BMJ Open

Feasibility of online mindfulness-based interventions for families affected with postpartum depression and anxiety: study protocol

Katarina Tabi ,[1,2,3] Manreet Bhullar,[2,3] Lenssa Fantu,[2] Barbara Shulman,[1,3] Royce Dueck,[3] Catriona Hippman,[3,4,5] Deirdre Ryan,[1,3] S Evelyn Stewart[1,2,6,7,8]

To cite: Tabi K, Bhullar M, Fantu L, *et al*. Feasibility of online mindfulness-based interventions for families affected with postpartum depression and anxiety: study protocol. *BMJ Open* 2022;**12**:e051935. doi:10.1136/bmjopen-2021-051935

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2021-051935).

Received 02 April 2021
Accepted 20 July 2022

For numbered affiliations see end of article.

Correspondence to
Dr Katarina Tabi;
katarina.tabi@gmail.com

ABSTRACT

Introduction Postpartum depression and anxiety (PPDA) is experienced by up to 20% of families in the first year. The condition impacts not only parents but also their developing child. While mindfulness-based interventions (MBI) have shown to be beneficial for this population, many parents do not have access to treatment or find it challenging to commit or complete the treatment. The COVID-19 pandemic has heightened some of the challenges that parents face. The ability to find time for needed self-care and health interventions is also affected by limited childcare support. The opportunity to attend a group online may significantly improve the accessibility to group MBI but may also bring challenges. This study aims to examine the feasibility and acceptability of online MBI groups for parents in families affected with PPDA.

Methods and analysis In this feasibility study, participants will include mothers diagnosed with PPDA and their partners. Two online MBI groups will run simultaneously for 8 weeks: one for mothers with PPDA and another one for their partners. The primary outcome will be feasibility of conducting the online groups, assessed from the facilitators' perspective, participants' perspective and attrition throughout the study. The participants' perspectives on feasibility will be assessed by questions including how difficult it was for them to make it to the sessions, specific obstacles encountered and their scheduling preferences. The facilitators' perspective will be assessed by frequency of technical difficulties encountered, of disruptions in the online sessions and of episodes where parents leave the screen (eg, to calm their child). Secondary outcomes will include mental health, couple relationship, satisfaction and acceptability which will also be evaluated through participant questionnaires.

Ethics and dissemination The study has received ethics approval from the University of British Columbia Children's and Women's Research Ethics Board. Study results will be disseminated through peer-reviewed journals and conferences.

Trial registration number NCT04617132.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study will be the first to examine the online delivery of mindfulness-based intervention for parents in families affected by postpartum depression and anxiety.
⇒ As a feasibility study, it will have a small sample size and will not be able to determine efficacy of the intervention.
⇒ This study is limited by certain data not being collected, including other treatment interventions the participants receive, which is done with the intention to decrease the burden on participants in this feasibility study.
⇒ Insights from the study will contribute to increased accessibility to the intervention and may inform future practice within clinical and community settings.

INTRODUCTION

Postpartum depression and anxiety (PPDA) is highly prevalent in parents, experienced by up to one in five families (17.7%).[1 2] In addition to impacting the parents facing distress, this condition can also have potential effects on the child.[3 4] PPDA interferes with central factors affecting the child's development: parent–infant interactions, secure attachment, the parent's responsiveness to the child's needs and the quality of the home environment.[5] On top of helping parents, treating PPDA goes a long way towards helping the child flourish in the long-term.[3 6] Due to mothers' concerns about using psychiatric medication when breast feeding, it is crucial that effective non-pharmacological treatments become available to mothers with PPDA.[7]

The benefits of mindfulness-based interventions (MBI) for the treatment of depression and anxiety in the general population are well documented.[8–12] In addition, there is a growing evidence showing the effectiveness of MBIs as a treatment option for those with PPDA.[13–17]

However, many individuals affected by PPDA do not receive any treatment or struggle to commit or complete their treatment. Some

of the several factors reducing treatment commitment include challenges of limited time, commuting difficulties and competing priorities faced by new parents.[18 19] The global pandemic has contributed to heightened challenges faced by new parents. Specifically, closed childcare facilities, and social distancing measures that prevent grandparents or others who may otherwise be available to help out all contribute to a limited childcare support—an area so important especially for those facing PPDA. This can significantly limit available time for parents' self-care and health interventions that are important to manage their PPDA.

The opportunity to attend a group online may significantly improve accessibility to MBI for parents with PPDA. Related advantages may include, but are not limited to, the flexibility of attending from anywhere, including home, time saved on commute and related preparation.[20] On the other hand, some parents might find it difficult to attend sessions online, whether it may be due to technological limitations, inadequate privacy at home for disclosure of vulnerable feelings during a therapeutic group or limited ability to focus on the session when the parent is simultaneously attending to one or more children at home in case of the limited childcare support.[21–23]

The majority of the existing literature exploring the feasibility, potential and limitations of online MBI for the perinatal population focused on mothers during pregnancy.[24–27] However, the daily routines and challenges during pregnancy differ greatly from those following the infant's birth.[28 29] These differences may include ability to commit to a regular group as well as the type of mindfulness practices that a new parent is able to incorporate into their daily routine.

From the limited amount of literature that explored online MBI in the postpartum population, the studies typically focused on non-clinical populations and postpartum parents without a current diagnosis of PPDA.[27 30 31] Gammer *et al* assessed a compassion-based intervention, reporting a high attrition rate even in a non-clinical population.[30] However, the ability to commit to a regular group, as well as the level of distress and challenges experienced by parents with acute mental health issues may differ from parents within the general population. Therefore, as brought to light by the COVID-19 pandemic, there is a need to explore the potential and limitations of online delivery for parents experiencing PPDA.

The aim of this study is to examine the feasibility and acceptability of online MBI groups for parents in families affected with PPDA in the first year post partum. The primary objective is to determine the feasibility of the online delivery for mothers with PPDA and their partners by answering the research question: Will parents in families affected with PPDA be able to commit to the online MBI group and continue with the online sessions? The secondary objectives are to capture preliminary evidence of outcomes including mental health, couple relationship, satisfaction and acceptability.

METHODS AND ANALYSIS

Study design

This is a prospective, single-site study exploring the feasibility of conducting mindfulness groups for the postpartum population in an online setting. The presented study is part of a larger research project exploring mindfulness for both partners in families affected by PPDA. The study will follow a non-randomised design with two arms, the main treatment arm representing families where both partners receive the intervention and the control arm where only the mother with PPDA receives the intervention. This protocol has been reported using the Standard Protocol Items Recommendations for Intervention Trials checklist.[32]

Participants and recruitment

Trial site and participating centres

The study will take place at the Reproductive Mental Health Program, a tertiary mental health clinic from where the participants will be recruited. This clinic is a part of BC Children's and BC Women's Hospital and Health Centre located in British Columbia, Canada. Given that groups run online, participants will be participating from their homes or other location of their choice.

Participants

Study participants will consist of mothers referred to this clinic and their partners. Following assessment by a perinatal psychiatrist, those postpartum mothers who are diagnosed with depression and/or anxiety, and who are interested in the MBI may register for the upcoming mothers' group. Their partners will also be contacted and invited to attend the MBI partners' group. Families who meet the study criteria will be invited to participate in this study.

Inclusion criteria

- Mother is up to 12 months postpartum.
- Mother with major depressive disorder, other specified depressive disorder, unspecified mood disorder, generalised anxiety disorder, other specified and/or unspecified anxiety disorder as per the DSM-5 (The Diagnostic and Statistical Manual of Mental Disorders (5th ed.)) criteria.
- Mother with PPDA and partner are cohabiting.
- Fluent in English.

Exclusion criteria

- Mother of age <19.
- Mother assessed to be at significant risk for suicide, have a psychotic disorder and/or currently have a substance use disorder.
- Lack of access to the internet or a wireless network.

Sample size will consist of 30 mothers with PPDA (plus 15 partners). With this sample we will be able to determine attendance and attrition rates to inform future studies. Recruitment to the study opened in September 2020 and is expected to close in June 2023. At the time of manuscript submission the study is open to recruitment.

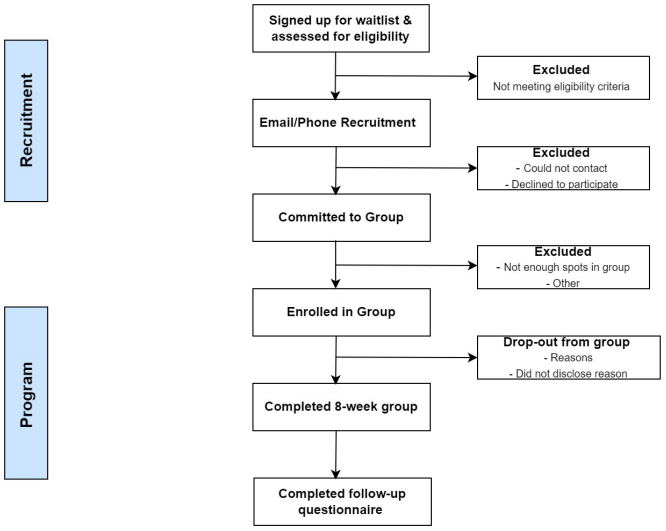

Figure 1 A consort diagram highlighting the intended recruitment process for the study.

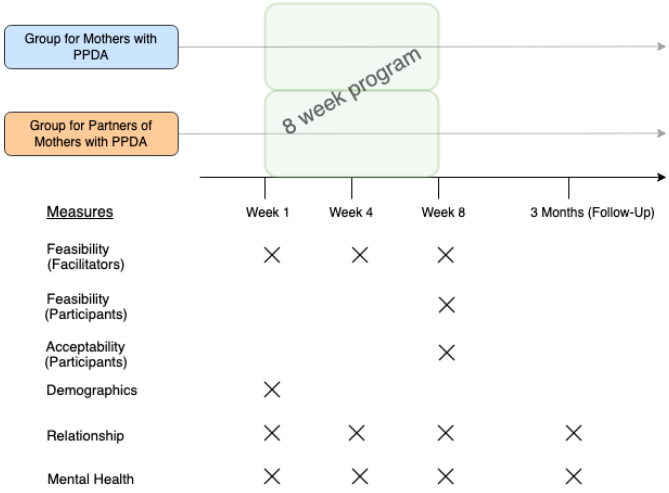

Figure 3 Timeline of concurrent mindfulness-based Interventions groups and data collection time points. PPDA, postpartum depression and anxiety.

Recruitment

Initial steps are described in figure 1, as well as in the Participants section.

Families who meet the eligibility criteria will be invited to the study. Those who indicate interest in participating in the study will be sent an email by the research team. This email will provide them with information about the study and a copy of the consent form. They will have time to discuss it at home prior to the first online sessions of the MBI and will have the opportunity to ask questions via email. It will be made clear that their willingness to participate in the study is entirely voluntary and will not impact their potential relationship with the clinic. Participants (mothers with PPDA and their partners) can decide to participate in the intervention groups and not participate in the study. Participants will be asked to join the online room 20 min before their first MBI group session. On their arrival, they will be reminded of the study procedures and asked to sign the consent form.

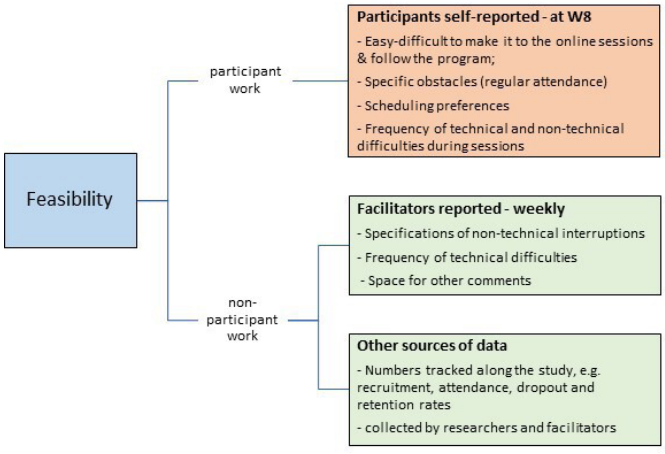

Figure 2 Feasibility of conducting the online mindfulness-based interventions groups measured in a variety of ways, aiming to decrease the workload and burden on participants.

Interventions

The intervention will consist of standardised 8-week MBI groups delivered online (via Zoom for healthcare settings) and will be adapted to the needs of parents during the postpartum period. The groups will be facilitated in real-time by trained and experienced mental health professionals. Two MBI groups will run simultaneously:

- Group for mothers diagnosed with PPDA—mindfulness-based cognitive therapy (MBCT).[33]
- Group for partners of these mothers—mindfulness-based stress reduction (MBSR).[34]

The Canadian Network for Mood and Anxiety Treatments guidelines recommend MBCT for adults with depression as a first-line maintenance treatment and as a second-line adjunctive treatment for acute depression.[11] The mothers are patients at our clinic with a formal diagnosis of PPDA, thus they are offered the MBCT. Their partners, who are not formal patients at our mental health clinic, receive MBSR which has been shown to help with stress management and coping with adversity in both those with a medical diagnosis and the non-clinical population.[34]

Allocation to two study arms:

Arm (1) Both mothers and their partners attend MBI groups ('main treatment' arm).

Arm (2) Only mothers attend an MBI group ('mother-only controls').

Mothers whose partners are not interested or unavailable to attend the partners' group will attend the MBI mother's group as mother-only controls.

Measures and data collection

Outcome measures

The primary outcome is the feasibility of running online MBI groups for this population (figure 2). Secondary outcomes include mental health, couple relationship, satisfaction and acceptability. Figure 3 demonstrates the outcome measures and their data collection time points.

Feasibility of conducting the online groups will be determined by a set of assessments (see figure 2), including:

- Feasibility measure administered to participants—self-report questionnaire includes both quantitative and qualitative questions, such as frequency of technical and non-technical interruptions, how easy/difficult it was to make it to the sessions and follow the programme, specific obstacles encountered (eg, time, mood, child's needs) and participants' scheduling preferences. This newly-developed questionnaire was informed by feedback from alumni participants. It will be completed by participants at week 8 (see online supplemental file 1 to view this questionnaire).
- Feasibility measure administered to facilitators—aims to assess the frequency of technical difficulties and frequency as well as the type of non-technical interruptions (eg, parent leaving the screen to calm the baby, turning off the camera, early sign-off, late sign-in). This short survey will be completed by group facilitators after each session (see online supplemental file 2 to view this survey).
- Numbers tracked along the study, including recruitment, attendance and dropout rates (see figure 1 for details).
- Enquiry exploring reasons for dropouts.

Acceptability and satisfaction

This questionnaire includes both quantitative and qualitative items, exploring what the participant is taking away from the programme; recommendations for changes to the programme; what impact they perceive the programme had on them, their partner, their relationship; and overall satisfaction.

Demographics

Includes variables on age, ethnic background, marital status, number of children and their ages, number of people in the household and socioeconomic status.

Couple relationship

This questionnaire aims to assess couple interactions and relationship dynamics, specifically related to change over time (pre-intervention vs post-intervention vs 3-month follow-up). It is a self-report measure completed separately by both partners, capturing their unique perspectives on their relationship. Specific areas assessed include communication and interactions within the couple (eg, behaving in a reactive way during disagreements, blaming and criticising the other during disagreements, attentive listening); support received (only in questionnaire for mothers with PPDA) and support provided (only in questionnaire for partners); and overall relationship satisfaction.

Mental health

- Patient Health Questionnaire-9
  The Patient Health Questionnaire-9 is a widely used measure assessing depression, known to have great reliability and validity.[35 36] It includes each of the nine DSM-IV criteria and scores as '0' (not at all) to '3' (nearly every day). Scoring includes cut-off points of 5, 10, 15 and 20, which indicate mild, moderate, moderately severe and severe depression, respectively.
- General Anxiety Disorder-7
  The General Anxiety Disorder-7 is an efficient tool assessing anxiety, with a good reliability and validity (construct and factorial).[37] Scoring includes cut-off points of 4, 9, 14, and 15+, which indicate minimal, mild, moderate, and severe anxiety, respectively.

Statistical analysis and data management

Data are collected and managed using REDCap (Research Electronic Data Capture) hosted at BC Children's Hospital. REDCap is a secure, web-based application designed to support data capture for research studies.[38] All data entered into REDCap will be de-identified. De-identified data and outcomes will later be saved into a password-protected research computer and stored on a secure local server.

Descriptive statistics will be used to describe the study sample, including demographics, recruitment and retention rates, as well as some of the quantitative data. Feasibility outcomes will be assessed by looking at attendance, dropout and retention rates, descriptive statistics of quantitative data and through inductive content analysis[39] of qualitative data in the facilitator survey as well as the participant survey to find common themes surrounding the factors that affected feasibility of the programme on either end. Measures that collect data over time, such as the mental health outcome measures or relationship outcome measure, will be explored using descriptive statistics for each of the measures and for each relevant time point. Exploratory analysis of the improvements in relationship and mother's mental health outcomes will be conducted using linear regression models, which will be used to model an association between relationship outcomes and each measure of mothers' mental health outcomes. Inductive content analysis[39] of responses to open-ended questions will be used for qualitative data to find common themes and participants' answers will be quoted in discussion of this data. This is primarily a feasibility study and not designed to measure efficacy, hence a formal sample size was not calculated. Thirty participants will be recruited to enable estimates of recruitment, treatment adherence, dropout rates and follow-up participation for future larger trials.[40]

Patient and public involvement

Patients and public were first involved in the development of measures, including the couple relationship questionnaire and the feasibility, acceptability and satisfaction questionnaire. Preliminary drafts of the measures were shared with alumni participants (those who took part in the in-person MBI groups in the past), clinicians, group facilitators and long-term mindfulness practitioners in the community. The research team conducted online interviews to consult with them and gather their opinions

and suggestions for the measures. Input included an assessment of the measures' burden as well as informing the content and wording of the final versions of these measures. For example, during an interview an alumni participant suggested that the wording of a particular question may give the opposite meaning than intended to those whose first language is Mandarin. With the guidance from this alumni participant, the team reworded the question accordingly. This was a very valuable feedback given that the Vancouver population and our study sample population is diverse and includes people for whom English is not their first language.

Further, during the study (at week 8 of the data collection), participants will be surveyed about a variety of items, which will inform and refine the study intervention prior to conducting future clinical trials. Specifically, this will include timing and scheduling of the intervention sessions, technical challenges they faced with the online delivery, non-technical challenges they faced while attending or trying to make themselves available to attend the session and their overall experiences with the intervention.

ETHICS AND DISSEMINATION

Ethics approval

Ethics approval for this study and all its instruments was obtained from University of British Columbia Children's and Women's Research Ethics Board (number H20-01884).

Consent

Written consent from potential trial participants will be obtained by the research team via the REDCap platform, signed in real-time during a Zoom video conference call prior to the first session. The potential participants will be sent a copy of the consent form a week before the session to read and discuss beforehand. They will have the opportunity to ask any questions about the study or the consent form both over email and orally during the video conference call (see online supplemental file 3 to view the consent form).

It is not expected that participating in this study will pose any additional risks to the participants compared with receiving clinical care without the research component. In case any participants feel distressed at any point during the study, they will have a list of emergency resources they can use to contact on-call psychiatrists, emergency departments or other crisis services.

Data storage and privacy

Participants will be given unique study codes that will be stored separately and only known to the research team. Personal information and de-identified data will be saved in two separate folders on a research computer that will be password-protected and stored on a secure server. No data will be shared with any outside agencies without the consent of the subjects. Selected research team members will have access to the final trial data set while other team members will only have access to de-identified data when needed.

Dissemination

Results from this study will be disseminated in peer-reviewed journals, at national and/or international conferences and oral presentations. Study findings will be shared via clinical rounds, webinars and symposia with clinicians, policy and community partners.

DISCUSSION

This is the first study to explore the feasibility and acceptability of online MBIs for families affected with PPDA. MBIs are beneficial for people with depression in the general population and are recommended in clinical guidelines internationally.[15 41 42] A growing number of studies suggest that MBIs are also effective for depression and anxiety in the postpartum period.[13–17] Preliminary literature shows that MBIs improve symptoms of anxiety and psychological distress in new mothers.[14 15] While exact mechanisms of MBIs in the perinatal population are yet to be examined, Dimidjian *et al* described potential domains of involvement.[43] They observed that rumination, decentralisation and self-compassion have been shown in the general population to be significantly improved following MBIs.[43–45] The same processes of rumination and self-critical attitudes also play a contributory role in perinatal depression.[43 46–48] Moreover, a study by Perez-Blasco showed that MBIs support postpartum individuals in cultivating self-compassion, parental self-efficacy and various dimensions of mindfulness including observing, acting with awareness, non-judging and non-reactivity.[14 15] However, many new parents do not have access to treatment or find it challenging to commit to or complete the treatment.

Importance

The online delivery of evidence-based interventions is promising as it may significantly improve the accessibility to care for this population. Even in urban communities, perinatal mental health services are only available in limited locations where most families need to commute long ways to access them on a regular basis when they finally make it off the waitlist to access this care. These challenges are further exacerbated for new parents living in rural areas where specialised care is not available, who would need to travel long distances to access this care, which may not be feasible on a regular basis. Further, the online groups are available also during times of crisis, including a pandemic, when in-person interventions are limited or paused. An online option ensures continued care even during circumstances where in-person options are unavailable.

Additionally, there are many other challenges faced by parents that may reduce their ability to commit

to in-person treatment including limited childcare support, competing priorities during limited available time and related limited time for self-care and health routines. Offering online groups that can be attended from home and eliminating commute times, can give parents extended time to attend to more of their needs that day. For all these reasons, the option to attend the group online may empower families to more easily access treatment and commit to the entirety of the intervention.

Limitations

Several limitations arise due to the feasibility nature of the study, including a smaller sample size, non-randomisation of study arms and potential for selection bias, thus limiting the generalisability of the secondary outcomes. Limited self-report data are being collected to decrease the burden on participants and focus on feasibility outcomes. Specifically, short-form versions of questionnaires are being used and not all data of interest is being collected, which also limits the efficacy conclusions. For example, data regarding other treatments received by participants in parallel with the MBIs are not being collected to ease the participant workload. Further, the study's inclusion and exclusion criteria limit the generalisability of this study's results, such that findings may not apply to teenage mothers; mothers with severe depression, a psychotic disorder, or a substance use disorder; mothers facing barriers in terms of housing or related amenities (without access to internet connectivity and/or a private place to participate in the group); or birthing individuals who do not identify as mothers.

In summary, this study will address the question of whether online groups are indeed feasible for postpartum parents affected with PPDA. Also, this protocol paper outlines a practical design of an online feasibility trial aiming to minimise participant burden, that may inform the design of future studies exploring other online health intervention.

Author affiliations
[1]Department of Psychiatry, The University of British Columbia, Vancouver, British Columbia, Canada
[2]Centre for Mindfulness, BC Children's Hospital, Vancouver, British Columbia, Canada
[3]Reproductive Mental Health Program, BC Children's Hospital, Vancouver, British Columbia, Canada
[4]Department of Obstetrics and Gynaecology, The University of British Columbia, Vancouver, British Columbia, Canada
[5]Faculty of Nursing, University of Calgary, Calgary, Alberta, Canada
[6]BC Mental Health and Substance Use Research Institute, Vancouver, British Columbia, Canada
[7]BC Children's Hospital Research Institute, Vancouver, British Columbia, Canada
[8]BC Women's Hospital & Health Centre, Vancouver, British Columbia, Canada

Acknowledgements We thank Dzung Vo for his mindfulness teacher insights and feedback during the development of the couple relationship measure. In addition, we thank patients and alumni participants who helped inform the measures development. We thank Robert Balent for his support with technological issues. We also thank our friends and colleagues from the BC Children's Hospital Centre for Mindfulness and BC Reproductive Mental Health Program for their ongoing support.

Contributors KT, SES, MB and LF designed the study and prepared the ethics application. BS and RD contributed to developing the measures, and BS, RD and DR contributed to the study design with clinical insights. KT and MB drafted the manuscript and designed the figures. SES and LF edited the first drafts of the manuscript. CH contributed to the qualitative analysis plan, discussion section and language polishing. LF formatted the final manuscript and the references. All authors read and approved the final manuscript.

Funding This work was supported by the BC Children's Hospital Centre for Mindfulness, Mind & Life Institute Varela Grant, BC Children's Hospital Foundation through a generous donation from Khalsa Credit Union, BC Women's Hospital Foundation and BC Reproductive Mental Health Program.

Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement As a protocol paper, there is no data collected. In future, data may be available upon request.

ORCID iD
Katarina Tabi http://orcid.org/0000-0002-2826-6973

REFERENCES

1 Hahn-Holbrook J, Cornwell-Hinrichs T, Anaya I. Economic and health predictors of national postpartum depression prevalence: a systematic review, meta-analysis, and meta-regression of 291 studies from 56 countries. *Front Psychiatry* 2017;8:248.
2 Radoš SN, Matijaš M, Anđelinović M, *et al*. The role of posttraumatic stress and depression symptoms in mother-infant bonding. *J Affect Disord* 2020;268:134–40.
3 Nonacs R. How does postpartum anxiety affect infants and young children? 2017MGH Center for Women's Mental Health. Massachusetts General Hospital. Harvard Medical School. Available: https://womensmentalhealth.org/posts/postpartum-anxiety-affect-infants-young-children/ [Accessed 2022 Aug 25].
4 el-Sheikh M, Cummings EM, Reiter S. Preschoolers' responses to ongoing interadult conflict: the role of prior exposure to resolved versus unresolved arguments. *J Abnorm Child Psychol* 1996;24:665–79.
5 Nicol-Harper R, Harvey AG, Stein A. Interactions between mothers and infants: impact of maternal anxiety. *Infant Behav Dev* 2007;30:161–7.
6 Cummings EM, Davies PT. Maternal depression and child development. *J Child Psychol Psychiatry* 1994;35:73–122.
7 Misri S, Kostaras X. Benefits and risks to mother and infant of drug treatment for postnatal depression. *Drug Saf* 2002;25:903–11.
8 Ghahari S, Mohammadi-Hasel K, Malakouti SK, *et al*. Mindfulness-based cognitive therapy for generalised anxiety disorder: a systematic review and meta-analysis. *East Asian Arch Psychiatry* 2020;30:52–6.
9 Goldberg SB, Tucker RP, Greene PA, *et al*. Mindfulness-based interventions for psychiatric disorders: a systematic review and meta-analysis. *Clin Psychol Rev* 2018;59:52–60.

10 Dhillon A, Sparkes E, Duarte RV. Mindfulness-Based interventions during pregnancy: a systematic review and meta-analysis. *Mindfulness* 2017;8:1421–37.
11 Parikh SV, Quilty LC, Ravitz P, *et al*. Canadian network for mood and anxiety treatments (CANMAT) 2016 clinical guidelines for the management of adults with major depressive disorder: section 2. psychological treatments. *Can J Psychiatry* 2016;61:524–39.
12 Goldberg SB, Riordan KM, Sun S. The empirical status of Mindfulness-Based interventions: a systematic review of 44 meta-analyses of randomized controlled trials. *Perspect Psychol Sci*.
13 Shi Z, MacBeth A. The effectiveness of mindfulness-based interventions on maternal perinatal mental health outcomes: a systematic review. *Mindfulness* 2017;8:823–47.
14 Perez-Blasco J, Viguer P, Rodrigo MF. Effects of a mindfulness-based intervention on psychological distress, well-being, and maternal self-efficacy in breast-feeding mothers: results of a pilot study. *Arch Womens Ment Health* 2013;16:227–36.
15 Babbar S, Oyarzabal AJ, Oyarzabal EA. Meditation and mindfulness in pregnancy and postpartum: a review of the evidence. *Clin Obstet Gynecol* 2021;64:661–82.
16 Miklowitz DJ, Semple RJ, Hauser M, *et al*. Mindfulness-based cognitive therapy for perinatal women with depression or bipolar spectrum disorder. *Cognit Ther Res* 2015;39:590–600.
17 Pan W-L, Chang C-W, Chen S-M, *et al*. Assessing the effectiveness of mindfulness-based programs on mental health during pregnancy and early motherhood - a randomized control trial. *BMC Pregnancy Childbirth* 2019;19:346.
18 Owens PL, Hoagwood K, Horwitz SM, *et al*. Barriers to children's mental health services. *J Am Acad Child Adolesc Psychiatry* 2002;41:731–8.
19 Antonini TN, Raj SP, Oberjohn KS, *et al*. A pilot randomized trial of an online parenting skills program for pediatric traumatic brain injury: improvements in parenting and child behavior. *Behav Ther* 2014;45:455–68.
20 Krausz RM, Ramsey D, Wetterlin F. Accessible and cost-effective mental health care using E-Mental Health (EMH). In: Javed A, Fountoulakis KN, eds. *Advances In Psychiatry*. Cham: Springer International Publishing, 2018: 129–41.
21 Haas LJ, Benedict JG, Kobos JC. Psychotherapy by telephone: risks and benefits for PSYCHOLOGISTS and consumers. *Prof Psychol* 1996;27:154–60.
22 Brenes GA, Ingram CW, Danhauer SC. Benefits and challenges of conducting psychotherapy by telephone. *Prof Psychol* 2011;42:543–9.
23 Oravec JA. Online counselling and the Internet: perspectives for mental health care supervision and education. *J Ment Health* 2000;9:121–35.
24 Müller M, Matthies LM, Goetz M, *et al*. Effectiveness and cost-effectiveness of an electronic mindfulness-based intervention (eMBI) on maternal mental health during pregnancy: the mindmom study protocol for a randomized controlled clinical trial. *Trials* 2020;21:933.
25 Felder JN, Segal Z, Beck A, *et al*. An open trial of web-based mindfulness-based cognitive therapy for perinatal women at risk for depressive relapse. *Cogn Behav Pract* 2017;24:26–37.
26 Hulsbosch LP, Nyklíček I, Potharst ES, *et al*. Online mindfulness-based intervention for women with pregnancy distress: design of a randomized controlled trial. *BMC Pregnancy Childbirth* 2020;20:159.
27 Yang M, Jia G, Sun S, *et al*. Effects of an online mindfulness intervention focusing on attention monitoring and acceptance in pregnant women: a randomized controlled trial. *J Midwifery Womens Health* 2019;64:68–77.
28 DiPietro JA, Goldshore MA, Kivlighan KT, *et al*. The ups and downs of early mothering. *J Psychosom Obstet Gynaecol* 2015;36:94–102.
29 Kantrowitz-Gordon I, Abbott S, Hoehn R. Experiences of postpartum women after mindfulness childbirth classes: a qualitative study. *J Midwifery Womens Health* 2018;63:462–9.
30 Gammer I, Hartley-Jones C, Jones FW. A randomized controlled trial of an online, compassion-based intervention for maternal psychological well-being in the first year postpartum. *Mindfulness* 2020;11:928–39.
31 Matvienko-Sikar K, Dockray S. Effects of a novel positive psychological intervention on prenatal stress and well-being: a pilot randomised controlled trial. *Women Birth* 2017;30:e111–8.
32 Chan A-W, Tetzlaff JM, Gøtzsche PC, *et al*. Spirit 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ* 2013;346:e7586 https://www.bmj.com/content/346/bmj.e7586
33 Segal ZV, Williams M, Teasdale J. *Mindfulness-based cognitive therapy for depression*. New York CIty: Guilford Publications, 2018.
34 Kabat-Zinn J, living Fcatastrophe. *Revised edition: how to cope with stress, pain and illness using mindfulness meditation*. London: Hachette UK, 2013.
35 Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–13.
36 Pillay B, Ftanou M, Ritchie D, *et al*. Study protocol of a pilot study evaluating feasibility and acceptability of a psychosexual intervention for couples postallogeneic haematopoietic stem cell transplantation. *BMJ Open* 2020;10:e039300.
37 Spitzer RL, Kroenke K, Williams JBW, *et al*. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006;166:1092–7.
38 Harris PA, Taylor R, Thielke R, *et al*. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377–81.
39 Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs* 2008;62:107–15.
40 Kraemer HC, Mintz J, Noda A, *et al*. Caution regarding the use of pilot studies to guide power calculations for study proposals. *Arch Gen Psychiatry* 2006;63:484–9.
41 National Collaborating Centre for Mental Health, Antenatal and Postnatal Mental Health. *The NICE guideline on clinical management and service guidance*. London: NCCMH, 2014.
42 MacQueen GM, Frey BN, Ismail Z, *et al*. Canadian network for mood and anxiety treatments (CANMAT) 2016 clinical guidelines for the management of adults with major depressive disorder: section 6. special populations: youth, women, and the elderly. *Can J Psychiatry* 2016;61:588–603.
43 Dimidjian S, Goodman SH, Felder JN, *et al*. Staying well during pregnancy and the postpartum: a pilot randomized trial of mindfulness-based cognitive therapy for the prevention of depressive relapse/recurrence. *J Consult Clin Psychol* 2016;84:134–45.
44 Teasdale JD, Moore RG, Hayhurst H, *et al*. Metacognitive awareness and prevention of relapse in depression: empirical evidence. *J Consult Clin Psychol* 2002;70:275–87.
45 Bieling PJ, Hawley LL, Bloch RT, *et al*. Treatment-Specific changes in decentering following mindfulness-based cognitive therapy versus antidepressant medication or placebo for prevention of depressive relapse. *J Consult Clin Psychol* 2012;80:365–72.
46 Sockol LE, Epperson CN, Barber JP. The relationship between maternal attitudes and symptoms of depression and anxiety among pregnant and postpartum first-time mothers. *Arch Womens Ment Health* 2014;17:199–212.
47 Barnum SE, Woody ML, Gibb BE. Predicting changes in depressive symptoms from pregnancy to postpartum: the role of brooding rumination and negative inferential styles. *Cognit Ther Res* 2013;37:71–7.
48 O'Mahen HA, Flynn HA, Nolen-Hoeksema S. Rumination and interpersonal functioning in perinatal depression. *J Soc Clin Psychol* 2010;29:646–67.

Supplementary File 1. The feasibility questionnaire completed by participants at week 8, after completion of the intervention.

Feasibility and Acceptability Questionnaire Administered to Participants

1. Overall, how satisfied are you with the program?

1. Quite dissatisfied
2. Indifferent or mildly satisfied
3. Mostly satisfied
4. Very satisfied

2. Did you find a positive impact/helpfulness of the program on:

- Yourself

1. Not at all helpful
2. A little bit helpful
3. Mostly helpful
4. Very helpful

- Your partner

1. Not at all helpful
2. A little bit helpful
3. Mostly helpful
4. Very helpful

- Relationships and interactions between you and your partner

1. Not at all helpful
2. A little bit helpful
3. Mostly helpful
4. Very helpful

3. What are you taking away from this program? What do you perceive as the benefits of participating?

4. What were the main challenges you encountered during the program? What would you recommend that changes for future programs?

5. How easy/difficult was it to make it to the online sessions and follow the program?

1. Very easy
2. Mostly easy
3. Neutral
4. Some difficulties
5. Very difficult

6. What were some of the obstacles? (Select all that apply)

1. Lack of time
2. My mood/health/energy level
3. Group scheduled at wrong time/day of the week
4. Pandemic related obstacles
5. Child-related needs
6. Other:
7. Not applicable

7. Scheduling: Were there certain days of the week or times (e.g. mornings, afternoons, evenings; certain hours) that would have made it easier to attend the sessions?

8. How often did you experience technical difficulties during the online sessions (e.g. video or sound not working immediately, other technical functions needed to participate in the group not working)?

1. Not at all
2. Minority of sessions
3. Once every session
4. More than once per session

9. How often did you experience any non-technical interruptions during the online sessions (e.g. child or other family members needing your attention; other reasons)?

1. Not at all
2. Minority of sessions
3. Once every session
4. More than once per session

Supplementary File 2. The survey is completed by facilitators on a weekly basis.

Feasibility Survey Administered to Facilitators

Week ____

1. **Were there any technical difficulties during this session?**

____ Yes ____ No

2. **Were there any situations when participants were not present during this session? (Select all that apply)**

- ☐ Nothing at all
- ☐ People turning off their video cameras
- ☐ Disruptions & temporarily not being present during the session (e.g. left the screen to calm or attend to the baby)
- ☐ Early sign-off
- ☐ Late sign-in
- ☐ Other: _____

3. This space is for any additional comments/explanations you would like to include.

Supplementary File 3. Consent form signed by participants.

Participant Consent and Signature

Taking part in this study is entirely your choice. You have the right to refuse to participate in this study. If you decide to participate, you may choose to end the study at any given time without providing a reason and without any impact on your access to services from this clinic.

Signature on this consent form means:

- I have read and understood the information on this consent form.
- I have had enough time to think about the information provided.
- I have been able to ask for advice if needed.
- I have been able to ask questions and have the satisfactory responses to my questions.
- I understand that all of the information collected will be kept confidential and that the results will only be used for scientific purposes.
- I understand that my participation in this study is voluntary.
- I understand that I am completely free at any time to refuse to participate or to withdraw from this study at any time, and that this will not change the quality of care that I receive.
- I understand that I am not waiving any of my legal rights as a result of signing this consent form.
- I understand that there is no guarantee that this study will provide any benefits to me.

_____ _____

Participant Signature Date

_____

Printed Name