



## A pilot feasibility study of mindfulness childbirth education for women with a history of sexual trauma



Cynthia Price<sup>a,\*</sup>, Ira Kantrowitz-Gordon<sup>b</sup>, Rebecca Calhoun<sup>c</sup>

<sup>a</sup> Box 357266, Dept. of Biobehavioral Nursing and Health Informatics, University of WA, Seattle, WA, 98195, USA

<sup>b</sup> Box 357262, Dept. of Family and Child Nursing, University of WA, Seattle, WA, 98195, USA

<sup>c</sup> Box 351525, Dept. of Psychology, University of WA, Seattle, WA, 98195, USA

### ARTICLE INFO

#### Keywords:

Childbirth education  
Interoceptive awareness  
Mindfulness  
Pregnancy  
Trauma

### ABSTRACT

**Background:** and purpose: Pregnant women with a history of sexual trauma are at increased risk for mood disorders. Mindfulness interventions delivered prenatally may reduce risk of mood disorders. The purpose of this pilot was to examine the feasibility and acceptability of Mindfulness-Based Childbirth and Parenting (MBCP) for women with a history of sexual trauma.

**Materials and methods:** A one-group repeated measures design was employed, involving three assessments: baseline, post-intervention and at eight weeks postpartum. Twelve pregnant women were recruited and enrolled. Self-report measures and open-ended written questionnaires were used to assess health outcomes and intervention acceptability.

**Results:** Results show high satisfaction with the program, an immediate reduction in prenatal anxiety, and longitudinal increase in interoceptive awareness skills.

**Conclusion:** The results suggest the feasibility and acceptability of the MBCP approach for women with a history of sexual trauma.

### 1. Introduction

Pregnant women with a history of interpersonal trauma (e.g. abuse during childhood, physical and/or sexual assault or intimate partner violence as adults), are particularly vulnerable to mood disorders and additional challenges during pregnancy. In the clinical literature, authors highlight women's discomfort with bodily changes, anxiety and/or discomfort with prenatal vaginal exams, and an overall sense of increased vulnerability and sensitivity around feeling safe and in control; particularly in anticipation of labor and birth [1,2]. Alvarez-Segura et al. conducted a systematic review and concluded that women with a history of interpersonal trauma are at higher risk for depression during the pre and postnatal periods, compared to those without a history of trauma [3]. Notably, a history of childhood abuse and/or lifetime trauma exposure increases women's risk of depression [4–6], and a prior history of severe depression is the largest risk factor for peripartum mood disorders [7].

Depression during and after pregnancy can have serious health consequences for the mother, such as: irritability, anxiety, fatigue, reduced coping, and risk of suicide [8]. In addition, a mother's mental health can have negative effects on fetal development, birth outcomes

(e.g. gestational age, birth weight, etc.), infant attachment, and long-term child development [3,8,9]. Given the potential health consequences and the overall high prevalence of postpartum depression symptoms among women in both developed and undeveloped countries [8,10], depression in the prenatal and postpartum periods is a major health concern and risk reduction strategies are needed, particularly for women at increased risk such as those with a history of interpersonal trauma [11,12].

To facilitate wellbeing and self-care skills for managing anxiety and stressors during pregnancy and labor, a mindfulness childbirth education program was developed for pregnant women called Mindfulness-Based Childbirth and Parenting (MBCP) [13]. Mindfulness is defined as awareness that arises by paying attention on purpose, in the present moment, and non-judgmentally [14]. MBCP covers similar topics as traditional childbirth education, such as information about bodily changes during pregnancy, what to expect during labor and delivery, strategies for managing labor and delivery. In addition, MBCP incorporates mindfulness skills using many of the Mindfulness-Based Stress Reduction [14] processes, and addresses the use of mindfulness for coping with concerns of pregnancy and early parenting [13]. The underlying theory is that with mindfulness skills, women are better able

\* Corresponding author.

E-mail address: [cynthiap@uw.edu](mailto:cynthiap@uw.edu) (C. Price).

<https://doi.org/10.1016/j.ctcp.2019.09.005>

Received 12 February 2019; Received in revised form 16 September 2019; Accepted 17 September 2019

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to cope with the additional stressors associated with pregnancy and the immediate post-partum period, as well as the pain and stress of labor and delivery [15]. An integral aspect of mindfulness training is attention to sensory cues in the body, or interoceptive awareness [16]. Difficulty with interoceptive processing is thought to underlie core aspects of depression [17], and would thus be critical to address in interventions for at-risk populations such as women with a history of sexual trauma.

Findings from multiple prior MBCP pilot studies demonstrate reduced symptoms of depression and/or anxiety compared to standard childbirth education [18], wait-list [19], or reading control condition [20,21]. Interoceptive awareness, studied in one prior MBCP study [18] demonstrated improvement in response to the intervention and in comparison to standard childbirth education. Research studies examining the effect of interoceptive awareness training among women with histories of sexual trauma show improved symptoms of depression and emotion regulation [22–24]. Mindfulness skills, however, have not consistently shown significant between group improvement [18]. In contrast, a meta-analysis of controlled mindfulness-based interventions of any kind during pregnancy, including MBCP [25] found no between-group differences on any health outcomes. However, among studies in which participants with elevated anxiety, depression, or stress were included, results demonstrated significant between-group pre-post effects for reduced depression and anxiety. This moderation effect suggests that prenatal mindfulness interventions are *most* useful for individuals who are susceptible to depression or anxiety [25].

Our study was designed to examine the feasibility and acceptability of a modified MBCP program for women with a sexual trauma history, a population that has increased vulnerability to pre and post-partum depression and anxiety. The study aims were to: 1) describe program recruitment and retention feasibility; 2) estimate intervention effects on mental health distress and coping (i.e., depression, anxiety, emotion regulation) and intervention process measures (interoceptive awareness and mindfulness skills) from baseline -post intervention, and from baseline to 8 weeks postpartum; and 3) examine program acceptability and participant experience.

## 2. Materials and methods

### 2.1. Design

A one-group pilot-test study design using repeated measures and qualitative written questionnaires were used. Designed for a vulnerable

population, the education-focused intervention and self-report measures were determined to pose only minimal risk to the participants. The study procedures and consent forms were approved by the Human Subjects Committee at a large university in the Pacific Northwest of the United States and were in accord with the Helsinki Declaration of 1975.

### 2.2. Sample and setting

We aimed to recruit 10–16 pregnant women with a history of sexual trauma to examine the feasibility of delivering a mindfulness childbirth education program. All study activities took place at a large university in the Pacific Northwest with the exception of the postpartum meeting, which was typically a home visit.

### 2.3. Intervention

The MBCP course [13] was used as the intervention. MBCP was designed to reduce stress and anxiety and increase resilience and coping skills during pregnancy, birth, and the post-partum period by teaching mindfulness skills within the context of childbirth education classes [21]. Mindfulness practices taught in MBCP include: the body scan, awareness of breathing, walking meditation, and loving-kindness. The teaching of mindfulness is integrated with teaching the psychobiological processes of pregnancy, labor, birth, breastfeeding, postpartum adjustment, and the needs of the infant. A variety of mind-body pain/fear coping skills for childbirth and awareness skills for coping with stress in daily life are also included. MBCP class sessions include an inquiry methodology in which participants are asked to reflect on their learning and to share their experiences of applying mindfulness skills in their own lives. This sharing helps to create an environment of safety and openness which is a key component of the MBCP program.

For this study, the MBCP protocol was modified to include specific information regarding childbirth and trauma, however, the participants were never asked to share directly about their own personal trauma histories. In addition, the number of classes were reduced to 6 from the usual 9, the full-day retreat was eliminated, and three individual coaching sessions were added to facilitate learning and practice of mindfulness skills, with a particular focus on developing interoceptive awareness and mindfulness skills for self-care. These modifications were made to: a) explore the feasibility of a shorter class and b) address the potential need for individualized mindfulness training and practice given that women with sexual trauma histories are often disconnected

**Table 1**  
Outline of modified mindfulness-based childbirth and parenting (MBCP) program.

Session/Class	Primary Topics	Mindfulness Practices & Exercises
Individual Coaching Session 1	Conceptual framing of individual sessions and mindfulness training for women with trauma histories	Yogic breath exercise
Class 1	Mindfulness as a skill	Interoceptive awareness exercise
Class 2	Relationship to stress & well-being	Mindful eating (raisin)
Class 3	Importance of perception	Intro awareness of breathing
Class 4	Physiology of normal birth, pain & fear	Awareness of breathing
Class 5	The comparing and judging mind	Ice “contractions” mindfulness
Class 6	Mechanisms of labor, positions and movement	Gentle yoga
Individual Coaching Session 2	Mindfulness practice check-in and discussion of helpful strategies	Ice “contractions”
Class 7	Body Scan: overview and purpose	Related resources if needed
Class 8	The illusion of control and factors at play in birth	Body Scan Exercise (using hands)
Class 9	Importance of flexibility in coping	Body scan meditation
Class 10	Turning toward fear	Ice “contractions” using sounding
Class 11	Self-Compassion, self-care as parent	Loving kindness meditation
Class 12	Newborn needs & breastfeeding	STOP technique
Class 13	Mindfulness to recognize needs of self and baby	Breath awareness with loving kindness
Class 14	Post-partum check-in re: postpartum transitions, stress & challenges	Three minute breathing space
Class 15	Self-care and related needs	Practice exploration – what is needed for integration in life
Class 16		Mindful practices for self-care reviewed or new strategies introduced

Note: STOP stands for Stop, Take a breath, Observe, Proceed.

from their bodies [26,27] and may find it challenging to attend mindfully to internal emotional and physical sensations [28]. See program outline, Table 1.

The classes were taught by an instructor with over 15 years' experience working with women in the perinatal period, who was trained with MBCP developer Nancy Bardacke, and has been teaching the full MBCP protocol in the community for 5 years. The individual coaching sessions were delivered by an expert in interoceptive awareness skill development for women with histories of sexual trauma.

#### 2.4. Procedures

There were multiple recruitment strategies. The primary strategy involved placement of flyers advertising the study in community clinics, obstetrical (OB) care offices, Supplemental Nutrition Women, Infants and Children (WIC) clinics, yoga studios offering prenatal yoga, etc. We also distributed flyers to nurse practitioners, midwives, and OB physicians to distribute to the women in their practices. In addition, we posted research notices describing the study in local newspapers, and on online research sites. In all, over one hundred clinics, community organizations and health professionals that serve pregnant women were contacted re: recruitment for this study.

The flyers instructed women to call a study phone line. Those who did were given a thorough description of the study, and then if interested in participation, were screened for eligibility. To be eligible for study participation, individuals had to be: a) between 12 and 32 weeks pregnant by the time of first scheduled intervention class; b) self-report a history of sexual trauma; c) able to attend class sessions when offered; d) fluent in English, e) have no untreated psychotic diagnosis or symptoms; and f) be willing or able to remain in the study for its duration (e.g, no planned relocation, pending incarceration, etc.).

Women eligible for study participation were scheduled for an initial appointment with the research coordinator, who reviewed the consent form and administered the baseline assessment. Informed consent was obtained from all individual participants included in the study. After completion of the initial appointment, the participant was scheduled for her first individual coaching session. The first individual coaching session was delivered one week prior to the start of the 6-week mindfulness childbirth education class. The second individual coaching session was scheduled mid-class, and the final individual coaching session was scheduled at 6 weeks post-partum.

The research coordinator administered assessments at three time-points: baseline (T1), post-intervention (T2), and at 8 weeks postpartum (T3). Baseline-only assessments were used to describe participant demographics and lifetime trauma exposure and included a demographic survey and two questionnaires: the Adverse Childhood Experiences Questionnaire (ACE) [29], and the Trauma Life Events Questionnaire (TLEQ) [30]. To assess intervention feasibility, we tracked recruitment and enrollment response, and participant attendance to classes and individual coaching sessions. To evaluate intervention acceptability, we solicited responses on surveys and written questionnaires at T2 and T3 regarding intervention satisfaction, intervention experience, and use of mindfulness skills. We used self-report measures to examine change on health outcomes and intervention process variables (interoceptive awareness and mindfulness skills), administered at all time-points. Last, we collected reported birth outcomes on the post-partum survey. In appreciation of the time and effort to attend study visits, participants were remunerated \$30 for completion of questionnaires at each assessment time point.

#### 2.5. Measures

##### 2.5.1. Symptom measures

To examine symptoms of distress we used four questionnaires. The *PTSD Symptom Scale-Self Report (PSS-SR)* [31] was used to assess Post-Traumatic Stress Disorder (PTSD) symptoms. Based on DSM-IV-TR

criteria [32], the 17 items measure frequency of symptoms based on a 4-point Likert-type scale. A score above 14 was used as the screening indicator of PTSD [33]. For diagnostic screening we used the *Patient Health Questionnaire (PHQ-9)* [33] to assess depression and the *Generalized Anxiety Disorder Scale (GAD-7)* [33] to assess anxiety. There are cut-points on both the PHQ-9 and the GAD-7 to screen for mild, moderate or severe symptom levels. We also used two pregnancy-specific measures including the *Edinburgh Postnatal Depression Scale (EPDS)* [34], which has 10-items to assess for depression during pregnancy and postpartum using a 4-point Likert-type scale; and the *Prenatal Pregnancy Anxiety (PPA)* [35], a 4-point Likert type scale to measure pregnancy-related anxiety.

##### 2.5.2. Coping measure

To examine coping, we used the *Difficulty in Emotion Regulation Scale – Short Form (DERS-SF)* [36]. The DERS-SF is a 5-point Likert-type scale with 18-items designed to assess difficulties with emotion regulation.

##### 2.5.3. Process measures

Two measures were used to examine intervention processes. The *Five Facet Mindfulness Questionnaire – Short Form (FFMQ-SF)* is a 24-item scale to assess frequency of mindfulness skills on a 5-point Likert-type scale [37]. The FFMQ-SF is comprised of five scales to measure mindfulness skills of observing, describing, acting with awareness, non-judging, and nonreacting. The *Multidimensional Assessment of Interoceptive Awareness (MAIA)* [40], has 8 distinct scales, all 5-point Likert-type scales, to assess interoceptive skills. The scales are: noticing (awareness of body sensations); not-distracting (tendency to not ignore or distract from sensations of discomfort); not-worrying (tendency to not worry with sensations of discomfort); attention regulation (ability to sustain attention to body sensations); emotional awareness (aware of connection between physical and emotional states); self-regulation (ability to regulate distress by attention to body sensations); body listening (active listening to body for insight); and trusting (experience one's body as safe and trust-worthy).

##### 2.5.4. Acceptability and qualitative surveys

To gather acceptability we created two surveys, one for immediate post intervention and one for the post-partum follow-up. Both surveys included two types of questions: a) Likert-type questions to measure overall satisfaction and b) open-ended questions to gather perceived helpfulness of the program. Specifically, the *Post-Intervention Survey* Likert-type questions were specific to the intervention components, and the open-ended questions focused on: skills learned, integration of skills into daily life, and helpfulness of program for coping with stressors during pregnancy/labor, and in the post-partum period. The *Follow-up Survey* Likert-type questions focused on use of mindfulness skills during labor, and perceived helpfulness of the MBCP class for managing pain and stressors associated with labor and delivery and the postpartum period. The open-ended questions focused specifically on what mindfulness skills were used during labor and delivery, and in the postpartum period.

##### 2.5.5. Birth and breastfeeding

A Birth Outcomes and Breastfeeding Survey was administered at T3 to gather participant responses regarding mode of delivery, gestational age, birth weight, labor analgesia, neo-natal intensive care unit (NICU) admission, and breastfeeding.

#### 2.6. Statistical and qualitative analyses

Descriptive statistics (median, range) were used to present sample characteristics. Histograms of assessment outcomes were visualized for evaluation of distributions; statistical tests for normal distribution and outliers were not performed because of the small sample size. Changes over time on assessments were analyzed using paired-sample *t*-test and

Cohen's *d* effect size [38]. Open-ended qualitative responses were analyzed using qualitative description [39] and qualitative content analysis [40].

### 3. Results

#### 3.1. Sample characteristics

Twelve women were eligible for participation (i.e. had a self-reported history of sexual trauma and were pregnant) and agreed to attend. They were divided into two class cohorts of 8 and 4 participants based on the timing of their recruitment. One of the participants in the second cohort withdrew after completing one individual coaching session and one class session due to severe illness; the final sample size was 11 participants. All 11 participants engaged in the program and completed the three assessments. Baseline demographic and pregnancy characteristics were evaluated at the first assessment. All were singleton pregnancies and nine of the eleven participants were having their first child. The mean gestational age at enrollment was 24 weeks (range 12–32). The majority of participants were white, married or partnered, and college graduates. Two participants were of mixed race: one African American/Native American, and one Asian/Caucasian. Household income showed participants in two distinct groups: 5 participants with annual income > \$100,000/year and six participants with < \$40,000/year. The mean ACE score (4.4) showed a significant trauma history burden in the sample. The trauma life experience questionnaire (TLEQ) further characterized the type of trauma histories, including multiple exposures to violence, death, physical and sexual traumas (see Table 2).

Baseline data from outcome measures showed that the participants, as a group, were at increased risk for depression and anxiety. At baseline, the mean EPDS score was 8.6, with 5 of the 11 participants scoring ≥10, demonstrating risk for depression. The GAD-7 showed similar results, with a mean score of 8.1. The majority of participants (n = 9) scored high enough to demonstrate mild or moderate anxiety (see Table 3).

**Table 2**  
Demographic characteristics (N = 12).

Characteristic	Frequency	Median (range)
Age		30.5 (24–40)
Week of gestational age at enrollment		22 (12–32)
Parity		
Nulliparous	9	
Parous	3	
High-risk pregnancy	2	
Race		
White	10	
Mixed Race	2	
Ethnicity		
Hispanic	1	
Not Hispanic	11	
Married or cohabiting:	10	
College graduate	8	
Household annual income < \$50,000	6	
ACE score		4 (0–9)
Traumatic life experiences		
Sudden death of loved one or friend	10	
Uninvited sexual attention	9	
Stalking	8	
Witnessed family violence as child	7	
Unwanted sexual contact (age > 18)	7	
Natural disaster	6	
Unwanted sexual contact (age 13–18)	6	
Threatened with death or injury	5	
Intimate personal violence (physical)	5	
Sexual contact (< age 13)	5	
Childhood physical abuse	4	

Note: ACE = Adverse Childhood Experiences.

**Table 3**  
Health and process outcomes at T1, T2, and T3 with effect sizes, N = 11.

Variable	T1	T2	T3	T1-T2	T1-T3
	Mean (SD)	Mean (SD)	Mean (SD)	Cohen's d	Cohen's d
EPDS	8.8 (3.2)	8.8 (4.6)	10.2 (6.9)	0	0.27
PHQ-9	6.9 (4.1)	7.3 (5.2)	5.9 (4.9)	0.08	−0.22
DERS-SF	35.3 (8.9)	32.8 (5.7)	33.1 (8.3)	−0.34	−0.25
PSS-SR	11.9 (7.8)	9.0 (9.2)	12.4 (12.1)	−0.34	0.05
GAD-7	8.1 (3.4)	6.7 (4.8)	6.8 (5.1)	−0.34	−0.30
PPA	24.4 (5.6)	18.9 (3.6)	–	−1.18**	–
FFMQ-SF					
Observe	13.7 (3.4)	13.6 (2.2)	13.3 (3.3)	−0.03	−0.14
Describe	19.4 (2.9)	19.5 (1.8)	18.9 (2.4)	0.04	−0.17
Act with	17.1 (3.8)	18.0 (1.9)	16.1 (4.2)	0.32	−0.25
Awareness					
Nonjudging	15.5 (3.4)	18.2 (1.6)	15.7 (3.7)	1.06*	0.05
Nonreacting	15.5 (4.7)	16.8 (2.0)	16.2 (3.2)	0.41	0.18
MAIA					
Noticing	2.8 (1.1)	3.3 (.61)	3.3 (.58)	0.69	0.64
Non-distracting	2.5 (1.1)	2.9 (.79)	2.6 (.78)	0.43	0.10
Not worrying	2.9 (1.0)	3.1 (.80)	3.1 (.94)	0.20	0.15
Attention regulation	2.7 (.64)	3.1 (.70)	2.9 (.81)	0.52	0.23
Emotional awareness	3.2 (.99)	3.6 (.78)	3.5 (.81)	0.47	0.40
Self-regulation	2.9 (.90)	3.7 (.82)	3.7 (.82)	0.96*	0.87*
Body listening	1.9 (1.1)	2.4 (1.1)	2.2 (1.1)	0.46	0.30
Trusting	2.9 (1.3)	3.7 (.99)	3.7 (1.1)	0.65*	0.62*

\* p < 0.05, \*\* p < 0.01.

Note: EPDS = Edinburgh Postnatal Depression Scale; PHQ-9 = Patient Health Questionnaire-9; DERS-SF = Difficulties in Emotion Regulation-Short Form; PSS-SR = PTSD Symptom Scale-Self Report; GAD-7 = Generalized Anxiety Disorder -7; PPA = Prenatal Pregnancy Anxiety; FFMQ -SF = Five Factor Mindfulness Questionnaire-Short Form; MAIA = Multidimensional Assessment of Interoceptive Awareness.

#### 3.2. Program implementation feasibility: recruitment, attendance and retention

Over the four month recruitment period, twenty-five women indicated interest in study participation; of these 15 were eligible, and 12 enrolled. Of the eligible women who did not enroll, two chose not to participate due to concerns about completing the class before their due date, and one chose not to participate due to illness. Given the extensive recruitment outreach this level of response was low indicating the challenges of recruitment for this particular population.

Program participation was high. Class attendance averaged 4.7 classes (out of 6 possible) across the sample (this included scheduled make-up classes for the 2 participants who missed 2 or 3 class sessions). With one exception, the three individual coaching sessions were attended by all participants. The missed individual coaching session was the post-partum visit for a participant who moved out of the region.

Study retention was also high. One hundred percent of the participants completed the assessments at each of the three time-points.

#### 3.3. Health and process measure outcomes

A two-tailed *t*-test for dependent groups was used to examine differences in study measures between T1 and T2 (pre-post intervention) and between T1 and T3 (through 8 weeks post-partum). The significant pre-post intervention improvements included a decrease in prenatal pregnancy anxiety (*p* = 0.002), an increase on the non-judging facet of mindfulness (*p* = 0.018), and increased interoceptive awareness skills of self-regulation (*p* = 0.016) and body trusting (*p* = 0.022). The significant longitudinal improvements included interoceptive awareness



skills of self-regulation ( $p = 0.04$ ) and body trusting ( $p = 0.05$ ). The effect sizes for these significant improvements were large, ranging from 0.62 to 1.18 (see Table 3).

### 3.4. Program acceptability

#### 3.4.1. Intervention satisfaction and experience

The participants indicated high satisfaction with the program, with 9/11 participants rating their experience as “very satisfied” or “extremely satisfied.” Participants gave similarly high ratings for the class content for both delivery and parenting information (7/11) and mindfulness skills (8/11). The two individual coaching sessions during the class period were perceived to be helpful, with 10 of 11 participants rating them as “helpful”, “very helpful”, or “extremely helpful.” In response to the question of helpfulness given their history of sexual trauma, the majority (8) of participants rated the program as “probably helpful”; the other three participants rated the program as “probably not helpful.”

The majority of participants (7/11) reported using mindfulness skills in daily life at least three times/week during the period of the childbirth education class; three of the participants reported some but less frequent use of mindfulness skills. The online audio meditations were used only occasionally (0–2 times/week) by the majority (7/11), and three participants reported more frequent use of audio meditations. Participants indicated the helpfulness of the program, on a 1–5 scale in which 1 was “not helpful” and 5 was “tremendously helpful,” a mean of 3.7 for helping to understand the body and how it works, a mean of 3.6 for helping to feel more bodily connected, and a mean of 4.1 for helping to feel prepared for labor and delivery, and a mean of 4.0 for helping to manage stressors related to pregnancy, childbirth and parenting.

The primary theme that emerged from the written responses about overall helpfulness of the program was the combined educational elements (i.e. what to expect during labor and post-partum period) and learning mindfulness skills to manage generalized anxiety and pain during labor and delivery. For example, one participant wrote: “*I appreciated the practices with mindfulness in a variety of ways. It was helpful for me to be around and hear from other expecting parents. I appreciated the information and facts about labor, delivery and postpartum. The session on pain was helpful to understand the types of things to expect. The session on fear and loving kindness was helpful as a strategy to manage anxiety.*” Another participant example: “*The class was very helpful for learning mindfulness techniques for pain management (and also more about the psychology and physiology of pain). I had many opportunities to practice these techniques with several weeks of painful contractions and false labor.*” An additional theme that emerged was receiving support for, and feeling more confident about, the possibility of an un-medicated birth.

The primary theme that emerged from the written responses about the individual prenatal coaching sessions was the helpfulness of having one-on-one practice of mindfulness skills with a specific focus on the use of skills in response to daily stressors. For example: “*... helped me understand how I could incorporate mindfulness strategies that ground me in my body and breath during the course of the day rather than just focusing on a lengthy sitting meditation which has been a harder practice for me to develop.*”

The primary suggestion for program improvement was to increase time for discussion and social connection among the participants during the class. This included sharing experiences of using mindfulness in daily life, as well as experiences more specific to their common histories of sexual trauma.

#### 3.4.2. Birth and postpartum experience

The 8-week postpartum assessment (T3) focused on use of mindfulness skills since the time of class completion, perceived helpfulness of the final individual coaching session, and overall experience of the program for labor and delivery and during the postpartum period based on responses to the Follow-up Survey. In addition, we collected birth

**Table 4**  
Obstetric and breastfeeding outcomes (N = 11).

Variables	Mean (SD)
Gestational age at birth	39.6 (1.5)
Length of labor (hours):	11.7 (7.0)
Birthweight (grams)	3461.0 (757)
Birthweight < 1500 g	1.0 (9.0)
Frequency (%)	
Labor induced: n (%)	6 (55)
Vaginal birth	10 (91)
Epidural in labor	3 (27)
NICU admission	2 (18)
Breastfeeding 8 weeks postpartum	10 (91)

Note: NICU = Neonatal Intensive Care Unit.

outcomes and breastfeeding information to describe these characteristics of the sample (see Table 4). All infants were born at term ( $\geq 37$  weeks). Six women had induced labor, 6 had epidurals, and 1 had a cesarean birth. All women breastfed, with the exception of one participant who chose not to after delivering a very low birth weight infant who spent 7 weeks in the neonatal intensive care unit.

All participants, with one exception, indicated that they used mindfulness skills (primarily mindful breathing but also other skills of body scan, loving kindness, and sounding) during labor and delivery. These same participants reported the regular use (average of 3 times/week) of mindfulness skills in daily life between the time they completed the class and the postpartum assessment. The specific mindfulness skills used/practiced included both formal and informal mindfulness practices, practiced at least once or twice a week to cope with pain, stay relaxed, relieve stress and anxiety, and remain focused in the moment. There was one participant who indicated that although she found the class helpful, she had little interest in mindfulness and did not use mindfulness skills. The online mindfulness resources were used occasionally (less than once/week) by five participants, two reported more frequent use (1–3 times/week), and two indicated no use of these resources.

The overall program experience as it related to labor and delivery was highly satisfactory. The participants found mindfulness skills helpful with a mean of 4.0 on a 1–5 scale in which 1 was “not helpful” and 5 was “extremely helpful” during labor and delivery. Likewise, they had overwhelmingly positive birth experiences which were widely attributed to the helpfulness of this childbirth education program. For example, one participant wrote: “*I used mindfulness throughout my labor and have continued to use it with my newborn. I practiced taking the labor one contraction at a time and resting during the restful stages like we learned in class. I used the sounding method throughout my labor as well and visualized opening my body. This resulted in an unmedicated labor like I wanted and a very fast birth. I couldn't be happier with the outcome.*” Another participant wrote: “*I got my VBAC!! This birth experience was so amazing. I felt empowered and in control. I felt safe with my care providers and in my body. Pushing was hard work, but pulling him up on my chest myself was magical. I'm so grateful.*”

In the postpartum period, the program skills were helpful for managing stressors of parenting, with a mean of 3.3 on a 1–5 scale in which 1 was “not helpful” and 5 was “extremely helpful,” and for facilitating calm and confidence when parenting (mean of 3.5). The primary theme for the overall effect of the program in the postpartum period was the helpfulness of learning and using mindfulness skills to facilitate calm and reduce anxiety associated with being a new parent. For example, “*I have learned the general principal of mindfulness which has been very helpful in enjoying and finding calm in this special time. It has increased my bonding with my partner and baby.*” Another participant wrote, “*It has been helpful having these tools for anxiety-management and has helped the quality of my interactions with my partner as well as making*

me more adaptable in high pressure situations.”

Overall, about half of the participants indicated that they would like to use mindfulness skills more during the postpartum period. Barriers to use included lack of time, loss of the support from the class, not remembering to use skills when sleep deprived or anxious, and returning to old habits. This was especially true for the three participants who struggled with postpartum depression and/or anxiety. For example, one participant wrote: *“The program really helped my birth experience but postpartum, I really struggled. I focused so much on birth that I forgot to plan better for afterwards. My depression got really bad for several weeks. It’s still bad sometimes, but I’m struggling through. I’m having a lot of difficulty feeling connected to both of my kids and my husband. I should probably use more mindfulness, but when my brain is telling me that I’m a shitty mom, I’m not very good at breathing and connecting with my body.”*

The final individual coaching session occurred at 6 weeks postpartum, and 9 of the 10 of these sessions were held at the participant’s home. The participants perceived that the postpartum individual coaching session was helpful. The primary theme regarding this session’s helpfulness was that it provided an opportunity to reflect on their recent parenting experience and to identify what mindfulness skills and additional supports might be useful. For example, one participant wrote: *“This visit was very beneficial and positive. We practiced mindfulness strategies and these have reduced my anxiety and made me feel significantly calmer and happier. We talked about the need for counseling for postpartum depression/anxiety.”* Another wrote: *“... it was helpful to share what was going well and what the challenges have been. We worked on finding breathing and mindfulness techniques to help for calming down for rest and relaxation. It was helpful to get guidance on adapting the loving kindness meditation so that it was easier to do. I felt more confident and reassured after the visit.”*

#### 4. Discussion

The results from this study indicate the feasibility and acceptability of MBCP, modified for shorter duration and additional individual coaching sessions, for women with a history of sexual trauma. Participants perceived all aspects of the program to be helpful. They practiced formal and informal use of mindfulness skills multiple times/week in daily life during the class period and, with one exception, all used mindfulness skills to manage the pain of contractions during labor and delivery.

The inclusion of a postpartum individual coaching session and assessment provided the opportunity to gather data on the longer-term effects of prenatal mindfulness training. The participants continued to use formal and informal mindfulness skills multiple times/week in daily life after the class and into the postpartum period. Half the participants indicated that they wished they used mindfulness skills more during the postpartum period. Barriers to use of mindfulness skills were most keenly expressed by the participants who struggled with depression and anxiety symptoms during this time. Notably, participants discussed and explored ways that they might better incorporate mindfulness skills to address their personal stressors. The participants’ active use of the postpartum session to address self-care, and their positive survey responses about this postpartum individual coaching session, suggests the need for more postpartum support for this population.

While depression symptoms were not decreased, the significant reduction in prenatal anxiety was similar to the large effect found in prior MBCP research findings [21]. Of the process measures, mindfulness non-judging was significantly reduced during the class period but not maintained. In contrast, interoceptive awareness skills related to: a) the ability to regulate distress by attention to body sensations, and b) the experience one’s body as safe and trust-worthy, were significantly improved during the class period and maintained through the T3 assessment at 8 weeks postpartum. The improved and maintained increase in these aspects of interoceptive awareness indicates that these women, who had significant trauma histories, learned important and

fundamental skills to support their use of mindfulness practices in daily life. This finding also suggests the helpfulness of the individual coaching sessions to facilitate comfort with attending to, and trust of, the body among women with a trauma history for whom these capabilities may be particularly unfamiliar and/or challenging [27].

Study limitations included the small sample size and the lack of a control or comparison condition. Due to the small sample size there was insufficient power to detect the effect of the intervention on outcomes. The lack of a control condition also restricted result interpretation.

We have some recommendations for future mindfulness childbirth education research and clinical care with this population. While we were successful meeting our recruitment goals within a reasonable time period, the intensity of recruitment that was required to meet those goals, we have reservations about recommending a larger trial or clinical programs targeting *only* women with a history of sexual trauma. Rather than attempting to recruit this specific population, we recommend that future studies target a community sample and collect trauma exposure information to examine the potential moderating effect of trauma on outcomes of interest. Additionally, whether in research or clinical care, we recommend the inclusion of trauma-related educational information in the class (i.e. potential challenges women may face, and increased vulnerability to post-partum depression), since in any class there will likely be participants with a history of interpersonal trauma unknown to the class facilitator. The inclusion of individual coaching sessions may be helpful for most women, or may be most appropriate to add to the postpartum period to provide additional support for women who are at increased risk due to prenatal depression, anxiety or trauma history. These are questions for future research.

#### 5. Conclusion

In conclusion, this study demonstrated the implementation feasibility and acceptability of a modified MBCP approach aimed at providing additional individual mindfulness skills coaching and postpartum support for women with a history of sexual trauma. Due to the increased risk of postpartum depression among women with a history of sexual trauma, and the high prevalence of sexual trauma among women in the general population, it is critically important to better understand whether mindfulness approaches may reduce the risk of depression and related health outcomes in this population. These study findings raise important clinical and research questions for future exploration.

#### Funding

We gratefully acknowledge the support for this research, provided by a gift from the Maritz Family Foundation.

#### Acknowledgements

We gratefully acknowledge the efforts of Anna Treadway, the Research Coordinator on this study, and the individuals who participated in this project.

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