things I am afraid of" and "I feel alone inside and not close to other people." Initially developed to assess PTSD symptoms in children, the UPID—Short Form—Adult is the adapted version for adult populations (Pynoos, Rodriguez, Steinberg, Stuber, & Frederick, 1998). The UPID has demonstrated reliability in the current sample (α = 0.93), validity, and high test-retest reliability with "an interval range from 6 to 28 days" (Steinberg et al., 2013, p. 2).

The State-Trait Anxiety Inventory (STAI)

The STAI measures state and trait anxiety based on a 4-point Likert scale where 1 = Not at all, and 4 = Very much so (Spielberger & Sydeman, 1994). Participants self-report answers to 40 items (20 State Anxiety; 20 Trait Anxiety), including "I feel tense" and "I feel secure" as indicators of State Anxiety and "I worry too much over something that really doesn't matter" and "I feel like a failure" as indicators of Trait Anxiety. The STAI has demonstrated reliability in the current sample (α = 0.74 State Anxiety; 0.82 Trait Anxiety), test-retest reliability over a 2-month interval (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), validity, and higher scores indicate higher anxiety (Grös, Antony, Simms, & McCabe, 2007). While the STAI does not have a clinical cutoff score, using Jacobson methodology for defining clinically significant change, Fisher and Durham (1999) determined 46 to be the cutoff point based on aggregate data from six randomized controlled trials with adults with Generalized Anxiety Disorder. The agency where the current study occurred regularly uses the UPID and STAI and requested their use to maintain consistency within the organization.

For the qualitative portion of the study, clients were asked to participate in a focus group held at the end of the formal yoga instruction. Participants responded to a semistructured interview schedule that included the following nine questions: 1. Before beginning yoga classes at [agency], what were your ideas and thoughts about yoga? 2. What did you think of the classes? 3. Have your thoughts and ideas about yoga changed? 4. What got in the way of

coming to class? 5. What did you like/dislike about yoga? 6. Do you do yoga on your own outside of class? 7. If a friend told you s\he was considering going to yoga class and asked your opinion about yoga, what would you tell them? 8. What would make the yoga classes better? 9. Is there anything else we should know about your experience? Focus group questions were developed to garner information about the participants' lived experience with yoga before and after the intervention. Open-ended questions gave participants the opportunity to discuss the benefits and challenges of the class with the facilitator(s) encouraging interaction between participants (Bender & Ewbank, 1994). The focus groups were audio recorded and transcribed.

Study procedures and data collection

Participants completed the three survey measures (the QOLS, UPID, and STAI) prior to the 6-week class cycle at a brief "Intro to Yoga" meeting held at the agency. The participants also completed a consent form at this time. The measures and consent form took about 30 minutes to complete in total. The yoga instructor was present and reviewed some of the basic yoga postures that would be taught in the class. The researchers were present to support participants who needed individualized attention completing the forms. Upon completion of the pretest measures all participants received a $10 grocery card. Demographic information was obtained through agency records.

Yoga classes were held for the following six weeks with instructions provided in both English and Spanish. The yoga classes were held in the building where clients received services in a room large enough to hold approximately 20 yoga mats. Participants were not required to wear special clothing, yoga mats and props were provided for participants who did not have their own, and everyone pitched in to move tables and chairs out of the way prior to and following class. Every class focused on breathing, opening with the Professional Yoga Therapist (Professional Yoga Therapy Studies, 2015) asking participants about any painful areas. Weeks 1 and 2 concentrated on introducing breathing and developing basic body awareness. Weeks 3 and 4 focused on continuing to build skills using breath to regulate mood and energy level, as well as introducing inversions to challenge the self from a place of grounded strength. Weeks 5 and 6 were dedicated to practice, review, and solidifying linkages and connections between the mind and body. Classes always closed with *savasana* to allow heart opening in deep relaxation and a reminder to breathe throughout the week (see Appendix A).

The week after the last class concluded, participants completed the posttest survey measures prior to attending a brief focus group. During the focus group, participants were asked whether they continued to utilize yoga outside of the research setting, about barriers to practicing yoga, and their reactions

to the class. All participants were provided a $35 grocery card upon completion of the post-test surveys and subsequent focus group.

Data analysis

A Wilcoxon Signed Ranks test, the nonparametric alternative to the paired samples *T*-test, was used to evaluate changes in quality of life, trauma, and anxiety as measured by the standardized instruments. Quantitative results were analyzed using SPSS version 22. Qualitative data were coded with open, axial, and process methods using the online research application Dedoose. Two researchers separately reviewed the deidentified transcripts using consensual qualitative approach strategies in order to identify and create initial domains (Hill et al., 2005). The researchers then compared the identified domains and reached a consensus on which codes should be used to represent the identified patterns emerging from the data. The process of code development included a review of any discrepancies, which were resolved through team discussion. Codes were determined as a result of this consensual process by deleting and revising themes, and agreement was reached based on the relevance of the codes.

Results

Quantitative

Quality of life

Although median quality of life scores increased during the yoga intervention, results of a Wilcoxon Signed Ranks Test reveal no statistically significant changes in quality of life scores between pretest and post-test (see Table 2).

Trauma/PTSD

A Wilcoxon Signed Ranks Test revealed a statistically significant reduction in PTSD following participation in the yoga classes, $z = -2.98$, $p = 0.00$, with a large effect size ($r = 0.86$). The median PTSD score decreased between pretest ($Md = 44$) and post-test ($Md = 32$).

Table 2. Pretest and post-test median, z-scores, and effect sizes for quality of life, trauma/PTSD, and anxiety.

	Pretest (Md)	Post-test (Md)	z-Score	Effect size
QOL ($n = 11$)	70	76	−1.82	
Trauma/PTSD ($n = 12$)	44	32	−2.96*	0.86
State ($n = 12$)	52	38	−2.94*	0.85
Trait ($n = 11$)	51	50	−1.69	

*$p < 0.05$.

State anxiety

Wilcoxon Signed Ranks Tests revealed a significant reduction in State Anxiety from the pre-yoga measurement to the post-yoga measurement $z = -2.94$, $p = 0.00$, with a large effect size ($r = 0.85$). The median score on the State Anxiety measure decreased from pre-program ($Md = 52$) to post-program ($Md = 38$). In the current study, 14 women met the criteria for clinical anxiety at pretest with 50% lower (n = 7) at post-test.

Trait anxiety

Wilcoxon Signed Ranks Tests revealed no statistically significant differences in trait anxiety. As seen in Table 2, median trait anxiety scores remained relatively stable throughout the study.

Qualitative

Nine women participated in one of two focus groups. The majority of focus group participants identified as Latina or Hispanic, and the focus group participants tended to be more educated than study participants as a whole. We identified 94 different thematic excerpts, which we then grouped into five themes describing how participants felt about the yoga classes. We ranked the themes according to their relative importance, based on the number of coding instances within each theme across both focus groups. Table 3 lists the five themes and illustrative quotes.

Thoughts about yoga prior to class

Most participants described themselves as having been uncertain about yoga prior to the class, not believing it was something they could do due to previous injury or because it would not be within reach. "I thought it was something impossible. I had no idea. So many movements, flexible [laughs], my idea was that stretching that's like gymnastics [laughs]. I can't do that!" (Josephine,[1] 33 years old, Hispanic). Participants who were uncertain about yoga reported initially attending the classes because they were available and to receive the gift card incentive. "I figured I might as well try it" (Maria, 60 years old, Caucasian). One respondent had participated in yoga previously and expressed enthusiasm for the practice from the outset.

Barriers to participation

The researchers identified two kinds of barriers to participation among participants' statements: barriers to attending class and barriers to participating in yoga at home or on their own. The biggest barrier to attending class was childcare, which we broadly defined as children having adequate

[1]All names are pseudonyms.

Table 3. Summary of themes related to how participants felt about yoga classes.

Theme (coding instances, N = 94)	Description	Excerpt
Improvement due to yoga (n = 27)	How participants perceive yoga has helped them	LUZ: I definitely know when I have a bad day, if I'm struggling with a fight with the kids or something, I'm real frustrated, I will use the breathing techniques to get myself, my heart rate to go down, to mellow out. Same thing with my anxiety, I deal with anxiety really bad. And um, before I couldn't really control it, but now with the breathing I can get it under control now. JOSEPHINE: It [yoga] definitely helped me not to be so irritated.
Enjoyment of yoga (n = 23)	What participants liked about the classes and why they liked yoga	T: I was able to recognize my body and calm myself down, as well as just socialize and mingle with other people. ANA: Well, I liked everything, different types of moves really, it was really relaxing and helpful.
Barriers (n = 19)	Activities or events that stopped participants from attending class (n = 10) or practicing yoga at home (n = 9)	MOLLY: I have six kids. I have to pick up three kids, take them to different locations and schools, different transits to get here. MARIA: I've tried but I can't find a place where I can just be by myself, and uh, do the breathing and stretching, um, I do the breathing mostly when I get um, hyper or agitated. I do the breathing (laughs) in the car but it's very hard to find like uh, my little quiet space.
Ways to improve classes (n = 15)	Items or actions that could be taken to make the classes more accessible	LUZ: A little bit more time because you're talking and you're trying to get in the positions. I think there's not enough time. VICKI: Availability of more items [props]. Sometimes there was some items would have run out. MOLLY: Music, maybe. It was difficult to calm down because I was very tense coming to the class because of everything I had to do to get here.
Thoughts before yoga (n = 10)	Participants' thoughts about yoga prior to attending classes	MARIA: I thought it was um, not going to be as effective. CHRISTINA: Um, I didn't think I would be able to do it as because of previous injuries. SALLY: I always knew that yoga will help calm me down.

supervision for their safety. "I missed once because my daughter … she was ill" (Josephine, 33 years old, Hispanic). Childcare was also a barrier to participating in yoga at home.

> Okay, so, um, and this goes with everything in my life, if I am in my home, with my husband and my children, it doesn't matter what I try to do, I am a chef, and a laundry person and chauffeur and a nurse and I come and change the channel, and "please clean the pee of the floor," and "mommy come wipe my butt," and, "honey the dog needs to go outside." And there is, no, no way in

> a million years I could say "It's my time right now, nobody bother me." That's not a possibility. (Vicki, 30 years old, Caucasian)

Improvement due to yoga/enjoyment of class

Participants attributed physical and emotional improvement to attending yoga class, stating "it helps when I'm angry" and "I felt very relaxed, um, stress reliever" as well as "my headaches and migraines have improved" and "the warrior poses really help my sciatica." Improvement due to yoga was tied closely with enjoyment of the class(es).

> Yoga made me realize I was putting a lot of pressure and weight on my body and my mind and it was always great to come to the class, like at the end of the week I would look forward to "when is weds coming?" so I could do yoga (laughs) so yeah it felt really good being in the class. (Sally, 25 years old, African American)

Ways to improve class

Participants offered suggestions for improving the class(es) related to barriers, including the suggestion that classes be held during school hours to overcome childcare issues. Additionally, participants overwhelmingly thought class(es) should be longer in duration: "maybe because it wasn't long enough … I didn't feel like … I didn't … sometimes, I wanted more" (Maria, 60 years old, Caucasian). The facilitator asked "so even kind of considering all the different obligations you had to do it would still work for your life if we made the class like an hour and a half?" to which Christina (33 years old, Caucasian) responded "two hours" followed by several "yes" answers, laughter, and one participant saying "I would go all day!" followed by more laughter from the group.

Group cohesion, collaboration, and support were important to participants. Ana (19 years old, Hispanic) requested "more people" in the classes, stating "it doesn't feel the same, I don't know, you just get used to the people around and … I feel like, well, I'll give you like, I felt just like the positive energy, I guess." Vicki concurred with Ana, adding "camaraderie!" when Ana struggled to find the word she wanted to use to describe her feelings.

Triangulation of results

When the results from both study phases were examined and compared to explore the effects of a yoga intervention on the quality of life, anxiety, and PTSD/trauma symptomatology of low-income adults with mental illness, results from qualitative focus groups shed light on quantitative findings. Quantitative results revealed a statistically significant decrease in state anxiety that was corroborated by participants' comments during the qualitative focus groups.

> I definitely know when I have a bad day, if I'm struggling with a fight with the kids or something, I'm real frustrated, I will use the breathing techniques to get myself, my heart rate to go down, to mellow out. Same thing with my anxiety, I deal with anxiety really bad. And um, before I couldn't really control it, but now with the breathing I can get it under control now. (Luz, 38 years old, Hispanic/African American)

> I try to take a couple min in the morning to, um, start off my day um, I suffer of lot of anxiety and depression so that that [yoga] kind of has been helping, you know? (Josephine, 33 years old, Hispanic)

Although quantitative quality of life survey results revealed no statistically significant difference after taking 6 weeks of yoga classes, quality of life scores did improve after the yoga classes, and focus group participants proclaimed their enjoyment of the class(es) and detailed how their lives improved, which they attributed to yoga. The yoga classes focused on breathing and relaxation as a means of decreasing anxiety and PTSD symptoms, which the women acknowledged in their qualitative statements. Only one question on the QOL survey related to physical health, and none directly addressed emotional health or well-being. It is possible that the QOL measure was not specific enough to capture improvements due to yoga.

Discussion

This study found mixed support for the efficacy of a short yoga class to influence the well-being of women with children facing multiple risks of low socioeconomic status and mental illness. Quantitative measures showed significant improvements in state anxiety and PTSD symptoms for yoga participants. Qualitative results corroborate the quantitative findings and suggest benefits in terms of breathing, relaxation, and anger management for this relatively simple intervention that is feasible for community-based agencies.

The relationship between quality of life, anxiety, and PTSD should not be overlooked. Warshaw et al. (1993) found that PTSD has profound effects on quality of life, while Spitzer et al. (1995) demonstrated that psychiatric disorders have a greater effect on quality of life than physical disorders. While the concept "quality of life" is increasingly being recognized as important to study in and of itself (Wilson & Cleary, 1995), it is possible that a reduction in psychological symptoms such as PTSD and anxiety ultimately results in improved quality of life for individuals. In our study, improved quality of life was indicated by qualitative responses and seen in quantitative measures, albeit not at a statistically significant level. The short duration of the intervention may be one of the limitations that explain the negligible changes in quantitative quality of life scores; six weeks simply may not have

been enough time to produce significant differences in major indicators of well-being on standardized survey measures. Qualitative reports, however, indicated widespread improvement in quality of life concepts, and add to published literature suggesting that this important outcome may be difficult to measure with quantitative instruments (Revicki et al., 2000). Quality of life is individual by nature (Gill & Feinstein, 1994), but intuitively understandable to most people (Revicki et al., 2000), and therefore difficult to capture using standardized measures. Despite the quantitative survey measure revealing no statistically significant improvement in participants' quality of life in the current study, participants themselves clearly credited yoga for reduced anxiety, better anger management, improved physical functioning, lower stress, and greater relaxation.

Participants indicated that a major barrier to being able to attend class was childcare. What we initially perceived as a means of alleviating a barrier—providing childcare—turned out to not be all that useful for these busy parents. We learned that "childcare" meant picking children up from school, driving them to afterschool activities, supervising homework, making dinner, and countless other activities that could not be alleviated by having the children spend an hour in supervised childcare while their mother took a yoga class.

> I didn't have anybody to watch my boys. . .just even to get them to come out, it would probably be a challenge sometimes 'cause I got a little older boys so they're not to the age where I could leave them but if I were to bring them here it would be a big fight. (Luz, 38 years old, Hispanic/African American)

Participants provided several anecdotal examples of utilizing the skills learned in their daily lives throughout the six weeks of yoga classes as well as overall improvement in general well-being. One particularly enthusiastic participant showed up after her classes concluded in an effort to advocate for additional yoga classes at the agency.

Limitations and future research

Even without attrition, a beginning sample size of 18 is quite small for quantitative analyses. Nevertheless, our sample size is congruent with previous yoga studies at community-based agencies (Clark et al., 2014; Harner et al., 2010). We triangulated data using qualitative methods in an effort to compensate for this limitation, and suggest future studies consider using a larger sample size for quantitative analyses if the facilities are of sufficient size.

It is possible that PTSD/trauma symptomatology naturally improved over time (Mills et al., 2012). An alternative explanation is that study participants

continued to receive their usual course of treatment at the agency and thus their PTSD/trauma symptomatology was positively affected. Previous research reveals the efficacy of evidence-based treatments for PTSD (Cukor, Spitalnick, Difede, Rizzo, & Rothbaum, 2009) and the agency where the current study occurred uses evidence-based practices such as exposure therapy (Foa, Davidson, & Frances, 1999; Foa, Rothbaum, & Furr, 2003) and cognitive processing therapy (CPT) (Monson et al., 2006) in treating its clients. While a one-group pretest/post-test design meant that no one was denied their usual course of treatment, a more rigorous design that includes a comparison or control group would control for threats to internal validity such as history, maturation, or testing, and should be utilized in future studies.

Particularly troubling was not being able to follow up with participants who chose to drop out of the study prior to completion. Although every effort was made to contact participants who did not return, we were unsuccessful in reaching them. In four instances, therapists explained that they were unable to locate our participants/their clients who stopped coming to the agency for regular services. Despite attending at least four of the six yoga classes, one participant did not complete the pretest measures, and two participants did not complete the post-test measures or participate in the focus groups. These instances emphasize how multiple stressors experienced by vulnerable populations may create barriers to quantitative data collection, while simultaneously highlighting the importance of making accessible low-cost interventions such as yoga available to communities marginalized by oppressive social conditions.

Future studies and interventions should consider potential barriers to participation for vulnerable populations. Prior to implementing the yoga intervention, we carefully considered when to offer the yoga classes. It was decided to hold the classes from 6–7 p.m. on Wednesday evenings because (1) free childcare was provided by the agency nightly until 8 p.m., (2) 6 p.m. is typically after work hours, and (3) 7 p.m. is early enough to be home before bedtime for most children. In addition, we thought that holding the yoga classes in the same building where participants received regular services meant they would be able to get to and from the classes easily; and Wednesdays were the agency's busiest day, so perhaps participants were already at the agency and could "tack on" yoga prior to going home for the evening.

Conclusion

The overarching aim of this study was to explore the effects of yoga on the quality of life, anxiety, and trauma symptomatology of low-income adults

with mental illness receiving mental health services in a community-based agency. An underlying but no less important aim was to bring yoga to a population that does not typically have a chance to experience it. Yoga utilized with this vulnerable population revealed promising results and positive feedback from participants. Opportunities for future mind/body interventions and research with vulnerable populations in communities marginalized by oppressive social conditions abound, and the study described in this article should be considered only a starting point.

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Appendix A: Yoga poses and intended effects, by week

Week	Poses	Intended effect
1	- Pranayama * Deep Belly Breath * Sighing Breath * Intro to TATD (Transverse Abdominis Assisted Thoraco-Diaphragmatic) Breath	- Develop awareness of breath and its ability to regulate mood. - TATD breath to begin building core strength; energizing breath, contrast to other calming breaths.
	- Seated poses (in chair) * Knee Lifts * Feet Tapping * Twist * Eagle Arms * Neck Stretch * Cat/Cow	- Build awareness of yoga's accessibility for all types of physical/emotional states. - Develop basic body awareness and learn gentle tension release techniques (gentler relationship w/one's body).
	- Supine * Knee/Sacrum Circles * Knee Lifts (w/strap as needed) * Guided Meditation * Savasana (Corpse Pose)	- Increase compassion toward body/self. - Experience balance of relaxation after effort.
2	- Pranayama * Deep Belly Breath * Sighing Breath * TATD Breath	- Build skill in using breath to regulate mood and energy level. - TATD breath to further build core strength, lift out of depression, and discharge anxiety.
	- Seated poses (in chair) * Feet Tapping * Cat/Cow * Twist	- Further developing body awareness and how feelings are stored/held in body. - Learning to be gentle w/the body/self (i.e., less judgmental).
	- Standing * Mountain pose w/Arm Spiral * Half Sun Salute w/chair	- Grounding and energizing to decrease anxiety and depression.
	- Supine * Leg Stretch with strap * Gentle Twist * Guided Meditation * Savasana	- Increase compassion toward body/self. - Experience balance of relaxation after effort.
3	- Pranayama * Sighing Breath * TATD Breath * Ujjayi (Victorious Breath)	- Continue building skill in using breath to regulate mood and energy level. - Introduce new breath technique, Ujjayi, for members to add to skills.
	- Seated poses (in chair) * Feet tapping * Cat/Cow * Eagle Arms	- Further developing body awareness and how feelings are stored/held in body. - Learning to be gentle w/the body/self (i.e., less judgmental).
	- Standing * Mountain Pose w/Arm Spiral * Half Sun Salute w/chair * Warrior 1 w/chair for support * Tree Pose w/chair for support (Modified as needed: ankle, calf)	- Grounding and energizing to decrease anxiety and depression. - Using physical supports to gently build strength (metaphor to emotional support).

(*Continued*)

(Continued).

Week	Poses	Intended effect
	- Kneeling: Shoulder Extensor Stretch w/chair	- Release tension in neck and shoulders; stress reduction.
	- Supine * Guided Meditation * Savasana on 3-tiered blankets, with sandbags as desired	- Increase compassion toward body/self. - Experience balance of relaxation after effort. - 3-tired blankets create support during relaxation; sandbags increase grounding, sense of safety.
4	- Breathwork/Pranayama * Deep Belly Breath * Sighing Breath * TATD Breath * Ujjayi	- Continue building skill in using breath to regulate mood and energy level.
	- Seated poses (in chair) * Feet tapping * Eagle Arms * Gentle Neck Stretch	- Further developing body awareness and how feelings are stored/held in body. - Learning to be gentle w/the body/self (i.e., less judgmental).
	- Standing * Mountain Pose w/Arm Spiral * Half Sun Salute w/chair * Warrior 1 w/chair for support * Tree Pose w/chair for support (modified as needed: ankle, calf)	- Grounding and energizing to decrease anxiety and depression. - Using physical supports to gently build strength (metaphor to emotional support).
	- Inversion * Prep for headstand—start in 4-point pose (hands and knees), place top of head on mat and clasp hands behind head, walk knees forward, practice strengthening and releasing shoulder and arm muscles	- Energizing and challenging self from a place of grounded strength. - Develop understanding of emotional and physical limits, accepting where you are while still moving forward.
	- Supine * Guided Meditation * Savasana on 3-tiered blankets, with sandbags as desired	- Increase compassion toward body/self. - Experience balance of relaxation after effort. - 3-tired blankets create support during relaxation; sandbags increase grounding, sense of safety.
5	- Pranayama * Reviewed all breathwork skills, had members choose their own to practice	- Members can tune in to their own needs and identify what breath skill will best help them.
	- Seated poses (in chair) * Feet tapping * Eagle Arms	- Further developing body awareness and how feelings are stored/held in body. - Learning to be gentle w/the body/self (i.e., less judgmental).
	- Standing * Mountain Pose w/Arm Spiral * Warrior 1 w/chair for support * Warrior 1 (no chair, but blanket supporting rear heel) * Warrior 2 * Tree Pose w/chair for support (modified as needed: ankle, calf)	- Grounding and energizing to decrease anxiety and depression. - Shifting use of physical supports, to identify what kind of help one needs and how much (metaphor to emotional needs/supports).

(*Continued*)

(Continued).

Week	Poses	Intended effect
	- Supine * Guided Meditation * Savasana on 3-tiered blankets, with sandbags as desired	- Increase compassion toward body/self. - Experience balance of relaxation after effort. - 3-tired blankets create support during relaxation; sandbags increase grounding, sense of safety.
6	- Pranayama * Reviewed all breathwork skills, had members choose their own to practice	- Learning to identify own needs and trust self to meet those needs.
	- Seated poses (in chair) * Feet tapping * Eagle Arms * Neck Stretch	- Further developing body awareness and how feelings are stored/held in body. - Learning to be gentle w/the body/self (i.e., less judgmental).
	- Standing * Half Sun Salute w/chair * Warrior 1 (no chair, but blanket supporting rear heel) * Tree Pose w/chair for support (modified as needed: ankle, calf)	- Grounding and energizing to decrease anxiety and depression. - Additional decrease in use of physical supports, to build strength and confidence (link to emotional well-being).
	- Supine * Guided Meditation * Savasana on blanket roll, with sandbags as desired	- Increase compassion toward body/self. - Experience balance of relaxation after effort. - Blanket roll supports spine and allows heart opening in deep relaxation; sandbags increase grounding, sense of safety.