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Efficacy of yoga for depressed postpartum women: A randomized controlled trial

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A B S T R A C T

Background: Up to 20% of women experience postpartum depression (PPD). PPD is associated with anxiety and poor health-related quality of life (HRQOL). Efficacious treatments are critical; many women with PPD prefer complementary therapies. Thus, the current study examined yoga as a complementary therapy for PPD.
Methods: Fifty-seven postpartum women with scores ≥12 on the Hamilton Depression Rating Scale were randomly assigned to a yoga ($N = 28$) or wait-list control ($N = 29$) group. The yoga intervention consisted of 16 classes over 8 weeks. Outcomes were depression, anxiety, and HRQOL.
Results: The yoga group experienced significantly greater rate of improvement in depression, anxiety, and HRQOL, relative to the control group with moderate to large effects. Reliable Change Index analyses revealed that 78% of women in the yoga group experienced clinically significant change.
Conclusion: These findings support yoga as a promising complementary therapy for PPD, and warrant large-scale replication studies.
Trial Registration: http://clinicaltrials.gov/NCT02213601.

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1. Introduction

Postpartum depression (PPD) is a significant public health issue with approximately 1 in 4 women experiencing depression following childbirth [1]. Negative consequences include personal suffering, impaired social relationships, and social, emotional, and cognitive delays in exposed children [2]. Antidepressant medications and psychotherapy are efficacious for treating PPD [3,4]; however, medication side effects and stigma associated with mental health treatment diminish uptake of these interventions [5]. Consequently, there is growing interest in complementary therapies for women with perinatal depression [6,7]. These interventions address barriers associated with conventional treatments because they are considered low risk and provide women with a sense of control in improving emotional and physical functioning [7,8].

Comorbid anxiety is prominent in PPD [9,10]. Postpartum prevalence rates of anxiety range from 0.5% to 2.9% for panic disorder to 6.1%–7.7% for generalized anxiety disorder [9], with some studies showing higher rates of GAD during the postpartum period, relative to the general population [10]. Finally, rates for social anxiety disorder range from 0.2% to 6.5% in the early postpartum period [9]. Empirical data to guide interventions for comorbid anxiety and PPD are limited. Evidence-based treatments for anxiety, including SSRIs and Cognitive Behavioral Therapy (CBT), have been used with some success to treat anxiety in depressed postpartum women; nonetheless, high rates of comorbid anxiety during the postpartum period still persist [9,10].

HRQOL is also an important outcome to consider when evaluating the efficacy of interventions for PPD. Boyce et al. [11] examined the impact of depressed mood at 8 weeks postpartum on functioning and well-being at 24 weeks postpartum. Depressed women were significantly more impaired on several scales of the SF-36. Further, Dennis [12] showed that women depressed at 4 and 8 weeks postpartum reported poorer Physical and Mental Health status compared to nondepressed women.

While there is a substantial literature on PPD treatment, PPD remains undertreated. Empirically-validated treatments include sertraline [13], CBT [14] and Interpersonal Psychotherapy (IPT) [15].

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Pharmacological treatments are recommended for women with severe PPD (e.g., presence of active suicidal ideation, intent or psychosis), either as a standalone or in conjunction with psychotherapy [3]. Breastfeeding mothers are often reluctant to use medication for many reasons, but particularly because they do not want to expose their infants to medication in breastmilk [5,16].

Empirical data suggest that psychotherapy is as efficacious as pharmacotherapy for PPD [4]. Nonetheless, characteristics unique to the postpartum period, including the risks associated with medications, add a layer of complexity in developing efficacious treatments for PPD. Researchers are beginning to study complementary and alternative medicine (CAM) therapies for PPD to broaden the scope of current treatments and to reach more women. Empirical evidence for CAM therapies is growing, with several studies demonstrating the efficacy of yoga for depression and anxiety in the general population [17,18], and prenatal yoga for depression and anxiety in pregnant women specifically [19–23]. Yoga has also outperformed control conditions in reducing depression and anxiety [18,20], and has beneficial effects for improving HRQOL [17].

Yoga is identified as one of the top 10 CAM therapies used among adults for depression [24]. *Hatha*, the physical form of yoga, is the most commonly practiced style of yoga in Western culture [25]. The system of yoga integrates three basic components: breath (*pranayama*), physical poses (*asanas*), and meditation (*dhyana*) [26–28].

The primary objective of this study was to examine the efficacy of yoga for PPD. We hypothesized that women randomized to a yoga condition would improve more rapidly on measures of depression, anxiety, and level of HRQOL over the course of the 8-week intervention relative to a wait-list control (WLC) condition.

2. Methods

2.1. Participants and study procedure

Fifty-seven participants were randomized (Yoga: $N = 28$; WLC: $N = 29$). See Table 1 for sample characteristics and Fig. 1 for participant flow through the study. Participants were recruited using public birth records, local flyers, the university's mass e-mail system, and referrals. Women ages 18 to 45 who gave birth within the past 12 months and could speak and read English were invited to participate. Eligibility criteria included: (1) score ≥ 12 on the HDRS [29]; (2) residence within a 30-mile radius of the yoga studios; and (3) ≥ 6 weeks postpartum if delivery was complicated and/or involved a cesarean section. Participants received 8 weeks of yoga at no cost and received $20 for the pre-treatment assessment and $10 for each assessment during the treatment phase. The study was approved by the University of Iowa's Institutional Review Board, and full consent was obtained from participants.

Table 1
Sociodemographic and intervention characteristics of women recruited to the study.

	Yoga ($n = 28$)[a]	Wait-list control ($n = 29$)		
Continuous variable	M (SD)	M (SD)	Statistic t ($df = 54$)	p
Age	29.81 (5.17)	32.45 (4.78)	1.98	0.053*
Education	16.89 (2.24)	16.38 (2.29)	−0.84	0.404
Mo. postpartum	4.63 (3.47)	4.72 (2.91)	0.11	0.912
No of classes attended[b]	11.46 (4.48)			
Categorical variable	n (%)	n (%)	χ^2 ($df = 1$)	p
Breastfeeding	21 (78%)	21 (72%)	0.25	0.621
Non-Hispanic	26 (96%)	27 (93%)	0.28	1.00
White	24 (89%)	27 (93%)	0.31	0.664
Married	22 (82%)	22 (76%)	0.26	0.609
Primiparous	16 (59%)	12 (41%)	1.79	0.181
Income (≥$50,000)	16 (59%)	19 (65%)	0.23	0.629
Employed	15 (56%)	22 (76%)	2.57	0.109
Past MDE	19 (70%)	16 (55%)	1.38	0.240
Prior yoga experience	13 (48%)	10 (34%)	1.08	0.299
Attended > 9 classes[b]	17 (63%)			

*$p < 0.05$.
[a] Demographic characteristics are only reported for $n = 27$ women who provided this information at the pre-treatment assessment.
[b] These variables are specific to the yoga group; thus, statistics are not provided for the wait-list control group.

2.2. Design

Participants were assessed at pre-treatment, 2 weeks, 4 weeks, 6 weeks, and 8 weeks (post-treatment). During the screening phase of the study, consenting participants provided eligibility information and completed the 9-item Patient Health Questionnaire (PHQ-9) [30]. Participants who met eligibility criteria and had a PHQ-9 score ≥10 were asked to participate in a telephone interview using the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID-I) [31] and the HDRS. Those scoring ≥12 on the HDRS and not meeting exclusionary criteria based on psychiatric disorders (anorexia, bipolar disorder, personality disorders, psychosis) and poorly controlled medical conditions, were asked to participate in an in–home visit to review study protocol and consent to be randomized. After consenting, participants were given a questionnaire packet (pre-treatment assessment) to return via the mail. Assessors were blind to treatment condition with the exception of the PI who participated in pre-treatment interviews; the PI was blinded to all other assessments.

A 1:1 blocked randomization allocation ratio was used following pre-treatment assessments. Block size varied to ensure that the PI could not predict group assignment for the next participant, and to address potential imbalance with group assignment during the study [32]. For example, with a block of eight participants randomized according to a predetermined ratio of 1:1, four participants were allocated to the yoga group and four to the WLC group.

2.3. Measures

The nine-item Patient Health Questionnaire (PHQ-9) [30] is a depression scale that includes the 9 criteria for diagnosing DSM-IV major depression. The PHQ-9 has high sensitivity (73%–88%) and specificity (88%–98%) in large population-based studies, and is used as an effective screening tool for depression [33]. The SCID-I assesses major Axis I and II psychiatric disorders using the DSM-IV, and was administered to participants in the current study with PHQ-9 scores ≥10, a cut-off score that is predictive of Major Depressive Disorder [33].

The Hamilton Depression Rating Scale (HDRS) [29] is a reliable measure of the severity of current depressive symptoms, and is used extensively in depression treatment studies. The 17-item HDRS was selected as the primary measure of depression because it is sensitive to treatment change in the postpartum population [15], and is a valid indicator of depression severity in PPD [34].

The SCID and HDRS were administered over the telephone by Masters-level clinicians with experience in psychiatric interviewing. All interviews were audiotaped for reliability. The intraclass correlation was 0.98, 95% CI [0.94, 0.99] for the HDRS based on 18 interviews and three separate raters.

The Inventory of Depression and Anxiety Symptoms (IDAS) [35] is a 64-item factor analytically derived, multidimensional inventory that uses a 5-point Likert scale to assess symptoms of depression and anxiety over the past 2 weeks (1 = *not at all* to 5 = *extremely*). The IDAS has strong internal consistency, and has been validated for use in a postpartum sample [35]. We used the General Depression

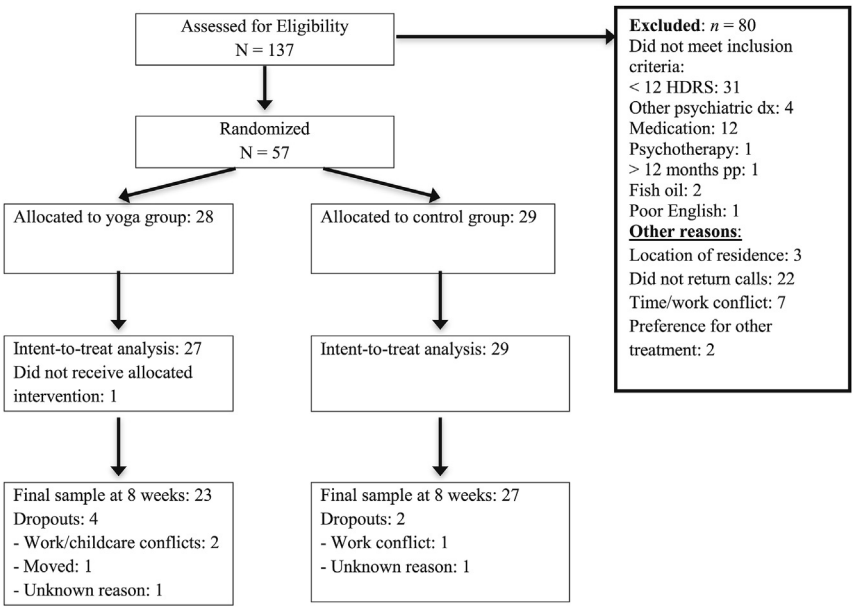

Fig. 1. Diagram showing the flow of participants through the trial and reasons for dropout. HDRS = Hamilton Depression Rating Scale; dx = diagnosis; pp = postpartum.

and Well-Being scales to assess the nature and course of depression over time (along with the HDRS), and the Panic, Social Anxiety, and Traumatic Intrusions scales to assess anxiety.

The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) [36,37] was used to measure HRQOL. It consists of 36 items reflecting 8 domains of health: 1) role-limiting physical, 2) role-limiting emotional, 3) physical functioning, 4) social functioning, 5) mental health, 6) energy and vitality, 7) pain, and 8) general health perceptions. All domains are scored on a scale from 0 to 100; higher scores reflect better health. The measure has strong psychometric properties, and has been validated in PPD samples [11,12].

2.4. Intervention

A Gentle Vinyasa Flow class was developed by certified yoga instructors with expertise in yoga for postpartum women. Consideration was given to yoga poses used in previous yoga-based interventions for depression. The yoga intervention consisted of 16 1-h yoga classes over the course of 8 weeks. The 1-h yoga class consisted of sun salutations, balancing, twisting, and relaxation poses (see Appendix for the yoga protocol). The same series of poses were taught for all 16 classes. The classes were taught by certified yoga instructors, primarily the lead investigator. Participants in the yoga intervention were asked to practice at home at least once a week using a DVD that offered a 30-min yoga sequence modeled after the class taught in the studio. The home-based practice was assessed via questions developed by the PI to capture frequency of practice in days and hours/minutes (e.g., "During the last 2 weeks, how many days did you do any yoga at home? "). WLC participants were asked to refrain from practicing yoga with an instructor and/or seeking other treatments during the 8-week waiting period. The blinded assessor confirmed compliance at each time point, and assessed participants' suicide risk.

2.5. Statistical analyses

Analyses were primarily conducted using growth curve modeling (GCM) techniques [38] and HLM 7 software [39]. GCM estimates within-individual change or growth trajectories for a variable (e.g., depression). GCM provides tests of whether parameters of a growth trajectory differ significantly from zero, and whether there is variability in parameter estimates across participants. Five repeated measurements were nested within participants: pre-treatment, week 2, week 4, week 6, and week 8. All available data are used to estimate within-subject parameters; thus, all participants are retained in the analyses despite missing data. The parameter of interest in these analyses was the Time × Treatment interaction, which indicated whether the groups (Yoga = 1 and WLC = 0) significantly differed in rates of improvement over the 8-week intervention.

An *intent-to-treat analysis* was conducted such that all enrolled participants were included in all analyses unless the participant did not provide data for the pre-treatment assessment ($n = 1$). Thus, the final analysis was conducted with $n = 27$ women. To address missing data due to attrition/drop-out, pattern-mixture models for non-ignorable missing data were conducted [40,41] with the primary dependent variable (DV), HDRS, such that drop-out status was examined as a moderator of treatment effect, which did not vary as a function of attrition ($t = -1.16$; $df = 51$; $p = 0.252$).

3. Results

Forty-four percent of the yoga group ($n = 12/27$) and 34% of the control group ($n = 10/29$) had prior yoga experience (≥1 month with a certified instructor), a non-significant difference ($p = 0.378$). On average, women in the yoga group attended 11.46 out of 16 classes ($SD = 4.48$, *range* = 1–16). Class sizes ranged from 1 to 8 participants (mode = 1). Seventy-eight percent ($n = 21/27$) of the women practiced at home using the yoga DVD at least once every two weeks during the 8-week intervention.

Pre-treatment comparisons between groups were conducted for DVs and sociodemographic factors including: race and ethnicity, education, age, parity (number of live births), income, and marital and breastfeeding status. Comparisons were conducted using chi-square analysis (or Fisher's exact test when appropriate) for categorical variables and t-tests for continuous variables. These analyses indicated that the yoga and WLC groups were similar in their

Table 2
Means (SDs) of dependent variables for the Yoga and WLC groups at each assessment.

	Pre-treatment		Week 2		Week 4		Week 6		Post-treatment	
Variable	Yoga	WLC	Yoga	WLC	Yoga	WLC	Yoga	WLC	Yoga	WLC
HDRS	17.33 (5.10)	15.34 (3.12)	10.37 (5.36)	12.07 (5.39)	8.77 (6.77)	10.23 (5.01)	6.35 (5.22)	9.41 (5.43)	5.87 (6.03)	8.52 (5.43)
GD	58.19 (9.10)	57.21 (9.49)	49.40 (9.14)	53.39 (10.93)	46.91 (11.89)	50.92 (10.46)	41.71 (6.88)	49.00 (12.57)	36.56 (6.51)	49.56 (9.16)
WB	17.37 (4.24)	16.28 (3.99)	19.96 (4.78)	17.07 (4.09)	21.74 (6.49)	17.75 (4.96)	22.65 (5.23)	17.73 (5.56)	24.25 (3.79)	17.67 (4.75)
SA	10.96 (3.33)	9.03 (3.66)	9.00 (3.14)	8.71 (3.43)	8.87 (3.48)	8.63 (3.16)	7.71 (1.99)	8.18 (3.62)	7.00 (2.03)	8.44 (3.73)
TI	7.30 (4.20)	5.62 (2.30)	6.88 (3.17)	5.75 (2.10)	6.26 (3.19)	5.38 (2.02)	4.71 (1.16)	5.32 (2.08)	4.94 (1.39)	5.39 (2.23)
Panic	11.44 (3.00)	11.03 (3.21)	9.76 (2.11)	10.00 (2.71)	10.43 (2.52)	10.00 (2.96)	8.88 (1.17)	9.59 (2.13)	8.75 (1.18)	9.83 (2.91)
SF36	51.54 (11.73)	56.33 (14.06)	59.23 (12.88)	56.53 (16.30)	66.28 (15.25)	61.12 (15.90)	76.48 (11.01)	65.00 (14.99)	75.19 (12.72)	63.18 (15.27)

WLC = wait-list control; HDRS = Hamilton Depression Rating Scale; GD = IDAS General Depression scale; WB = IDAS Well-Being Scale; SA = IDAS Social Anxiety; TI = IDAS Traumatic Intrusions; SF36 = 36-Item Short-Form Health Survey.

racial and ethnic backgrounds, history of depression, education, parity, income level, and breastfeeding status. There was a significant difference between groups at pre-treatment for age ($t = 2.63$; $df = 54$; $p < 0.05$) and the IDAS Social Anxiety scale ($t = -1.93$; $df = 54$; $p < 0.05$). Thus, these variables were included as covariates in the GCM analyses. Means and standard deviations of DVs are presented in Table 2.

On average, depressive symptoms (assessed via the HDRS) decreased systematically over time *for the entire sample* ($t = -10.17$; $df = 55$; $p < 0.001$), and there was significant between-subject variability in the slope parameter ($\chi^2 = 114.16$; $df = 54$; $p < 0.001$). The same pattern of results emerged for the other DVs (improvement over time; individuals differed in rates of improvement).

Individuals in the yoga group experienced a steeper linear decline in depressive symptoms over the course of the intervention than WLC group ($t = -2.94$; $df = 52$; $p = 0.005$; Fig. 2). A Reliable Change Index score (RCI) [42] was calculated to determine clinical significance. Roughly 78% of the women in the yoga group ($n = 18/23$) and 59% ($n = 16/27$) in the control group experienced clinically significant change from pre-to post-treatment. Four women from the yoga group and two from the WLC group did not complete the post-assessment and were necessarily excluded from the analyses. Individuals in the yoga group, relative to the WLC, also experienced steeper linear decline in scores on the IDAS General Depression scale ($t = -3.26$; $df = 52$; $p = 0.002$), and steeper linear increase in scores on the IDAS Well-Being scale ($t = 2.94$; $df = 52$; $p = 0.005$; Table 3).

Individuals in the yoga group, relative to the WLC, experienced steeper linear decline in scores on the IDAS Traumatic Intrusions scale ($t = -2.37$; $df = 52$; $p = 0.021$), and the IDAS Social Anxiety scale ($t = -2.84$; $df = 52$; $p = 0.006$). However, there were no group differences in rates of change for the IDAS Panic scale ($t = -1.11$; $df = 52$; $p = 0.272$). Individuals in the yoga group, relative to the WLC, experienced steeper linear increase in HRQOL scores during the 8-week intervention ($t = 5.09$; $df = 52$; $p < 0.001$).

For treatment response rates, we examined whether women in the yoga group benefited more from attending a greater number of classes or from having prior yoga experience. The recommended "dose" of the yoga intervention was 16 yoga classes over 8 weeks. The number of classes attended ($t = 0.05$; $df = 25$; $p = 0.960$), and prior yoga experience ($t = 0.43$; $df = 25$; $p = 0.672$) were not associated with rates of change in depressive symptoms (HDRS) over the 8 weeks.

4. Discussion

Women in the yoga group improved at a significantly faster rate on measures of depression, anxiety, well-being, and health-related quality of life (HRQOL) relative to the WLC group. These findings are consistent with previous studies investigating the effects of yoga on depression and anxiety in cancer patients and survivors, and college students, and lend support for yoga as an efficacious treatment for PPD. Further, our findings suggest that yoga improves HRQOL. Although women in the yoga group experienced significantly greater improvement across multiple dimensions of mental health,

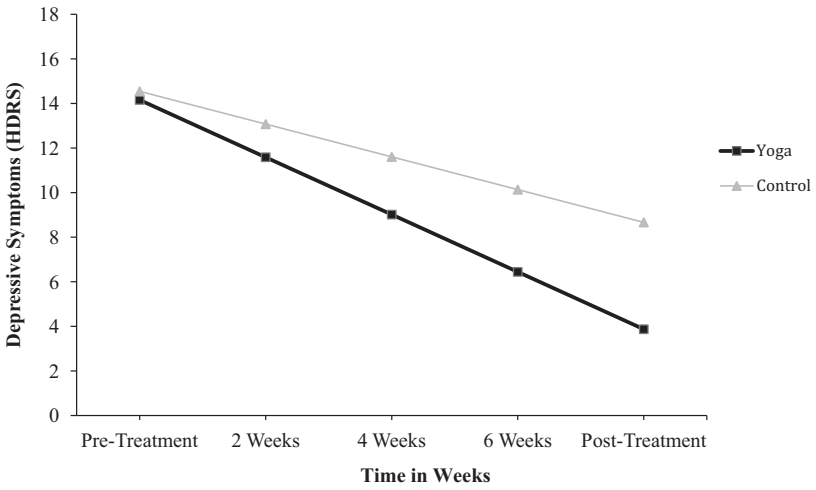

Fig. 2. Mean trajectories of scores on the Hamilton Depression Rating Scale (HDRS) for the Yoga and WLC groups, controlling for social anxiety at pre-treatment and mother's age, were graphed using parameter estimates from the GCM analyses. Rate of decline in HDRS scores for the Yoga group was greater than the average rate of weekly decline for the control group ($t = -2.94$; $df = 52$; $p < 0.005$).

Table 3
Treatment assignment predicting rate of change over the 8-week intervention.

Variable	γ	*SE*	95% CI γ	*t* (*df* = 52)	Stand. effect	% Of variance
HDRS	−0.55	0.19	[−0.92, −0.18]	−2.94**	−1.06	13.69%
IDAS: GD	−1.09	0.41	[−1.88, −0.47]	−3.26**	−0.91	17.89%
IDAS: WB	0.56	0.19	[0.19, 0.93]	2.94*	0.90	11.42%
IDAS: SA	−0.26	0.09	[−0.43, −0.08]	−2.84*	−1.03	11.17%
IDAS: TI	−0.25	0.11	[−0.46, −0.04]	−2.37*	−0.92	8.66%
IDAS: Panic	−0.09	0.08	[−0.24, 0.07]	−1.11	−0.56	33.80%
SF-36 Total	2.23	0.44	[1.37, 3.09]	5.09***	1.26	37.35%

γ = unstandardized coefficient; *SE* = standard error; 95% CI γ = 95% confidence interval of unstandardized coefficient; Stand. effect = $\gamma_{p1}/\sqrt{\tau_{pp}}$ (i.e., standardized difference between the two groups in rates of change).
*p < 0.05; **p < 0.005; ***p < 0.001.

relative to women in the wait-list control condition, the two groups did not differ with regard to rates of change in panic symptoms. Nonetheless, women presented with relatively few panic symptoms at the start of treatment (M = 11.23, SD = 3.09, *range* = 8-19; *possible range* = 8–40); therefore, improvement over time would be minimal, regardless of group assignment.

We identified a large standardized effect size (i.e., standardized difference between the two groups in rates of change) favoring yoga relative to the control group on the primary outcome measure of depression (HDRS). This is notable given that a meta-analytic review of "gold-standard" psychological treatments for PPD identified a medium effect size [4]. Our study also demonstrated a large effect size for social anxiety scores, favoring yoga. Together, these findings provide compelling support for the implementation of large-scale randomized controlled trials on yoga for PPD.

Regarding HRQOL, women in the yoga group experienced steeper linear increase in scores on the SF-36 total composite over the 8-week intervention than the control group. Studies using the SF-36 to measure HRQOL in depressed postpartum women show strong evidence for a negative association between depression and role functioning in various domains such as work, family, and social relationships [43,44]. Of note, previous findings in an MDD sample support yoga's role in facilitating a sense of connectedness with oneself and others [19]. Together, these outcomes may inform theories of self-efficacy as a mediator in the pathway between yoga and improved psychological and physical health.

We also provide evidence for feasibility of the study. We demonstrate the ability to recruit sufficient numbers of the target population (*N* = 57), evidenced by having adequate power to detect clinically significant improvement in primary and secondary outcomes over the course of the intervention. Additionally, women in the yoga group completed 11.46 of the classes offered through the yoga intervention (*range* = 1–16), which is more than half of the recommended "dose" of 16 classes. It is not clear what the necessary "dose" of yoga is to facilitate clinically significant change. Future studies should address this question in the context of systematically examining yoga as an efficacious complementary therapy.

There is a growing interest in the role of yoga as a CAM therapy for emotional and physical health [17,18], particularly during the perinatal period [20–23]. As such, researchers are beginning to consider the rigorous examination of yoga interventions in the context of well-established psychotherapy treatment trials. Therefore, these trials should emphasize clear randomization procedures, adequate comparison groups and description of the yoga style and protocol (e.g., sequence of poses, studio environment). Additionally, it is important to systematically examine intervention-related characteristics, including the "dose–response effect" and prior yoga experience to standardize these variables for comparison with future yoga efficacy studies. Emphasis on the systematic study of yoga interventions will support replicability and the expansion of rigorous empirical support for yoga.

The use of a WLC group was an adequate comparison group for conducting this initial efficacy RCT to determine whether yoga had beneficial effects on reducing depression and anxiety, and improving HRQOL, in depressed postpartum women. Strengths of a WLC group include controlling for the passage of time, the effects of repeated assessments, and the expectation for treatment. As a follow-up to this initial efficacy study, future studies should employ an attention control group to address potential issues surrounding threats to internal validity and the generalizability of study findings. Finally, the mechanistic role of mindfulness, breathing, and physical activity in the efficacy of yoga for reducing depression and anxiety and improving HRQOL in depressed postpartum depression is unclear. Dismantling studies targeting these potential mechanisms of action are warranted, along with the inclusion of more rigorous control groups above and beyond a wait-list control or treatment-as-usual.

4.1. Strengths and limitations

Strengths include the use of outcome measures similar to those used in rigorous PPD treatment trials (e.g., HDRS as a measure of depression), blinded clinical assessors, a rigorous randomization process using a wait-list control for the comparison group, and a yoga intervention developed specifically for postpartum women.

There are several limitations of the study that warrant discussion. First, the sample size was modest (*N* = 57), and smaller than other treatment trials for PPD (*N* = 120) [15]. Generally a small sample size reduces the power to detect significant differences between groups; nonetheless, we detected both statistically and clinically significant differences between groups for primary and secondary outcome measures with a sample size of *N* = 57. Second, our sample consisted of primarily White, well-educated, married women, which limits the generalizability of our findings to more diverse populations of women with PPD.

Third, the PI of the study (an experienced yoga instructor) taught the majority of classes. The yoga classes were taught in a standardized way, consistent with the protocol developed for this study, to maximize treatment response. Since a waiting list control group was used, there was no allegiance bias possible. That is, the yoga instructors did not provide "suboptimal" therapy of another type; rather they simply provided the best yoga instruction possible.

Further, clinical interviewers who were blind to treatment condition conducted clinical assessments at all time points during the intervention. Therefore, this potential rating bias was also addressed in this study. Nevertheless, it will be important to conduct future studies to replicate this work with instructors having a broader range of teaching experience to determine

whether there are notable effects on outcomes. Finally, we cannot speak to the maintenance of treatment gains; thus, we cannot address questions regarding the long-lasting effects of yoga, if any, after treatment completion.

5. Conclusion

This study represents the first efficacy trial of yoga for PPD, and extends empirical support for yoga with postpartum women. Future research should include large-scale replication studies that involve a follow-up period of substantial length (e.g., 12 months) and a larger sample size with an ethnically diverse population. Second, theory-driven mechanisms of action such as mindfulness, physical activity, and breathing should be examined. Finally, we should consider bringing a systematic approach to conducting yoga efficacy trials to build the foundation for valid replication studies and to standardize intervention-related characteristics.

Conflict of interest statement

None declared.

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Appendix

Yoga sequence and poses

I. Breathing and centering techniques
II. Warm-up
  1. Arms overhead/down (seated)
  2. Cat-Cow
  3. Thread the needle
  4. Downward facing dog
  5. Standing forward bend (with feet apart)
  6. Mountain
  7. Sun Salutation A (with modifications)
III. Integrative
  1. Lateral side stretch
  2. Arms overhead/down (standing)
  3. Crescent lunge (with modifications)
  4. Warrior II
  5. Exalted warrior
  6. Extended side angle (with modifications)
  7. Extended triangle (with modifications)
  8. Tree
IV. Floor Stretches/Relaxation
  1. Half camel
  2. Bridge
  3. Single knee to chest
  4. Double knee to chest
  5. Supine twist
  6. Happy baby
  7. Corpse

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