

**Feasibility and Acceptability of a Brief Acceptance and Commitment Therapy  
Intervention for Parents in the Postpartum**

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## **I. Lay Summary**

### **Why did we do this research?**

The perinatal period (which is from pregnancy to 12-months after giving birth) is a time of increased psychological difficulties (e.g., depression and anxiety). These difficulties negatively impact the mother, infant and the family. Consequently, the National Health Service (NHS) has prioritised to increase access to psychological therapies.

This research wanted to understand how useful a group of relatively new therapies (called third wave therapies) are at reducing distress and improving well-being during the perinatal period. Unlike some other therapies, third wave therapies do not focus on getting rid of people's difficult experiences (although this can occur). Instead, the main aim is to help people become aware of their thoughts and feelings, treat them in a non-judgemental way and behave in ways that follow their personal values. We were particularly interested in one type of third wave intervention called Acceptance and Commitment Therapy (said as ACT). The research took place at Royal Holloway, University of London.

### **What did we do?**

There were two main parts to this research.

#### ***Part 1: Systematic Review***

- First, we searched online libraries to find all the research that had already looked at third wave interventions for adults during the perinatal period. This process is called a 'systematic review'.
- We specifically only looked at studies that randomly split their participants into two groups. One group were given a third wave intervention, and the other group received no treatment or usual routine care. After the treatment was finished, the groups were compared. This type of research is called a randomised control trial (RCT).

- We wanted to answer three questions:
  1. Which third wave interventions have been used in the perinatal period?
  2. Did the intervention reduce depression, anxiety and/or stress?
  3. How many participants did not complete (e.g., dropped out) the study?

### **What the Systematic Review found**

- We found 15 papers. The main findings were:

#### Question 1:

- 80% of the interventions were mindfulness-based interventions.  
Mindfulness can be described as someone's ability to bring attention and awareness to the present moment in a non-judgemental way.
- 80% were group-delivered interventions.
- Only one study examined ACT.
- There were no studies examining some types of third wave interventions (e.g., Dialectical Behaviour Therapy, Functional Analytic Psychotherapy, Metacognitive Therapy and Compassion Focused Therapy).

#### Question 2:

- Overall, most papers found third wave interventions reduced depression, anxiety and/ or stress but it was less clear whether improvements lasted once the intervention had finished.

#### Question 3:

- Across the 15 papers on average 19% dropped out before completing questions given after the intervention (i.e., post-intervention) and 28% dropped out before completing the final set of questions sometime after the intervention had ended (i.e., at follow-up).

Overall, the systematic review highlighted the need for further research, particularly higher quality research and research examining interventions delivered during the postpartum (i.e., the 12 months after childbirth).

### ***Part 2: Research Study***

- Becoming a parent can be a demanding time, with 10-20% of women experiencing postpartum depression.
- However, asking for help and/or attending face-to-face therapy can be challenging for parents. For instance, due to fear of stigma or childcare responsibilities.
- Online forms of therapy overcome many of these challenges.
- We wanted to understand how postpartum parents (i.e., parents with an infant 12 months or under) experienced a 4-week online programme based on ACT. The programme specifically focused on mindfulness and values.
- The study wanted to know:
  1. If parents would sign up and stay in the study?
  2. Parents experience of the programme. Including if it was useful, easy to use and how it met their expectations?
  3. The estimated differences in size (i.e., effect size) between the group of participants receiving the programme compared to the group not given the programme in terms of depression and well-being.
  4. If parents who had access to the programme increased in mindfulness and valued living (i.e., engaging in behaviours that are personally important to them).

### **What the Study found**

Question 1.

- 138 postpartum women signed up to the RCT study over 20 months. 65 parents were given access to the online programme and 73 were not given access (referred to as the control group).
- However, only 23% of the parents given access completed the questions at the end of the programme.

#### Question 2.

- Of the 16 parents who provided information on how they experienced the programme most found it useful and easy to use. The programme met many of the parents' expectations particularly being able to complete it in their own time and learning mindfulness. However, six parents felt overwhelmed by the weekly sessions and four reported the programme made them feel like a failure.
- Overall, this suggests that the programme was mainly well accepted but some parents experienced challenges.

#### Question 3.

- The parents who were given access to the programme saw a greater reduction in depressive symptoms than the control group. The effect size was moderate after completing the intervention and large when comparing depression at the start of the study to 4-weeks after finishing the programme.
- Whereas the study found on average parents in both groups had lower levels of well-being when measured at approximately 4-weeks, and 8-weeks, after the start of the study. A greater decrease of well-being was seen in the control group.

#### Question 4.

- Around half of the parents who engaged with the programme showed reliable improvements in mindfulness at the end (i.e., 8/15 parents) and 4-weeks after

completing the programme (i.e., 6/13 parents), suggesting the improvements in mindfulness were maintained beyond the programme ending.

- Also, a greater proportion of parents who were given access to the programme showed increased valued living at the end of the programme compared to the control group. However, this was not shown 4-weeks after the programme suggesting improvements were not maintained.

### **What Next?**

- More research looking at ACT during the perinatal period is needed before it can be routinely offered to parents during the perinatal period.
- The findings from this research will be shared with lots of different people, including the parents that took part, parents viewing social media and parenting websites, researchers, and students.

**II. Paper 1. Effectiveness of Third Wave Interventions During the Perinatal  
Period: A Systematic Review of Randomised Control Trials**

## Abstract

The perinatal period is a time of increased risk for psychological difficulties. Improving access to evidence-based psychological therapies during the perinatal period is one of the key priorities set out in the National Health Service (NHS) Long Term Plan. Although evidence-based therapies exist (i.e., cognitive behavioural therapy and interpersonal psychotherapy) not all women benefit. Third wave interventions which focus on the context, process, and function of internal experiences, rather than the content, may be a viable alternative. This paper aimed to systematically review and synthesis randomised control trials (RCTs) examining the effectiveness of third wave interventions on depression, anxiety, and stress during the perinatal period. Three key databases (PubMed, PsycINFO, Web of Science) were searched. Fifteen RCTs met the inclusion criteria. Studies were critically appraised using the Revised Cochrane Risk-of-Bias 2 tool (RoB 2; Sterne et al., 2019). The overall risk of bias ratings for eleven studies was 'some concern' and 'high' concern for four studies. This paper found the majority of RCTs examined mindfulness-based interventions (80%) and most interventions were delivered via group format (80%). The average attrition rate for the intervention group was 19% pre-to-post and 28% pre-to follow-up, which are comparable to attrition rates reported in reviews on CBT. Regarding effectiveness, 11/13 RCTs assessing depression showed medium to large effect sizes, 5/7 RCTs assessing anxiety showed large effect sizes and 8/10 RCTs assessing stress showed small to large effect sizes in favour of the third wave intervention. However, the findings regarding the sustained benefits of third wave interventions were mixed. Further high-quality research is also needed to draw firmer conclusions the effectiveness and sustained benefits third wave interventions. This review also highlighted a lack of RCTs examining the effectiveness of certain third wave interventions (such as dialectical behaviour therapy and compassion focused therapy) which warrants further investigation.

## Introduction

The perinatal period, defined as pregnancy up to and including one year after giving birth can be both an exciting yet challenging time for women. Women may experience stress in relation to the demanding adjustments associated with the substantial physiological, psychological, and social changes that occur. The perinatal period is also known to be a time of increased risk for psychological difficulties, with up to two in 10 women experiencing mental health problems (Bauer et al., 2014; Shorey et al., 2018). However, the true prevalence in recent years could be significantly higher. Research exploring the impact of the Covid-19 pandemic has shown there to be an increased likelihood of anxiety and depression during the perinatal period, with the increased prevalence relating to the reduction in available support, increased anxiety due to fear of infection, increased domestic violence and bereavement (Papworth et al., 2021).

In terms of the impact of perinatal mental health problems, there is a wealth of research documenting the severe adverse consequences on women, children, and families (Branquinho et al., 2021; Howard & Khalifeh, 2020). Perinatal mental health problems have been associated with increased risk of premature delivery and low birthweight, increased risk for child emotional, behavioural, and cognitive difficulties (Stein et al., 2014), negative impacts to the mother-infant bonding and interactions (Fernandes et al., 2021) and suicide is the leading cause of death for women in the perinatal period (MBRRACE, 2021). The economic costs are also substantial, whereby perinatal mental health problems costs the National Health Service (NHS) £1.2 billion for each annual cohort of (Bauer et al., 2014).

Due to the extensive negative implications, there have been investments in specialist perinatal services in several countries in recent years (Howard & Khalifeh., 2020). In the UK, perinatal mental health has been identified as a priority area in the National Health Service Long Term Plan (NHS England, 2019). Within this plan, a



key priority for improving perinatal mental health is improving access to evidence-based psychological therapies. It is important to ensure effective psychological interventions are available since research shows that women overwhelmingly prefer non-pharmacological treatments during the perinatal period; with pregnant women expressing concerns about medication harming their developing baby and concerns about becoming dependent (Battle et al., 2013).

Preventing and treating depression, particularly postnatal depression, has largely been the focus in terms of the evidence-base for psychological therapies during the perinatal period. Systematic reviews and meta-analyses have found evidence supporting the clinical effectiveness of cognitive behavioural therapy (CBT) and interpersonal psychotherapy (IPT) for depression during the perinatal period (O'Conner et al., 2016; Sockol, 2015; van Ravesteyn et al., 2017). For instance, in Sockol (2015) 20 of the 40 studies found significantly greater reductions in postpartum depression in CBT treatment conditions compared to control conditions: with the overall effect size (ES) for treatment studies being  $g = 0.65$  (moderate range) and the overall ES being  $g = 0.39$  (small to moderate range) for prevention studies. Furthermore, an average attrition rate of 23% was found. It is important for research to report attrition rates, as a high attrition rate can weaken the validity of findings and be a possible indicator of poor acceptability of the intervention. However, there are limitations to these studies including small samples, the exclusion of women with comorbidity meaning the research samples may not reflect the true population of women seen in perinatal services, thus reducing the external validity of findings and uncertainties regarding effect sizes remain (Howard & Khalifeh, 2020). This data suggests that CBT and IPT can be effective for some women experiencing, or at risk of, perinatal mental health problems, but that there is scope for identifying alternative psychological interventions.

### **Third Wave Interventions**

A viable alternative could be third wave interventions, which have become, and continue to be, increasingly popular with clinicians and researchers (Hayes & Hofmann, 2017; Hofmann & Hayes, 2019). Third wave therapies, also referred to as contextual behavioural therapies, first emerged in the empirical literature in 2004 (Hayes, 2004). In contrast to second wave (traditional) CBT, which focuses on the content of a person's thoughts and internal experiences, third wave interventions focus on the context, process, and function of internal experiences. Although third wave interventions are conceptually and methodologically different, their unifying features, concepts and methods have been defined in the literature. Hayes (2004) first defined the unifying features as interventions that emphasize: "mindfulness, acceptance, defusion, values, relationship, spirituality" (p.661). The central concepts and methods of third wave interventions have also been reported to include: mindfulness methods, acceptance-based processes, decentering, cognitive diffusion, values and psychological flexibility processes (Hayes & Hofmann., 2017). Hayes et al. (2011) also noted three common therapeutic objectives shared by all third wave interventions: opening clients towards their own experience, becoming aware of their own behaviour, and promoting valued actions in the presence of any private experience.

Which interventions fall under the term third wave intervention has been debated in the literature (Hofmann et al., 2010; Kahl et al., 2012). Nevertheless, the following interventions are commonly described by experts in the field as third wave (Hayes, 2004; Hayes et al 2011; Ost 2008): Acceptance and Commitment Therapy (ACT; Hayes et al., 1999), Dialectical Behaviour Therapy (DBT; Linehan, 1993), Compassion Focused Therapy/Compassionate Mind Training (CFT/CMT; Gilbert, 2005), Functional Analytic Psychotherapy (FAP; Kohlenberg & Tsai, 1994), Metacognitive Therapy (MCT; Wells, 2009), Mindfulness-Based Cognitive Therapy

(MBCT; Segal et al., 2013) and Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn., 1990). A brief explanation of these interventions can be found in Churchill et al. (2013).

### **Third Wave Interventions During the Perinatal Period**

Systematic reviews and meta-analyses have found preliminary evidence in terms of the effectiveness of third wave interventions, specifically mindfulness-based interventions (MBIs), on reducing depression, anxiety, and stress during pregnancy (Dhillon et al., 2017; Hall et al., 2016; Matvienko-Sikar et al., 2016; Shi & MacBeth., 2017) and across the perinatal period (Taylor et al., 2016). These reviews showed MBIs led to significant reduction in depression, anxiety, and stress when pre-to post data was examined, however a significant difference was not shown when between group effects were examined. Consequently, these reviews concluded there to be insufficient evidence from high quality research (i.e., RCTs) and highlighted the need for more methodologically robust controlled studies.

For instance, Hall et al. (2016) systematic review examined the effectiveness of mindfulness training during pregnancy. From the nine studies included in this review, a significant reduction of depression was found in two non-RCT studies (Goodman et al., 2014; Muzik et al., 2012), a significant reduction of anxiety was found in four non-RCT studies (Byrne et al., 2014; Duncan & Bardacke., 2010; Goodman et al., 2014; Woolhouse et al., 2014) and a significant reduction of perceived stress was found in one non-RCT study (Woolhouse et al., 2014). However, in the two RCTs, between-group differences were not statistically significant for stress, anxiety (Guardino et al., 2014; Woolhouse et al., 2014) or depression (Woolhouse et al., 2014). Taylor et al. (2016) meta-analysis examining the effectiveness of MBIs during the whole perinatal period also found similar findings. Of the 17 studies examined, seven were RCTs. The review concluded MBIs led to a significant reduction in depression, anxiety and stress when examining pre-to

post data, with effect sizes (ESs) being small to medium ( $g = 0.36-0.51$ ). However, the MBIs were not found to be significantly different than the control conditions (e.g., waiting-list control, treatment-as-usual, and a reading control) when between group effects were examined; ESs being small or negligible.

During the process of conducting the search strategy for this current review, two additional reviews examining MBIs during pregnancy (Lucena et al., 2020) and mind-body interventions (i.e., MBIs, CBT, relaxation therapy and yoga) on stress management during pregnancy (Guo et al., 2020) were identified. These reviews both exclusively reviewed RCTs and found significant between group effects favouring the MBIs compared to the control group. For instance, of the 11 RCTs reviewed in Lucena et al. (2020) a significant between group effect, favouring the MBI was shown in six RCTs for depression (Dimidjian et al., 2016; Faramarzi et al., 2015; Krusche et al., 2018; Pan et al., 2019; Yazdanimehr et al., 2016; Zemestani & Nikoo., 2020), six RCTs for anxiety (Faramarzi et al., 2015; Guardino et al., 2014; Vieten & Astin., 2008; Yazdanimehr et al., 2016; Zang et al., 2019; Zemestani & Nikoo., 2020), and five RCTs for stress (Krusche et al., 2018; Faramarzi et al., 2015; Muthukrishnan et al. 2016; Pan et al., 2019; Zang et al., 2019).

### **Current Review**

The previous literature has found evidence that MBIs can have positive effects for the improvement of depression, anxiety, and stress during the perinatal period. Nevertheless, conducting a further systematic review was warranted for several reasons. Firstly, the discussed reviews only examined MBIs and did not include other third wave interventions such as FAP or MCT, meaning the effectiveness of these interventions remained unknown. Secondly, there would be value in conducting a review that includes RCTs where the interventions were delivered at any point during the perinatal period, not just during pregnancy. This is because the recent reviews only examined MBIs during pregnancy (Guo et al., 2020;

Lucena et al., 2020) and only one study examining the use of mindfulness during the postpartum period (Perez-Blasco et al., 2013) was identified in Taylor et al. (2016) review. Lastly, since psychological interventions should be empirically supported, further evidence is required before third wave interventions can be routinely recommended for the treatment of perinatal mental health problems. Therefore, this review aimed to add to existing literature by systematically reviewing the evidence from RCTs that examined third wave interventions on perinatal mental health.

The review research questions were:

1. Which third wave interventions have been examined using randomised control trial design with women in the perinatal period?
2. How effective are these interventions for improving depression, anxiety, and stress during the perinatal period?
3. What are the attrition rates when women engage in a third wave intervention during the perinatal period?

## **Methods**

### **Search Strategy**

This systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; Moher et al., 2009). A protocol and search strategy were developed and used as a template for conducting the review. The PICO tool (Schardt et al., 2007) was also used to develop research questions and guide the development of inclusion and exclusion criteria.

Relevant studies were identified through searches of the following databases on 27th August 2020: PsycINFO, PubMed and Web of Science. The “Advanced Search” option was used in all searches with no restrictions on publication date, type, or language. The search terms were selected based on terms used by past relevant systematic reviews and discussed with supervisor and a librarian expertise in conducting systematic reviews at Royal Holloway, University of London (RHUL). All

articles including the terms “‘third wave’ OR ‘third-wave’ OR ACT OR ‘acceptance and commitment therapy’ OR DBT OR ‘dialectical behaviour therapy’ OR ‘dialectical behavior therapy’ OR CFT OR ‘compassion focused therapy’ OR ‘CMT’ OR ‘compassionate mind’ OR MBI OR mindful\* OR ‘mindfulness-based’ OR mindfulness based OR ‘mindful-approach’ OR ‘mindfulness based intervention’ OR MBCT OR MBSR OR FAP OR functional analytic psychotherapy OR MCT OR metacognitive” in combination with “perinatal OR peri-natal OR prenatal OR pre-natal OR postnatal OR post-natal OR antenatal OR antepartum OR ante-partum OR postpartum OR post-partum OR pre-partum OR peripartum OR peri-partum OR pregnan\* OR “expectant mothers” OR gestation\*” in combination with “wellbeing OR well-being OR ‘maternal health’ OR depress\* OR depression OR mood OR anxiety OR affect OR stress” were identified. The ‘Abstract’ search field was used in PsycINFO, the ‘Title/Abstract’ used in PubMed and a combination of ‘Title’, ‘Abstract’, ‘Abstract’ were used in Web of Science.

Search results were exported to and managed using Zotero referencing database. After duplications were removed, titles and abstracts of studies were screened for eligibility, full-text papers of eligible studies were then screened. When screening review papers, the reported studies were also screened for eligibility to potentially identify further eligible studies to include in the review; no additional eligible studies were found. Furthermore, when an RCT study, with the same baseline participants, were reported by more than one publication with different time points, the most recently published study, or the study with the most complete outcomes data were selected as the ‘core paper’. The other study only being used as a supplementary source of information. The author of this systematic review based this decision on best practice guidance detailed in the following reference: Boland, A., Cherry, G., & Dickson, R. (Ed.). (2017).

To check for consistency in the paper selection process, a screening tool was developed (see Appendix A) and used by a second reviewer who independently reviewed 20% of title and abstract screening (percentage agreement 96.4%,  $\kappa = .702$ ) and 20% of full-text screening (percentage agreement 100%,  $\kappa = 1$ ). Disagreements were resolved using discussion with a third reviewer. The search strategy was repeated on 30<sup>th</sup> October 2020 to identify any eligible new publications; no new publications were included.

### **Inclusion and Exclusion Criteria**

Studies were included if they met the following criteria:

1. Randomised-controlled design or reviews (to then search for RCT's)
2. Adult women ( $\geq 18$  years of age) currently in the perinatal period (defined as pregnancy to  $\leq 12$  months after childbirth)
3. Third wave intervention, specifically: ACT, DBT, CFT or CMT, FAP or MBI.  
MBI must meet the following criteria: last at least eight sessions and either be, or adapted from MCT, MBCT or MBSR
4. Include a validated primary or secondary outcome measure of depression, anxiety, and/or stress
5. All settings
6. Written in English

Exclusion criteria include:

1. Study protocols that do not present results of the study
2. Qualitative or mixed method studies

The decision to exclude mixed methods studies (i.e., not synthesise the quantitative findings from studies with a mixed method methodology) was based on the following reasons: to avoid the possible inclusion of studies with a minimal focus on quantitative data and to avoid the risk of failing to capture an accurate account of

the study's findings. A further consideration was that including mixed methods would further increase the heterogeneity of the studies included in the review.

### **Data Extraction**

Data was extracted and recorded using a data extraction table in Excel, specifically designed for the purpose of this review. The extraction table were developed by examining tables in previous systematic reviews in a similar topic area and following guidance (Boland et al., 2017). Authors were contacted via email for further information where data were missing or unclear. If no response following two emails, sent within a two week-period, missing data were reported as 'not reported'. To check for consistency, a second reviewer independently reviewed 20% of studies (percentage agreement 100%,  $\kappa = 1$ ).

The study characteristics that were extracted included: (a) author, year of publication and country of study; (b) perinatal stage (c) participants' characteristics, including number of weeks gestation, sample size, age (mean and standard deviation), ethnicity, employment status and relationship status; (d) outcome measures and (e) time points for data collection. Attrition rates for each study were also extracted to address the reviews second research question of attrition rates when third wave interventions are used during the perinatal period.

To address the first research question, of which third wave interventions have been used with women in the perinatal period characteristics of interventions were extracted. This included, (a) control condition; (b) type of third wave intervention; (c) content of intervention and homework assignments; (d) intervention delivery including mode of delivery, number of sessions, duration of sessions, total duration of intervention and information about the delivery provider of the intervention.

To address the third research questions regarding the effectiveness of interventions the following information for each study were extracted: (a) intervention and control group outcome measure scores (mean and standard deviations) for



depression, and/or anxiety, and/or stress at baseline, post-intervention and follow-up (if applicable); (b) within group effects pre-to-post intervention (reported or calculated ESs) for outcome measures; (c) between group effects in post-intervention scores (reported or calculated ESs) for outcome measures.

### **Assessment of Methodological Quality**

The Revised Cochrane risk-of-bias tool for randomized trials (RoB 2; Sterne et al., 2019) was used to assess the quality of the studies. The RoB 2 tool addresses five domains through which bias might be introduced (see Table 3). For each domain, a series of “signalling” questions are first answered, which results in three possible risk-of-bias judgements: ‘low risk’ ‘some concern’ and ‘high risk’ of bias. The judgements across the five domains then leads to an overall risk-of bias judgement. When using the RoB 2 tool the effect of interest, either ‘the effect of assignment’ (intention-to-treat) or ‘the effect of adhering’ (per protocol effect) to an intervention must also be decided upon. Given that intention-to-treat (ITT) analysis maintain the benefits of randomisation, this review selected ‘effect of assignment’.

This tool was chosen because it is a design-specific tool used to evaluate RCTs, the tool has clear guidance including a detailed cribsheet to follow and the earlier version has been used in previous systematic reviews in similar topic areas (Guo et al., 2020; Shi & MacBeth., 2017). To check for accuracy in the assessment of quality, a second reviewer independently reviewed 20% of studies and the overall risk-of-bias judgements for each of the five domains were compared (percentage agreement 93.3%). Furthermore, no studies were excluded from the review due to methodological quality.

### **Data Analysis**

A narrative synthesis was completed and reported following PRISMA guidelines. Conducting a meta-analysis was not deemed to be appropriate due to the heterogeneity of the studies, including variation in the interventions and different

outcome measures used to collect data at differing time points. Furthermore, concerns were noted regarding study quality and small sample sizes, both impacting statistical power.

The percentage of attrition pre- to post-intervention, and post-intervention to follow-up, were calculated for the intervention and control group in each study. The mean values of psychological outcome measures (i.e., depression, anxiety, stress) at baseline, post-intervention and follow up for each condition were also examined, where reported. ESs were reported or calculated, to enable comparison between studies. ESs were calculated for both within group effects pre- to post-intervention and between groups effects pre- to post-intervention, and pre-intervention to follow-up, for all reported depression, anxiety, and stress outcome measures. ESs were calculated by dividing the difference between pre- and post-intervention mean changes of both groups by the pooled pre-test standard deviation (Morris, 2008). Within group ESs were adjusted using a small sample bias correction to obtain  $g$  (Hedges, 1981). Where the studies that did not report the required data to calculate attrition rate or ESs, requests for data were made to authors.

## **Results**

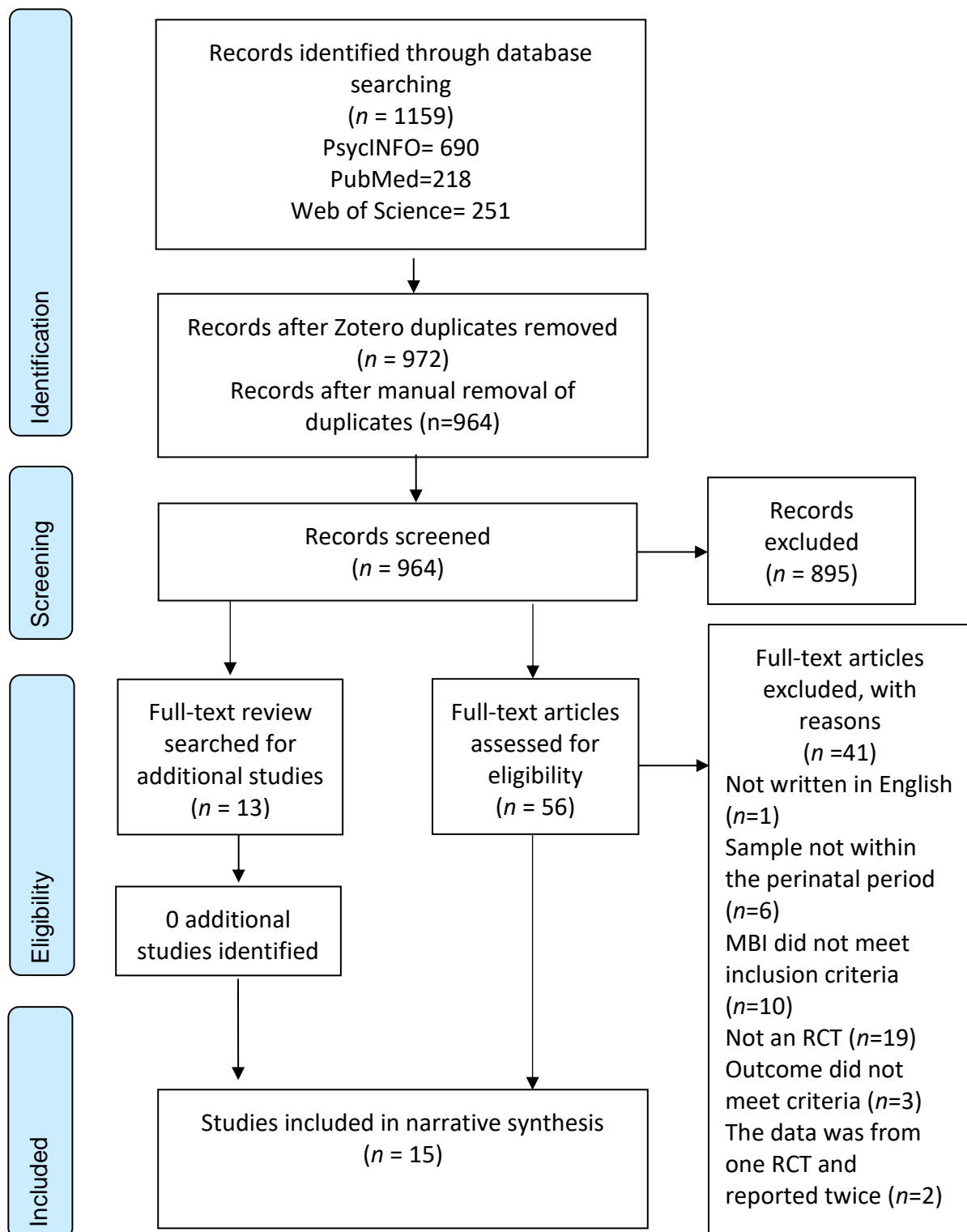
### **Study Selection**

A PRISMA flow diagram depicts the study selection process (see Figure 1). Overall, the search strategy retrieved a total of 1159 citations: PsychINFO ( $n = 690$ ), PubMed ( $n = 218$ ) and Web of Science ( $n = 251$ ). After removing 195 identified duplicates, the titles, and abstracts of 964 articles were screened, with 56 studies and 13 reviews being deemed as eligible for a further full-text screen. Five of the 56 studies which had a full-text screen met the exclusion criteria of being a mixed method study. However, these five studies all also met another exclusion criteria; two studies were mixed methods plus 'not an RCT' and three studies were mixed methods plus 'MBI did not meet inclusion criteria'. Thus, none of the studies receiving

a full-text review were excluded solely for having a mixed method methodology. No additional eligible RCT studies were identified from screening the 13 review articles. Fifteen studies were assessed as meeting the eligibility criteria for this review and included in the narrative synthesis.

**Figure 1**

*PRISMA Flow Diagram*



## Study Characteristics

A summary of the included studies and their key characteristics can be found in Table 1. The year of publication of studies ranged from 2008 and 2020, with most studies published since 2016 ( $n=12$ , 80%). Studies were conducted in the following countries, Iran ( $n=6$ ), United States of America ( $n=3$ ), China ( $n=2$ ), Taiwan ( $n=1$ ), Sweden ( $n=1$ ), India ( $n=1$ ) and United Kingdom ( $n=1$ ). In terms of stage of the perinatal period, the majority of studies solely examined third wave interventions in pregnant women ( $n=9$ , 60%), in five of the studies the intervention was delivered during pregnancy and the effects were examined into the postpartum period. The final study solely examined a third wave intervention for women in the postpartum period (Ahmadpanah et al., 2018).

The sample characteristics in Table 1 are based on the full randomized samples at baseline, as this information was reported in most studies. However, the sample characteristics in Table 1 for Kruishe et al. (2008) and Yazdanimehr et al. (2016) represent data for only the participants with pre- and post-intervention data. Therefore, these studies were not included when calculating the averages of characteristics across studies. Including these studies may have led to a misrepresentation of the actual participants' characteristics, as it may have been participants with specific characteristics that dropped out from the study for potential reasons including lack of time or not finding the intervention helpful.

Sample sizes ranged from 34 to 314, with the total number of participants from all included studies being 1444. The mean age of participants across the 15 studies ranged from 21 to 33.9 years. Data on ethnicity were reported in six studies, with information being sought and obtained from the author for two additional studies.

A range of ethnicities were captured by the studies. Participants in Zang et al. (2019) were all Chinese, participant in Zhang and Emory (2015) all self-identified as African Americans, participants in Pan et al. (2019) were all Taiwanese and

participants in Faramarzi et al. (2015) were all Persian. In the three remaining studies reporting on ethnicity, most participants were Caucasian (70%, 89% and 98%). Employed status ranged from 2% (Vakilian et al., 2019) to 76% (Krusche et al., 2018) across the ten studies with available data. Eight studies reported on marital status with the majority of participants married or cohabiting (range 51.4% to 100%,  $M = 88.60\%$ ,  $SD = 15.94$ ). Five studies based in Iran, one in China and one in India did not provide data regarding relationship status.

In terms of mental health characteristics, seven studies actively sought participants at risk (Dimidjian et al., 2016; Guo et al., 2020; Lönnberg et al., 2020; Yazdanimehr et al., 2016) or currently depressed (Ahmadpanah et al., 2018; Shahaheri et al., 2016; Zemestani & Nikoo., 2020). Six studies excluded participants with current depression (Dimidjian et al., 2016; Faramarzi et al., 2015; Guo et al., 2020; Lönnberg et al., 2020, Pan et al., 2019; Vakilian et al., 2019).

Across the 15 RCTs, all included at least one primary or secondary outcome measure of depression, anxiety, or stress with a total of 15 different psychological measures across studies. The Edinburgh Postnatal Depression Scale (EPDS) was the most used measure of depression ( $n = 6$ ), the Perceived Stress Scale (PSS) was most used for measure of stress ( $n = 6$ ) and the State-Trait Anxiety Inventory (STAI) was the measure most seen for measuring anxiety ( $n = 3$ ). Outcome measure data was reported for randomization and post-intervention for all studies, with 13 studies also including data at follow-up with follow-up periods ranging from one-month post-intervention to 12-months postpartum.

**Table 1***Study Characteristics*

| Author, Year,<br>Country            | Sample Characteristic        |   |  | Outcome Measures |         |        |  |
|-------------------------------------|------------------------------|---|--|------------------|---------|--------|--|
|                                     | Perinatal<br>stage           | Population  |  | Depression       | Anxiety | Stress | Time points for<br>data collection   |
| Ahmadpanah<br>et al. (2018)<br>Iran | Postpartum                   | Postpartum women with postpartum depression that began within the first 10 weeks after delivery<br><i>N</i> = 45<br>Age <i>M (SD)</i> : 24.49 (2.62)<br>Ethnicity: NR<br>Employed: NR<br>Married or cohabiting: NR  |  | MADRS<br>BDI     | N/A     | N/A    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 8 weeks<br>FU                                       |
| Dimidjian et al.<br>(2016)<br>USA   | Pregnancy<br>&<br>Postpartum | Pregnant women (up to 32 weeks gestation) with prior, but not current, major depressive disorder<br><i>N</i> = 86<br>Age <i>M (SD)</i> : IG: 30.98 (4.08)<br>CG: 28.72 (5.50)<br><br>Ethnicity <i>N (%)</i> : White 61 (70.93), Black 16 (18.6), Asian 2 (2.32), Hispanic 6 (6.98), self-identified as other 1 (1.12) |  | EPDS             | N/A     | N/A    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 1-month<br>postpartum<br>T3: 6-months<br>postpartum |

| Author, Year,<br>Country        | Sample Characteristic        |   | Outcome Measures |         |        |  |
|---------------------------------|------------------------------|---|------------------|---------|--------|--|
|                                 | Perinatal<br>stage           | Population  | Depression       | Anxiety | Stress | Time points for<br>data collection   |
|                                 |                              | Employed: NR<br>Married or cohabiting <i>N</i> (%): 73 (84.88) <sup>a</sup>   |                  |         |        |  |
| Faramarzi et al. (2015)<br>Iran | Pregnancy                    | Pregnant women (6-12 weeks gestation) with medically diagnosed moderate NVP and no psychological illness<br><i>N</i> = 86<br>Age <i>M</i> ( <i>SD</i> ): IG:25.11 (4.60)<br>CG: 23.27 (5.24)<br>Ethnicity <i>N</i> (%): Persian 86 (100) <sup>b</sup><br>Employed <i>N</i> (%): NR (10) <sup>b</sup><br>Married or cohabiting <i>N</i> (%): 86 (100) <sup>b</sup> | HADS             | HADS    | PDQ    | T0:<br>Randomisation<br>T1: Post<br>intervention<br>T2: 1-month<br>FU          |
| Guo et al. (2020)<br>China      | Pregnancy<br>&<br>Postpartum | Pregnant women (second trimester to 34 weeks) deemed as high risk of developing perinatal depression, but no current or history of psychiatric disorders<br><i>N</i> = 314<br>Age <i>M</i> ( <i>SD</i> ): IG: 31.4 (5.7)  | EPDS<br>BDI      | STAI    | PSI    | T0:<br>Randomisation<br>T1: 3-months<br>postpartum<br>T2: 1 year<br>postpartum |



| Author, Year,<br>Country       | Sample Characteristic        |   |      | Outcome Measures |         |  |                                    |
|--------------------------------|------------------------------|---|------|------------------|---------|--|------------------------------------|
|                                | Perinatal<br>stage           | Population  |      | Depression       | Anxiety | Stress   | Time points for<br>data collection |
|                                |                              | CG: 29.8 (6.2)  |      |                  |         |  |                                    |
|                                |                              | Ethnicity: NR   |      |                  |         |  |                                    |
|                                |                              | Employed <i>N</i> (%): 168 (53.51) <sup>a</sup>   |      |                  |         |  |                                    |
|                                |                              | Married or cohabiting <i>N</i> (%): 288 (91.72) <sup>a</sup>  |      |                  |         |  |                                    |
| Krusche et al.<br>(2018)<br>UK | Pregnancy<br>&<br>Postpartum | General pregnant women (12-34 weeks gestation)<br><i>N</i> = 185<br>Age <i>M</i> ( <i>SD</i> ): 32.7 (NR) <sup>c</sup><br>Ethnicity <i>N</i> (%): British/ White-British/White 64<br>(88.9) <sup>c</sup><br>Employed <i>N</i> (%): 55 (76.4) <sup>c</sup><br>Married or cohabiting <i>N</i> (%): 69 (95.8) <sup>c</sup> | EPDS | GAD-7            | PSS     | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 8 weeks<br>postpartum |                                    |

| Author, Year,<br>Country                         | Sample Characteristic        |   |            | Outcome Measures |        |   |
|--|------------------------------|---|------------|------------------|--------|---|
|  | Perinatal<br>stage           | Population  | Depression | Anxiety          | Stress | Time points for<br>data collection  |
| Lönnberg et<br>al. (2020) <sup>d</sup><br>Sweden | Pregnancy<br>&<br>Postpartum | Pregnant women (19-26 weeks gestation) deemed<br>as high risk of developing perinatal depression, but<br>not currently clinically depressed<br><i>N</i> = 193<br>Age <i>M (SD)</i> : IG: 32 (3.86)<br>CG: 32 (4.14)<br>Ethnicity <i>N (%)</i> : Swedish 169 (87.56), Swedish &<br>other 9 (4.82), European 11 (5.91), Non-European 4<br>(2.07) <sup>a</sup><br>Employed <i>N (%)</i> : *Data missing for one participant-<br>Up to 40 h/week 139 (72.4), More than 40<br>hours/week 53 (27.6) <sup>a</sup><br>Married or cohabiting <i>N (%)</i> : 186 (96.37) <sup>a</sup> | EPDS       | N/A              | PSS    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T3 <sup>d</sup> : 3 months<br>postpartum<br>T4 <sup>d</sup> : 9months<br>postpartum<br>T5 <sup>d</sup> : 12 months<br>postpartum |
| Muthukrishnan<br>et al. (2016)<br>India          | Pregnancy                    | General pregnant women (12 weeks gestation)<br><i>N</i> = 74<br>Age <i>M (SD)</i> : IG:21 (2.56)<br>CG: 23 (2.4)<br>Ethnicity: NR   | N/A        | N/A              | PSS    | T0:<br>Randomisation<br>T1: Post-<br>intervention   |

| Author, Year,<br>Country                    | Sample Characteristic        |  |            | Outcome Measures |        |   |  |
|---|------------------------------|--|------------|------------------|--------|---|--|
|   | Perinatal<br>stage           | Population   | Depression | Anxiety          | Stress | Time points for<br>data collection  |  |
|   |                              | Employed: NR<br>Married or cohabiting: NR  |            |                  |        |   |  |
| Pan et al.<br>(2019) <sup>e</sup><br>Taiwan | Pregnancy<br>&<br>Postpartum | Pregnancy women (13-28 weeks gestation) with no<br>history of mental illness <sup>c</sup><br><i>N</i> = 104<br>Age <i>M (SD)</i> : 32.83 (3.83)<br>Ethnicity <i>N (%)</i> : Taiwanese 104 (100) <sup>b</sup><br>Employed <i>N (%)</i> : 19(19.8)<br>Married or cohabiting <i>N (%)</i> : 92 (95.8) | EPDS       | N/A              | PSS    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 36 weeks<br>gestation<br>T3 <sup>e</sup> : 3months<br>postpartum |  |
| Shahtaheri et<br>al. (2016)<br>Iran         | Pregnancy                    | Pregnant women (NR) diagnosed with depression<br>and stress<br><i>N</i> = 30<br>Age: NR<br>Ethnicity: NR<br>Employed: NR<br>Married or cohabiting: NR  | HDS        | N/A              | PSS    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 2-month<br>FU  |  |

| Author, Year,<br>Country          | Sample Characteristic        |  |            | Outcome Measures |        |  |
|-----------------------------------|------------------------------|--|------------|------------------|--------|--|
|                                   | Perinatal<br>stage           | Population   | Depression | Anxiety          | Stress | Time points for<br>data collection   |
| Vakilian et al.<br>(2019)<br>Iran | Pregnancy                    | Pregnant women (NR) with no history of<br>psychological disorders<br><i>N</i> = 44<br>Age <i>M (SD)</i> : IG: 22.6 (1.52)<br>CG: 22.1 (1.38)<br>Ethnicity: NR<br>Employed <i>N (%)</i> : 1 (2.27) <sup>a</sup><br>Married or cohabiting: NR  | N/A        | PRAQ             | N/A    | T0:<br>Randomisation<br>T1: Post<br>intervention<br>T2: 1-month<br>FU                                      |
| Vieten & Astin<br>(2008)<br>USA   | Pregnancy<br>&<br>Postpartum | Pregnant women (12-30 weeks) with a history of<br>mood concerns<br><i>N</i> = 34<br>Age <i>M (SD)</i> : 33.9 (3.8)<br>Ethnicity <i>N (%)</i> : White (74), Hispanic (13), Asian (7),<br>Mixed race (3), East Indian (3)<br>Employed: NR<br>Married or cohabiting <i>N (%)</i> : 34 (100) | CES-D      | STAI             | PSS    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T3: 3months<br>post-<br>intervention<br>postpartum FU |

| Author, Year,<br>Country             | Sample Characteristic |   |            | Outcome Measures |        |  |
|--------------------------------------|-----------------------|---|------------|------------------|--------|--|
|                                      | Perinatal<br>stage    | Population  | Depression | Anxiety          | Stress | Time points for<br>data collection                                     |
| Yazdanimehr<br>et al. (2016)<br>Iran | Pregnancy             | Pregnant women (1-6 months gestation) with no history of psychological disorders but scoring >13 on the EPDS and >16 on the BAI<br><i>N</i> = 80<br>Age <i>M (SD)</i> : IG: 26.0 (5.8) <sup>c</sup><br>CG: 26.7 (4.5) <sup>c</sup><br>Ethnicity: NR<br>Employed <i>N (%)</i> : 23 (36.51) <sup>a</sup><br>Married or cohabiting: NR | EPDS       | BAI              | N/A    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 1-month<br>FU |
| Zemestani &<br>Nikoo (2020)<br>Iran  | Pregnancy             | Pregnant women (1-6 months gestation) meeting DSM-5 criteria for depression and anxiety<br><i>N</i> = 38<br>Age <i>M (SD)</i> : 28.63 (3.02)<br>Ethnicity: NR<br>Employed <i>N (%)</i> : NR (39.5) <sup>a</sup><br>Married or cohabiting: NR  | BDI-II     | BAI              | N/A    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 1-month<br>FU |

| Author, Year,<br>Country        | Sample Characteristic |  |            | Outcome Measures |        |  |
|---------------------------------|-----------------------|--|------------|------------------|--------|--|
|                                 | Perinatal<br>stage    | Population   | Depression | Anxiety          | Stress | Time points for<br>data collection                                     |
| Zhang &<br>Emory (2015)<br>USA  | Pregnancy             | General pregnant women (12-31 weeks gestation)<br><i>N</i> = 65<br>Age <i>M (SD)</i> : 25.3 (4.6)<br>Ethnicity <i>M (SD)</i> : African-Americans 65 (100)<br>Employed <i>N (%)</i> : NR (15.4) <sup>a</sup><br>Married or cohabiting <i>N (%)</i> : NR (51.4) <sup>a</sup> | BDI-II     | N/A              | PSS    | T0:<br>Randomisation<br>T1: Post-<br>intervention<br>T2: 1-month<br>FU |
| Zhang et al.<br>(2019)<br>China | Pregnancy             | General pregnant women (14-28 weeks gestation)<br><i>N</i> = 66<br>Age <i>M (SD)</i> : IG: 25.70 (2.79)<br>CG: 25.58(2.33)<br>Ethnicity <i>M (SD)</i> : Chinese: 63 (100)<br>Employed <i>N (%)</i> : IG: 19 (59.4)<br>CG:16 (51.6)<br>Married or cohabiting: NR            | SDS        | STAI             | PSRS   | T0:<br>Randomisation<br>T1: Post<br>intervention                       |

*Note:* *BAI*, Beck Anxiety Inventory; *BDI*, Beck Depression Inventory; *CES-D*, Centre for Epidemiologic Studies Depression Scale; *CG*, Control group; *EPDS*, Edinburgh Postnatal Depression Scale; *GAD-7*, The General Anxiety Disorder-7; *HADS*, Hospital Anxiety and Depression Scale; *HDS*, Hamilton depression scale; *IG*, Intervention group; *MADRS*, Montgomery-Asberg depression rating scale; *NR*,

not reported; *PDQ*, Pregnancy Distress Questionnaire; *PRAQ*, Van den Bergh's Pregnancy-Related Anxiety Questionnaire; *PSI*, Parent Stress Index; *PSRS*, Pregnancy Stress Rating Scale; *PSS*, Perceived Stress Scale; *SD*, Standard deviation; *SDS*, Self-rating Depression Scale; *STAI*, State-Trait Anxiety Inventory.

<sup>a</sup> Calculated based on information in full-text paper

<sup>b</sup> Information provided by author

<sup>c</sup> Data for participants with pre and post intervention

<sup>d</sup>Information supplemented by Lönnberg et al. (2020) published February 2020

<sup>e</sup>Information supplemented by Pan et al. (2019) published October 2019

## Characteristics of Third Wave Interventions

A summary of the characteristics of the interventions can be found in Table 2. In terms of delivery of interventions, two studies included an online intervention with the remaining 13 studies being face-to-face group interventions ranging between 3-20 participants per group. The majority of interventions lasted eight sessions ( $n=11$ ). Three studies included an optional reunion/follow up session. The face-to-face group sessions ran weekly in 10 studies and fortnightly in three studies. In terms of the two online interventions, MBCT was delivered in 10 sessions over a four-week period in Krusche et al. (2018) and MBSP was delivered across 36 episodes of training delivered over six-weeks (i.e., six episodes of training per week) in Guo et al. (2020). The duration per session ranged from 15 minutes to 180 minutes (based on lower value  $M=99$  minutes), with total intervention duration ranging from 6.67 hours to 24 hours (based on lower value  $M=14.24$  hours). Although, it should be noted that session frequency was not reported in Yazdanimehr et al. (2016), session duration was not reported in three studies (Krusche et al., 2018; Muthukrishnan et al., 2016; Shahtaheri et al., 2016) and total intervention duration was not reported in four studies (Guo et al., 2020; Krusche et al., 2018; Muthukrishnan et al., 2016; Shahtaheri et al., 2016).

Information regarding the intervention delivery provider was reported in 11 studies. The delivery providers included the following professions: clinical psychologist ( $n=3$ ), psychologist ( $n=1$ ), Ph.D student in clinical psychology ( $n=1$ ), psychotherapist ( $n=1$ ), master level clinical psychologist ( $n=2$ ), profession not specified ( $n=3$ ). Nine studies also explicitly stated the delivery provider has been trained to deliver the intervention. However, Dimidjan et al. (2016) was the only study to report that adequate instructor adherence to the protocol was shown, as measured by using the modified MBCT Adherence Scale (MBCT-PD-AS).



Ten types of intervention were examined across the 15 RCTs. Two studies examined MBSR (Shahtaheri et al. 2016; Zhang et al., 2019), three examined MBCT (Faramarzi et al., 2015; Krusche et al., 2018; Zemestani & Nikoo, 2020), eight studies examined MBI interventions adapted from either MBSR or MBCT (Ahmadpanah et al., 2018; Dimidjian et al., 2016; Guo et al., 2020; Lönnberg et al., 2020; Muthukrishnan et al., 2016; Pan et al., 2019; Vieten & Astin., 2008; Zhang & Emory., 2015), one study examined Mindfulness-integrated cognitive behavioural therapy (MiCBT) (Yazdanimehr et al., 2016) and one study examined ACT (Vakilian et al., 2019). However, a further three studies incorporated ACT elements into the MBI (Ahmadpanah et al., 2018; Vieten & Astin, 2008; Zhang & Emory, 2015). None of the studies were reported to be solely DBT or CFT interventions, however, the MBI in Zhang & Emory (2015) was reported to have been adapted from DBT, amongst other third wave interventions, and self-compassion was a core focus of the MBI used in Guo et al. (2020).

Shahtaheri et al. (2016) was the only study that did not include information on the contents of the intervention, instead only stating that the intervention (i.e., mindfulness-based stress reduction program and conscious yoga) was delivered via a group across eight sessions. Thus, the study was still deemed to meet the current reviews inclusion criteria. The level of detail regarding the content of interventions varied across the remaining 14 studies, with the majority providing an outline of each session ( $n=8$ ; Ahmadpanah et al., 2018; Faramarzi et al., 2015; Krusche et al., 2018; Lönnberg et al., 2020; Muthukrishnan et al., 2016; Pan et al., 2019; Yazdanimehr & Nikoo., 2020; Zhang et al., 2019), two including a table detailing the intervention protocol (Dimidjian et al., 2016; Vakilian et al., 2019) and the remaining four studies including a brief overview of the intervention.

Furthermore, all the inventions detailed in the remaining 14 studies included formal and/or informal mindfulness practices, with the most commonly reported

practices being body scan ( $n=11$ ), mindfulness of breathing ( $n=8$ ) mindful yoga ( $n=9$ ), mindful movement ( $n=9$ ), sitting meditation ( $n=7$ ) and mindful eating ( $n=6$ ). Other noted components included, loving kindness meditation ( $n=3$ ), cognitive-behavioural strategies ( $n=2$ ) and acceptance of negative emotions or thoughts ( $n=5$ ). Eight of the studies stated that the interventions included psychoeducation element relating to mindfulness, the relationship of mindfulness with CBT, antenatal education, or mental wellbeing during the perinatal period. Modifications for the perinatal period were also explicitly noted for the majority of the studies ( $n=9$ ; 60%). For example, the 'Mindful Motherhood' intervention (Vieten & Austin et al., 2008; Zhang & Emory., 2015) included awareness of the developing fetus and stomach during the body scan.

Homework assignments were included in nearly all interventions ( $n=13$ ; 87%). The homework assignments were made up of informal practices (e.g., mindful eating), brief formal practices (e.g., 3-minute breathing space practice) to formal guided 20-30minutes practices. Participants in Pan et al. (2019) study were also encouraged to engage in one seven-hour retreat day. The interventions in studies encouraged participants to engage practices for the following frequencies, daily ( $n=7$ ), six times per week ( $n=3$ ), 3 times per week ( $n=1$ ), frequency not specified ( $n=2$ ). Participants were also provided with supplementary materials to support home assignments, such as audio recordings, handout materials or DVDs in seven of the studies.

All 15 studies included a control/comparison condition, of which ten used treatment-as-usual (TAU), three used a waitlist condition, and three studies used an active control condition. The active control conditions included childbirth education classes (Lönnberg et al., 2020; Pan et al., 2019) and stress management training (Ahmadpanah et al., 2018).

**Table 2***Description of Interventions*

| Author, Year             | Control  | Intervention  | Key Intervention Components  | Delivery  |
|--------------------------|--|---|--|---|
| Ahmadpanah et al. (2018) | TAU:<br>Pharmacologic treatment (Citalopram)<br><br>Active Control: Stress management training plus pharmacologic treatment (Citalopram) | Detached Mindfulness plus pharmacologic treatment (Citalopram)<br><br>(based on MBSR and elements of ACT <sup>a</sup> ) | Psychoeducation about detached mindfulness therapy and attention training techniques<br><br>Practices included, detached mindfulness, assessment against prevented inhibition, association techniques, wandering mind and task orientation, circle words and unruly child management, imagery cloud and train station tasks<br><br>Homework: Patients were asked to exercise at least three times per week at home | Group (7-9 participants)<br><br>Duration: 8 sessions lasting 60-90min (8-12hours total), held weekly<br><br>Delivery provider: Trained clinical psychologists |
| Dimidjian et al. (2016)  | TAU  | MBCT-PD<br><br>(based on MBCT)  | Psychoeducation about perinatal depression, anxiety, and worry<br><br>Practices included, body scan, sitting meditation, mindful walking, 3-minute breathing space, mindful eating, loving kindness meditation and emphasis on self-care practices.  | Group (3-9 participants)<br><br>Duration: 8 sessions lasting approx. 120min (16hours total), held weekly. Plus, one   |

| Author, Year            | Control                 | Intervention                        | Key Intervention Components  | Delivery  |
|-------------------------|-------------------------|-------------------------------------|--|---|
|                         |                         |                                     | Practices were modified for the context of perinatal period, with a stronger emphasis on brief informal mindfulness practices<br>Cognitive-behavioural strategies to enhance social support<br>Homework: Formal practice assigned for 6 days per week between sessions 1 and 7. Audio recorded files to guide mindfulness meditation practices and a DVD to guide yoga practice was provided                               | optional monthly follow-up class<br>Delivery provider: A behavioural health provider plus one of the two study investigators; both clinical psychologists trained in MBCT |
| Faramarzi et al. (2015) | TAU:<br>Medical therapy | Intensive MBCT plus Medical therapy | Practices included, body scan, mindful movement, yoga, eating-related guided meditations, a forgiveness meditation related to one's body and self, and a wisdom meditation to develop better choice-and decision-making techniques.<br>Homework: Practices assigned for first 5 sessions.<br>Participants were advised to continue practices throughout the trial period, such as eating a meal or snack mindfully per day | Group (NR)<br>Duration: 8 sessions lasting 50min (6.67hours total), over 3 weeks<br>Delivery provider: MBCT psychotherapist, experienced in MBCT                          |
| Guo et al. (2020)       | WL                      | MBSP                                | An instruction video providing an outline and information about the program procedure. Followed by six sequential steps involving different types of exercises with guided   | Online (N/A)<br>Duration: 36 episodes of training lasting approx.   |

| Author, Year             | Control                                 | Intervention   | Key Intervention Components   | Delivery   |
|--------------------------|---|--|---|--|
|                          |   | (modelled on MBSR)                                     | instructions performed in a stepwise way. Exercises focused on self-compassion and mindfulness. The intervention focused more on the self-compassion given the pressure of being a new mother and incapability in self-regulation<br><br>Homework: After completing each exercise, participants were instructed to exercise the steps during the day  | 15mins, with 6 episodes per week<br><br>Delivery provider: NR  |
| Krusche et al. (2018)    | WL                                      | MBCT<br><br>(condensed into a four-week online course) | Practices included, body scan, mindful movement, breathing space, sitting meditation and mindful eating, delivered through videos and assignments<br><br>Homework: Practice assignments, such as mindful routine activity, mindful eating, sitting meditation. To finish the course in the quickest time of 4-weeks, course website recommends setting aside 30 minutes a day for practice <sup>b</sup> | Online (N/A)<br><br>Duration: 10 sessions condensed into four-week format; allowing participants to stop and start as required<br><br>Delivery provider: Two leading mindfulness teachers, virtually guide participants <sup>b</sup> |
| Lönnerberg et al. (2020) | Active Control: Lamaze childbirth class | MBCP<br><br>(adapted from MBSR)                        | Mindfulness with antenatal education.<br><br>Practices included, body scan, mindful eating, mindful movement, mindful yoga, sitting and walking meditation, loving kindness meditation, informal meditation in daily life,  | Groups (8-14 participants)<br><br>89% of participants were accompanied by their partner during the sessions  |

| Author, Year                | Control | Intervention                                  | Key Intervention Components   | Delivery  |
|-----------------------------|---------|---|---|---|
|                             |         |   | mindful speaking and listening inquiry, methods to increase awareness of the baby and to cope with pain during labour<br>Sessions included a 15min snack break, enabling networking and peer support. Partners were encouraged to participate in the antenatal classes<br>Homework: 30min formal daily practice, plus informal practice whenever participant sensed foetal movements and during various other daily activities. An informative text, including home-practice assignments and links to audio-files with guided mindfulness practices given at each session | Duration: 8 sessions lasting 135min (18hours total), held weekly. Plus, re-union session within 2-4 months after the birth of their babies<br>Delivery provider: Three teachers trained in MBCP |
| Muthukrishnan et al. (2016) | TAU     | Mindful Meditation<br><br>(adapted from MBSR) | Psychoeducation on mindfulness, importance of breathing on stress reduction, stress during pregnancy and the importance of bringing mind to 'present moment'<br>Practices included, sitting and lying mindfulness of breathing, mindfulness of sounds around them and thoughts, mindful walking, and body scan<br>Homework: 30min daily formal practice. Mp3 CD provided in session 3,4,5,6,8 to listen to for daily practice   | Group (NR)<br>Duration: 10 sessions, held over twice per week for 5 weeks<br>Delivery provider: NR  |

| Author, Year             | Control                                      | Intervention            | Key Intervention Components   | Delivery  |
|--------------------------|--|-------------------------|---|---|
| Pan et al. (2019)        | Active Control: Routine childbirth education | MBCP (based on MBSR)    | <p>Psychoeducation on history MBCP, and the needs of the newborn and the postpartum family</p> <p>Practices included, body scan, mindful eating, loving-kindness meditation, mindful movement, yoga, being with the ice, three-minute breathing space, and seated meditation. Informal practices included, participants noticing their experience from moment to moment and concentrating their attention on one thing as many times as possible throughout the day.</p> <p>Homework: 30min formal practices assigned 6 times per week. Programme-related audio recordings provided. Plus, one seven-hour retreat day</p> | <p>Group (8-15 participants<sup>c</sup>)</p> <p>Duration: 8 sessions lasting 180min (24 hours total), held weekly</p> <p>Delivery provider: The first author, who had previously completed MBCP and MBSR teacher training and taught yoga to pregnant women</p> |
| Shahtaheri et al. (2016) | TAU  | MBSR and conscious yoga | NR  | <p>Group (NR)</p> <p>Duration: 8 sessions, held weekly</p> <p>Delivery provider: NR</p>   |
| Vakilian et al. (2019)   | TAU: received pamphlet of intervention       | ACT                     | Intervention covered the 6 core processes of ACT, with a focus on anxiety during pregnancy. Each session involved   | Group (NR)  |

| Author, Year          | Control             | Intervention  | Key Intervention Components  | Delivery   |
|-----------------------|---------------------|---|--|--|
|                       | after data analysis |   | <p>assignments, group feedback, appropriate exercises, and review of the content of previous sessions</p> <p>Session titles: 1. Welcoming and introduction to ACT. 2. Living in the present and mindfulness. 3. Experiential avoidance. 4. Acceptance. 5. Defusion. 6. Self as context. 7. Values. 8. Committed action</p> <p>Homework: Assignments set for first 7 sessions including mindfulness practices, using defusion metaphors and writing down unpleasant thoughts and feeling, strategies to help control unpleasant thoughts, short and long-term effects of control strategies, values ordered in priority</p> | <p>Duration: 8 sessions lasting 90min (12 hours total), held twice per week for 4 weeks</p> <p>Delivery provider: NR</p>   |
| Vieten & Astin (2008) | WL                  | <p>Mindful Motherhood</p> <p>(developed from elements of MBSR, MBCT, ACT)</p> | <p>The intervention contained approximately equal parts education, discussion, and experiential exercises tailored for perinatal period</p> <p>Three main elements of the intervention</p> <p>(1) mindfulness of thoughts and feelings through breath awareness and contemplative practices</p> <p>(2) mindfulness of the body through guided body awareness meditation and mindful hatha yoga</p>   | <p>Group (12-20 participants)</p> <p>Duration: 8 sessions lasting 120min (16 hours total), held weekly</p> <p>Delivery provider: Clinical psychologist trained in mindfulness-based intervention, as well as</p> |



| Author, Year              | Control  | Intervention | Key Intervention Components   | Delivery  |
|---------------------------|--|--------------|---|---|
|                           |  |              | (3) presentation of psychological concepts that incorporate mindfulness such as acceptance and cultivation of an observing self<br>Homework: 20min formal daily guided meditations. Weekly session reading material and a compact disco with three guided meditations provided  | certified prenatal yoga instructor  |
| Yazdanimehr et al. (2016) | TAU: received training manual of intervention sessions at the end of the study | MiCBT        | Psychoeducation on mindfulness, components of CBT and the relationship of mindfulness with CBT<br>Practices included, mindful breathing, body scan, awareness of visceral sensations, behaviour therapy techniques (such as problem solving), interpersonal skills, assertiveness and role play, acceptance and management of suffering in daily life<br>Homework: NR | Group (NR)<br>Duration: 8 sessions lasting 90min (12hours total)<br>Delivery provider: a MSc in clinical psychology (first author) who had received specialized training in this area under the supervision of a PhD in clinical psychology |

| Author, Year             | Control  | Intervention                                  | Key Intervention Components  | Delivery   |
|--------------------------|--|---|--|--|
| Zemestani & Nikoo (2020) | TAU: received two educational sessions about depression and anxiety and its effects on mother and the foetus at the end of the study | MBCT  | The overarching theme of momentary awareness and acceptance of negative emotions and affect during pregnancy (e.g., depression, anxiety, rumination, worry) was introduced and reinforced throughout the training. Practices modified for perinatal period included, body scan, mindful yoga, sitting meditation, mindfulness of everyday activities such as mindful eating and mindful walking. Homework: 30min of daily formal and informal mindfulness practices. In addition, practice the 3-min breathing space three times per day. Then during the last 3 weeks of the intervention to utilize the 3-min breathing space whenever participant noticed unpleasant thoughts or feelings. Audio-recorded files were provided each week to guide mindfulness meditation practices | Group (NR)<br>Duration: 8 sessions lasting 120min (16 hours total), held weekly<br>Delivery provider: Trained master's level clinical psychologist who had at least 2 years of clinical experience and received supervised training in delivering MBCT |
| Zhang & Emory (2015)     | TAU  | Mindful Motherhood<br><br>(adapted from MBSR, | See Vieten & Astin (2008)  | Group (1-6 participants)<br>Duration: 8 sessions lasting 120min (16hours total), held twice per week over 4 weeks<br>Delivery provider: Advanced Ph.D. student in clinical   |

| Author, Year        | Control | Intervention       | Key Intervention Components  | Delivery  |
|---------------------|---------|--------------------|--|---|
|                     |         | MBCT, ACT and DBT) |  | psychology (principal investigator of the study) with online training of the Mindful Motherhood intervention                    |
| Zhang et al. (2019) | TAU     | MBSR               | Practices included, mindfulness-based awareness training, breathing mindfully, walking meditation, body scan, general yoga, sitting mouna and some modified exercises for perinatal period, such as monitoring fetal heart rate or movement<br><br>Homework: Mindfulness practice set each week. Plus, a 3-hour banned language meditation in week 6 and 7 | Group (3-6 participants)<br>Duration: 8 sessions lasting 90min (12 hours total), held weekly<br>Delivery provider: Psychologist |

*Note:* ACT, Acceptance and Commitment Therapy; DBT, Dialectical Behaviour Therapy; MBCP, Mindfulness-Based Childbirth and Parenting Program; MBCT, Mindfulness-Based Cognitive Therapy; MBCT-PD, Mindfulness-Based Cognitive Therapy for Perinatal Depression; MBSP, Mindful Self-Compassion Program; MBSR, Mindfulness Based Stress Reduction; MiCBT, Mindfulness-integrated Cognitive Behaviour Therapy; NR, not reported; TAU, treatment as usual; WL, waiting list.

<sup>a</sup> Additional information provided by contacting author.

<sup>b</sup> Information supplemented using [www.bemindfulonline](http://www.bemindfulonline) website

<sup>c</sup> Information supplemented by Pan et al (2019) published October 2019

### **Risk of Bias Within Studies**

A summary of the risk of bias ratings for each study is provided in Table 3. The overall risk of bias ratings for eleven studies (73%) were 'some concern' and four studies (27%) were deemed to have 'high' concerns indicating overall moderate to poor methodological quality. A low risk of bias was seen for the domain measuring randomisation process in fourteen studies (93%) indicating a common area of strength. Krusche et al. (2018), was deemed to be 'high risk of bias' since the paper stated, "where a course participant withdrew from the study, or was withdrawn having been lost to follow-up their random allocation was re-assigned to the next participant recruited to the study to maintain balance across study arms". It should be noted that only nine of the thirteen studies explicitly stated how the randomisation sequence was generated.

In terms of common areas of risk of bias (i.e., weakness), the domains measuring deviation from intervention and missing outcome data introduced risk of bias. For the domain measuring 'deviation from intervention', studies that did not use intention to treat analysis ( $n=5$ ) were deemed as 'some concern' and if missing data were an additional issue ( $n=4$ ) deemed as 'high risk'. Under the domain 'missing outcome data' eight studies (53.3%) were deemed as 'low risk' as outcome data was available for all, or nearly all (i.e., >95%) of the randomised participants. Three studies (20%) were deemed as 'some concern' as although missing outcome data could have biased the results, there was evidence to imply this was not likely, while four studies (26.6%) were deemed as 'high risk' as missing outcome data likely biased the results. Overall, the rate of attrition pre-to post-intervention across thirteen studies for the intervention group ranged from 0% (Ahmadpanah et al., 2018; Pan et al., 2019) to 79% (Krusche et al., 2018) ( $M=18.83\%$ ) and from 0% (Ahmadpanah et al., 2018) to 45% (Zhang & Emory., 2015) ( $M=11.5\%$ ) for the control group. It was not possible to determine attrition rate for two studies

(Muthkrishnan et al., 2016; Shahtaheri et al., 2016). Furthermore, although not included in the RoB2 quality assessment this review also examined attrition rates pre-intervention to the longest follow-up period. The attrition rates for the intervention group ranged from 0% to 85% ( $M=28.42\%$ ) and the attrition rate for the control group ranged from 0% to 64.5% ( $M = 20.46\%$ ).

The domain of 'Measurement of outcome' were judged to have 'some concern' for all studies reflecting the inability of participants to be blind to whether they received the intervention and that this could potentially have influenced the self-reported outcomes. One study (Guo et al., 2020) were deemed as 'high risk' for the domain 'selection of the reported results', as the study did not report statistical analysis for anxiety and only reported one of the two depression outcome measures used.

Although sample size is not addressed in the RoB2, it is important to consider power of the included studies, as studies were not excluded based on sample size. A small sample size increases the risk of type II error, three studies in this review had small samples <40 participants (Shahtaheri et al., 2016; Vieten & Astin., 2008; Zemestani & Nikoo., 2020), which increases the risk of type-II error.

**Table 3**

*Quality Assessment Using RoB2*

| Study                       | Randomization Process | Deviations from intervention | Missing outcome data | Measurement of the outcome | Selection of the reported results | Overall bias   |
|-----------------------------|-----------------------|------------------------------|----------------------|----------------------------|-----------------------------------|----------------|
| Ahmadpanah et al. (2018)    | +                     | +                            | +                    | ?                          | ?                                 | ?              |
| Dimidjian et al. (2016)     | +                     | +                            | +                    | ?                          | ?                                 | ?              |
| Faramarzi et al. (2015)     | +                     | +                            | +                    | ?                          | +                                 | ?              |
| Guo et al. (2020)           | +                     | ?                            | ?                    | ?                          | - <sup>a</sup>                    | - <sup>a</sup> |
| Krusche et al. (2018)       | -                     | -                            | -                    | ?                          | ?                                 | -              |
| Lönnberg et al. (2020)      | +                     | +                            | +                    | ?                          | ?                                 | ?              |
| Muthukrishnan et al. (2016) | +                     | -                            | -                    | ?                          | ?                                 | ?              |
| Pan et al. (2019)           | +                     | ?                            | ?                    | ?                          | ?                                 | ?              |
| Shahtaheri et al. (2016)    | +                     | ?                            | ?                    | ?                          | ?                                 | ?              |
| Vakilian et al. (2019)      | +                     | +                            | +                    | ?                          | ?                                 | ?              |
| Vieten and Astin (2008)     | +                     | ?                            | +                    | ?                          | +                                 | ?              |
| Yazdanimehr et al. (2016)   | +                     | -                            | -                    | ?                          | ?                                 | -              |
| Zemestani and Nikoo (2020)  | +                     | +                            | +                    | ?                          | +                                 | ?              |
| Zhang and Emory (2015)      | +                     | -                            | -                    | ?                          | ?                                 | -              |
| Zhang et al. (2019)         | +                     | ?                            | +                    | ?                          | ?                                 | ?              |

Note. Low Risk Some Concern High risk

In accordance with RoB2 quality assessment tool guidance, each separate outcome measure use in a study was assessed based on the five domains. Due to only one slight deviation, the rating in Table 3 reflects outcome measures (depression, anxiety and or stress) combined per study.

<sup>a</sup> Depression and Anxiety deemed as 'High risk' and Stress deemed as 'Some concern'.

## **Study Results**

The main findings of the studies are presented in Table 4 for depression outcomes, Table 5 for anxiety outcomes and Table 6 for stress outcomes. Tables include the mean and standard deviations at pre, post and follow up for both the intervention and control group when reported. Within and between group effects are also reported. A summary of successful outcomes for each paper across domains of depression, anxiety and stress is presented in Table 7.

### ***Depression***

The effectiveness of third wave interventions upon depression symptoms was examined in 13 RCTs (Ahmadpanah et al., 2018; Dimidjian et al., 2016; Faramarzi et al., 2015; Guo et al., 2020; Krushe et al., 2018; Lönnberg et al., 2020; Pan et al., 2019; Shahtaheri et al., 2016; Vieten & Astin., 2008; Yazdanimehr et al., 2016; Zemestani & Nikoo., 2020; Zhang & Emory, 2015; Zhang et al., 2019).

In terms of between group changes, one RCT showed no difference between MBSR and TAU at post-intervention (Zhang et al., 2019). One RCT did not examine between group effects, reporting that it would not be statistically meaningful due to the high attrition rate (44% at post-intervention and 66% at follow-up) with only two participants completing all eight sessions of the Mindful Motherhood intervention (Zhang & Emor, 2015). Eight RCTs showed a significant time by group interaction pre-intervention to follow-up, in favour of the third wave intervention when compared to the control group. The ESs ranged from  $d = -4.60$  to  $-0.55$ ; with large ES in four

RCTs (Ahmadpanah et al., 2018; Shahtaheri et al., 2016; Yazdanimmehr et al., 2016; Zemestani & Nikoo., 2020), medium ES in three RCTs (Dimidjian et al., 2016; Faramarzi et al., 2015; Pan et al., 2019) and it was not possible to calculate an ES for Guo et al. (2020). An additional three RCTs found a significant time by group interaction pre- to post-intervention, with large ES in two RCTs (Krushe et al., 2018; Vieten & Astin., 2008) and a medium ES in Lönnberg et al. (2020). However, two of these studies did not find a significant between group difference when comparing pre-intervention to 8-week postpartum follow-up (Krusche et al., 2018) and 3-month postpartum follow up (Vieten & Austin., 2008), indicating the improvements in depression did not persist. Lönnberg et al. (2020) also did not find a significant time by group interaction when comparing post-intervention to 12-month follow-up scores ( $F = 1.86, p = 0.13$ ) and they reported that the significant improvements pre-to-post intervention were not sustained at longer-term follow-up assessments at three, nine and 12-months postpartum. Overall, therefore, 11 RCTs showed medium to large ES in favour of the third wave intervention, two showed no significant differences / negligible ES, and the limited evidence for sustained gains was mixed.

### **Anxiety**

Anxiety was assessed in eight RCTs. However, Guo et al. (2020) did not report on post-intervention or follow-up anxiety despite reporting that participants provided this data. Only seven studies are therefore reviewed (Faramarzi et al., 2015; Krushe et al., 2018; Vakilian et al., 2019; Vieten & Astin., 2008; Yazdanimmehr et al., 2016; Zemestani & Nikoo., 2020; Zhang et al., 2019).

In terms of between group changes, Krusche et al. (2018) noted there was a trend for participants who completed the online MBCT intervention to have lower anxiety post-intervention compared to waitlist control  $F(1,69) = 3.15, p=.08, \eta^2=.04$ ; with both groups showing decreased levels of anxiety at the post-intervention time point. However, symptoms of anxiety were not significantly different between groups



at post-intervention, nor at the 8-week postpartum follow up. A significant difference pre- to post-intervention, in favour of the third wave intervention was seen in five of the RCTs. Large ES were seen in all five studies, ranging from  $d = -0.80$  to  $-2.7$  (Vakilian et al., 2019; Vieten & Astin., 2008; Yazdanimehr et al., 2016; Zemestani & Nikoo., 2020; Zhang et al., 2019). Furthermore, the improvements in anxiety remained significant at the 1-month follow-up in Vakilian et al. (2019), Zemestani and Nikoo (2020) and Yazdanimehr et al. (2016). Whereas Vieten and Austin (2008) did not find a significant difference between the Mindful Motherhood intervention group and waitlist control group when comparing pre-intervention to the 3-months postpartum follow-up, indicating that the beneficial effects of the intervention did not persist. Furthermore, although Faramarzi et al. (2015) did not report results on pre- to post-intervention, they did report a significant time (pre-intervention to 1-month follow-up) by group interaction, indicating that the MBCT plus medical treatment intervention was significantly more effective than medical treatment alone with beneficial effects remaining after a month. Thus, there was strong evidence for the effectiveness of third wave intervention pre- to post-intervention but the evidence regarding the persistence of effects was less clear.

### **Stress**

Ten studies examined the effectiveness of third wave interventions on stress (Faramarzi et al., 2015; Guo et al., 2020; Krusche et al., 2018; Lönnberg et al., 2020; Muthukrishnan et al., 2016; Pan et al., 2019; Shahtaheri et al., 2016; Vieten & Astin., 2008; Zhang & Emory, 2015; Zhang et al., 2019).

In terms of between group changes, one RCT did not examine between group effects due to high attrition rates (Zhang & Emory., 2015) and Muthukrishnan et al. (2016) only conducted paired t-test finding there was a significant decrease in perceived stress compared to the control group at post-intervention. Six RCTs showed a significant difference pre- to post-intervention, in favour of the third wave

intervention when compared to the control group. The ESs ranged from  $d = -1.20$  to  $0.30$ ; with large ES in one (Zhang et al., 2019), medium ES in two (Krusche et al., 2018; Pan et al., 2019), small ES in two (Lönnerberg et al., 2020; Vieten & Astin., 2008) and it was not possible to calculate an ES for Guo et al. (2020). The remaining two studies did not report findings for pre- to post-intervention, instead reporting a significant time by group interaction pre-intervention to 1-month follow-up (Faramarzi et al., 2015) and 2-month follow-up (Shahtaheri et al., 2016). Pan et al. (2019) also showed stress severity was significantly lower for the MBCP intervention group compared to the active control group at the 36 weeks gestation follow-up. The ESs from these three RCT ranged from  $d = -2.86$  to  $-0.50$ ; with ES being large in Shahtaheri et al. (2016) and medium in two RCTs (Faramarzi et al., 2015; Pan et al., 2019). Although these three studies demonstrated the beneficial effects of third wave interventions can persist, a further three studies found the between group effects were not significant pre-intervention to follow up (Guo et al., 2020; Krusche et al., 2018; Vieten & Astin., 2008). Furthermore, two RCT did not include a follow up time point meaning the long-term effectiveness was not examined (Muthukrishnan et al., 2016; Zhang et al., 2019). Overall, therefore, eight RCTs showed small to large ES in favour of the third wave intervention, two RCTs did not examine between group effects, and the evidence for sustained gains was mixed.

**Table 4**

*Depression*

| Author                   | Measure | Intervention Group |                 |                 |  | Control Group   |                 |                 |   | Between Group Effects  |  |
|--------------------------|---------|--------------------|-----------------|-----------------|--|-----------------|-----------------|-----------------|---|--|--|
|                          |         | Pre M (SD)         | Post M (SD)     | FU M (SD)       | Within Group Effects (Pre vs Post)                                 | Pre M (SD)      | Post M (SD)     | FU M (SD)       | Within Group Effects (Pre vs Post)                                  | Pre Vs Post (reported <i>p</i> , <i>ES</i> , calculated <i>d</i> ) | Pre Vs FU (reported <i>p</i> , <i>ES</i> , calculated <i>d</i> )               |
| Ahmadpanah et al. (2018) | BDI     | 22.60<br>(3.20)    | 15.53<br>(2.33) | 16.86<br>(2.94) | NR<br><i>d</i> =-2.53 <sup>a</sup><br><i>g</i> =-2.46 <sup>a</sup> | 22.86<br>(2.82) | 24.66<br>(3.69) | 24.80<br>(3.76) | NR<br><i>d</i> =0.55 <sup>a</sup><br><i>g</i> =0.53 <sup>a</sup>    | ✓<br><i>d</i> = -2.86 <sup>a</sup>                                 | ✓<br>Significant time by group interaction<br><i>p</i> < .001, $\eta^2 = 0.40$ |
|                          | MADRS   | 30.14<br>(3.45)    | 21.93<br>(5.05) | 20.89<br>(3.84) | NR<br><i>d</i> =-1.90 <sup>a</sup><br><i>g</i> =-1.85 <sup>a</sup> | 29.20<br>(4.74) | 28.78<br>(4.23) | 32.21<br>(3.09) | NR<br><i>d</i> = -0.09 <sup>a</sup><br><i>g</i> = -.09 <sup>a</sup> | ✓<br><i>d</i> = -1.83 <sup>a</sup>                                 | ✓<br>Significant time by group interaction<br><i>p</i> < .001, $\eta^2 = 0.40$ |

| Author                  | Measure | Intervention Group |             |             |   | Control Group           |             |             |   | Between Group Effects  |  |
|-------------------------|---------|--------------------|-------------|-------------|---|-------------------------|-------------|-------------|---|--|--|
|                         |         | Pre M (SD)         | Post M (SD) | FU M (SD)   | Within Group Effects (Pre vs Post)                                | Pre M (SD)              | Post M (SD) | FU M (SD)   | Within Group Effects (Pre vs Post)  | Pre Vs Post (reported <i>p</i> , <i>ES</i> , calculated <i>d</i> ) | Pre Vs FU (reported <i>p</i> , <i>ES</i> , calculated <i>d</i> )                             |
| Dimidjian et al. (2016) | EPDS    | 5.98 (3.95)        | 4.67 (3.95) | 4.90 (5.22) | ↓<br><i>p</i> =.043,<br><i>d</i> = 0.44                           | 5.07 (4.91)             | 6.39 (3.81) | 6.62 (4.94) | ↑<br><i>p</i> = .014<br><i>d</i> = 0.54   | ✓<br><i>p</i> = .002<br><i>d</i> = 0.70                            | ✓<br><i>p</i> =.002<br><i>d</i> =0.72  |
| Faramarzi et al. (2015) | HADS    | 7.32 (3.46)        | 3.82 (0.58) | 5.23 (2.05) | ↓<br><i>p</i> <0.001<br><i>d</i> =.70                             | 7.34 (3.44)             | 7.30 (3.23) | 7.16 (3.18) | ↕<br><i>p</i> >0.01<br><i>d</i> =-0.01 <sup>a</sup><br><i>g</i> =-0.01 <sup>a</sup> | NR<br><i>d</i> =-0.99 <sup>a</sup>                                 | ✓<br>Significant time by group interaction<br><i>p</i> <0.01<br><i>d</i> =-0.55 <sup>a</sup> |
| Guo et al. (2020)       | EPDS    | 12.5 (2.8)         | NR          | NR          | ↓<br>T0 to T1 (3month postpartum)<br><i>p</i> <0.01. <sup>b</sup> | 12.4 (2.5) <sup>c</sup> | NR          | NR          | ↕<br>T0 to T1 (3month postpartum)<br><i>p</i> >0.05 <sup>b</sup>                    | ✓<br>at T1 (3months postpartum)<br><i>p</i> <0.01 <sup>b</sup>     | ✓<br>at T2 (12 months postpartum)<br><i>p</i> <0.01 <sup>b</sup>                             |

| Author                 | Measure | Intervention Group |                |                |                                      | Control Group   |                |                |                                      | Between Group Effects   |  |
|------------------------|---------|--------------------|----------------|----------------|--------------------------------------|-----------------|----------------|----------------|--------------------------------------|---|--|
|                        |         | Pre M (SD)         | Post M (SD)    | FU M (SD)      | Within Group Effects (Pre vs Post)   | Pre M (SD)      | Post M (SD)    | FU M (SD)      | Within Group Effects (Pre vs Post)   | Pre Vs Post (reported $p$ , $ES$ , calculated $d$ )                                   | Pre Vs FU (reported $p$ , $ES$ , calculated $d$ )                      |
|                        | BDI     | 6.4<br>(3.2)       | NR             | NR             | NR <sup>b</sup>                      | 6.6<br>(3.8)    | NR             | NR             | NR <sup>b</sup>                      | NR <sup>b</sup>   | NR <sup>b</sup>  |
| Krusche et al. (2018)  | EPDS    | NR                 | NR             | NR             | ↓<br>$p < .001$<br>$\eta^2 = 0.29$   | NR              | NR             | NR             | ↕<br>$p = .054$<br>$\eta^2 = 0.05$   | ✓<br>Significant<br>time by<br>group<br>interaction,<br>$p < .005$<br>$\eta^2 = 0.14$ | X<br>No<br>significant<br>time by<br>group<br>interaction <sup>b</sup> |
| Lönnberg et al. (2020) | EPDS    | 9.92<br>(4.81)     | 6.31<br>(4.10) | 7.44<br>(4.96) | NR<br>$d = -0.81^a$<br>$g = -0.80^a$ | 10.19<br>(5.18) | 8.29<br>(5.46) | 7.96<br>(5.59) | NR<br>$d = -0.36^a$<br>$g = -0.36^a$ | ✓<br>Significant<br>time by<br>group<br>interaction<br>$p = 0.004$                    | NR<br>$d = -0.05^a$  |

| Author                   | Measure | Intervention Group       |                          |                          |   | Control Group            |                          |                          |                                    | Between Group Effects                               |  |
|--------------------------|---------|--------------------------|--------------------------|--------------------------|---|--------------------------|--------------------------|--------------------------|------------------------------------|---|--|
|                          |         | Pre M (SD)               | Post M (SD)              | FU M (SD)                | Within Group Effects (Pre vs Post)          | Pre M (SD)               | Post M (SD)              | FU M (SD)                | Within Group Effects (Pre vs Post) | Pre Vs Post (reported $p$ , $ES$ , calculated $d$ ) | Pre Vs FU (reported $p$ , $ES$ , calculated $d$ )                          |
|                          |         |                          |                          |                          |   |                          |                          |                          |                                    | ( $p=0.004$<br>$d=0.42$ ) <sup>c</sup>              |  |
| Pan et al. (2019)        | EPDS    | 9.75 (4.21) <sup>d</sup> | 7.31 (4.35) <sup>d</sup> | 6.78 (4.54) <sup>d</sup> | ↓<br>$p<0.001$<br>$d=-0.57^a$<br>$g=0.57^a$ | 9.02 (4.55) <sup>d</sup> | 9.16 (4.82) <sup>d</sup> | 8.51 (4.54) <sup>d</sup> | NR<br>$d=0.03^a$<br>$g=-0.03^a$    | ✓<br>$p<.0001$<br>$d=-0.58^a$                       | ✓<br>at 36 weeks gestation follow-up.<br>$p<.0007$<br>$d=-0.56^a$          |
| Shahtaheri et al. (2016) | HDS     | 68.08 (1.78)             | 46.75 (1.71)             | 47.25 (2)                | NR<br>$d=-12.22^a$<br>$g=-11.89^a$          | 68.08 (2.84)             | 56.41 (2.96)             | 58.41 (2.96)             | NR<br>$d=-4.02^a$<br>$g=-3.91^a$   | NR <sup>b</sup>                                     | ✓<br>Significant time by group interaction<br>$p<.0001$ ,<br>$\eta^2=.786$ |

| Author                    | Measure | Intervention Group |                |                |                                    | Control Group   |                 |                 |                                    | Between Group Effects  |   |
|---------------------------|---------|--------------------|----------------|----------------|------------------------------------|-----------------|-----------------|-----------------|------------------------------------|--|---|
|                           |         | Pre M (SD)         | Post M (SD)    | FU M (SD)      | Within Group Effects (Pre vs Post) | Pre M (SD)      | Post M (SD)     | FU M (SD)       | Within Group Effects (Pre vs Post) | Pre Vs Post (reported $p$ , $ES$ , calculated $d$ )                          | Pre Vs FU (reported $p$ , $ES$ , calculated $d$ )   |
| Vieten & Astin (2008)     | CES-D   | 20.4<br>(8.4)      | 16.2<br>(7.3)  | NR             | NR<br>$d=-0.53^a$<br>$g= -0.52^a$  | 14.2<br>(5.4)   | 17.2<br>(7.4)   | NR              | NR<br>$d=0.46^a$<br>$g=0.46^a$     | ✓<br>Significant<br>time by<br>group<br>interaction<br>$p=0.06$<br>$d= 0.80$ | X <sup>b</sup>  |
| Yazdanimehr et al. (2016) | EPDS    | 16.83<br>(2.7)     | 9.93<br>(2.81) | 9.03<br>(2.95) | NR<br>$d= -2.50^a$<br>$g= -2.48^a$ | 16.63<br>(2.64) | 15.84<br>(2.77) | 16.03<br>(2.45) | NR<br>$d= -0.29^a$<br>$g= -0.29^a$ | NR<br>$d= -2.27^a$   | ✓<br>$p < 0.001$<br>Significant<br>time by<br>group<br>interaction<br>$p < 0.001$<br>$d= -2.67^a$ |

| Author                   | Measure | Intervention Group        |                           |              |  | Control Group             |                           |              |  | Between Group Effects                               |   |
|--------------------------|---------|---------------------------|---------------------------|--------------|--|---------------------------|---------------------------|--------------|--|---|---|
|                          |         | Pre M (SD)                | Post M (SD)               | FU M (SD)    | Within Group Effects (Pre vs Post)               | Pre M (SD)                | Post M (SD)               | FU M (SD)    | Within Group Effects (Pre vs Post)             | Pre Vs Post (reported $p$ , $ES$ , calculated $d$ ) | Pre Vs FU (reported $p$ , $ES$ , calculated $d$ )   |
| Zemestani & Nikoo (2020) | BDI-II  | 35.76 (10.97)             | 15.15 (2.23)              | 15.53 (3.55) | ↓<br>$p < .05$<br>$d = -2.60^a$<br>$g = -2.44^a$ | 36.60 (7.23)              | 38.86 (6.01)              | 37.80 (7.50) | ↕<br>$p > .05$<br>$d = 0.34^a$<br>$g = 0.33^a$ | ✓<br>$p < .0001$<br>$d = -2.41^a$                   | ✓<br>$p < 0.0001$<br>Significant time by group interaction<br>$p < .0001$ ,<br>$\eta p^2 = .68$ |
| Zhang & Emory (2015)     | BDI-II  | 18.9 (11.2)               | 17.3 (10.2)               | 17.5 (11.0)  | NR<br>$d = -0.15^a$<br>$g = -0.14^a$             | 14.2 (8.97)               | 15.2 (7.70)               | 19.3 (9.82)  | NR<br>$d = 0.12^a$<br>$g = 0.12^a$             | NR due to high attrition <sup>b</sup>               | NR due to high attrition <sup>b</sup>   |
| Zhang et al. (2019)      | SDS     | 51.75 (7.39) <sup>e</sup> | 51.38 (7.66) <sup>e</sup> | N/A          | ↓<br>$d = -0.05^a$ ,<br>$g = -0.05^a$            | 52.06 (6.33) <sup>e</sup> | 51.97 (6.70) <sup>e</sup> | N/A          | ↕<br>$d = -0.01^a$ ,<br>$g = -0.01^a$          | X<br>No significant time by                         | N/A   |



| Author | Measure | Intervention Group |                   |                 |  | Control Group    |                   |                 |  | Between Group Effects  |  |
|--------|---------|--------------------|-------------------|-----------------|--|------------------|-------------------|-----------------|--|--|--|
|        |         | Pre<br>M<br>(SD)   | Post<br>M<br>(SD) | FU<br>M<br>(SD) | Within<br>Group<br>Effects<br>(Pre vs<br>Post) | Pre<br>M<br>(SD) | Post<br>M<br>(SD) | FU<br>M<br>(SD) | Within<br>Group<br>Effects<br>(Pre vs<br>Post) | Pre Vs Post<br>(reported $p$ ,<br>$ES$ ,<br>calculated $d$ ) | Pre Vs FU<br>(reported $p$ ,<br>$ES$ ,<br>calculated $d$ ) |
|        |         |                    |                   |                 |  |                  |                   |                 |  | group  |  |
|        |         |                    |                   |                 |  |                  |                   |                 |  | interaction  |  |
|        |         |                    |                   |                 |  |                  |                   |                 |  | $p=.589$   |  |
|        |         |                    |                   |                 |  |                  |                   |                 |  | $\eta^2=.005$  |  |

*Note:* Longest follow-up time period reported. Manually calculated within group effect  $d$ ,  $g$  using pre-intervention, post-intervention and online calculator <http://georgebeckham.com/2016/cohens-d-and-hedges-g-excel-calculator/> Manually calculated between group effect  $d$  using pre-intervention, post-intervention and follow-up  $M (SD)$  and an online calculator [https://www.psychometrica.de/effect\\_size.html](https://www.psychometrica.de/effect_size.html) specifically the third calculator.

Key: ↓, Symptoms severity significantly decreased; ↑, Symptoms severity significantly increased; ↕, Symptoms severity did not significantly decrease; ✓, Symptoms severity was significantly lower for intervention group compared to control group; X, Symptoms severity was not significantly different between groups; NR, Not Reported; IG, Intervention Group; CG, Control Group; ES, Effect Size; FU, Follow-up; N/A, Not Applicable

<sup>a</sup> Calculated effect size

<sup>b</sup> Insufficient information in full-text paper to calculate effect size

<sup>c</sup> Taken from supplementary paper

<sup>d</sup> Data provided by author. Analysis based on N=51 in intervention group, N=45 in control group

<sup>e</sup> Analysis based on N=28 in intervention group, N=30 in control group

**Table 5***Anxiety*

| Author                     | Measure | Intervention Group |                |                |  | Control Group   |                 |                |   | Between Group Effects   |  |
|----------------------------|---------|--------------------|----------------|----------------|--|-----------------|-----------------|----------------|---|---|--|
|                            |         | Pre<br>M (SD)      | Post<br>M (SD) | FU<br>M (SD)   | Within<br>Group<br>Effects<br>(Pre vs<br>Post)     | Pre<br>M (SD)   | Post<br>M (SD)  | FU<br>M (SD)   | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                                      | Pre vs<br>Post<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> ) | Pre vs FU<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> )                           |
| Faramarzi et<br>al. (2015) | HADS    | 11.30<br>(4.39)    | 6.23<br>(3.09) | 5.95<br>(2.95) | ↓<br><i>p</i> <0.001<br><i>d</i> =0.53             | 10.13<br>(3.66) | 10.11<br>(3.82) | 3.73<br>(0.57) | ↕<br><i>p</i> >0.01<br><i>d</i> =-0.01 <sup>a</sup><br><i>g</i> =-0.01 <sup>a</sup> | NR<br><i>d</i> =-1.24 <sup>a</sup>  | ✓<br>Significant<br>time by<br>group<br>interaction<br><i>p</i> <0.001<br><i>d</i> = 0.26 <sup>a</sup> |
| Guo et al.<br>(2020)       | STAI    | 30.3<br>(7.9)      | NR             | NR             | NR <sup>b</sup>                                    | 31.4<br>(8.5)   | NR              | NR             | NR <sup>b</sup>   | NR <sup>b</sup>   | NR <sup>b</sup>  |
| Krusche et<br>al. (2018)   | GAD-7   | NR                 | NR             | NR             | ↓<br><i>p</i> <.001<br><i>η</i> <sup>2</sup> =0.21 | NR              | NR              | NR             | ↓<br><i>p</i> < .001,<br><i>η</i> <sup>2</sup> =0.17                                | X<br>No<br>significant<br>time by   | X<br>No<br>significant<br>time by  |

| Author                    | Measure | Intervention Group     |                        |                        |  | Control Group          |                        |                        |  | Between Group Effects   |  |
|---------------------------|---------|------------------------|------------------------|------------------------|--|------------------------|------------------------|------------------------|--|---|--|
|                           |         | Pre<br>M (SD)          | Post<br>M (SD)         | FU<br>M (SD)           | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                     | Pre<br>M (SD)          | Post<br>M (SD)         | FU<br>M (SD)           | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                     | Pre vs<br>Post<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> ) | Pre vs FU<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> )   |
|                           |         |                        |                        |                        |  |                        |                        |                        |  | group<br>interaction<br><i>p</i> = .08<br>$\eta^2 = 0.04$                         | group<br>interaction<br>. <sup>b</sup>   |
| Vakilian et al.<br>(2019) | PRAQ    | 219.05<br>(51.01)<br>c | 148.35<br>(42.59)<br>c | 148.35<br>(54.74)<br>c | NR<br><i>d</i> =1.50 <sup>a</sup><br><i>g</i> =-1.47 <sup>a</sup>  | 170.47<br>(52.51)<br>c | 210.76<br>(30.21)<br>c | 215.38<br>(31.17)<br>c | NR<br><i>d</i> = 0.94 <sup>a</sup><br><i>g</i> = 0.92 <sup>a</sup> | ✓<br><i>d</i> =-2.11 <sup>a</sup>   | ✓<br>Significant<br>time by<br>group<br>interaction<br><i>p</i> =0.001 <sup>a</sup><br><i>d</i> = -2.19 <sup>a</sup> |
| Vieten &<br>Astin (2008)  | STAI    | 43.8<br>(12.4)         | 35.4<br>(9.1)          | NR                     | NR<br><i>d</i> =-0.77 <sup>a</sup><br><i>g</i> =-0.74 <sup>a</sup> | 35.6<br>(10.9)         | 35.6<br>(8.4)          | NR                     | NR<br><i>d</i> = 0 <sup>a</sup> ,<br><i>g</i> = 0 <sup>a</sup>     | ✓<br>Significant<br>time by   | X <sup>b</sup>   |

| Author                       | Measure | Intervention Group |                 |                 |  | Control Group   |                 |                 |  | Between Group Effects   |   |
|------------------------------|---------|--------------------|-----------------|-----------------|--|-----------------|-----------------|-----------------|--|---|---|
|                              |         | Pre<br>M (SD)      | Post<br>M (SD)  | FU<br>M (SD)    | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                                     | Pre<br>M (SD)   | Post<br>M (SD)  | FU<br>M (SD)    | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                                     | Pre vs<br>Post<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> ) | Pre vs FU<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> )                            |
|                              |         |                    |                 |                 |  |                 |                 |                 |  | group<br>interaction<br><i>p</i> =0.04<br><i>d</i> =0.85                          |   |
| Yazdanimehr<br>et al. (2016) | BAI     | 19.76<br>(6.33)    | 10.86<br>(4.48) | 10.80<br>(6.8)  | NR<br><i>d</i> =-1.66 <sup>a</sup><br><i>g</i> =-1.60 <sup>a</sup>                 | 20.24<br>(6.11) | 20.54<br>(6.75) | 20.78<br>(6.18) | NR<br><i>d</i> = 0.05 <sup>a</sup><br><i>g</i> = 0.05 <sup>a</sup>                 | ✓<br><i>p</i> <0.001<br><i>d</i> = -1.47 <sup>a</sup>                             | ✓<br>Significant<br>time by<br>group<br>interaction<br><i>p</i> <0.001<br><i>d</i> = -1.51 <sup>a</sup> |
| Zemestani &<br>Nikoo (2020)  | BAI     | 31.92<br>(5.61)    | 18.15<br>(3.91) | 19.15<br>(3.41) | ↓<br><i>p</i> <.05<br><i>d</i> =-2.85 <sup>a</sup><br><i>g</i> =-2.74 <sup>a</sup> | 32.66<br>(4.80) | 33.73<br>(4.93) | 32.73<br>(4.87) | ↑↓<br><i>p</i> >.05<br><i>d</i> =0.22 <sup>a</sup><br><i>g</i> = 0.22 <sup>a</sup> | ✓<br><i>p</i> < .0001<br><i>d</i> = -2.78 <sup>a</sup>                            | ✓<br>( <i>p</i> <<br>.0001)   |

| Author                 | Measure | Intervention Group           |                              |              |   | Control Group                |                              |              |   | Between Group Effects   |  |
|------------------------|---------|------------------------------|------------------------------|--------------|---|------------------------------|------------------------------|--------------|---|---|--|
|                        |         | Pre<br>M (SD)                | Post<br>M (SD)               | FU<br>M (SD) | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                      | Pre<br>M (SD)                | Post<br>M (SD)               | FU<br>M (SD) | Within<br>Group<br>Effects<br>(Pre vs<br>Post)                      | Pre vs<br>Post<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> )                         | Pre vs FU<br>(reported<br><i>p</i> , <i>ES</i> ,<br>calculated<br><i>d</i> )   |
|                        |         |                              |                              |              |   |                              |                              |              |   |   | Significant<br>time by<br>group<br>interaction<br><i>p</i> < .0001,<br><i>η</i> <sup>2</sup> = 0.67<br><i>d</i> = -2.41 <sup>a</sup> |
| Zhang et al.<br>(2019) | STAI    | 71.53<br>(6.45) <sup>d</sup> | 66.91<br>(5.70) <sup>d</sup> | N/A          | ↓<br><i>d</i> = -0.76 <sup>a</sup><br><i>g</i> = -0.75 <sup>a</sup> | 71.29<br>(7.42) <sup>d</sup> | 72.13<br>(5.80) <sup>d</sup> | N/A          | ↕<br><i>d</i> = 0.13 <sup>a</sup> ,<br><i>g</i> = 0.12 <sup>a</sup> | ✓<br>Significant<br>time by<br>group<br>interaction<br>, <i>p</i> < .001,<br><i>η</i> <sup>2</sup> = .240 | N/A  |

*Note:* Longest follow-up time period reported. Manually calculated within group effect *d* = , *g* = using pre-intervention, post-intervention and online calculator <http://georgebeckham.com/2016/cohens-d-and-hedges-g-excel-calculator/> Manually calculated between group

effect  $d$  using pre-intervention, post-intervention and follow-up  $M$  ( $SD$ ) and an online calculator

[https://www.psychometrica.de/effect\\_size.html](https://www.psychometrica.de/effect_size.html) specifically the third calculator.

Key: ↓, Symptoms severity significantly decreased; ↑↓, Symptoms severity did not significantly decrease; ✓, Symptoms severity was significantly lower for intervention group compared to control group; X, Symptoms severity was not significantly different between groups; CG, Control Group; ES, Effect Size; FU, Follow-up; IG, Intervention Group; M, Mean; N/A, Not Applicable; NR, Not Reported; SD, Standard Deviation.

<sup>a</sup> Calculated effect size

<sup>b</sup> Insufficient information in full-text paper to calculate effect size

<sup>c</sup> Total Anxiety Subscale of PRAQ

<sup>d</sup> Analysis based on N=28 in intervention group, N=30 in control group

**Table 6***Stress*

| Author                  | Measure | Intervention Group |              |              |  | Control Group |              |              |   | Between Group Effects   |  |
|-------------------------|---------|--------------------|--------------|--------------|--|---------------|--------------|--------------|---|---|--|
|                         |         | Pre M (SD)         | Post M (SD)  | FU M (SD)    | Within Group Effects (Pre vs Post)     | Pre M (SD)    | Post M (SD)  | FU M (SD)    | Within Group Effects (Pre vs Post)  | Pre vs Post (reported <i>p</i> , ES, calculated <i>d</i> )  | Pre vs FU (reported <i>p</i> , ES, calculated <i>d</i> )   |
| Faramarzi et al. (2015) | PDQ     | 18.65 (8.24)       | 12.72 (5.54) | 12.76 (5.38) | ↓<br><i>p</i> >0.001<br><i>d</i> =0.59 | 17.58 (7.73)  | 17.27 (7.16) | 17.48 (7.20) | ↓<br><i>p</i> >0.05<br><i>d</i> =-0.04 <sup>a</sup><br><i>g</i> =-0.04 <sup>a</sup> | NR<br><i>d</i> = -0.70 <sup>a</sup>   | ✓<br>Significant time by group interaction for Total PDQ<br><i>p</i> <0.001<br><i>d</i> = -0.72 <sup>a</sup> |
| Guo et al. (2020)       | PSI     | NR                 | 2.5 (0.8)    | 2.3 (0.7)    | NR <sup>b</sup>                        | NR            | 2.8 (1.0)    | 2.4 (0.8)    | NR <sup>b</sup>   | Symptoms severity significantly decreased T0 to T1 (3month postpartum)<br><i>p</i> <0.05 <sup>b</sup> | X<br>at 12months postpartum<br><i>p</i> > 0.05 <sup>b</sup>  |



| Author                   | Measure | Intervention Group |                 |                 |                                      | Control Group   |                 |                 |                                      | Between Group Effects   |   |
|--------------------------|---------|--------------------|-----------------|-----------------|--------------------------------------|-----------------|-----------------|-----------------|--------------------------------------|---|---|
|                          |         | Pre M (SD)         | Post M (SD)     | FU M (SD)       | Within Group Effects (Pre vs Post)   | Pre M (SD)      | Post M (SD)     | FU M (SD)       | Within Group Effects (Pre vs Post)   | Pre vs Post (reported $p$ , $ES$ , calculated $d$ )   | Pre vs FU (reported $p$ , $ES$ , calculated $d$ )   |
| Krusche et al. (2018)    | PSS     | NR                 | NR              | NR              | ↓<br>$p < .001$ ,<br>$\eta^2 = 0.33$ | NR              | NR              | NR              | ↓<br>$p < .001$ ,<br>$\eta^2 = 0.16$ | ✓<br>Significant<br>time by group<br>interaction<br>$p < .01$<br>$\eta^2 = 0.10$                | X<br>No significant<br>time by group<br>interaction<br>$p > .05^b$<br>No significant<br>time by group<br>interaction<br>$p > .05^c$ |
| Lönnerberg et al. (2020) | PSS     | 26.82<br>(7.76)    | 20.71<br>(6.53) | 21.11<br>(8.42) | NR<br>$d = -0.85^a$<br>$g = -0.84^a$ | 27.10<br>(7.62) | 23.16<br>(7.81) | 21.65<br>(7.80) | NR<br>$d = -0.51^a$<br>$g = -0.51^a$ | ✓<br>Significant<br>time by group<br>interaction<br>$p = 0.04$<br>$p = 0.038^d$<br>$d = 0.30^d$ | NR<br>$d = -0.03^a$   |

| Author                      | Measure | Intervention Group        |                           |                          |   | Control Group             |                          |                           |   | Between Group Effects  |   |
|-----------------------------|---------|---------------------------|---------------------------|--------------------------|---|---------------------------|--------------------------|---------------------------|---|--|---|
|                             |         | Pre M (SD)                | Post M (SD)               | FU M (SD)                | Within Group Effects (Pre vs Post)  | Pre M (SD)                | Post M (SD)              | FU M (SD)                 | Within Group Effects (Pre vs Post)                                  | Pre vs Post (reported <i>p</i> , <i>ES</i> , calculated <i>d</i> ) | Pre vs FU (reported <i>p</i> , <i>ES</i> , calculated <i>d</i> )                            |
| Muthukrishnan et al. (2016) | PSS     | 30.59 (1.9)               | 19.05 (1.4)               | N/A                      | NR<br><i>d</i> =-6.92 <sup>a</sup><br><i>g</i> =-6.84 <sup>a</sup>                  | 30.59 (2.1)               | 32.11 (2.4)              | N/A                       | NR<br><i>d</i> = 0.23 <sup>a</sup><br><i>g</i> = 0.23 <sup>a</sup>  | NR   | N/A   |
| Pan et al. (2019)           | PSS     | 15.61 (6.24) <sup>e</sup> | 12.12 (4.82) <sup>e</sup> | 13.20 (4.2) <sup>e</sup> | ↓<br><i>p</i> =0.01<br><i>d</i> =-0.63 <sup>a</sup><br><i>g</i> =-0.62 <sup>a</sup> | 13.69 (5.76) <sup>e</sup> | 13.22 (5.6) <sup>e</sup> | 14.29 (4.28) <sup>e</sup> | NR<br><i>d</i> =0.08 <sup>a</sup> ,<br><i>g</i> = 0.08 <sup>a</sup> | ✓<br><i>p</i> = 0.01<br><i>d</i> = -0.50 <sup>a</sup>              | ✓<br><i>p</i> = 0.01<br><i>d</i> = -0.50 <sup>a</sup>                                       |
| Shahtaheri et al. (2016)    | PSS     | 52.25 (3.51)              | 43.08 (2.39)              | 44 (2.29)                | NR<br><i>d</i> =-3.05 <sup>a</sup><br><i>g</i> =-2.97 <sup>a</sup>                  | 55.91 (1.78)              | 55.58 (2.53)             | 55.83 (2.97)              | NR<br><i>d</i> =-0.15 <sup>a</sup><br><i>g</i> =-0.15 <sup>a</sup>  | NR <sup>b</sup>  | ✓<br>Significant time by group interaction<br><i>p</i> <.0001<br><i>η</i> <sup>2</sup> =.67 |

| Author                | Measure | Intervention Group        |                           |             |                                    | Control Group             |                           |             |                                    | Between Group Effects   |  |
|-----------------------|---------|---------------------------|---------------------------|-------------|------------------------------------|---------------------------|---------------------------|-------------|------------------------------------|---|--|
|                       |         | Pre M (SD)                | Post M (SD)               | FU M (SD)   | Within Group Effects (Pre vs Post) | Pre M (SD)                | Post M (SD)               | FU M (SD)   | Within Group Effects (Pre vs Post) | Pre vs Post (reported $p$ , ES, calculated $d$ )                                | Pre vs FU (reported $p$ , ES, calculated $d$ ) |
| Vieten & Astin (2008) | PSS     | 20.1 (5.1)                | 15.9 (5.7)                | NR          | NR<br>$d=-0.78^a$<br>$g=-0.76^a$   | 17.1 (5.0)                | 16.9 (4.6)                | NR          | NR<br>$d=0.04^a$<br>$g=-0.04^a$    | ✓<br>Significant<br>time by group<br>interaction<br>$p=0.35$ $d=0.39$           | $X^b$  |
| Zhang & Emory (2015)  | PSS     | 43.9 (10.2)               | 39.7 (7.46)               | 40.8 (11.4) | NR<br>$d=-0.47^a$<br>$g=-0.44^a$   | 39.5 (8.22)               | 38.9 (8.62)               | 40.6 (8.48) | NR<br>$d=-0.07^a$<br>$g=-0.07^a$   | NR due to high attrition  | NR due to high attrition                       |
| Zhang et al. (2019)   | PSRS    | 58.53 (4.85) <sup>f</sup> | 52.63 (4.43) <sup>f</sup> | N/A         | NR<br>$d=-1.28^a$<br>$g=-1.27^a$   | 58.97 (6.36) <sup>f</sup> | 59.97 (6.63) <sup>f</sup> | N/A         | NR<br>$d=0.15^a$<br>$g=0.15^a$     | ✓<br>Significant<br>time by group<br>interaction<br>$p=<.0001$<br>$\eta^2=.427$ | N/A  |

Note: Longest follow-up time period reported. Manually calculated within group effect  $d=$  ,  $g=$  using pre-intervention, post-intervention and online calculator <http://georgebeckham.com/2016/cohens-d-and-hedges-g-excel-calculator/> Manually calculated between group

effect  $d$  using pre-intervention, post-intervention and follow-up  $M (SD)$  and an online calculator

[https://www.psychometrica.de/effect\\_size.html](https://www.psychometrica.de/effect_size.html) specifically the third calculator.

Key: ✓, Symptoms severity was significantly lower for intervention group compared to control group; X, Symptoms severity was not significantly different between groups; AC, Active Control; CG, Control Group; ES, Effect Size; FU, Follow-up; IG, Intervention Group; M, Mean; NR, Not Reported; SD, Standard Deviation.

<sup>a</sup> Calculated effect size

<sup>b</sup> Insufficient information in full-text paper to calculate effect size

<sup>c</sup> ITT analysis between groups effect

<sup>d</sup> Taken from supplementary paper

<sup>e</sup> Data provided by author. Analysis based on N=51 in intervention group, N=45 in control group

<sup>f</sup> Analysis based on N=28 in intervention group, N=30 in control group

**Table 7***Successful Outcomes Across Domains of Depression, Anxiety and Stress*

| Author, Year                | Depression  |           | Anxiety     |           | Stress         |           |
|-----------------------------|-------------|-----------|-------------|-----------|----------------|-----------|
|                             | Pre Vs Post | Pre VS FU | Pre Vs Post | Pre VS FU | Pre Vs Post    | Pre VS FU |
| Ahmadpanah et al. (2018)    | ✓           | ✓         | -           | -         | -              | -         |
| Dimidjian et al. (2016)     | ✓           | ✓         | -           | -         | -              | -         |
| Faramarzi et al. (2015)     | NR          | ✓         | NR          | ✓         | NR             | ✓         |
| Guo et al. (2020)           | ✓           | ✓         | NR          | NR        | ✓ <sup>a</sup> | X         |
| Krusche et al. (2018)       | ✓           | X         | X           | X         | ✓              | X         |
| Lönnberg et al. (2020)      | ✓           | NR        | -           | -         | ✓              | NR        |
| Muthukrishnan et al. (2016) | -           | -         | -           | -         | NR             | -         |
| Pan et al. (2019)           | ✓           | ✓         | -           | -         | ✓              | ✓         |
| Shahtaheri et al. (2016)    | NR          | ✓         | -           | -         | NR             | ✓         |
| Vakilian et al. (2019)      | -           | -         | ✓           | ✓         | -              | -         |
| Vieten & Astin (2008)       | ✓           | X         | ✓           | X         | ✓              | X         |
| Yazdanimehr et al. (2016)   | NR          | ✓         | ✓           | ✓         | -              | -         |
| Zemestani & Nikoo (2020)    | ✓           | ✓         | ✓           | ✓         | -              | -         |
| Zhang & Emory (2015)        | NR          | NR        | -           | -         | NR             | NR        |
| Zhang et al. (2019)         | X           | -         | ✓           | -         | ✓              | -         |

*Note: Key: ✓, Symptoms severity was significantly lower for intervention group compared to control group; X, Symptoms severity was not significantly different between groups; -, Not Applicable; NR, Not Reported; FU, Follow-up.*

<sup>a</sup> Symptom severity significantly decreased T0 to T1 (3month postpartum)

## Discussion

This review aimed to systematically examine the evidence from RCTs that investigated third wave interventions on perinatal depression, anxiety and/or stress. The review specifically aimed to identify which interventions have been used, the attrition rates and the effectiveness of the interventions for improving perinatal mental health.

### Summary of Evidence

From the 15 RCTs included, ten different types of interventions were examined. The majority of RCTs ( $n=13$ ; 80%) examined MBSR, MBCT or protocols based on these interventions; with seven of these interventions specifically having modifications for the context of the perinatal period. The interventions were delivered in group format in all but two RCTs, which instead delivered the interventions online. This finding suggests that the research for other third wave interventions, such as ACT, DBT, CFT/CMT, FAP and MCT is either lacking, or still in its infancy meaning high quality RCTs have yet to be conducted. Furthermore, the majority of the RCTs ( $n=8$ ) examined third wave interventions during pregnancy, only one study examined an intervention delivered during the postpartum, and the remaining studies ( $n=6$ ) delivered the intervention during pregnancy with follow-up data during the postpartum period. The current evidence-base is therefore limited in terms of understanding the effects of third wave interventions targeting postpartum depression per se.

In terms of the second research question, when comparing pre-to-post data the review found the average attrition rate was 19% for the intervention group, and 28% when comparing pre-intervention to the longest follow-up period. This is an important finding as the relatively low attrition rates are an indication that participants found the interventions accessible. It is worth bearing in mind that these interventions were predominantly delivered to pregnant mothers rather than those with young infants, which is likely to affect attrition.

In terms of the third research question relating to the effectiveness of third wave interventions, this review found the interventions led to reductions in perinatal depression, anxiety, and stress at post-intervention. Furthermore, when compared to the control group, the review found evidence supporting the effectiveness of third wave interventions on perinatal depression. Eleven of the 13 RCTs found a significant between group effect, with medium-large ESs in favour of the third wave intervention. From the remaining two RCTs, a non-significant result was found in Zang et al. (2019) and Zhang and Emory (2015) did not examine between group effects. However, the evidence for the sustained benefits of third wave interventions was mixed. Although eight RCTs found depression symptom severity to be significantly lower at the follow up period relative to baseline, with the favourable effects being seen as long as 12 months post-intervention (i.e., at 12-months postpartum) (Guo et al., 2020), a significant between group effect was not shown when depression was examined at 8-weeks postpartum (Krusche et al., 2018) and 3-months postpartum (Vieten & Astin., 2008). Therefore, the sustained benefits of third wave interventions on depression is unclear.

In terms of anxiety, the review found strong evidence for the effectiveness of third wave interventions, as demonstrated by a significant between group effect being shown in all but one study with large ESs reported. The review also found evidence to suggest the beneficial effects can remain during pregnancy for at least one-month post-intervention (Faramarzi et al., 2015; Vakilian et al., 2019; Yazdanimehr et al., 2016; Zemestani & Nikoo., 2020). However, the beneficial effects may not persist into the postpartum, as Vieten and Austin (2008) found a lack of significant difference between groups at the 3-months postpartum follow-up.

The review also found evidence supporting the effectiveness of third wave interventions on stress. A significant between group effect was shown in all but two RCTs, with one of these RCTs deciding to not conduct between group analysis due

to high attrition (Zhang & Emory., 2015). With the ESs for pre- to post-intervention ranging from small to large. In terms of the persistent benefits of third wave interventions the review found mixed evidence, with three studies finding medium to large ESs for pre-intervention to follow-up and three studies not finding a significant difference at the follow-up timepoint. Therefore, the sustained benefits of third wave interventions on stress is unclear.

### **Findings in the Context of Existing Evidence**

Preliminary evidence for the beneficial impact of MBIs on depression, anxiety, and stress during pregnancy was highlighted by previous systematic reviews (Hall et al., 2016; Matvienko-Sikar et al., 2016; Dhillion et al., 2017; Shi & MacBeth., 2017) with additional evidence from more methodologically robust controlled studies being found (Guo et al., 2020; Lucena et al., 2020). The findings from this review are in accordance with the previous literature.

Unlike the existing reviews examining MBIs, this review had a broader inclusion of third wave interventions across the entire perinatal period (i.e., pregnancy and postpartum). Despite this broader inclusion, the review found the majority of the RCTs examined MBSR, MBCT or protocols based on these interventions. Indicating a lack of RCTs on other third wave interventions. Nonetheless, the review did identify one RCT which found evidence supporting the effectiveness of ACT on perinatal anxiety. The review also identified one RCT where the intervention was delivered during the postpartum period (Ahmadpanah et al., 2018) with the findings showing the intervention had beneficial effects on depression.

Furthermore, the average attrition rate seen in this review (19% pre- to post-intervention and 28% pre-intervention to follow-up) is comparable to those reported in systematic reviews on CBT (e.g., 23%, Sockol, 2015). Lastly, in terms of ESs, these were also comparable in size to ESs for CBT for the treatment or prevention of



perinatal depression (Sockol, 2015). Thus, supporting the suggestion that third wave interventions could be a viable alternative treatment.

### **Evaluation of the Current Review**

There are several strengths in this review. Firstly, the review minimised the risk of research bias and methodological errors by using a second reviewer, obtaining an acceptable level of inter-rater reliability. This review also included data that was actively sought from authors, due to missing information in studies. Thus, improving the validity of the conclusions made in this review.

Nevertheless, there are limitations to this review which highlight the need for caution when interpreting findings. Firstly, this review did not search grey literature, the reference lists of included articles, and excluded studies that were not written in English, therefore increasing the risk of publication bias which could have implications for the conclusions that are drawn. Secondly, the online calculator used to manually calculate ESs was not a repeated measures calculator, instead the pre- and post-intervention means were treated as independent. This may have inflated the ESs reported. This online calculator was used as the studies in this review did not provide the required data to calculate the correlation between the pre- and post-intervention data, which is needed when using a repeated measures calculator. A final limitation is that the RCTs had differences in time between timepoints, particularly the length of time from post-intervention to follow-up. The heterogeneity in follow-up time points impacted the ability of this review to draw firm conclusions regarding the sustained benefits of third wave interventions. This limitation may also explain why the review found mixed evidence in terms of between group effects when pre-intervention to follow-up was examined.

### **Evaluation of Included Studies**

The quality assessment revealed significant methodological issues indicating caution is needed when drawing conclusions from the findings. Across the 15 RCTs,

the overall bias rating was 'some concern' for 11 and 'high risk' for four RCTs. The quality assessment identified strengths in the RCTs randomisation process for all but one study. The use of validated tools to measure depression, anxiety and stress is a further strength of the included studies, as this reduces the risk of the results not being valid and allows better comparison across studies. Nonetheless, since the measurement tools used were self-report, and it was not possible to blind participants to the intervention allocation, all studies have the possible risk of reporting bias. One RCT in this review overcame this risk by using both a self-report and expert-rated measure of depression, finding comparable results, enabling this study to conclude that the results were not a result of social desirability (Ahmadpanah, et al., 2018). The use of an active control group in three RCTs is a further strength. This is because waitlist-control, and TAU to a lesser degree, do not control for the possibility that the intervention effects were not due to time and/or attention paid to the participant.

RCTs often suffer from the complication of missing outcomes with one solution to this problem being the use of intention-to-treat (ITT) analysis. Seven of the RCTs in this review did not use ITT analysis, with a further two studies not reporting whether ITT analysis was used. Therefore, the results from these RCTs may reflect a biased estimate of treatment effect. Other study weaknesses include the use of small samples ( $n < 40$ ) in three RCTs, which can increase the risk of not having enough statistical power to detect differences in outcomes (i.e., type II error). Lastly, the RCTs did not report rates of harm, (e.g., adverse events, side-effects, or clinically important symptom deterioration), meaning the potential harmful, or unwanted effects of third wave interventions remains unknown. The level of detail regarding the content of interventions also varied across the RCTs, with some providing very little (Guo et al., 2020), to no information (Shahtaheri et al., 2016). For instance, only two studies stated that the intervention included guided inquiry, which is an important

component to mindfulness practices, and it was also not possible to determine how long experiential practices were. Thus, limiting the conclusions that could be drawn from this review. Furthermore, although the interventions were reported to be delivered by appropriate clinicians, the risk of treatment fidelity remains as only one RCT reported that adequate instructor adherence to the protocol was measured and shown (Dimidjian et al., 2016).

Caution also needs to be taken when considering the generalisability of the findings from this review. Although this review included RCTs conducted in six different countries, from both eastern and western cultures, homogeneous samples were used in the majority of studies. Thus, limiting the studies ability to generalise their findings to wider populations. Additionally, since longitudinal RCTs require a high level of commitment from participants, a further limitation is the possibility that a selection bias may have occurred. Specifically, the women who volunteered to participate in the RCTs may have been women with higher levels of motivation to improve their mental health.

### **Recommendations and Conclusions**

This review did not identify any RCTs examining FAP, MCT, CFT/CMT or DBT, indicating that the research on these interventions during the perinatal period is either lacking, or still in its infancy meaning high quality RCTs have yet to be conducted. Therefore, this review has highlighted the need for future research to understand the utility and effectiveness of these interventions during the perinatal period. This review also highlighted the scarcity of RCTs examining third wave interventions delivered during the postpartum period. However, the one study that was included in this review found evidence supporting the effectiveness of the third wave intervention. Furthermore, a previous systematic review also identified one study (Perez-Blasco et al., 2013) where a MBI was delivered during the postpartum, with evidence supporting the beneficial effect on anxiety and stress. Due to the

positive findings found in these studies, future research is warranted. It would be particularly beneficial to understand the effectiveness during the postpartum period, as specialist perinatal mental health services are going to expand from supporting women until 12-months postpartum to 24-months postpartum, as part of the NHS Long term plan (NHS England, 2019).

A relatively low average attrition rate of 19% from pre-to-post intervention was seen; providing an indication that participants found the interventions accessible. This review also found that aside from two RCTs, interventions were delivered in group format. Unfortunately, the review was unable to draw conclusions on the effectiveness and acceptability of online mode of delivery, as contrasting results were found in the two RCTs in terms of attrition rate and between group differences. Consequently, future research examining the effectiveness of third wave intervention delivered online would be beneficial. Particularly as web-based intervention for perinatal mental health is an area of current interest and rapid development (Ashford et al., 2016).

This review found mixed evidence across the RCTs, and consequently was unable to provide a clear conclusion in terms of the sustained effects of the interventions. Therefore, further research is needed to determine whether benefits are sustained over time. Future RCTs that use the same follow-up periods would be particularly helpful, as the heterogeneity in follow-up time points seen in this review may explain the mixed findings.

Overall, the RCTs in this review provide further evidence supporting the effectiveness of third wave interventions during the perinatal period. However, future research, with higher methodological quality is still needed to understand the effectiveness during the postpartum and to conclude on the sustained benefits of interventions.

**III. Paper 2. Feasibility and Acceptability of a Brief Acceptance and  
Commitment Therapy Intervention for Parents in the Postpartum**

## Abstract

Psychological difficulties, particularly low mood, are common in the postpartum period. However, there are knowledge, practical and attitudinal barriers that reduce treatment uptake. Internet-based interventions overcome many of the identified barriers. This study aimed to examine the feasibility and acceptability of a 4-week internet-based ACT intervention for postpartum parents with elevated depressive symptoms. A 2 (intervention versus wait-list control) by 3 (baseline, post-intervention, and 4-weeks follow-up) feasibility RCT was employed. 138 participants met the inclusion criteria and were randomised to the intervention ( $n=65$ ) or control group ( $n=73$ ). Participants completed the Edinburgh Postnatal Depression Scale, Flourishing Scale, Five Facet Mindfulness Questionnaire, Valuing Questionnaire at baseline, post-intervention, and follow-up. Acceptability was established by participants receiving the intervention also completing self-report data, including the System Usability Scale at post-intervention. The study found it was possible to recruit postpartum women via social media, albeit slowly (averaging 7 per month). Attrition during the intervention was high; 26% ( $n=17$ ) participants completed measures post-intervention and 20% ( $n=13$ ) completed measures at follow-up. Support for the acceptability of the intervention, for those completing it, was indicated by participants rating the intervention as usable, useful, and meeting several of their expectations. However, the data did not conclusively support acceptability, as some participants reported feeling overwhelmed with the weekly sessions. For depression, a moderate between group effect in favour of the intervention was seen pre-to-post intervention ( $d=-0.53$ ) and a moderate to large effect ( $d=-0.7$ ) was seen pre-intervention to follow-up. Likewise, a greater proportion of intervention group participants demonstrated a reliable improvement compared to the control group. Whereas, both groups saw a decrease in well-being. Furthermore, a large between group effect in favour of the intervention was seen pre-to-post intervention for mindfulness ( $d=0.82$ ) and valued

living (progress subscale,  $d=-0.8$ ; obstruction subscale,  $d= 0.72$ ). Study limitations and recommendations for future research are included.

## Introduction

The postpartum period, defined as the 12-months following the birth of an infant, is usually a demanding time for parents as it requires adjustment to lifestyle changes and new responsibilities. Psychological difficulties, particularly low mood, are common in the postpartum period. Postpartum depression (PPD) is estimated to occur in 10-20% of women (Shorey et al., 2018) and 8% for men (Rao et al., 2020). Recent meta-analyses examining the prevalence of PDD during the COVID-19 pandemic have found the pooled prevalence to be 22% (Yan et al., 2020) and 28% (Safi-Keykaleh et al., 2021). Thus, the prevalence rate may have increased in recent years due to the additional stressors associated with having a child during the pandemic. As described on p. 14, the adverse impact of PPD on the mental and physical health of the mother, infant, partner and/or significant others is well documented in the literature (Rao et al., 2020; Slomian et al., 2019) and the economic costs are substantial (Bauer et al., 2014). Consequently, perinatal mental health is a priority area in the NHS Long Term Plan with a key priority being improving access to evidence-based psychological therapies (NHS England, 2019).

Evidence-based psychological therapies for PPD exist, with cognitive behavioural therapy (CBT) and interpersonal psychotherapy (IPT) being evidenced as the most widely used and effective intervention modalities for depression during the perinatal period (Nillni et al., 2018). For instance, a systematic review found CBT interventions resulted in significantly greater reductions in perinatal depression symptoms post-intervention compared to control conditions, with moderate to large, pooled effect size ( $g = 0.65$ ) (Socket., 2015). However, systematic reviews have also highlighted that not all studies find CBT to be superior to control groups (Branquinho et al., 2021; Socket., 2015), and inconsistent findings regarding the durability of pre-to-post effects (Chow et al., 2021).

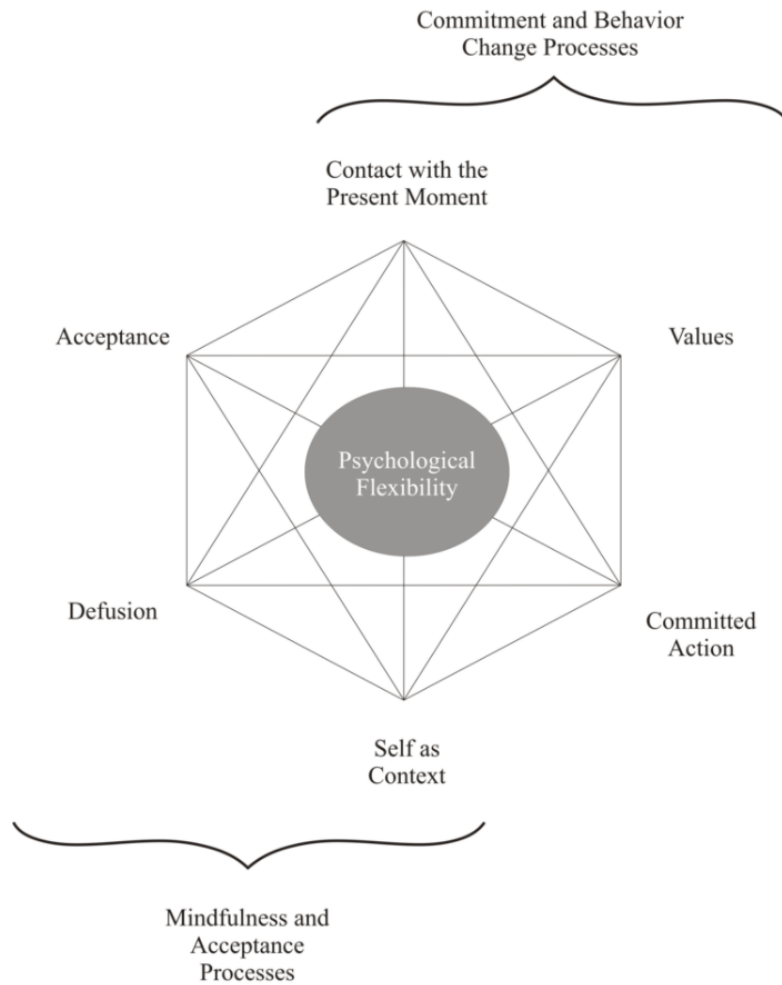


## **Acceptance and Commitment Therapy (ACT)**

ACT is a 'third-wave' CBT approach based on Relational Frame Theory (RFT; Hayes et al., 2001), which is a comprehensive contextualistic account of human language and cognition (see Hayes et al., 2006 for full description). According to ACT theory, experiential avoidance (i.e., the unwillingness to experience unpleasant internal events) is a fundamental process underlying psychopathology (Hayes et al., 1999). Unlike traditional CBT, ACT focuses on an individual's relationship to their internal experiences rather than on affecting a change in those internal experiences per se (Hayes & Hofmann, 2017). The main aim of ACT is to cultivate psychological flexibility (PF); the ability and willingness to stay in contact with the present moment, regardless of unpleasant thoughts, feelings, and bodily sensations, while choosing one's behaviours based on one's personally held values (e.g., adventure, family, loyalty etc.) (Hayes et al., 2013). The ACT model establishes PF through six core processes captured by the "Hexaflex" (see Figure 2) (Hayes et al., 2006).

**Figure 2**

*The Hexaflex Model*



Note. Reprinted from "Acceptance and Commitment Therapy: Model, processes and outcomes" by S. C. Hayes, 2006, *Behaviour Research and Therapy*, 44(1), 1-25. Copyright 2005 by Elsevier Ltd.

ACT was developed as a transdiagnostic approach, consequently there is no theory that is unique to depression (Zettle, 2016). From an ACT perspective, psychological inflexibility underlies diverse forms of human suffering including depression. There is empirical research to support the ACT model being relevant to understanding and treating depression.

Firstly, considering depression in general, cross-sectional research has produced findings that suggest psychological flexibility (PF) serves as a protective factor against depressive symptoms in the general population (Fonseca, Trindade, et al., 2020; Gloster et al., 2017). In accordance with previous literature, Fonseca et al. (2020) found major life events (e.g., worsening of a romantic relationship, financial situation etc.), and negative appraisals of major life events, had a direct impact on depressive symptoms. This study also found that PF was a significant moderator of the association between number of major life events, and negative appraisal of events, with depressive symptoms. Thus, suggesting a protective role of psychological flexibility. Likewise, Gloster et al. (2017) found PF significantly moderated the relationship between daily stress and physical health, psychological health (including depression) and well-being, following a dose response relationship. However, the cross-sectional nature of these studies cannot determine the direction of causality.

Research also suggests that PF may be relevant to understanding PPD. In perinatal populations, the association of higher PF and lower depressive symptoms has been shown in cross-sectional studies (Evans et al., 2012; Monteiro et al., 2019). Monteiro et al. (2019) found women deemed to be at-risk of PPD who had higher levels of PF and higher levels of non-judgemental appraisal of thought content (i.e., acceptance-focused processes) had a decreased likelihood of presenting clinically relevant depressive symptoms. The findings from this cross-sectional study suggest that the acceptance-focused processes associated with ACT, may play an important role in protecting against depressive symptoms during the postpartum. Consequently, the authors recommended future longitudinal studies are conducted to confirm this found association.

## The Evidence Base for ACT and Depression

Research examining the use of ACT for depression in the general adult population supports the clinical usefulness of ACT for depression. A systematic review of RCTs evaluating ACT for depression concluded ACT was significantly more effective than control conditions and equivalent to CBT post-intervention (Twohig & Lewin, 2017). A further meta-analysis concluded ACT and CBT were equivalent post-intervention (Ruiz, 2012). A meta-analysis that examined the effectiveness of ACT on reducing depression symptoms for different follow-up periods and degrees of depression also found ACT was significantly more effective than control groups, especially at post-intervention, three-month follow-up and for mild depression (Bai et al., 2020). Overall, these reviews show ACT to be an effective intervention for depression and comparable to CBT post-intervention.

Research has also investigated the efficacy of ACT self-help, with a meta-analysis finding small to moderate pooled effect sizes favouring self-help ACT for depression when compared to wait-list controls ( $g = 0.40$ ; 95% CIs [0.13, 0.68]) (French et al., 2017). RCTs have also provided empirical evidence that internet-based ACT self-help programmes significantly reduced depressive symptoms compared to wait-list control groups (Lappalainen et al., 2015; Pots et al., 2016). For instance, Lappalainen et al. (2015) examined a six-module online ACT intervention and found a significant large between group effect size ( $g = 0.83$ ) in favour of the intervention group, with treatments effect being maintained at the 12-month follow-up. Therefore, suggesting the efficacy of ACT for depression when delivered via self-help format.

Although currently in its infancy, there is a growing body of literature examining ACT during the perinatal period. Bonaocquisti et al. (2017) described the development of a four session ACT-based inpatient group intervention for perinatal anxiety and mood disorders. Bonaocquisti et al. (2017) highlighted that ACT's focus

on value-based living can help people continue to engage in behaviours that are in accordance with their values whilst adapting to their new roles and responsibilities of parenthood. Also, the transdiagnostic nature of ACT could be beneficial due to the comorbidity of physical and mental health difficulties that occur during the perinatal period. Research has also found evidence for the feasibility and acceptability of ACT interventions during the perinatal period (Howard et al., 2021; Waters et al., 2020). A single-session ACT intervention was found to be feasible and acceptable for helping women manage fear of childbirth for a first pregnancy (Howard et al., 2021). Waters et al. (2020) also conducted a feasibility and proof of concept study for an 8-week, group-delivered ACT intervention for women with perinatal mood and/or anxiety disorders. In terms of feasibility, attrition was low (65/74 women were deemed as treatment completers; attending at least 4/8 sessions) and no adverse impacts were reported from the women that dropped out. Participants who engaged with the ACT intervention provided positive qualitative feedback at the end of treatment. Consequently, the study concluded that the ACT intervention was feasible and safe for women presenting to specialist perinatal services. Furthermore, depression was found to be significantly lower ( $p < .001$ ;  $d = 1.05$ ), and PF significantly higher ( $p < .001$ ;  $d = 0.93$ ), pre-to-post intervention. Thus, although there are only a few studies examining ACT for the postpartum phase, preliminary findings support its suitability, feasibility, and acceptability. More research is clearly warranted, however.

### **Internet-Based Interventions for Perinatal Mental Health**

There are several barriers preventing people from seeking support and/or attending psychological therapies (Howard & Khalifeh, 2020). Knowledge barriers include not knowing where to seek treatment and poor knowledge, or recognition of symptoms (Bilszta et al., 2010). Structural/practical barriers include childcare responsibilities, transportation, financial difficulties, or logistical challenges attending set appointment times (O'Mahen & Flynn, 2008). Attitudinal barriers include feelings

of guilt or shame, the fear of stigma (Ford et al., 2019; Goodman, 2009) or the fear of having their children taken away (Dennis & Chun-Lee., 2006).

Internet-based psychological interventions may help to overcome many of the identified barriers (Danaher et al, 2013). They offer flexibility/convenience in choosing a suitable location and time, not requiring childcare, no out-of-pocket costs, no transport requirements and increased privacy or anonymity (Loughnan et al., 2019; Mu et al., 2021). An additional benefit of internet-based interventions is they are a low-cost, high-volume approach. Therefore, offering a solution to the challenge of supply and demand by expanding the type of treatments available to people. A systematic review examining electronic health (eHealth) technology during the perinatal period also concluded that eHealth has the potential to deliver a revolution in perinatal care (van den Heuvel et al., 2018). A systematic review that appraised systematic reviews on interventions for PPD also found antidepressants and telemedicine were the most effective treatments for PPD (Chow et al 2021). Furthermore, due to COVID-19 perinatal services have had to adapt to deliver services remotely (Bridle et al., 2022).

The use of internet-based interventions for perinatal mental health is a rapidly developing area of research with several reviews (Ashford et al., 2016; Chae & Kim, 2021; Lau et al., 2017; Lee et al., 2016; Loughnan et al., 2019) including reviews specifically focusing on internet-based interventions for PPD (Mu et al., 2019; Roman et al., 2020) being published. Overall, the findings from these reviews suggest internet-based interventions can improve perinatal mental health.

For instance, Mu et al. (2019) review identified seven studies examining internet-based interventions for PPD. In terms of intervention type, five studies examined CBT and two examined behavioural activation. Six of the seven intervention incorporated some therapist support, such as weekly low-intensity telephone support to reinforce participant progress (Milgrom et al., 2016), weekly

support via email (Pugh et al., 2016) or minimal support via access to online clinic where questions could be asked/answered (O'Mahen et al., 2013). The length of interventions ranged from six to eleven modules/sessions. In terms of efficacy, the random-effects model in this review found internet-based interventions significantly reduced depressive symptoms post-intervention with the pooled effect size being moderate to large ( $d=0.64$ ; 95% CI [0.507-0.813]). This effect size is comparable to the pooled effect size ( $d = - 0.54$ , 95% CI [-0.716, -0.423]) obtained in a similar review (Roman et al., 2020) thus suggesting that internet-based interventions can significantly reduce depressive symptoms during postpartum. However, the findings from Mu et al. (2019) review should be interpreted with caution as there was high heterogeneity amongst the studies whereby sample sizes at baseline ranged from 42-910 participants, attrition rates ranged from 4.5%-86.9% and follow-up periods and measured using to measure depression varied between studies. The wide range of attrition rate has also been noted in other similar reviews (Lau et al., 2017; Ashford et al., 2016), suggesting that high attrition is one potential limitation of internet-based interventions. Likewise, a recent systematic review of reviews examining effectiveness of psychological interventions for perinatal depression found rates of attrition were higher for internet-based intervention compared to the low to medium attrition rates seen for face-to-face interventions (Branquinho et al., 2021). Providing reminders to intervention users has been proposed as a strategy to reduce attrition (Nieminen et al., 2016).

To date, most research has examined internet-based CBT. However, one study has investigated the feasibility, acceptability and preliminary efficacy of a CBT internet-based intervention incorporating acceptance and compassion-based approaches (Fonseca, Alves, et al., 2020). 'Be a Mom' is a self-guided, five module intervention, developed to prevent PPD symptoms. Fonseca et al. (2020) pilot study randomly allocated women presenting with risk factors or early-onset PPD symptoms

to the intervention ( $n = 98$ ) or to the wait-list control ( $n = 96$ ) group. The study found a significant time by group interaction pre-to-post intervention, with the reduction in depression being significantly greater in the intervention group ( $d = 0.62$ ) than the wait-list control ( $d = 0.28$ ). Furthermore, 58.2% of the intervention group dropped out of the intervention, with the authors highlighting this is similar amount seen in other self-guided interventions for PPD.

### **Current Study**

Previous literature has shown higher PF is associated with lower depression and found evidence suggesting PF may protect against depression, including PPD. There is also literature demonstrating the efficacy of ACT for depression, including via a self-help format, and preliminary evidence for the suitability, feasibility, and acceptability for face-to-face ACT during the postpartum. Furthermore, research has shown internet-based interventions significantly reduced depressive symptoms in postpartum women. However, no research to date has examined an internet-based ACT intervention. Therefore, the current study aimed to extend the previous research by being the first study to develop and then investigate the feasibility and acceptability of a brief internet-based ACT intervention for postpartum parents with elevated depressive symptoms.

The research questions were:

1. Is it possible to recruit and retain postpartum parents experiencing mild to moderate depressive symptoms to a brief (i.e., 4-week) internet-based ACT intervention?
2. How acceptable is a brief internet-based ACT intervention to this group?
3. What is the estimated effect size and confidence interval for the interventions effect on the clinical outcomes; depression and well-being?
4. Did parents who engaged in the brief internet-based ACT intervention experience an increase in mindfulness and valued living?



## **Method**

### **Research Approval**

This trial is registered at [clinicaltrials.gov](https://clinicaltrials.gov) (NCT05173285) and the study protocol was approved by Royal Holloway University Ethics Committee (see Appendix B).

### **Design**

A 2 (4-week internet-based ACT intervention versus inactive wait-list control) by 3 (baseline, post-intervention, and 4-weeks follow-up) feasibility RCT was employed using simple randomisation with a 1:1 allocation ratio. Participants allocated to the wait-list control group were given access to the 4-week internet-based intervention at the end of the study. However, due to a technical error setting up the randomisation function the first six participants were allocated to the waitlist control before the randomisation function commenced. The primary outcome variable was depression, and the secondary outcome variable was well-being. Process of change were assessed by measuring mindfulness and valued living. Outcome and process measures were collected at baseline (T1), post-intervention (T2) and 4-weeks follow-up (T3).

### **Participants**

#### ***Eligibility criteria***

The target sample for this study were postpartum parents with elevated depression. Consequently, parents were eligible to participate if there were aged  $\geq 18$  years, have an infant  $\leq 12$  months, scored  $\geq 10$  on the Edinburgh Postpartum Depression Scale (EPDS), have access to the internet through a computer, tablet or mobile and able to read and write in English. Participants were excluded from the study if they did not meet the above inclusion criteria. There were no additional exclusion criteria.

#### ***Sample Size***

Power calculations are not appropriate to the aims and design of feasibility RCTs (Arain et al., 2010). Rather, recommendations suggest that an overall sample size  $n = 30$  or greater (Browne, 1995), or ranges between  $n = 24$  (Julious, 2005) and  $n = 50$  (Sim & Lewis, 2012). Thus, in line with these recommendations, an overall target sample size of  $n = 32$  was chosen ( $n = 16$  per condition).

To account for a potentially high attrition rate, a conservative approach was taken by over recruiting by 60%; overall sample  $n = 80$  ( $n = 40$  per condition). Attrition rates post-intervention in similar studies have ranged from 11.3% (Danaher et al., 2013) to 62.3% (O'Mahen et al., 2013). The intended sample size of  $n = 80$  was deemed as feasible, as previous studies using the same recruitment strategies of parenting websites and social media and similar inclusion criteria have obtained samples of 50 (Pugh et al., 2014) to 910 participants (O'Mahen et al., 2013).

### ***Recruitment***

Recruitment took place between June 2020 and January 2022. Using an opportunity sampling method, the study recruited a self-selecting sample via social media (i.e., Facebook, Twitter), popular parenting websites (i.e., netmums.com, mumsnet.com) and poster advertisement in community settings (see Appendix C).

### ***Measures***

Qualtrics, a secure online platform for conducting research, was used to host the intervention and all the self-report measures. The self-report questionnaires are presented in Appendix D.

### ***Sociodemographic information***

Sociodemographic information was collected at T1 including age, sex, ethnicity, education level, employment status, household income, relationship status, number of children and infants. This information was used to describe the sample and examine between group differences at baseline.

### ***Feasibility***

To examine feasibility, the following data were recorded: *Recruitment source*, to examine which recruitment platform was most successful. *Recruitment rate*, to understand how feasible it would be to recruit for a fully powered RCT. *Attrition rate*, to provide expected attrition rate, which could be used to inform a potential fully powered RCT in the future. This approach to feasibility has been applied in previous similar feasibility RCTs (Ashford, et al., 2018; O'Mahen, et al., 2013).

### ***Acceptability***

To examine acceptability, the following data were collected:

*Reasons for signing up to the study.* At T1 participants were asked to select all applicable reasons for signing up to the study from a list of reasons (e.g., 'I have heard mindfulness is helpful'). The items in this list were based on a list used in a similar feasibility study (O'Mahen et al., 2013) with additional items being included based on the feedback from the experts by experience consultation for this study.

*Usability of the intervention.* At T2 participants in the intervention condition completed the System Usability Scale (SUS; Brooke, 1996). This 10-item questionnaire asks participants to rate on a 5-point Likert scale (0 = strongly disagree – 4 = strongly agree) positive and negative descriptions of the intervention. The SUS was adapted by replacing the word 'system' with 'online programme' (i.e., 'I found this online programme unnecessarily complex'). The maximum score is 100 and a score above 68 is considered average usability. Bangor et al. (2008) added an adjective rating scale to the SUS to aid interpretation of individual scores. Whereby scores  $\geq 85$  are considered 'Excellent', 70 'Good', 51 'OK' and  $\leq 50$  'Poor'. This study also used this scale when interpreting SUS scores. The SUS has acceptable internal reliability ( $\alpha = .80$ ) and been used in feasibility RCT's evaluating internet-based

treatment for postpartum depression and anxiety (Ashford et al., 2018; Danaher et al., 2013).

*Usefulness of the intervention and level of satisfaction.* At T2 participants were also instructed to rate usefulness (i.e., “I found this intervention useful”) on a 5-point Likert scale (1= strongly disagree - 5= strongly agree). Lastly, satisfaction was measured by instructing participants to select all applicable items from a list of items relating to ways the intervention met (e.g., ‘It helped me identify my values’) or failed to meet their expectations (e.g., ‘It wasn’t relevant to me or my situation’).

### **Outcome measures**

*Primary outcome measure:* The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) was used to assess severity of postpartum depressive symptoms. This 10-item questionnaire asks participants to rate how much they felt different symptoms based on the previous seven days. Each item is scored from 0-3, with higher scores indicating more severe symptoms. This study operationalized elevated symptomatology as scores  $\geq 10$ , as this threshold has been recommended for community samples (Pugh et al., 2016). The EPDS has demonstrated excellent internal ( $\alpha = .88$ ) and test-retest reliability (Cox et al., 1987). Furthermore, an online-administered version completed by postpartum mothers demonstrated acceptable internal consistency (Monteiro et al., 2020;  $\alpha = .80$ ; Pugh et al., 2016;  $\alpha = .80$ ). Although the EPDS is not diagnostic of mental disorder (Cox et al., 2014) it is among the most widely used screening tools for depression in women and validated in most regions of the world (McBride et al., 2014). The EPDS has also been used in previous pilot RCTs to examine treatment effects of internet-based interventions during the perinatal period (Monteiro et al., 2020; Pugh et al., 2016)

*Secondary outcome measure.* The primary aim of ACT is not symptom reduction, rather it aims to facilitate the person’s ability to live a rich and meaningful life. Therefore, well-being was another key clinical outcome of the intervention. The

Flourishing Scale (FS; Diener, et al., 2009) provides a single psychological well-being score. Participants answer on a 7-point scale to what extent they agree (7) or disagree (1) with eight statements relating to relationships, self-esteem, purpose, and optimism. Sums scores range from 8-56, with a high score representing a person with many psychological resources and strengths. The FS has been found to have good internal consistency ( $\alpha = .87$ ) and test-retest reliability (.71) (Diener et al., 2009). Subsequent studies involving samples of parents have also obtained similar results (Lucic et al., 2017; Pozo Muñoz, & Bretones Nieto, 2019). Schotanus-Dijkstra et al. (2016) also evaluated the FS psychometric properties in a sample of adults with suboptimal levels of well-being concluding it is a reliable and valid instrument, though its use in intervention studies might be debateable and advised researchers to be aware of its possible limitations as a standalone measure.

### ***Process Measures***

The Five Facet Mindfulness Questionnaire (Baer et al., 2006) was used to measure mindfulness. This 39-item questionnaire measures describing, non-reactivity, act with awareness, non-judging and observing. Items are rated on a 5-point scale ('1' -never or very rarely true, '5' - very often or always true). However, this study did not include the observer factor items, as research has shown these items do not load significantly onto the overall mindfulness factor in community samples (Williams et al., 2014). This scale has demonstrated adequate to good consistency ( $\alpha = 0.75 - 0.91$ ) in perinatal populations (Townshend & Caltabiano, 2019; Kantrowitz-Gordon, 2018).

The Valuing Questionnaire (VQ; Smout, et al., 2014) was used to measure valued living. This 10-item questionnaire measures two constructs; progress in valued living (i.e., awareness and enactment of values-consistent behaviour) and obstruction to valued living (i.e., failure to enact consistent behaviour due to inattention or inference of negative internal experiences) during the past week. Each

item is rated on a 7-point scale (0= not at all true to 6= completely true). The VQ was created for use in clinical and research settings and since it is not domain-specific it generates standardized scores enabling comparison of participants scores. Although the VQ is a relatively new measure research has demonstrated adequate reliability and validity (Smout et al., 2014) and been used in clinical research evaluations of ACT interventions VQ progress ( $\alpha=.89$ ) and VQ obstruction ( $\alpha=.84$ ) (Levin et al., 2017).

### **Intervention**

The brief internet-based ACT intervention (Appendix E) was hosted on Qualtrics using a self-help format with no external clinician input. As part of the development of this intervention, amendments were made to the language used in the modules based on the feedback sought from experts by experience.

The intervention included four 20–30-minute modules; two modules focusing on mindfulness and two modules on valued living. The content and experiential practices of the intervention were purposely selected to reflect the three pillars of psychological flexibility, which overarch the six core processes of ACT: (1) Be open (i.e., acceptance and defusion), (2) Be present (i.e., contact to the present moment and self-as-context), and (3) Do what matters (i.e., values and committed action) (Harris, 2009). At the end of each module a home practice was set, followed by a 'Tips' section to support the participant to engage with the home practice. All the audios and the video included in the intervention were recorded by the principal investigator.

At the start of the intervention the 'reservoir' metaphor (adapted from Kroeker, 2009) was used to emphasise how draining the demands of parenthood can be, and the need to maintain and 'replenish' one's reservoirs to manage the challenges and avoid becoming vulnerable to stresses of parenting. It then stated that this intervention aims to teach different ways to maintain or replenish their reservoirs.

Module 1 introduced and defined mindfulness. Using the autopilot parenting metaphor (adapted from O'Donoghue et al., 2018) participants were introduced to how mindfulness can help improve their ability to choose how they respond to situations, thoughts, and feelings. A three-minute breathing exercise (adapted from O'Donoghue et al., 2018) was then presented via an audio recording and followed by written enquiry questions. The three-minute breathing exercise was chosen as research has found this to be the most appropriate mindfulness exercise for mothers with young children (Luberto et al., 2018). Home practice: listen to the three-minute breathing exercise once per day for the following week.

Module 2 introduced the benefits, and accessibility, of engaging in informal daily practices of mindfulness. A list of daily activities was presented such as mindful getting your child dress, mindful eating, mindful pushing the pram. Then an audio recording of 'mindful drinking' (adapted from Cree, 2015) encouraging participants to focus their attention to the sensory experiences of drinking was presented. Home practice: bring mindful attention to a routine activity each day for the following week.

Module 3 introduced the concept of values. Participants were invited to complete a value card-sort task, using the values list from O'Donoghue et al. (2018) and procedures adapted from Kingston et al. (2020). This involved sorting 12 values into one of three categories: "very important to me", "quite important to me" and "not important to me". Participants were then asked to select one value from the "very important to me" category which they wanted to connect with during the following week. To connect with this value, participants were asked to recall a memory of an event where they engaged with this value and how it made them feel about themselves. Next, participants spend three minutes writing about their feelings about this value and why it is important and meaningful for them. Then participants were asked to set a short-term "SMART" (specific, measurable, achievable, realistic, and time-framed) goal relating to their identified value. Common external (e.g., time,

money etc.) and internal (e.g., difficult feelings or thoughts) barriers to engaging in value consistent behaviours was discussed. Homework practice: complete short-term SMART goal and notice the feelings, and impact, of engaging in value consistent behaviour.

Module 4 invited participants to reflect on their experience connecting with their value and reflect on the barriers they encountered. Participants were then asked to set a further short-term, and a medium-term, 'SMART' goal. This was followed by a video describing an adapted version of the 'Pushing Against the Folder Exercise' described in the book *ACT for psychosis recovery* by O'Donoghue et al. (2018). This exercise, which explains three different ways we can respond to internal barriers, is a metaphor for acceptance and experiential avoidance. Homework practice: (1) connect with your values, (2) complete short-term goal and (3) bring mindful attention to daily activities.

### **Procedure**

The study procedure is shown in Figure 3. Participants accessed the study via a Qualtrics web link. After reading the information sheet (Appendix F) and completing the consent form (Appendix G), participants were automatically sent an email including the link to the second survey and informed of their unique identification number to access Qualtrics, therefore keeping responses anonymous. Furthermore, regarding risk management the study repeatedly encouraged participants to seek help if they felt distressed or had any concerns about their wellbeing. The following statement was included in the participant information sheet, in the email inviting participants to complete T1 and T2 measures, in every reminder email and in the debriefing sheet:

*"It is unlikely that taking part in the study will have a negative impact on your wellbeing. However, in the event that the questionnaires, or the programme activities, do cause distress or upset, we advise that you contact your GP, call NHS 111 or*



*contact the Samaritans (116 123). **If you feel you need immediate help, we advise you go to A&E or call 999.***

The EPDS was the first measure presented in this survey, participants who scored <10 were informed that they do not meet the study inclusion criteria and given the debriefing sheet (Appendix H). Participants with scores  $\geq 10$  on the EPDS were redirected to complete baseline measures. Participants were then automatically randomised to the inactive waiting control group (CG) or the intervention group (IG).

Participants in the IG were automatically sent an email with a link to access the first module (i.e., week 1) of the intervention. At the end of each module, the participant was informed that they would receive an email in a weeks' time providing them with a link for the next module and a PDF version of the module. The IG also received an automatic email at T2 and T3 asking them to complete the battery of online questionnaires. Participants who dropped out of the study were still emailed and asked to complete T2 and T3 questionnaires.

Participants in the CG were informed that they will receive an email including a link to the second set of questionnaires in 4 weeks' time (i.e., T2), and a further email with a link at 4-week follow-up (i.e., T3). After completing T3 measures, CG participants received the debriefing sheet (Appendix I) and were given access to all four modules of the intervention. The control groups engagement, or experience, of the intervention was not examined by this study.

Email reminders help encourage greater adherence with internet-based interventions (Danaher et al., 2013). Consequently, participants who consented to reminders, were sent up to two emailed reminders for each occasion where the subsequent part of the study was not completed. For instance, if the intervention was not opened within two days of being given access, the participant would receive a reminder.

## Data Analysis

All data analysis was completed using the IBM SPSS Statistics for Windows, Version 25.0. To answer the first research question regarding feasibility, recruitment source was presented as percentages and a CONSORT (Consolidation Standards of Reporting Trials) flow diagram presented recruitment and attrition rates. This information answers feasibility, specifically by answering whether it is possible to recruit postpartum parents using the studies recruitment strategy, which recruitment source was most successful, and whether the attrition rate was low enough to warrant a fully powered RCT.

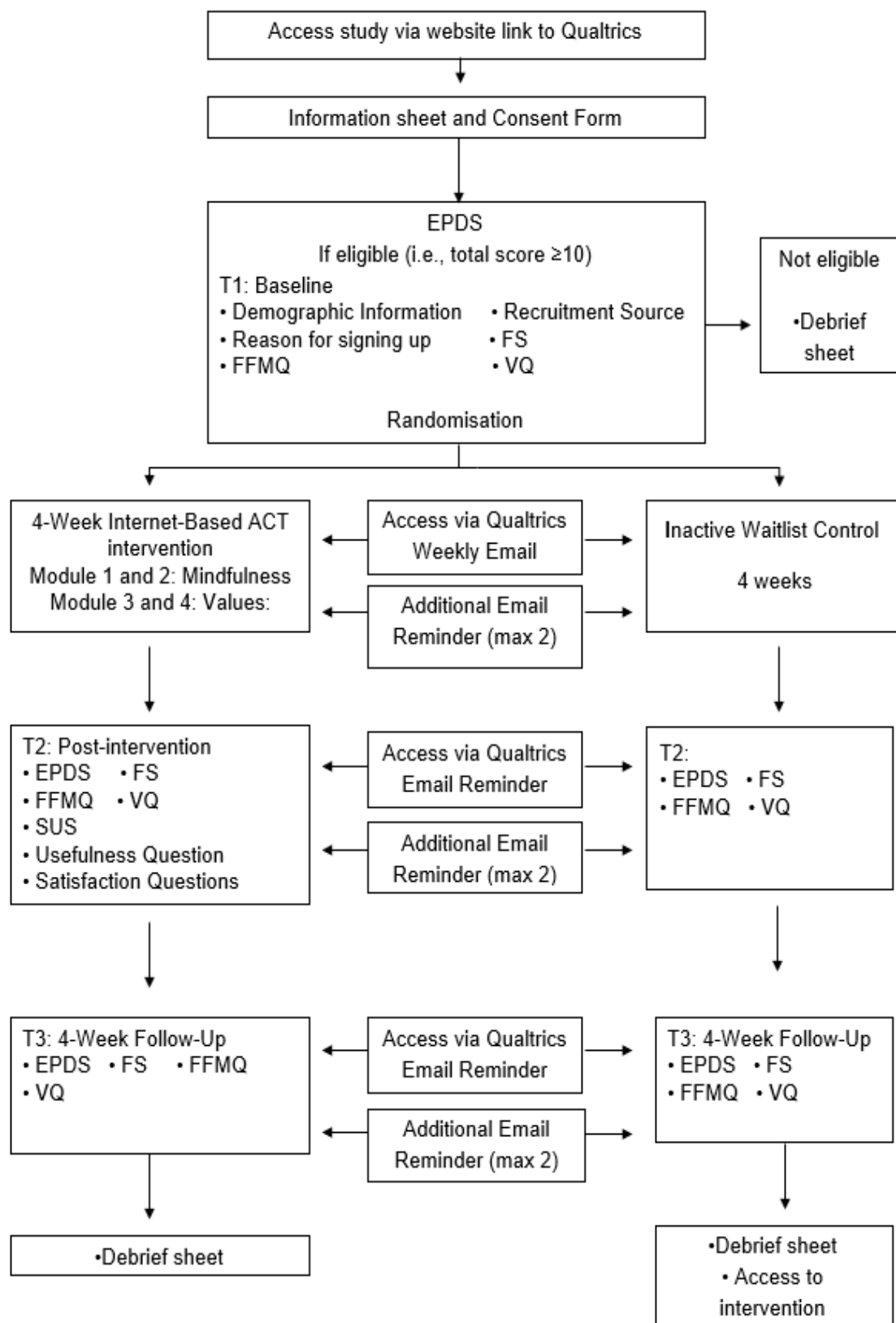
The second research question regarding the acceptability of the intervention was examined via descriptive statistics, including frequencies of reported reasons for signing up to the study, frequencies of participants' ratings of usefulness, frequencies of how the intervention met/failed to meet expectations, and the mean usability score for the intervention.

The third and fourth research questions were addressed in three ways. Firstly, the study used per-protocol analysis, whereby the descriptive statistics for participants who completed measures were used to calculate estimated effect sizes and confidence intervals for the interventions effect on clinical outcome and process measures. Estimated effect sizes and confidence intervals were calculated using an online calculator [https://www.psychometrica.de/effect\\_size.html](https://www.psychometrica.de/effect_size.html) specifically the third calculator. Secondly, as the sample sizes were small reliable change indices (RCI) (Jacobson & Truax, 1991) were calculated for each participant to examine whether the observed changes were more than can be explained by errors of measurement. Thirdly, clinical significant change (CSC) (Jacobson & Truax, 1991) scores were calculated for each participant to understand whether changes were clinically meaningful. RCI were calculated from T1-T2 and T1-T3. If the RCI was greater than 1.96, the difference was considered reliable ( $p < .05$ ) as a change of that magnitude

would not be expected from measurement error alone (Jacobson & Truax, 1991). Furthermore, a RCI of 4-points for improvements and 3-points for worsening was used for EPDS, as this has been estimated in previous literature (Mao, et al., 2021; Matthey, 2004). RCI and CSC were calculated using the Leeds Reliable Change Indicator calculator (Morley & Dowzer, 2014). This calculator requires users to enter reliability estimates and mean (*SD*) values for a clinical sample, and a comparison sample when available. Jacobson and Truax (1991) criteria A (i.e., post-intervention score falling outside of the clinical range by 2*SD*) was used to identify CSC, as norms for a comparison non-clinical group were not available. Reference data for RCI and CSC is available in Appendix J.

**Figure 3**

*Study Procedure*



## Results

This section begins with exploratory data analysis where methods used to handle missing data and outliers are described. Then participants' characteristics are presented. Finally, each research question is outlined, with the associated findings presented.

### Exploratory data analysis

#### *Missing Data*

To minimise missing data, participants were automatically alerted by Qualtrics to any items they had not completed. Where a participant had missed <10% of items on a given questionnaire, missing item data was imputed with the sample median for that item at that time point. Where participants missed  $\geq 10\%$  of items on a questionnaire, their data was not included for analyses using that variable.

One participant missed <10% of the FFMQ at T1, and one participant missed <10% of the VQ at T2; missing items were replaced, and data retained for analysis. See Figure 4 for the number of completed measures at each time point. It should be noted that one participant returned T2 measures after 8-weeks (i.e., at T3 time point), therefore, this data was entered as T3 data. Furthermore, five participants only completed T1 and T3 measures, missing all T2 measures.

#### *Outliers*

Outliers identified by boxplots were visually inspected with outliers retained if they were deemed to reflect meaningful variation in the data. Following this approach, no outliers were removed from the data.

### Participant characteristics

A summary of the sociodemographic characteristics for participants who completed EPDS at T1 and at either T2 or/and T3 can be found in Table 8. Of the total  $n = 67$  participants, only  $n = 1$  was male, the sample had a mean age of 34.19 (ranging between 25 and 43 years;  $SD = 3.71$ ), the majority were white British  $n = 45$

(67%) or other white  $n = 20$  (30%),  $n = 66$  (99%) were married/living together,  $n = 51$  (76%) were on maternity leave, the number of children ranged from 1 to 4 with  $n = 37$  (55%) of the participants having one child and  $n = 25$  (37%) having two children, and infants ranged from 0 to 12 months ( $M = 5.31$ ;  $SD = 3$ ).

Independent t-tests for continuous variables and chi-square test for categorical variables were conducted to establish whether the IG and CG differed significantly at baseline in terms of sociodemographic characteristics, clinical and process measures (see Table 8 and Table 9). No significant differences between groups were found. Thus, demonstrating baseline equivalence between groups.

**Table 8**

*Sociodemographic Characteristics of the Participants Who Completed EPDS at T1 and at Either T2 or/and T3 by Group Condition*

| Sociodemographic Characteristics          |   | IG<br>( <i>n</i> = 18) | CG<br>( <i>n</i> = 49) | Test Statistic           |
|---|---|------------------------|------------------------|--------------------------|
| Age (years)                               |   | 34.28 (2.89)           | 34.16 (4)              | $t_{(65)} = .111$        |
|   | - <i>M</i> ( <i>SD</i> )                |                        |                        | $p = .91$                |
| Sex - <i>n</i> (%)                        | Female                                  | 18 (100%)              | 48 (98%)               | $\chi^2_{(1)} = .631$    |
|   | Male                                    | 0 (0%)                 | 1 (2%)                 | $p = .43^a$              |
| Ethnicity - <i>n</i> (%)                  | White (British)                         | 12 (67%)               | 33 (67%)               | $\chi^2_{(3)} = 3.29$    |
|   | Any other White                         | 5 (28%)                | 15 (31%)               | $p = .35^a$              |
|   | Multiple ethnic groups                  | 0 (0%)                 | 1 (2%)                 |                          |
|   | Asian                                   | 1 (6%)                 | 0 (0%)                 |                          |
|   | Black                                   | 0 (0%)                 | 0 (0%)                 |                          |
|   | Arab                                    | 0 (0%)                 | 0 (0%)                 |                          |
|   | Any other ethnic group                  | 0 (0%)                 | 0 (0%)                 |                          |
| Highest level of education - <i>n</i> (%) | GCSE (or equivalent)                    | 0 (0%)                 | 0 (0%)                 | $\chi^2_{(2)} = 4.041$   |
|   | A-Level (or equivalent)                 | 3 (17%)                | 2 (4%)                 | $p = .13^a$              |
|   | Undergraduate degree                    | 7 (39%)                | 14 (29%)               |                          |
|   | Postgraduate studies                    | 8 (44%)                | 33 (67%)               |                          |
| Work Status - <i>n</i> (%)                | Maternity Leave                         | 16 (89%)               | 35 (71%)               | $\chi^2_{(2)} = 2.822$   |
|   | Unemployed (full-time parent)           | 1 (6%)                 | 4 (8%)                 | $p = .24^a$              |
|   | Employed (full-time, part-time or self) | 1 (6%)                 | 10 (20%)               |                          |
|   | <£10000                                 | 0 (0%)                 | 0 (0%)                 | $\chi^2_{(4)} = 5.081$   |
|   | £10,000-£19,999                         | 0 (0%)                 | 1 (2%)                 | $p = .28^a$ <sup>b</sup> |

| Sociodemographic Characteristics |   | IG<br>( <i>n</i> = 18) | CG<br>( <i>n</i> = 49) | Test Statistic                        |
|----------------------------------|---|------------------------|------------------------|---------------------------------------|
| Household Income (annual)        | £20,000-£39,999                         | 4 (24%)                | 7 (14%)                |                                       |
|                                  | £40,000-£59,999                         | 5 (29%)                | 6 (12%)                |                                       |
|                                  | £60,000-£79,999                         | 4 (24%)                | 12 (25%)               |                                       |
| - <i>n</i> (%)                   | >£80,000                                | 4 (24%)                | 23 (47%)               |                                       |
| Relationship Statue              | Single or Separated                     | 0 (0%)                 | 1 (2%)                 | $\chi^2_{(1)} = .631$<br>$p = .43^a$  |
| - <i>n</i> (%)                   | Married/ Living together                | 18 (100%)              | 48 (98%)               |                                       |
|                                  | In a relationship (not living together) | 0 (0%)                 | 0 (0%)                 |                                       |
|                                  | Divorced                                | 0 (0%)                 | 0 (0%)                 |                                       |
| Number of Children               | 1                                       | 9 (50%)                | 28 (57%)               | $\chi^2_{(2)} = 2.776$<br>$p = .43^a$ |
|                                  | 2                                       | 7 (39%)                | 18 (37%)               |                                       |
| - <i>n</i> (%)                   | 3                                       | 1 (6%)                 | 3 (6%)                 |                                       |
|                                  | 4                                       | 1 (6%)                 | 0 (0%)                 |                                       |
|                                  | 5+                                      | 0 (0%)                 | 0 (0%)                 |                                       |
| Infant's age in months           |   | 4.97 (3.08)            | 5.44 (3)               | $t_{(65)} = -.56$<br>$p = .58$        |
| - <i>M</i> ( <i>SD</i> )         |   |                        |                        |                                       |

Note. CG, Control Group; IG, Intervention Group; <sup>a</sup> Likelihood Ratio; <sup>b</sup> based on *n* =

66 due to missing data



**Table 9***Participants' Pre-Intervention Score on Outcome Measures and Process Measures*

| Pre-Intervention Scores<br><i>M (SD)</i> | IG<br>( <i>n</i> = 18)     | CG<br>( <i>n</i> = 49) | Test Statistic              |
|--|----------------------------|------------------------|-----------------------------|
| EPDS                                     | 14.28 (2.72)               | 14.35 (3.72)           | $t_{(65)} = -.072, p = .94$ |
| FS                                       | 42.17 (7.53)               | 41.18 (7.24)           | $t_{(65)} = .487, p = .63$  |
| FFMQ                                     | 81.53 (13.43) <sup>a</sup> | 84.76 (11.85)          | $t_{(64)} = -.935, p = .35$ |
| VQ                                       | 33 (4.42) <sup>a</sup>     | 31.59 (4.44)           | $t_{(64)} = 1.128, p = .26$ |

*Note.* CG, Control Group; IG, Intervention Group; EPDS, Edinburgh Postnatal

Depression Scale; FS, Flourishing Scale; FFMQ, Five Facet Mindfulness

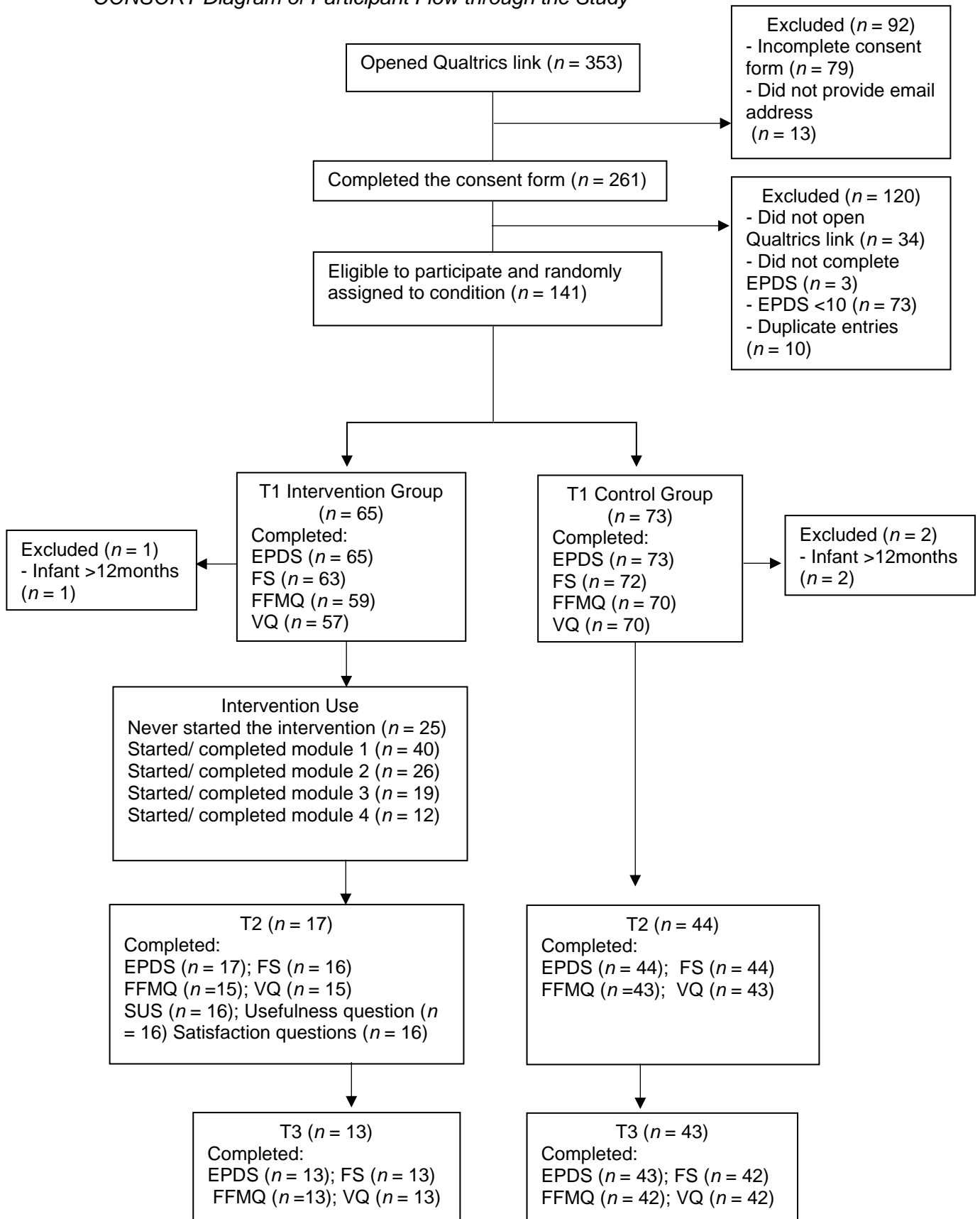
Questionnaire; VQ, Valuing Questionnaire; <sup>a</sup> based on *n* = 17 due to missing data

**Question 1: Is it Possible to Recruit and Retain Postpartum Parents****Experiencing Mild to Moderate Depressive Symptoms to a Brief Internet-Based ACT Intervention?*****Recruitment***

The flow and attrition of participants through the study is shown in the CONSORT diagram presented in Figure 4. In total, 353 participants opened the Qualtrics link, and 261 participants completed the consent form. Of these 261 participants, 141 participants met eligibility criteria (EPDS  $\geq 10$ ) and were randomised to condition. See Figure 4 for exclusion reasons. Of those randomised, three participants were excluded due to not meeting the eligibility criteria of having an infant  $\leq 12$  months. Of the remaining 138 participants, 65 were allocated to the IG and 73 were allocated to the CG. Of the 138 randomised participants, all but one participant reported the source of recruitment: *n* = 118 (86%) were recruited via Facebook, *n* = 13 (9%) were recommended by a friend, *n* = 6 (4%) were recruited via other social media and zero participants were recruited via posters in the community across the 20-month recruitment period (June 2020 – January 2022).

**Figure 4**

*CONSORT Diagram of Participant Flow through the Study*



## **Attrition**

Attrition was tested by examining the number of participants who completed the primary (i.e., EPDS) and secondary (i.e., FS) outcome measures at T1 and T2, T1 and T3 and at T1, T2 and T3. Secondly, by examining whether attrition rates differed between the IG and CG. Lastly, by examining whether there were any significant differences between participants who completed measures versus those that dropped out in regard to sociodemographic characteristics and baseline levels of depression, well-being, mindfulness and valued living.

In the IG,  $n = 17$  (26%) completed the EPDS at T1 and T2,  $n = 13$  (20%) completed EPDS at T1 and T3 and 12 (19%) completed the EPDS at T1, T2 and T3. For Flourishing,  $n = 16$  (25%) completed the FS at T1 and T2,  $n = 13$  (20%) completed FS at T1 and T3 and 12 (19%) completed the FS at T1, T2 and T3.

In the CG,  $n = 44$  (60%) completed the EPDS at T1 and T2,  $n = 43$  (59%) completed EPDS at T1 and T3 and 38 (52%) completed the EPDS at T1, T2 and T3. For Flourishing,  $n = 44$  (60%) completed the FS at T1 and T2,  $n = 42$  (58%) completed FS at T1 and T3 and 37 (51%) completed the FS at T1, T2 and T3.

Attrition rates for completing the EPDS at T1 and at either T2 or/and T3 differed significantly between groups,  $\chi^2_{(1)} = 21.4$ ,  $p < .001$  with a higher attrition being seen in the IG. Attrition rates for completing the FS at T1 and at either T2 or/and T3 also differed significantly between groups,  $\chi^2_{(1)} = 23.13$ ,  $p < .001$  with a higher attrition being seen in the IG.

However, no significant differences were found between participants who completed the EPDS and FS outcome measures at T1 and at either T2 or/and T3 and those that dropped out regarding sociodemographic characteristics (Appendix K, Table K1) or baseline clinical outcome and process measures (Appendix K, Table K2).

## **Question 2: How Acceptable was the Brief Internet-Based ACT Intervention to Postpartum Parents Experiencing Mild to Moderate Depressive Symptoms?**

### ***Acceptability***

Of the 138 participants, 137 provided data for the reasons of signing up to the study. Looking for helpful tools and skills, hearing that mindfulness is helpful, and wanting help adjusting to parenthood were the three most frequently reported reasons. See Table 10 for full list of reasons.

Forty percent ( $n = 16$ ) of participants accessing the intervention provided data on usefulness, usability, and their satisfaction with the intervention. Most participants agreed with the statement 'I found this intervention useful' as indicated by  $n = 3$  selecting 'strongly agree',  $n = 8$  'agree',  $n = 3$  'neither agree or disagree',  $n = 2$  'disagree' and  $n = 0$  'strongly disagree'. The mean SUS usability score was 75 (scores ranged from 42.5 - 100), which is above the recommended average of 68. Furthermore, based on the adjective rating scale for interpreting scores, most SUS scores were 'Good' ( $n = 9$ ), with the remaining scores being 'Excellent' ( $n = 3$ ), 'OK' ( $n = 3$ ) and 'Poor' ( $n = 1$ ). Participants satisfaction with the intervention are presented in Table 11. The most frequently reported ways the intervention met expectation were, 'I could do it in my own time', 'it was emailed to my inbox each week' and 'I learnt about mindfulness'. However, six participants reported that they felt overwhelmed by the weekly sessions, and four participants reported the intervention made them feel like a failure.

**Table 10***Participants' Reasons for Signing up to the Study*

| Reason  | <i>n</i> |
|---|----------|
| I was looking for tools and skills that would help me   | 105      |
| I have heard mindfulness is helpful   | 87       |
| I wanted some help adjusting to parenthood  | 61       |
| I can sometimes be bothered by unpleasant thoughts, feelings and bodily sensations that I find difficult to shake off   | 54       |
| Wanted something straight forward I could do for myself   | 40       |
| I like trying new things  | 38       |
| I find it hard to talk face to face   | 34       |
| I wanted some help but find it hard to tell people I am struggling  | 34       |
| Wanted help in coping without medication  | 33       |
| Don't have anyone to look after my child so can't attend clinic sessions  | 14       |
| I do everything online, it's just easier  | 11       |
| To win the prize draw   | 9        |
| A friend recommended the programme  | 8        |
| The waiting list for NHS counselling was too long   | 8        |
| It is difficult to get a GP appointment   | 8        |
| It looked like fun  | 8        |
| I didn't know what else to do   | 6        |
| My GP could not help me   | 2        |
| Other, please specify...  | 6        |
| 'I like to contribute to research studies'  |          |
| 'Find mindfulness really helpful but haven't had time to do much since baby born and feel it would help me cope better' |          |
| 'Have had ppa/ppd and had treatment prenatal and postnatal'   |          |
| 'I'm under the perinatal mental health team and want to help'   |          |
| 'Like helping researchers as well'  |          |
| 'I have experience carrying out research and recruiting participants.'  |          |
| I know it can be difficult so I wanted to help!   |          |

*Note.* Based on  $n = 137$

**Table 11***Participants Satisfaction with the Intervention*

| Expectations   | <i>n</i> |
|--|----------|
| Ways the Intervention Met Participants' Expectations   |          |
| I could do it in my own time   | 12       |
| I learnt about mindfulness   | 11       |
| It was emailed to my inbox each week   | 11       |
| It was free  | 10       |
| I got to practice mindfulness skills   | 7        |
| It helped me identify my values  | 4        |
| Other, please specify...   | 0        |
| Ways the Intervention Fail to Meet Participants' Expectations  |          |
| I felt overwhelmed with the weekly sessions  | 6        |
| It made me feel like a failure   | 4        |
| Other, please specify...   | 4        |
| It wasn't relevant to me or my situation   | 2        |
| I didn't see how the activities would be helpful   | 2        |
| I didn't find the materials interesting  | 2        |
| I did not receive the emails   | 0        |
| It was too hard  | 0        |
| Other, please specify...   | 4        |
| "Didn't really feel the 'values' reflection helped my mood"  |          |
| "Couldn't find the time to complete the sessions"  |          |
| "Harder to engage with the values part, possibly because it is less practical and more thinking and writing" |          |
| "Very brief and short resources"   |          |

*Note.* Based on  $n = 16$

### **Question 3. What is the Estimated Effect Size and Confidence Interval for the Interventions Effect on the Clinical Outcomes; Depression and Well-being?**

Table 12 shows descriptive statistics, and Table 13 shows RCI and CSC, for EDPS and FS by time points and group.

#### ***EPDS***

The mean change between T1 to T2 for the IG was -2.94 ( $SD = 3.94$ ) compared to 0.93 ( $SD = 3.76$ ) for the CG<sup>1</sup>. The between group effect T1 to T2 was  $d = -0.53$  (95% CI [-1.1, 0.04]), indicating a moderate effect in favour of the intervention. The mean change between T1 to T3 for the IG was -4.23 ( $SD = 3.42$ ) compared to 1.37 ( $SD = 4.24$ ) for the CG<sup>2</sup>. The between group effect T1 to T3 was  $d = -0.7$  (95% CI [-1.33, -0.07]), indicating a moderate to large effect in favour of the intervention from baseline to follow-up. Furthermore, as reported in Table 13, a greater proportion of IG participants compared to the CG participants demonstrated a reliable improvement in depression, and a CSC, from T1 to T2 and from T1 to T3. These findings suggest that the intervention had a beneficial impact on depressive symptom severity for some participants and that the reliable pre-post improvement was maintained at follow-up.

#### ***Flourishing***

The mean change between T1 to T2 for the IG was -3.19 ( $SD = 5.74$ ) compared to - 6.32 ( $SD = 4.74$ ) for the CG, indicating both groups saw a decrease in well-being (see Footnote 1). The between group effect size for T1 to T2 was  $d = 0.62$  (95% CI [0.04, 1.21]), indicating a moderate effect with a greater decrease in well-being being seen in the CG. The mean change between T1 to T3 for the IG was -2 ( $SD = 6.19$ ) compared to -5.38 ( $SD = 5.22$ ) for the CG (see Footnote 2). The between group effect size T1 to T3 was  $d = 0.62$  (95% CI [0.01, 1.25]), indicating a

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<sup>1</sup> Data corresponds to per-protocol based on completing data T1-T2

<sup>2</sup> Data corresponds to per-protocol based on completing data T1-T3

moderate effect with a greater decrease in well-being being seen in the CG.<sup>3</sup>

Furthermore, neither the IG, nor the CG participants showed reliable improvements from T1 to T2, suggesting the intervention did not improve participants well-being.

From T1 to T3 only one IG participant showed reliable improvement. In terms of deterioration in well-being, a greater proportion of the CG participants showed a deterioration from T1 to T2, and T1 to T3, compared to IG participants (see Table 13). Furthermore, no participants demonstrated a CSC.

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<sup>3</sup> Between group effect size for depression and well-being were calculated with the three excluded participants' data included, the relative size of Cohen d remained the same



**Table 12***Descriptive Statistics of Clinical Outcome and Process Measures at Study Time Points*

| Measure | Intervention Group                      |   |   | Control Group                           |   |   |
|---------|---|---|---|---|---|---|
|         | T1                                      | T2                                      | T3                                      | T1                                      | T2                                      | T3                                      |
|         | <i>M</i> ( <i>SD</i> )<br><i>n</i> = 18 | <i>M</i> ( <i>SD</i> )<br><i>n</i> = 17 | <i>M</i> ( <i>SD</i> )<br><i>n</i> = 13 | <i>M</i> ( <i>SD</i> )<br><i>n</i> = 49 | <i>M</i> ( <i>SD</i> )<br><i>n</i> = 44 | <i>M</i> ( <i>SD</i> )<br><i>n</i> = 43 |
| EPDS    | 14.28 (2.72)                            | 11.47 (4.35)                            | 10.46 (4.05)                            | 14.35 (3.72)                            | 13.14 (4.63)                            | 12.6 (4.81)                             |
| FS      | 42.17 (7.53)                            | 38.06 (6.06) <sup>b</sup>               | 39.31 (6.24) <sup>d</sup>               | 41.18 (7.24)                            | 35.25 (7.63)                            | 36.38 (9.23) <sup>f</sup>               |
| FFMQ    | 81.53 (13.43) <sup>a</sup>              | 91.53 (16.09) <sup>c</sup>              | 92.46 (17.31)                           | 84.76 (11.85)                           | 87.65 (14.19) <sup>e</sup>              | 88.57 (15.26) <sup>f</sup>              |
| VQ_P    | 15.38 (5.23) <sup>b</sup>               | 17.8 (4.78) <sup>c</sup>                | 15.77 (4.04)                            | 14.59 (5.11)                            | 15.05 (5.22) <sup>e</sup>               | 15.81 (5.19) <sup>f</sup>               |
| VQ_O    | 18.06 (2.95) <sup>b</sup>               | 14.13 (4.73) <sup>c</sup>               | 14.46 (3.64)                            | 17 (4.21)                               | 15.74 (5.43) <sup>e</sup>               | 15.6 (5.34) <sup>f</sup>                |

*Note.* EPDS, Edinburgh Postnatal Depression Scale; FFMQ, Five Facet Mindfulness Questionnaire; FS, Flourishing Scale; *M*, Mean; *SD*, Standard deviation; *T1*, Pre-intervention; *T2*, Post-intervention; *T3*, 4-week Follow-up; VQ\_P, Valued Living Progress Subscale; VQ\_O, Valued Living Obstruction Subscale; <sup>a</sup> based on *n* = 17; <sup>b</sup> based on *n* = 16; <sup>c</sup> based on *n* = 15; <sup>d</sup> based on *n* = 12; <sup>e</sup> based on *n* = 43; <sup>f</sup> based on *n* = 42.

**Table 13**

*Reliable Change Indices (RCI) and Clinically Significant Change (CSC) for Outcome and Process Measures by Time points and Group*

| Measure | Time point | Condition | N  | Reliable Change |             |               | CSC    |
|---------|------------|-----------|----|-----------------|-------------|---------------|--------|
|         |            |           |    | Improved %      | No Change % | Deteriorate % | % (n)  |
| EPDS    | T1-T2      | IG        | 17 | 41              | 53          | 6             | 12 (2) |
|         |            | CG        | 44 | 23              | 52          | 25            | 7 (3)  |
|         | T1-T3      | IG        | 13 | 54              | 46          | 0             | 23 (3) |
|         |            | CG        | 43 | 40              | 42          | 19            | 12 (5) |
| FS      | T1-T2      | IG        | 16 | 0               | 81          | 19            | 0 (0)  |
|         |            | CG        | 44 | 0               | 70          | 30            | 0 (0)  |
|         | T1-T3      | IG        | 13 | 8               | 85          | 8             | 0 (0)  |
|         |            | CG        | 42 | 0               | 64          | 36            | 0 (0)  |
| FFMQ    | T1-T2      | IG        | 15 | 53              | 40          | 7             | 40 (6) |
|         |            | CG        | 43 | 16              | 77          | 7             | 9 (4)  |
|         | T1-T3      | IG        | 13 | 46              | 46          | 8             | 23 (3) |
|         |            | CG        | 42 | 21              | 67          | 12            | 10 (4) |
| VQ_P    | T1-T2      | IG        | 15 | 33              | 60          | 7             | 27 (4) |
|         |            | CG        | 43 | 9               | 77          | 14            | 9 (4)  |
|         | T1-T3      | IG        | 13 | 8               | 85          | 8             | 8 (1)  |
|         |            | CG        | 42 | 14              | 79          | 7             | 12 (5) |
| VQ_O    | T1-T2      | IG        | 15 | 53              | 40          | 7             | 13 (2) |
|         |            | CG        | 43 | 21              | 67          | 12            | 9 (4)  |
|         | T1-T3      | IG        | 13 | 54              | 46          | 0             | 15 (2) |
|         |            | CG        | 42 | 17              | 69          | 14            | 2 (4)  |

*Note.* CG, Control Group; EPDS, Edinburgh Postnatal Depression Scale; FFMQ, Five Facet Mindfulness Questionnaire; FS, Flourishing Scale; IG, Intervention Group; N, Number of participants; T1, Pre-intervention, T2, Post-intervention; T3, 4-week Follow-up, VQ\_P, Valued Living Progress Subscale; VQ\_O, Valued Living Obstruction Subscale.

#### **Question 4. Did Parents Who Engaged in the Brief Internet-Based ACT Intervention Experience an Increase in Mindfulness and Valued Living?**

Table 12 shows descriptive statistics, and Table 13 shows RCI and CSC, for FFMQ and VQ by time points and group.

##### ***FFMQ***

The between group effect from T1-T2 was large ( $d = 0.82$ ; 95% CI [-0.21, 1.42]) and from T1-T3 was moderate to large ( $d = 0.63$ ; 95% CI [-0.01, 1.26]), both in favour of the intervention. Furthermore, a greater proportion of IG participants compared to the CG participants demonstrated a reliable improvement in mindfulness, and a CSC, from T1-T2 and from T1-T3 (see Table 13). Overall suggesting the intervention increased participants' mindfulness skills, with the improvements being maintained 4-week post-intervention for some participants.

##### ***VQ***

**VQ Progress Subscale.** The IG saw an increase in VQ progress T1-T2, whereas the CG saw no change<sup>4</sup>. The between group effect T1-T2 was large ( $d = 0.8$ ; 95% CI [-1.4, -0.19]) in favour of the intervention. However, the mean IG VQ Progress score decreased from T2-T3 and no between group effect T1-T3 was seen ( $d = -0.06$ ; 95% CI [-0.68, 0.56]). Furthermore, a greater proportion of IG participants compared to the CG participants demonstrated a reliable improvement in VQ progress, and a CSC, from T1-T2 but not from T1-T3 (see Table 13). Overall suggesting the intervention led to an increase in awareness and enactment of value-consistent behaviour for some participants, but improvements were not maintained.

**VQ Obstruction Subscale.** The IG saw a decrease in VQ obstruction T1-T2. The between group effect T1-T2 was moderate ( $d = 0.72$ ; 95% CI [0.12, 1.33]) in favour of the intervention. The improvements in VQ obstruction were maintained at T3 with a

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<sup>4</sup>Based on per-protocol analysis data

large effect in favour of the intervention T1-T3 ( $d = 0.8$ ; 95% CI [0.16, 1.44]). Furthermore, a greater proportion of IG participants compared to the CG participants demonstrated a reliable improvement in VQ obstruction, and a CSC, from T1-T2 and from T1-T3 (See Table 13). Overall suggesting the intervention led to a decrease in obstruction for some participants, with the reduction being maintained at the 4-week follow-up.

## **Discussion**

The present study developed and examined the feasibility and acceptability, of a brief internet-based ACT intervention for postpartum parents experiencing mild to moderate depressive symptoms.

### **Key Findings**

#### ***Feasibility***

Regarding the first research question, the current study found it was possible to recruit postpartum women with elevated depressive symptoms via online advertisements. However, the study did not successfully recruit postpartum men. Over the recruitment period (i.e., June 2020 to January 2022) 138 participants were deemed as eligible and randomised to conditions and Facebook was the main recruitment source ( $n = 118$ ; 86%). The sample sizes seen in previous internet-based intervention studies have varied greatly, with an extremely large sample of 910 eligible participants being recruited via advertisements on a parenting website (O'Mahen et al., 2013), a sample of 194 participants were recruited via Facebook or in person recruitment during postpartum hospitalisation (Fonseca, Alves, et al., 2020) and a smaller sample of 50 was recruited when a mixture of recruitment strategies, including social media websites, were utilised (Pugh et al., 2014). Thus, the sample size of the current study sits within the range seen in previous literature and provides further evidence supporting Facebook as a successful recruitment strategy for women during the postpartum.

Whereas the current study findings did not support the feasibility of retaining postpartum participants, as indicated by the high attrition. High attrition has been highlighted as a potential limitation of internet-based interventions during the perinatal period (Mu et al., 2019). However, the 26% completion rate for the IG from T1 to T2 seen in the current study is lower than the 39% seen in O'Mahen et al. (2013), which was identified as the study showing the highest level of attrition in Mu et al. (2019) review of internet-based interventions for PPD. Furthermore, it is markedly lower than the 84% (Pugh et al., 2014), 89% (Danaher et al., 2013) and 64% (Loughnan et al., 2019) completion rate for the IG from T1-T2 seen in previous CBT internet-based interventions and the 66% seen in an internet-based intervention which incorporated acceptance and compassion-based approaches (Fonseca, Alves, et al., 2020). Moreover, the higher completion rates seen in these studies are unlikely to reflect the use of incentives as studies either stated participants were not paid for their participation (Fonseca, Alves, et al., 2020; O'Mahen et al., 2013; Pugh et al., 2014) or did not mention any compensation (Danaher et al., 2013; Loughnan et al., 2019).

Previous literature has found levels of attrition are higher when the internet-based intervention lacks any therapist support (Westerhoff et al., 2019). Therefore, one possible reason for the high attrition seen in this study could be due to the lack of therapist support. Authors have also proposed that attrition could reflect participant curiosity (O'Mahen et al., 2013), whereby one intervention session may satisfy participants need (Milgrom et al., 2016). Furthermore, since this study was conducted during the pandemic it could be hypothesised that screen fatigue may have contributed towards the high attrition. Overall, despite recruitment being successful for postpartum women, this study did not find evidence that a fully powered RCT would be feasible due to the high attrition.

## **Acceptability**

Regarding the second research question, the current study found some evidence suggesting that the intervention was acceptable to the postpartum women who completed it. Though findings should be interpreted with caution due to the low responses regarding acceptability (i.e.,  $n = 16/40$ ). The most frequently reported reason for signing up to the study was 'I was looking for tools and skills that would help me' ( $n = 105$ ), which was also the most reported reason in O'Mahen et al. (2013). This suggests that there is perhaps an unmet desire/need from women to learn new skills during the postpartum. The usability of the intervention was evidenced by the study finding that the average SUS score was above the recommended average. Likewise, most participants agreed that the intervention was useful. Regarding satisfaction, most participants reported the intervention met their expectations in terms of being able to complete it in their own time, it being emailed to them each week and learning about mindfulness. This finding further supports the proposition that internet-based interventions overcome practical barriers of attending face-to-face interventions and women can engage in mindfulness-based interventions during the perinatal period (Hall et al., 2016; Shi & MacBeth, 2017). However, 6/14 participants (38%) reported that they felt overwhelmed by the weekly sessions, and 4/16 (25%) reported that the intervention made them feel like a failure. This suggests that some participants encountered challenges with the intervention, with four potentially experiencing harmful effects. This study is not the first to generate these findings. In O'Mahen et al (2013) 14/41 participants (34%) reported feeling overwhelmed by weekly internet-based behavioural activation sessions and 4/41 (10%) reported feeling like a failure. In a recent paper lack of time was identified as the most frequently reported reason for postpartum women dropping out of an internet-based intervention (Xavier et al., 2022). Therefore, it is possible that participants reported negative experiences with the intervention in the current study

may reflect the challenge of finding free time during the postpartum period, rather than caused by the intervention in itself. Likewise, feeling overwhelmed and feeling like a failure is a commonly reported emotion experienced by first-time mothers during the postpartum period (Newby et al., 2021). One potential solution to overcome the challenge of limited time is having a longer time to complete the intervention than the number of weekly sessions, which the current and previous similar studies have done (Loughnan et al., 2019; O'Mahen et al., 2014; Pugh et al., 2013). Overall, the current study found preliminary evidence for acceptability, as participants completing the intervention found it usable, useful, and met expectations of learning mindfulness and having flexibility on when completed.

### ***Clinical Outcome Measures***

The third research question was to establish the estimated effect sizes and confidence intervals for the interventions effect on depression and well-being. For depression, a moderate between group effect in favour of the intervention was seen T1 to T2 ( $d = -0.53$ ) and a moderate to large effect ( $d = -0.7$ ) was seen T1 to T3. Furthermore, at an individual level a greater proportion of the IG compared to the CG demonstrated a reliable improvement in depression, and a CSC, from T1-T2 and T1-T3. This suggests that the intervention had a beneficial impact on depressive symptom severity for some participants, with benefits being maintained at follow-up. The estimated ESs are also comparable to ESs reported for internet-based CBT, with Roman et al. (2020) reporting a pooled between group effect size pre-to-post intervention of  $d = -0.54$  and  $d = 0.64$  was found in a similar review (Mu et al., 2019). The between group ESs seen in this study are also consistent with those seen in previous research evidencing the effectiveness of ACT internet-based interventions for the general population ( $g = 0.83$ , Lappalainen et al., 2015;  $d = 0.56$ , Pots et al., 2016). Overall, the current study's findings support the suggestion that ACT is a suitable alternative intervention for PPD. However, the findings should be interpreted

with caution as it is possible that the participants who remained in the study reflect a subgroup of postpartum women who are highly motivated/committed to improving their mental health. Furthermore, the reduction in depressive symptoms seen in some participants, should not be interpreted as preliminary evidence supporting the efficacy of the intervention. This is because feasibility RCTs are underpowered to make useful assessments of effectiveness (Williams, 2016).

For well-being the study did not find the intervention led to improvements. Instead, both conditions saw a decrease in well-being with a moderate between group effect size being found T1 to T2 ( $d = 0.62$ ) and T1 to T3 ( $d = 0.62$ ) with a greater decrease being seen in the CG. This finding is in contrast with other studies that have provided evidence for the effectiveness of ACT interventions in improving well-being (Bohlmeijer et al., 2015). However, it is in accordance with the literature examining the change in subjective well-being before and after having a child. Longitudinal research has found evidence suggesting parents experience a temporary increase in subjective well-being before, and around the time of, the birth of their (first or second) child, but this increase is followed by a decline in well-being after the infant is born (Myrskylä & Margolis, 2014). Therefore, the decrease in well-being seen in the current study may reflect naturally occurring changes in well-being. Furthermore, one important context to this finding is that the study was conducted during the pandemic, which has been found to negatively impact well-being (Allen et al., 2021). Consequently, it could be hypothesised that confounding variables associated with the pandemic (e.g., social distancing measures, the demands of home-schooling etc.) that were not measured or controlled may have negatively impacted participants well-being.

### ***Process Measures***

Lastly, this study sought to answer whether parents who engaged in the intervention experienced an increase in mindfulness and valued living. The findings



from the current study suggest the intervention improved participants' mindfulness skills. Around half of the participants who engaged in the intervention achieved reliable change improvements in mindfulness at T1-T2 ( $n = 8/15$ ) and T1-T3 ( $n = 6/13$ ), with six participants showing a CSC post-intervention and three participants continuing to show a CSC T1 to T3. These findings support the previous literature demonstrating internet-based ACT interventions improves mindfulness skills (Lappalainen et al., 2015) and that the beneficial impact of mindfulness-based interventions during the perinatal period can be sustained (Shi & MacBeth, 2017). For valued living, reduced obstruction and increased progress in valued living was seen post-intervention. However, at the 4-week follow up only the reduced obstruction to valued living was sustained. It could be hypothesised that the demanding challenges associated with the postpartum and no longer receiving reminders via the intervention may explain why the progress in valued living was not sustained. Overall, these findings provide evidence supporting the validity regarding the intentions of the ACT intervention.

### **Strengths and Limitations**

The strengths of the study include being the first study to examine an ACT internet-based intervention during the perinatal period, the use of validated and standardised measures and the inclusion of a follow-up time point. Having a 4-week follow-up time point enabled the study to examine whether the effects of the intervention were maintained. By including process measures in addition to clinical outcome measures, the study was also able to examine whether the intervention achieved its aims of improving PF, as indicated by increased mindfulness skills and valued based living. Furthermore, a wait-list control group was used in the current study (i.e., participants in the control group being given access to the brief internet-based ACT intervention at the end of the study) rather than a no-treatment control group. Since the target population was parents with elevated levels of depression a

wait-list control was deemed to be preferable, as it would be unethical to deny participants the opportunity to access the intervention.

There are also several limitations that warrant consideration. Firstly, due to a technical error setting up the randomisation process, the first six participants were allocated to the CG, thus being a limitation to the randomisation process. Also, since the study used a convenience sample method, it is possible that a sampling bias occurred whereby participants in the study may reflect postpartum women who are more motivated to improve their mental health. The sample also had an over representation of white participants (97%), those with a high level of postgraduate education (61%), married or living together (99%) and those with an annual household income >£40000 (81%), which is higher than the medium annual household income in the United Kingdom in the financial year ending 2020 (April 2019 to March 2020) (Office for National Statistics, 2021). Thus, limiting the generalisability of the results, particularly to women from other ethnic backgrounds, lower social economic status, and single parents. Participants were also mainly recruited via the internet (particularly Facebook), meaning it is possible that postpartum women who do not use social media, or parenting websites, were not represented by the study sample. The study is also unable to draw any conclusions regarding postpartum men, as only one male participant was recruited. One possible reason for the unsuccessful recruitment of men could be due to the studies recruitment strategy, as research examining new parents found postpartum women used Facebook significantly more than postpartum men (Bartholomew et al., 2012). Moreover, the lack of male participants could be due to the help-seeking barriers experienced by postpartum men including stigma, lack of awareness of support available and conforming to masculine norms (Penderson et al., 2021; Rominov et al., 2018).

It is also possible that an attrition bias occurred whereby participants with greater levels of depression, lower levels of motivation or those not finding the intervention beneficial dropped out. Hence, systematic attrition may be the reason for the greater reduction in depressive symptoms seen in the IG compared to the CG and this bias could have possibly inflated the found effect sizes. A further limitation of this study was no information was gathered in terms of reasons for drop-out. Consequently, this study was unable to explore or understand the reasons for the high attrition seen in the intervention group.

### **Implications and Future Recommendations**

The current study has added to the existing evidence that postpartum women can be recruited via online recruitment strategies and provided preliminary evidence that a brief internet-based ACT intervention can reduce depressive symptoms in postpartum women. Furthermore, the effect sizes from the current study can be used to inform a power analysis for a future RCT.

The current study has also highlighted several areas for future research. This study suffered from high levels of attrition. A qualitative study interviewing participants about their experience of the brief ACT intervention would provide further understanding of how the intervention was received, the reasons for drop out, and if, or how, improvements could be made. The lack of therapist support in the intervention is likely to have affected participants level of engagement and intervention adherence. Research has indicated that there is value in incorporating therapist support since internet-based interventions without support have significantly higher drop-out rates (Westerhoff et al., 2019). Consequently, future research could examine whether minimal support (such as weekly email support) may enhance engagement with the internet-based ACT intervention. Future research investigating rates of harm for internet-based interventions is also warranted, as four participants in the current study reported that the intervention made them feel like a failure. The

current study findings also suggest postpartum parents without elevated levels of depression still have a desire to engage in an internet-based ACT intervention to support them in their adjustment to parenthood; indicated by 73/261 of the participants who completed the consent form being excluded for scoring  $\leq 10$  on the EPDS. Since PF has been proposed as a protective factor against depressive symptoms (Fonseca, Trindade, et al., 2020), future research could examine the use of internet-based ACT interventions in postpartum parents without elevated depression. Furthermore, there is a growing body of literature highlighting the prevalence and impact of PPD in men (Rao et al., 2020). This study was unable to draw any conclusions regarding postpartum men. Thus, there continues to be a gap in the literature regarding the effectiveness of an internet-based ACT intervention for depression in postpartum men, which warrants further investigation.

## **Conclusion**

This study was the first to investigate the feasibility and acceptability of a brief ACT internet-based intervention. Feasibility was not supported, as although the study was successful in recruiting postpartum women, the study suffered from high attrition. Acceptability was indicated by participants rating the intervention as useful, the mean usability score being above the recommended average and the findings supporting participants' satisfaction with the intervention. However, the conclusions regarding acceptability are tentative and should be interpreted with caution due to the small sample, the findings relating to how the intervention failed to meet participants' expectations and the possibility that participant drop out may have been due to low satisfaction with the intervention. Although findings from the current study did not support feasibility or conclusively support acceptability, the findings suggest that the intervention had a beneficial impact on reducing depressive symptoms and increasing mindfulness skills and valued living for some participants. The estimated

ESs for depression were also comparable in size to that seen from internet-based CBT. Whereas, the intervention did not improve participants' well-being, with a decrease in well-being seen in both conditions. Given the study limitations and preliminary supportive findings, further research investigating internet-based ACT interventions during the perinatal period is warranted.

#### **IV. Integration, Impact, Dissemination**

The section below includes a discussion of how the systematic review (SR) and empirical study (ES) are distinct yet related pieces of work. The SR and ES are critically evaluated and reflections on different aspects of the project are discussed, including challenges and dilemmas which influenced the decisions made. The impact of the research and the proposed plans for disseminating findings are also included.

##### **Integration**

The overall objective of this thesis was to evaluate and enhance the evidence-base for the use of third wave interventions, specifically ACT, for adults during the perinatal period. I was drawn to this research topic due to my interest in ACT and the desire to strengthen my knowledge of perinatal mental health. The SR and ES are related in that the findings from both papers contribute to the existing literature regarding ACT during the perinatal period. The RCTs synthesised in the SR provide evidence supporting the effectiveness of third wave interventions on depression, anxiety, and stress during the perinatal period. However, the majority of the interventions identified were MBIs. Only one RCT examined an ACT intervention, with three further RCTs incorporating ACT elements into the MBI. Therefore, the specific focus on ACT was fairly minimal in the SR. Nonetheless, the RCT that did examine a group-delivered ACT intervention on perinatal anxiety found a large between group effect size pre- to post-intervention in favour of the intervention group. The improvements in anxiety also remained significant at the one-month follow-up. Thus, the findings were supportive of ACT during the perinatal period. The SR also highlighted the scarcity of RCTs examining third wave interventions delivered during the postpartum period. This finding, in combination with the lack of RCTs investigating ACT, highlighted a gap in the literature. The ES aimed to address these research gaps in the literature.

Due to the doctoral course timetable and time limits, the SR was conducted after ethical approval was sought for the ES. However, the findings from the SR helped situate the ES findings and informed what information would be beneficial to include when writing up the ES. For instance, the SR identified two online interventions studies with one RCT, which examined online MBCT, finding a high attrition rate in the intervention group (i.e., 79% attrition pre- to post-intervention) similar to that seen in the ES (i.e., 73.8%). The SR also found the EPDS was the most used measure for depression, which was the chosen measure used in the ES. The SR also found that most third wave interventions included modifications for the perinatal period, included homework tasks with many also including psychoeducation about mindfulness. The developed intervention examined in the ES also incorporated these elements, therefore the SR findings provided further justification for how the intervention was created. Furthermore, the SR found that although the level of detail provided for the content of interventions varied across the RCTs, most provided an outline of each session and reported which practices were included. Consequently, this level of detail was provided in the ES. Lastly, the SR identified that one of the weaknesses of the included RCTs was that they did not report rates of harm, meaning the unwanted effects of the interventions remained unknown. Consequently, when the ES calculated the reliable change indices for the clinical outcome measures it also reported the number of participants who showed a reliable deterioration in depression or well-being.

### **Reflections on Systematic Review**

I had initially hoped to conduct a SR relating to either online interventions or ACT. However, from conducting a scoping search I discovered there was already recent reviews examining online interventions for depression (Josephine et al., 2017), online third wave therapies for depression (Sierra et al., 2018), and online interventions during perinatal periods (Ashford et al., 2016; Westerhoff et al., 2019).

Likewise, reviews had already examined ACT self-help (French et al., 2017) and ACT for depression (Bai et al., 2019) yet there was not enough research on ACT during the perinatal period to warrant a review. Consequently, I moved my attention to mindfulness during the perinatal period. Although previous reviews on this topic area existed, I was able to identify several reasons justifying why conducting a systematic review on third wave interventions was warranted, particularly the growth of RCT studies in recent years. Unfortunately, whilst conducting the SR I discovered two further recent systematic reviews which shared similarities with my SR. However, I decided to continue due to the time limits of the doctorate, the amount of work I had already put into the SR and since my review had several differences. Nonetheless, I felt disappointment as I was aware that these reviews weakened the justification of my SR.

A further challenging aspect of the SR was determining which studies should be included. I created and used a screening tool to aid the screening process. For instance, if a study examined a MBI that was not MBCT, MBSR or MCT it was required to be adapted from these gold standard mindfulness interventions and at least 8 sessions. This criterion was set in an attempt to ensure the intervention had an adequate dose of mindfulness. I found the screening tool incredibly helpful, and it is possible it also contributed to the high inter-rater reliability shown by the second reviewer. However, a weakness of my SR is that there is over a year time gap between the SR search ending and the completed ES. This is because I wrote the results of the SR in 2020 prior to my 12-months maternity leave. Consequently, it is possible that several other relevant papers have been published but not included in the SR.

Overall, on reflection I found the SR process rewarding and a great opportunity to improve my research skills. I now have an increased understanding on how to use truncation and Boolean operators. I am also now aware how to use, and



the benefits of, bibliography software. These skills will hopefully aid my ability to conduct research in the future.

### **Reflection on Methodology**

Feasibility studies are used to collect information to establish whether a main study is possible and inform the design and processes (Williams, 2016). Since no previous research had investigated an internet-based ACT intervention during the perinatal period, conducting a feasibility RCT was deemed as appropriate. It was also hope that the study results could be used to inform a fully powered RCT in the future, such as by another trainee.

Increasing the number of measures increases the chance of participant burden and fatigue, leading to less considered responses. Parents also often have limited free time. Consequently, one of the challenges I encountered was selecting an appropriate number of measures. Based on this rationale I decided not to gather in-depth qualitative feedback instead I included an 'Other (please specify...)' item on the quantitative questionnaire measuring acceptability, as this provided participants the opportunity to give additional feedback. In hindsight gathering qualitative data would have been beneficial to understand the reasons for the high attrition rate. I also decided not to include the Acceptance and Action Questionnaire -II (AAQ-II; Bond et al., 2011), which measures psychological inflexibility/experiential avoidance and has frequently been used to assess the efficacy of ACT interventions. This decision was based on several researchers raising concerns with the discriminant validity of the AAQ-II (Tyndall et al.,2019). However, by not including this measure the study was unable to examined if there was a negative correlation between psychological flexibility and depression and/or whether AAQ-II decreased following the intervention. Lastly, there is no universally accepted measure of well-being (Linton et al., 2016). It was important to select a well-being measure that focuses on positive functioning, since ACT aims is to facilitate a person's ability to live a rich and meaningful life,

rather than symptom reduction. Therefore, the Flourishing Scale (FS) was chosen because it is brief, provides a global measure of well-being and measures positive functioning. However, after recruitment had commenced, I discovered a paper highlighting caution over using the FS as a standalone measure in intervention studies (Schotanus-Dijkstra et al., 2016). Therefore, another measure of well-being may have been more suitable.

### **Reflections on Developing the Intervention**

From reflecting on the process of carrying out the ES developing the intervention felt the most rewarding, yet also the most challenging task. When developing the intervention, I encountered the dilemma of whether to adopt a blended approach with minimal therapist support versus a purely self-help format. After identifying and then discussing the pros and cons of both options during supervision, I decided to adopt a purely self-help format. The reasons for this include the potential risk of recruiting more participants than would be feasibly possible to support. Furthermore, the ES was created to hopefully lead to a fully powered RCT in the future, with the longer-term hope to extend the psychological interventions available during the perinatal period. Consequently, I chose a self-help format as it would be more cost-effective and easier for a perinatal service to adopt as it requires less clinician time. However, I was aware that the main con was that previous literature has found levels of attrition are higher when internet-based interventions do not involve any therapist support (Westerhoff et al., 2019). Furthermore, in reflection in order to complete the intervention participants required computer literacy and access to the internet. Consequently, it is possible that some postpartum parents may have found completing the intervention more challenging. For instance, people with an intellectual disability or those who do not own a device (e.g., mobile, computer or tablet) with access to the internet. If a clinical service were to include the offer of an online intervention to postpartum parents, they could address this potential

challenge by having a number of devices available to lend participants and offering participants the option to receive phone coaching to support them to navigate through the intervention.

Another valuable learning experience was ensuring the intervention was tailored to the perinatal period. Since parents can be sleep deprived and limited in time it was important to achieve the right balance of brevity whilst also including enough material to ensure adequate dose. Following the findings from literature on internet-based interventions, I strived to achieve a mixture of text, images, video, and audios to create an interactive and user-friendly intervention. Furthermore, I included a 'Tips' section at the end of each module to support parents to find the time and/or remember to engage with the set exercises from the module. Upon reflection, it was somewhat challenging to think of statements that a parent may relate to, or find helpful, consequently I greatly appreciated the guidance from my supervisors. However, now as a parent myself and recently experiencing some of the challenges associated with the postpartum period, I have a greater appreciation for the importance of tailoring the practices and the value of being able to complete the intervention on a mobile.

### **Reflections on Recruitment**

The start of recruitment for the ES coincided with the UK pandemic lockdown. Therefore, many of the community settings typically visited by parents during the postpartum were closed, such as children centres, play groups and community centres. In an attempt to overcome this challenge, I focused my attention on the online recruitment strategies and displayed posters in supermarkets in the borough of Runnymede, as this was one setting that remained accessible during the pandemic. Furthermore, once lockdown restrictions were lifted, I emailed several nurseries, children centres, and churches asking if they would be willing to display my recruitment posters. Although some services agreed, many more did not respond. In

the latter half of the recruitment process I was able to physically approach community settings, although this approach was more successful it had the limitation of being restricted to a small number of areas of Surrey and west London. Thus, potentially resulting in a biased sample.

Based on a previous study finding parenting websites hugely successful for recruitment (O'Mahen et al., 2013) I was surprised to discover that across the first three months of recruitment my study advert had only received nine views across the Mumsnet and Netmums parenting websites. Unlike the previous study which was able to advertise via a banner on the website, my study could only be advertised via research/survey forums which were harder to locate. In attempts to increase views, I posted my study advert at the beginning of each month so that it was listed further up and less likely to get lost. Based on the literature search conducted prior to the ES I was also aware of the need to over-recruit in anticipation of possible high attrition. In reflection, I believe my ES greatly benefitted from having a longer recruitment period typically seen in doctoral research which was made possible due to keeping my recruitment open whilst I was on maternity leave.

### **Reflections on Service User Involvement**

Service user involvement leads to better quality research, consequently the National Institute of Health Research (NIHR) requests evidence of service user involvement as a prerequisite for research funding. The "Ladder of participation" framework (Arnstein, 1969), which ranges from one-way communication through to equal partnership, was used to evaluate the level of service user involvement in this thesis.

The level of service user involvement in the ES sits somewhere between the "consultation" and "placation" category, both considered to be degrees of tokenism. Draft versions of the intervention, the information sheet, debrief sheet and poster advertisement were shared with postpartum parents. Several amendments were

made based on the feedback from these parents, including adding additional items to questionnaires measuring participants' reasons for signing up to the study and the satisfaction with the study, using the most voted image for the community poster advertisement, and amending the format and language used in the study materials. Positive statements encouraging participation were also added to the reminder emails since some parents highlighted that a four-module intervention is a big commitment. Although the postpartum parents included both genders with their babies ranging from 2-months to 12-months old, I did not measure whether they had an elevated level of depression. In hindsight it would have been more appropriate to ensure I sought feedback from parents with elevated levels of depression to confirm they represented the target audience. Additionally, if I were not limited by the timeframe of the doctorate, it would have been beneficial to have worked in "partnership" with postpartum parents to develop the intervention. By sharing the decision-making responsibilities, the acceptability of the intervention could have been improved and a lower level of attrition may have occurred. Furthermore, it would have been beneficial to consult postpartum men regarding alternative recruitment strategies, as this may have resulted in a higher number of men recruited.

Regrettably, the level of service user involvement in the SR only met the 'informing' category of the ladder, as postpartum parents were only informed about the review after I had completed the consultations about the ES. I also sought feedback on the lay summary from postpartum parents. The nonparticipation of service user involvement is a weakness of the SR and from this experience I have learnt to prioritise service user involvement in future research projects.

## Impact

### Clinical Impact

Perinatal mental health problems make a significant contribution to maternal and infant morbidity and mortality (Royal College of Psychiatrists, 2021). Therefore, research investigating psychological interventions to improve perinatal mental health play an important role in aiming to reduce rates of morbidity and mortality.

Psychologists also have a responsibility to engage in evidence-based practice (British Psychological Society, 2017). Consequently, the findings from the SR and EP may be of interest to clinicians working in perinatal mental health services. Overall, the findings from the SR add to the existing literature supporting the use of mindfulness during the perinatal period, specifically, group-delivered interventions. The ES also found the second most reported reason for signing up to the study was 'hearing mindfulness is helpful', which suggests the postpartum women had a desire to learn mindfulness. These findings may be used by clinicians to evidence their decision to teach mindfulness skills during individual therapy and/or run a group-delivered mindfulness intervention.

Regarding ACT, this thesis highlighted that research examining the use of ACT during the perinatal period is in its infancy. Since psychological interventions should be empirically supported, further evidence is required before ACT interventions can be routinely recommended for the treatment of perinatal mental health problems. Furthermore, the reduction in depressive symptoms seen in some participants in the ES, should not be interpreted by clinicians as preliminary evidence supporting the efficacy of the ACT internet-based intervention. This is because the ES was a feasibility RCT, meaning it is underpowered to make useful assessments of effectiveness (Williams, 2016). However, the current study has contributed towards the rapidly developing body of literature examining the use of internet-based

interventions during the perinatal period. The NHS faces the challenge of rising demand for services, constrained resources and there is a growing workforce crisis. Internet-based interventions offer a possible solution as they are a low-cost, high-volume approach requiring little, or no, clinician time. Consequently, services at a local level could consider carrying out future research into this area. For instance, interviewing women on their views on the prospect of being offered an internet-based ACT intervention or examine women's experience of attending a face-to-face group-delivered ACT to see if findings support those found in previous research (Vakilian et al., 2019; Waters et al., 2020).

### **Academic Impact**

The findings from the SR and ES have both contributed to advancing research in the area of the use of third wave interventions during the perinatal period. Potential avenues for future research were also highlighted in both papers. For instance, the SR highlighted the scarcity of RCTs examining third wave interventions during the postpartum period and a lack of RCTs investigating FAP, MCT, CFT/CMT or DBT. Thus, indicating a gap in the literature which warrants further investigation. Additionally, the SR was unable to provide a clear conclusion regarding the sustained benefits of interventions since the pre-intervention to follow-up findings across the RCTs was mixed and in some papers not available. A potential impact of this finding is future researchers ensuring to include a follow-up.

Furthermore, since the current empirical literature examining ACT during the perinatal period is in its infancy, the findings from the ES are also likely to be drawn upon when developing future research. For instance, the estimated effect sizes and attrition rates found in the ES could be used to inform a fully powered RCT. The findings from the ES also adds to the existing literature finding attrition is higher when

internet-based interventions lack therapist support. Consequently, future research may elect to include an element of therapist support as a strategy to reduce attrition.

### **Dissemination**

“Effective dissemination is simply about getting the findings of your research to the people who can make use of them, to maximise the benefit of the research without delay” (National Institute for Health Research, 2019, p 1.). Consequently, the dissemination plan detailed below was developed with the aim to reach multiple audiences, in a timely manner with materials tailored to resonate with each target audience.

Firstly, the findings from the ES have been disseminated to fellow trainee clinical psychologists and academic staff at the department of Clinical Psychology at Royal Holloway University of London (RHUL). The findings were shared via a PowerPoint presentation with the audience having the opportunity to provide feedback and ask questions. In addition to increasing fellow trainees’ awareness of ACT during the perinatal period, I hoped my presentation may encourage a trainee to conduct a future research building upon this thesis. Furthermore, the thesis will be available on PURE (RHUL research repository) meaning the results can be accessed by students, researchers and lecturers interested in this area of research.

The Health Research Authority recommend that research findings should be available to participants who took part in the study (HRA, 2021). Consequently, a lay summary of the findings will be given to all participants who requested to receive this. A lay summary will also be shared on the social media platforms and parenting websites from which participants were recruited. Therefore, participants who did not explicitly request to be informed of the findings, or those who chose not to participate, will still have access to the study findings if they wish.



The dissemination plan also includes seeking opportunities to present at conferences. I have been accepted to give a presentation on the ES at the British Association for Behaviour and Cognitive Psychotherapies (BABCP) 50th Annual Conference, which is taking place July 2022 in London. From this valuable opportunity, I hope to reach a broader audience of researchers and clinicians who can follow up on the recommendations for future research and/or use to the findings to influence their clinical practice. Lastly, to maximise the reach I intend to submit the ES to a high-quality peer-reviewed journal such as, *The Journal of Contextual Behavioural Science* or *Behaviour Therapy* for publication.

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## I. Appendices

### Appendix A

#### Screening and Selection Tool

#### Screening and Selection Tool

|                |       |          |
|----------------|-------|----------|
| Reviewer Name: | Date: |          |
| Author:        | Year: | Journal: |
| Title          |       |          |

|                     | Inclusion  | ✓ | Exclusion  | ✓ | Notes |
|---------------------|--|---|--|---|-------|
| <b>Population</b>   | Adult women aged 18 years or above currently in the perinatal period (i.e. from pregnancy to 12 months post birth).  | ✓ | Men in the perinatal period<br><br>Women not in the perinatal period   | ✓ |       |
| <b>Intervention</b> | <p><b>Third wave interventions. Specifically:</b></p> <ul style="list-style-type: none"> <li>• ACT</li> <li>• DBT</li> <li>• CFT or CMT (compassionate mind training)</li> <li>• FAP (Functional Analytic Psychotherapy)</li> <li>• MBI *intervention must meet the following criteria: <ul style="list-style-type: none"> <li>-MCT (metacognitive therapy), MBCT, MBSR</li> <li>- or an intervention that is adapted from the above and lasting at least 8 sessions.</li> </ul> </li> </ul> <p><i>All forms of interventions (e.g. individual, group, self-guided, workshop and online/app-based) will be included.</i></p> | ✓ | <p>MBI that is not MBCT, MBSR, MCT or adapted from the above. MBI intervention must last at least 8 sessions.</p> <p>intervention that included elements inconsistent with third wave principles, such as including cognitive restructuring.</p> | ✓ |       |

|                         |   |  |  |  |  |
|-------------------------|---|--|--|--|--|
| <b>Comparator</b>       | Control group (e.g. TAU, WL) or an alternative treatment.   |  |  |  |  |
| <b>Outcome</b>          | Must contain <b>ONE</b> of the following measures for maternal health <ul style="list-style-type: none"> <li>- Depression</li> <li>- Anxiety</li> <li>- Stress</li> </ul> |  | N/A  |  |  |
| <b>Setting</b>          | All settings  |  | N/A  |  |  |
| <b>Study design</b>     | RCT or Systematic Review papers (*to then search for further RCT's- only when screening Title/Abstract)   |  | Protocol papers<br><br>Any design other than RCT |  |  |
| <b>Methodology</b>      | Quantitative  |  | Qualitative or Mixed methods                     |  |  |
| <b>Language</b>         | Paper written in English  |  | Not written in English                           |  |  |
| <b>Overall decision</b> | <b>INCLUDED</b>   |  | <b>EXCLUDED</b>                                  |  |  |

## Appendix B

Ethical Approval from Research Ethics Committee at Royal Holloway University of London

Ethical approval from Research Ethics Committee at Royal Holloway, University of London

**From:** Ethics Application System <ethics@rhul.ac.uk>

**Sent:** 05 May 2020 14:00

**To:** Palma, Carlos, Hannah (2018) <Hannah.Palma.Carlos.2018@live.rhul.ac.uk>; Kingston, Jessica <Jessica.Kingston@rhul.ac.uk>; ethics@rhul.ac.uk <ethics@rhul.ac.uk>

**Subject:** Result of your application to the Research Ethics Committee (application ID 2105)

PI: Jessica Kingston

Project title: Feasibility and Acceptability of a Brief Internet-Based Acceptance and Commitment Therapy Intervention for Parents in the Postpartum

REC ProjectID: 2105

Your application has been approved by the Research Ethics Committee. Please report any subsequent changes that affect the ethics of the project to the University Research Ethics Committee ethics@rhul.ac.uk

## Appendix C

### Community Recruitment Poster

# Early Parenthood Mindfulness and Values Free Online Programme



## Have you had a baby in the last 12 months?

Would you like free online support in adjusting to parenthood?

If so,

**We would like to invite you to take part in our research study**

LINK: [https://rhulpsychology.eu.qualtrics.com/jfe/form/SV\\_6RIi27CKid1XnH7](https://rhulpsychology.eu.qualtrics.com/jfe/form/SV_6RIi27CKid1XnH7)

**Study Aim:** Mindfulness practices are increasingly being encouraged and used during early parenthood. This study is interested in finding out how postpartum parents (e.g. parents who have had a child in the last 12 months) experience a newly developed brief mindfulness-based online programme.

**What is involved:** If you decide to take part, and are eligible for the study, you will be given access to complete a brief 4-week online programme. Participants will also be asked to complete online questionnaires.



This study has been approved by Royal Holloway, University of London Ethics Committee.

**You will also be entered into a prize draw to WIN  
£100 Amazon voucher**



QR code for study

## Appendix D

### Measures

#### Sociodemographic Questionnaire

Age (in years):

Sex:

- Male
- Female

Ethnicity:

- White (British)
- Any other White background
- Mixed/Multiple ethnic groups (British)
- Any other Mixed/Multiple ethnic background
- Asian (British)
- Any other Asian background
- Indian
- Pakistani
- Bangladeshi
- Chinese
- Black (British)
- African
- Caribbean
- Any other Black background
- Arab
- Any other ethnic group

Highest level of education:

- GCSE (or equivalent)
- A-Level (or equivalent)
- Undergraduate degree
- Postgraduate studies

Work status:

- Maternity leave
- Unemployed (full-time parent)
- Employed (full-time, part-time or self)

Household income:

- <£1000
- £10,000-£19,999
- £20,000-£39,999

- £40,000-£59,999
- £60,000-£79,999
- >£80,000

Relationship Status:

- Single or separated
- Married/ Living together
- In a relationship (not living together)
- Divorced

Number of children:

- 1
- 2
- 3
- 4
- 5+

Your infant's age in months:

## Recruitment Source Question

Please select how you discovered this study:

- Facebook
- Other Social Media
- Poster Advert
- Recommended by a friend

## Reasons for Signing up to the Study Questionnaire

Reasons for signing up to the programme:

*(Please tick all that apply)*

- I wanted some help adjusting to parenthood
- I was looking for tools and skills that would help me
- I can sometimes be bothered by unpleasant thoughts, feelings and bodily sensations that I find difficult to shake off
- I find it hard to talk face to face
- It looked like fun
- To win the prize draw
- The waiting list for NHS counselling was too long
- I didn't know what else to do
- Don't have anyone to look after my child so can't attend clinic sessions
- I do everything online, it's just easier
- I have heard mindfulness is helpful
- I like trying new things
- Wanted something straight forward I could do for myself
- A friend recommended the programme
- I wanted some help but find it hard to tell people I am struggling
- My GP could not help me
- It is difficult to get a GP appointment
- Wanted help in coping without medication
- Other, please specify:



## Usefulness Question

I found this intervention useful.

- Strongly agree
- Slightly agree
- Neither agree nor disagree
- Slightly disagree
- Strongly disagree

## Satisfaction Questionnaire

Ways the programme met my expectation: *(Please tick all that apply)*

- It was free
- I learnt about mindfulness
- I could do it in my own time
- It was emailed to my inbox each week
- It helped me identify my values
- I got to practice mindfulness skills
- Other, please specify

Ways the programme failed to meet expectations: *(Please tick all that apply)*

- It wasn't relevant to me or my situation
- I did not receive the emails
- It was too hard
- I didn't see how the activities would be helpful
- I felt that I couldn't keep up with it
- I felt overwhelmed with the weekly sessions
- It made me feel like a failure
- I didn't find the materials interesting
- Other, please specify

## Edinburgh Postnatal Depression Scale<sup>1</sup> (EPDS)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Your Date of Birth: \_\_\_\_\_

\_\_\_\_\_

Baby's Date of Birth: \_\_\_\_\_

Phone: \_\_\_\_\_

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed.

I have felt happy:

- Yes, all the time
- Yes, most of the time      This would mean: "I have felt happy most of the time" during the past week.
- No, not very often      Please complete the other questions in the same way.
- No, not at all

In the past 7 days:

1. I have been able to laugh and see the funny side of things
  - As much as I always could
  - Not quite so much now
  - Definitely not so much now
  - Not at all
2. I have looked forward with enjoyment to things
  - As much as I ever did
  - Rather less than I used to
  - Definitely less than I used to
  - Hardly at all
- \*3. I have blamed myself unnecessarily when things went wrong
  - Yes, most of the time
  - Yes, some of the time
  - Not very often
  - No, never
4. I have been anxious or worried for no good reason
  - No, not at all
  - Hardly ever
  - Yes, sometimes
  - Yes, very often
- \*5. I have felt scared or panicky for no very good reason
  - Yes, quite a lot
  - Yes, sometimes
  - No, not much
  - No, not at all
- \*6. Things have been getting on top of me
  - Yes, most of the time I haven't been able to cope at all
  - Yes, sometimes I haven't been coping as well as usual
  - No, most of the time I have coped quite well
  - No, I have been coping as well as ever
- \*7. I have been so unhappy that I have had difficulty sleeping
  - Yes, most of the time
  - Yes, sometimes
  - Not very often
  - No, not at all
- \*8. I have felt sad or miserable
  - Yes, most of the time
  - Yes, quite often
  - Not very often
  - No, not at all
- \*9. I have been so unhappy that I have been crying
  - Yes, most of the time
  - Yes, quite often
  - Only occasionally
  - No, never
- \*10. The thought of harming myself has occurred to me
  - Yes, quite often
  - Sometimes
  - Hardly ever
  - Never

Administered/Reviewed by \_\_\_\_\_ Date \_\_\_\_\_

<sup>1</sup>Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786 .

<sup>2</sup>Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression *N Engl J Med* vol. 347, No 3, July 18, 2002, 194-199

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## Flourishing Scale

### **FLOURISHING SCALE**

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Below are 8 statements with which you may agree or disagree. Using the 1–7 scale below, indicate your agreement with each item by indicating that response for each statement.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

\_\_\_ I lead a purposeful and meaningful life

\_\_\_ My social relationships are supportive and rewarding

\_\_\_ I am engaged and interested in my daily activities

\_\_\_ I actively contribute to the happiness and well-being of others

\_\_\_ I am competent and capable in the activities that are important to me

\_\_\_ I am a good person and live a good life

\_\_\_ I am optimistic about my future

\_\_\_ People respect me

Scoring:

Add the responses, varying from 1 to 7, for all eight items. The possible range of scores is from 8 (lowest possible) to 56 (highest PWB possible). A high score represents a person with many psychological resources and strengths

## Five Facet Mindfulness Questionnaire

### Five Facet Mindfulness Questionnaire (FFMQ)

Ruth A. Baer, Ph.D.  
University of Kentucky

---

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

| 1                         | 2           | 3              | 4          | 5                         |
|---------------------------|-------------|----------------|------------|---------------------------|
| never or very rarely true | rarely true | sometimes true | often true | very often or always true |

- \_\_\_\_ 1. When I'm walking, I deliberately notice the sensations of my body moving.
- \_\_\_\_ 2. I'm good at finding words to describe my feelings.
- \_\_\_\_ 3. I criticize myself for having irrational or inappropriate emotions.
- \_\_\_\_ 4. I perceive my feelings and emotions without having to react to them.
- \_\_\_\_ 5. When I do things, my mind wanders off and I'm easily distracted.
- \_\_\_\_ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
- \_\_\_\_ 7. I can easily put my beliefs, opinions, and expectations into words.
- \_\_\_\_ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- \_\_\_\_ 9. I watch my feelings without getting lost in them.
- \_\_\_\_ 10. I tell myself I shouldn't be feeling the way I'm feeling.
- \_\_\_\_ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
- \_\_\_\_ 12. It's hard for me to find the words to describe what I'm thinking.
- \_\_\_\_ 13. I am easily distracted.
- \_\_\_\_ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
- \_\_\_\_ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.
- \_\_\_\_ 16. I have trouble thinking of the right words to express how I feel about things
- \_\_\_\_ 17. I make judgments about whether my thoughts are good or bad.
- \_\_\_\_ 18. I find it difficult to stay focused on what's happening in the present.
- \_\_\_\_ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
- \_\_\_\_ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- \_\_\_\_ 21. In difficult situations, I can pause without immediately reacting.

| <b>1</b>                         | <b>2</b>           | <b>3</b>              | <b>4</b>          | <b>5</b>                         |
|----------------------------------|--------------------|-----------------------|-------------------|----------------------------------|
| <b>never or very rarely true</b> | <b>rarely true</b> | <b>sometimes true</b> | <b>often true</b> | <b>very often or always true</b> |

- \_\_\_\_\_ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
- \_\_\_\_\_ 23. It seems I am "running on automatic" without much awareness of what I'm doing.
- \_\_\_\_\_ 24. When I have distressing thoughts or images, I feel calm soon after.
- \_\_\_\_\_ 25. I tell myself that I shouldn't be thinking the way I'm thinking.
- \_\_\_\_\_ 26. I notice the smells and aromas of things.
- \_\_\_\_\_ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.
- \_\_\_\_\_ 28. I rush through activities without being really attentive to them.
- \_\_\_\_\_ 29. When I have distressing thoughts or images I am able just to notice them without reacting.
- \_\_\_\_\_ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
- \_\_\_\_\_ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
- \_\_\_\_\_ 32. My natural tendency is to put my experiences into words.
- \_\_\_\_\_ 33. When I have distressing thoughts or images, I just notice them and let them go.
- \_\_\_\_\_ 34. I do jobs or tasks automatically without being aware of what I'm doing.
- \_\_\_\_\_ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
- \_\_\_\_\_ 36. I pay attention to how my emotions affect my thoughts and behavior.
- \_\_\_\_\_ 37. I can usually describe how I feel at the moment in considerable detail.
- \_\_\_\_\_ 38. I find myself doing things without paying attention.
- \_\_\_\_\_ 39. I disapprove of myself when I have irrational ideas.

### **FFMQ Scoring instructions**

For all items marked "R" the scoring must be reversed. Change 1 to 5, 2 to 4, 4 to 2, and 5 to 1 (3 stays unchanged). Then sum the scores for each subscale.

#### **Observing**

1, 6, 11, 15, 20, 26, 31, 36

#### **Describing**

2, 7, 12R, 16R, 22R, 27, 32, 37

#### **Acting with awareness**

5R, 8R, 13R, 18R, 23R, 28R, 34R, 38R

#### **Nonjudging of inner experience**

3R, 10R, 14R, 17R, 25R, 30R, 35R, 39R

#### **Nonreactivity to inner experience**

4, 9, 19, 21, 24, 29, 33

## Valuing Questionnaire

# Valuing Questionnaire (VQ)

### Instructions:

Please read each statement carefully and then circle the number which best describes how much the statement was true for you DURING THE PAST WEEK, INCLUDING TODAY.

|    |  | Not at all true | 1 | 2 | 3 | 4 | 5 | Completely True |
|----|--|-----------------|---|---|---|---|---|-----------------|
| 1  | I spent a lot of time thinking about the past or future, rather than being engaged in activities that mattered to me | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 2  | I was basically on "auto-pilot" most of the time   | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 3  | I worked toward my goals even if I didn't feel motivated to  | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 4  | I was proud about how I lived my life  | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 5  | I made progress in the areas of my life I care most about  | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 6  | Difficult thoughts, feelings or memories got in the way of what I really wanted to do                                | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 7  | I continued to get better at being the kind of person I want to be   | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 8  | When things didn't go according to plan, I gave up easily  | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 9  | I felt like I had a purpose in life  | 0               | 1 | 2 | 3 | 4 | 5 | 6               |
| 10 | It seemed like I was just 'going through the motions', rather than focusing on what was important to me              | 0               | 1 | 2 | 3 | 4 | 5 | 6               |

### Scoring and Interpretation

Two subscale scores are presented, Progress and Obstruction, which typically have a negative correlation.

- **Progress** (items, 3, 4, 5, 7,9. Range = 0 to 30) defined as enactment and perseverance in living consistently with one's values. Higher scores represent a closer alignment between one's internal values and one's actions.
- **Obstruction** (items 1, 2, 6, 8, 10. Range = 0 to 30) represents the extent to which various disruptions got in the way of valued living. Higher scores represent more interference with living consistently with one's values.

Scores indicative of psychological health are high scores on the Progress scale accompanied by low scores on the Obstruction scale.



## System Usability Scale

### **System Usability Scale**

© Digital Equipment Corporation, 1986.

|  | Strongly disagree        |                          |                          |                          |                          | Strongly agree |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| 1. I think that I would like to use this system frequently                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 2. I found the system unnecessarily complex  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 3. I thought the system was easy to use  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 4. I think that I would need the support of a technical person to be able to use this system | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 5. I found the various functions in this system were well integrated                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 6. I thought there was too much inconsistency in this system                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 7. I would imagine that most people would learn to use this system very quickly              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 8. I found the system very cumbersome to use   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 9. I felt very confident using the system  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |
| 10. I needed to learn a lot of things before I could get going with this system              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |                |
|  | 1                        | 2                        | 3                        | 4                        | 5                        |                |

### **Using SUS**

The SU scale is generally used after the respondent has had an opportunity to use the system being evaluated, but before any debriefing or discussion takes place. Respondents should be asked to record their immediate response to each item, rather than thinking about items for a long time.

All items should be checked. If a respondent feels that they cannot respond to a particular item, they should mark the centre point of the scale.

### **Scoring SUS**

SUS yields a single number representing a composite measure of the overall usability of the system being studied. Note that scores for individual items are not meaningful on their own.

To calculate the SUS score, first sum the score contributions from each item. Each item's score contribution will range from 0 to 4. For items 1,3,5,7, and 9 the score contribution is the scale position minus 1. For items 2,4,6,8 and 10, the contribution is 5 minus the scale position. Multiply the sum of the scores by 2.5 to obtain the overall value of SU.

SUS scores have a range of 0 to 100.

The following section gives an example of a scored SU scale.

### **Conclusion**

SUS has proved to be a valuable evaluation tool, being robust and reliable. It correlates well with other subjective measures of usability (eg., the general usability subscale of the SUMI inventory developed in the MUSIC project (Kirakowski, personal communication)). SUS has been made freely available for use in usability assessment, and has been used for a variety of research projects and industrial evaluations; the only prerequisite for its use is that any published report should acknowledge the source of the measure.

### **Acknowledgements**

SUS was developed as part of the usability engineering programme in integrated office systems development at Digital Equipment Co Ltd., Reading, United Kingdom.

### **References**

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## Appendix E

### The Brief Internet-Based ACT Intervention

**Welcome to this Mindfulness and Values programme!**

Thank you for joining our mindfulness and values training programme, which we have developed for parents with young children.

This is a 4-week programme. Week 1 and 2 will focus on mindfulness. Week 3 and 4 will focus on values – the things that matter the most to you in life. Each module will take approximately 20-30 minutes to complete. At the end of each module you will be set a task for that week.

Before we get started, let's briefly focus on why it's important to be thinking about ourselves.

#### **The Reservoir Metaphor** *adapted from O'Donoghue, Morris, Oliver & Johns (2018)*



We can think of our inner strength as a reservoir. When it's full, we feel good and able to cope with day to day stresses.

However, being a parent can be difficult and challenging. Many things can drain our reservoir – lack of sleep, difficulties feeding, an unsettled baby, adjusting to life changes, managing finances, juggling multiple tasks etc. You may quickly feel that you're running on empty.

When our reservoir is empty, it's harder to manage with the day to day stresses life throws at us.

This programme aims to teach you different ways of maintaining or 'replenishing' your reservoirs so that you can maintain well-being and do more of what's important in life.

## Week 1: MINDFULNESS



“There is only one time that is important-- Now! It is the most important time because it is the only time when we have any power.”- Leo Tolstoy

### **Mindfulness is defined as:**

- Paying attention to your experiences in the here-and-now, even experiences you don't like.
- Paying attention to these experiences in a kind, gentle and non-judgemental way.

In this module, we will help you to develop these skills.

### **We don't just think that mindfulness is helpful for parents – research supports this!**

Research has found taking part in mindfulness programmes can reduce stress, anxiety and distress (Perez-Blasco et al., 2013). Mindfulness can also increase positive experiences for expectant parents and help them cope with daily stresses (Abbass-Dick, 2019)!

#### **Being on autopilot** adapted from O'Donoghue, Morris, Oliver & Johns (2018)

Have you ever noticed how hard it can be to keep your attention in the here-and-now?! Our minds are often caught up in thinking about other things – remembering something from yesterday, planning something for tomorrow, have I fed the cat!

Sometimes being on autopilot can make tasks easier, such as cleaning the milk bottles or tidying the kitchen. However, living on autopilot can also be unhelpful. When we spend a lot of time on autopilot, we can fall into the trap of reacting to things without really thinking. You may find yourself making silly mistakes, such as putting your mobile in the fridge, or putting salt in your tea. But you may also find that you automatically react to difficult thoughts or feelings. You may find you quickly feel angry or tearful and you're not sure why. Being on autopilot can make you vulnerable to this.

Mindfulness can help you step out of autopilot and be better able to cope with day to day challenges. By focusing on the present moment, and purposely paying attention, you can choose how to respond to situations, thoughts or feelings. You are also more likely to notice and cherish the small things, which may otherwise be missed.

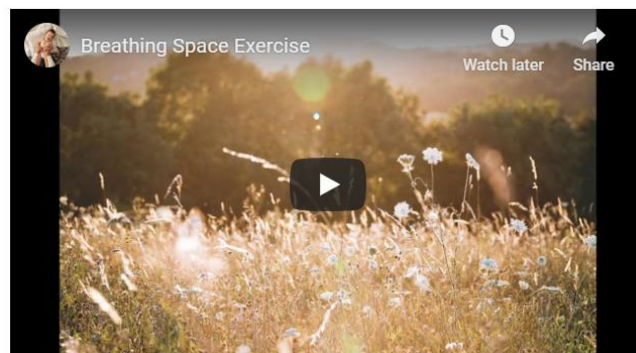


### Exercise: Mindfulness of the Breath

We now invite you to start developing your mindfulness skills using a short practise that focuses on your breath. Below you will find a brief practice that guides you through the process of becoming more mindful.

**Please click the link below** and follow the instructions given. (*Script adapted from O'Donoghue, Morris, Oliver & Johns (2018)*).

<https://youtu.be/nwMQT7y3ys4>



**How did you find the exercise? What did you notice?  
Do you think you benefited in any way?**

There is no right or wrong way of being mindful. If you became distracted and noticed your mind wandering, that is great noticing! If you found the exercise relaxing, that's a side effect people often report and enjoy - relaxation is not a goal of mindfulness but some people feel relaxed during mindfulness. You may have fallen asleep, that is ok too! You may like to test out different times of the day to see when you are most alert.



### Home Practice:

Mindfulness, like every skill, may be difficult at first and takes practice. Research shows that you are most likely to benefit if you practice regularly.

**Please listen to the audio once a day for the following week.**



### Tips

- **How will I remember:** You may want to set daily reminders on your mobile or put a sticky note somewhere in your home, like next to the kettle or on the fridge.
- **How will I find the time:** Plan your mindfulness practice for a time of day you are likely to be able to practice, such as when your child is asleep. You may want to pick a set time, the morning is popular time for parents to practice, but you can pick whatever time works for you.

**We hope you enjoy!**





## Week 2: INFORMAL MINDFULNESS PRACTICES



“The little things? The little moments? They aren’t little.” – Jon Kabat-Zinn

### Welcome back to week 2 of the programme!

We hope you found the first week interesting and helpful.

This week we will explore ways you can bring mindful awareness to your daily life as a parent.

One of many great things about **mindfulness** is it **can be done anywhere!** You do not need anything, and **it is free!**

This is because you can bring mindful awareness to any experience, even the everyday things. This week we are focusing on increasing **mindfulness in day to day activities.**

These could be:

- Mindful drinking
- Mindful brushing your teeth
- Mindful washing hair
- Mindful breast or bottle feeding
- Mindful eating
- Mindful walking with the pushchair
- Mindful bath time
- Mindful getting your child dressed

Quotes from expectant or new parents  
(Abbass-Dick et al., 2019)

“I think mindful walking is great in managing anxiety and mindful eating could help me from overeating”

“I think it would be great to be more present and aware of day to day feelings and happenings”

Life is busy with young children!

You may find yourself eating and drinking on the go, quickly eating a snack or simply seeing food as fuel. Mindful drinking and eating are both lovely ways to really enjoy and notice the flavours of food by slowing down and focusing your attention.

Please click the link below, to listen to an example mindful drinking practice

### Mindful Drinking

*adapted from Cree (2015)*

Please click the link below, to listen to an example mindful drinking practice.



<https://youtu.be/Mj6UhwY6v8Q>

### Mindful Drinking Script

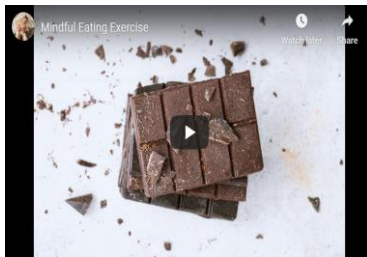
During this exercise we invite you to focus your attention to the experience of drinking a cup of liquid

First, notice how the cup feels in your hands. Noticing the texture or shape of the cup, and the warmth against your hands. Now switching your attention to what you can see. Explore the colours, or design of the cup. Looking inside the cup, really notice the colour of the drink, looking at it as if seeing the drink for the first time. Then gently rock the cup and observe the movement of the liquid. Notice the colours or whether you can see a light reflecting off the liquid. Now, move your attention to the smell. Taking a moment to fully focus and digest the smell of the drink as it reaches your nose. Next, slowly lift the cup towards your mouth and take a small sip of the drink. Imagining this was your first time you had you had ever encountered this drink. Really allowing yourself time to notice, and maybe enjoy, the temperature and taste of the liquid inside your mouth.

Mindful drinking is just one of many ways you can bring mindful attention to day-to-day activities. Below are several other ways you can bring mindful awareness to your daily life.

### Mindful Eating

Click the link below, to listen to an example mindful eating practice.



<https://youtu.be/S837KwWxn-l>

### Mindful Eating Script

**Seeing:** First focus your attention on the piece of food in between your fingers and thumb. Imagine you are coming to this as a baby who has never seen this object before. Let your eyes explore the shape, colour and size of the piece of chocolate.

**Touch:** Now, notice the texture and weight of the piece of food, as you gently hold it.

**Smell:** Then raise the piece of food to your nose and allow yourself to notice its smell. It might have a stronger scent than you expected.

**Tasting:** Now slowly bring the piece of food up to your lips, noticing any changes as you prepare to eat it. Then, as you place the piece of food in your mouth very consciously notice the sensations of taste and texture on your tongue.

**Swallowing:** After slowly chewing, notice when you first feel ready to swallow. Finally, see if you can follow the sensation of swallowing, sensing the food moving down into your stomach.



### **Mindful Walking with the Pushchair** *adapted from Cree (2015)*

Click the link below, to listen to an example mindful eating practice.



<https://youtu.be/1EmMcTRGnZY>

### **Mindful Walking with the Pushchair Script**

- Take a moment to bring your attention to your breath.
- Notice the texture of the pushchair handle and the grip of your hands. Then feel the resistance in your arms as you push.
- Next bring your attention to your feet. Focus on the sensation of your feet hitting the ground and lifting off the ground.
- Now turn your attention to your upper legs as walk. Notice, how your legs feel.
- Then direct your attention to the what you can see. Notice what is close by, such as the pattern of the pavement or grass on the ground. By widening your attention, notice what you can see in the distance.
- Now focus on what you can hear.
- Finally, bring this mindful attention to your child. In a kind and non-judgement manner, take in what you can see, hear and what you feel.

### **Mindful Brushing your Teeth**

Click the link below, to listen to an example mindful eating practice.



<https://youtu.be/ClkIPImjZCA>

### **Mindful Brushing your Teeth Script**

This can be a great way to bring mindfulness to the start of your day!

Rather than being on autopilot when brushing your teeth, you can use this time to practice focusing your attention to the present moment.

Start by noticing what you can see.

Now bring your attention to what you can hear. Now notice what you can smell. If you notice your mind has drifted thinking about the day ahead, simply bring your focus of attention back on the experience of brushing your teeth. Now focus your attention on what you can feel. Noticing the different sensations in your mouth, in your wrists and in your arm.



### Home Practice:

We hope the mindful drinking exercise has given you a flavour of the different ways you can bring mindful attention to your day-to-day life.

**Over the next week, try to bring mindful awareness to at least routine activity each day.**

What will that be?



### Tips

The acronym '**AUTO**' may serve as a helpful prompt to step away from the autopilot mode and instead engage mindfully on the activity.

**A**- Attention directed to the selected activity/action.

**U**- Use your 5 senses (touch, sight, hearing, smell and taste) to explore your actions.

**T**- Take your time to really notice, as if it was the first time you were doing the action.

**O**- Open and widen your attention to the emotions and thoughts experienced during the activity.

**We hope you enjoy!**



## Week 3: VALUES



“If you are facing in the right direction, all you need to do is keep on walking.” – Buddha

### **Welcome to week 3 of the programme!**

Great work, you have now completed half of the programme!

This week we will introduce and focus on values. The programme will support you to identify your own personal values and support you to engage in actions that are in line with your values.

#### **Deep down, what is most important to you in life? What do you most want your life to be about?**

We use the word “values” to describe the things you most care about in life. There might be loads! Or just a few.

**We can think of values as an internal compass** - they lead, guide and motivate you as you move through life. They can also help lead you back, if you go off track.

Values are not the same as goals.

Values are directions you keep moving in, whereas goals are what you want to achieve along the way. Values are ongoing, whereas goals can be reached. An example of a value might be being a loving parent, this is a value as it can never be fully completed. The same parent may also want to read her a child a bedtime story, this is a goal (in line with the value of ‘being a loving parent’) as it can be achieved.

**The aim is to bring your values to the forefront of your mind and to let them guide you through this challenging job – the job of being a parent!**

## What do I value?

In the following exercise we will help you to focus on your values. You will find a list of values that are relevant to some (but not all) people. *Values taken from O'Donoghue et al., (2018).*

**Please read each value and sort them into one of the three piles on the right:**

- Very important to me
- Quite important to me
- Not important to me

**Items**

|  |  |
|--|--|
| Being Connected with Family<br>                       | My Career and Being Employed<br>                  |
| Intimacy and Relationships<br>                        | Learning through Education or Personal Growth<br> |
| Being a Parent<br>                                    | Enjoying Fun and Leisure Activities<br>           |
| Connecting with Friends and having a Social Life<br> | Feeling Spiritually Connected<br>               |
| Sense of Community<br>                              | Accepting Yourself and Others<br>               |
| Physical Health and Wellness<br>                    | Being Compassionate to Myself and Others<br>    |

**Very important to me**

**Quite important to me**

**Not important to me**

1) Of the values that you sorted, **select one** from the **'Very important' value**. Choose one that you would most like to focus on and be connected with at this point in time.

2) Please bring to mind a **memory** of an event from your life where you were **engaging with this particular value**. Recall how this event made you feel about yourself.

**For the next 3 minutes, please write about this event**, your feelings about this value and why it is important and meaningful to you. Do not worry about how well it is written. There are no right or wrong answers. This is personal to you.



### Living my values

Values can provide a deep motivation that helps us to pursue important goals in life. Values can also help guide us when we need to make decisions.

For the week ahead, what one small thing could you do to help live your life in accordance with this value? **Please write this goal down** (e.g. the one thing you could do this week):



### Home practice:

Over the next week try to achieve your short-term SMART goal (e.g. Specific, Measurable, Achievable, Realistic, Timely).

We also invite you to notice when you are acting in line with your chosen value, explore how it feels to do so and what difference it makes. You may also like to write down your identified value and put them somewhere that you will see each day to remind yourself.



### Tips:

Doing things that are important to us can be really hard. There might be things in your day to day life that get in the way, such as not enough money or time. You might want to think of these as external barriers as they are things outside of us.

People also commonly experience internal barriers. These are thoughts, feelings or bodily sensations that hold you back from doing things that really matter to you. As a parent you may experience internal barriers such as, difficult emotions (shame, guilt etc.), thoughts (I can't be bothered, what's the point, etc.) or bodily sensations (achy muscles etc.).

Although it may not be possible to change the external barriers, we can choose how we respond to our internal barriers. For example, we can be aware of a tendency to get caught up with difficult feelings, or to struggle with them or to try to push them away. Instead, using mindfulness, we can notice them, be kind to ourselves whilst we are experiencing them, and let them pass without fighting against them.

Doing this can really help us move in the direction of our values. So, during the week ahead, see if you can notice any internal barriers, allow them to be present, and embrace any opportunities to live more consistently with your values.

**We wish you well for the third week**



## Week 4: VALUES



"The journey of a thousand miles begins with one step." Lao Tzu

### Welcome to week 4 of the programme!

The fourth, and final, week of this programme will continue to focus on your personal values.

#### **Reflection Exercise:**

We hope you found it helpful to identify an important personal value.

**For the next 5 minutes, please write about the times you felt you connected with your chosen value this week.**

Consider how it made you feel? What thoughts or images came to your mind? Did you notice in anything in your body? Did it have an impact on those around you?



Engaging in actions that are in line with our personal values can sometimes be hard.

**For the next 5 minutes, please write down what got in the way of you living in line with your personal value?**

For example, was it related to external barriers such as time, money etc.? Or was it related to more internal barriers such as, uncomfortable feelings or difficult thoughts? How did you respond to these barriers?



Unfortunately, we cannot always change external barriers (e.g. time or money) but mindfulness as a skill can be used to notice these experiences, allow them to be present (even if it is uncomfortable), and not allow difficult thoughts or feelings get in the way of living a life in line with our values.

**Goal setting Exercise:**

If an internal or external barrier got in the way of you completing your previously set goal, we invite you to have another go this week or set yourself a new short-term goal.

If you managed to achieve your previous small short-term goal, we invite you to set another!

**Please write your short-term goal here:**



We also invite you to set yourself a **medium-term** 'SMART' goal, something you can aim to achieve **within the next month**.

**Please write your medium-term goal here:**



**Common Barriers**

In the previous week you may have encountered some of the common external or internal barriers that get in the way of moving towards your chosen value and goals. Common barriers include lack of time or difficult thoughts, feelings or physical sensations.

The video below describes a metaphor explaining **3 different ways we can respond to these barriers** and the effects it has on our ability to engage with our values.



<https://youtu.be/ULNlnPfAe1o>





### **Home Practice:**

This week we invite you continue to practice and draw upon the skills you have been developing during this programme.

1. Connect with your values
2. Complete your short-term goal
3. Bring mindful attention to daily activities, such as mindful drinking.



### **Tips**

If you encounter an external or internal barrier this week try to notice how you respond to the barrier.

Are you...

1. Caught up and blocked by the barrier
2. Trying hard to push away and fight the barrier
3. Able to notice and accept them

### **Programme Recap:**

During this programme you have:

- Learnt about mindfulness
- Developed your mindful attention skills (e.g. mindful breathing and mindful everyday activities)
- Identified your own personal values
- Chosen a value that you would like to engage in more regularly
- Set yourself short-term goals, based on this important value

**We wish you well for the fourth week of the programme!**





## Appendix F

### Participant Information Sheet

#### Information Sheet

#### **MINDFULNESS AND VALUES – Brief Online Programme**

Thank you for your interest in our study. Before you decide whether to take part, it is important for you to understand what the study involves and all relevant information. Please take time to read the following sheet carefully.

##### **1. What is the study about?**

Previous research has shown that mindfulness-based programmes during pregnancy and early parenthood can have a positive impact on mental health and wellbeing. Research has also suggested that online interventions overcome some of the many barriers preventing new parents from seeking support. Therefore, this study is interested in finding out how postpartum parents (e.g. parents who have had a child in the last 12 months) experience a 4-week online programme. This programme focuses on mindfulness and values and has been developed by the researchers of this study.

##### **2. What does the study involve?**

This is an online study- all the resources you need are provided online. The programme lasts 4 weeks, with one online module per week. Week 1 and 2 will focus on mindfulness training and week 3 and 4 will focus on identifying personal values and engaging in actions in line with these values. Each of the four modules will take approximately 20-30minutes to complete.

First, you will be invited to complete a questionnaire that will help us to determine whether you are eligible to take part. After you complete this initial questionnaire, we will let you know straight away whether or not you are eligible. If you are eligible, you will be emailed a link to a small set of questionnaires that will ask about your emotions, behaviours and experiences. Demographic information (age, gender, work status etc.) and your reasons for signing up for this study will also be collected. This will take you approximately 15-20 minutes to complete.

After completing these questionnaires, a computer will randomly allocate you to one of two conditions. If you are allocated to the first, you will receive the online programme immediately (i.e. you will be able to start the programme without a delay). If you are allocated to the second, you will have to wait for a period of 8 weeks before being given access to the online programme. The condition you are allocated to is completely random and due to chance alone.

*If you receive access to the online programme immediately, the following things will happen:* You will receive access to the 4-week programme. Once you have completed the programme you will be asked to complete a second set of questionnaires, including questions about the usefulness, usability and your satisfaction with the programme. Finally, you will be asked to complete the questionnaires again, 4 weeks after completing the programme. The sets of questionnaires will take approximately 15-20minutes to complete each time you complete them.

Or

*If you have an 8 week wait before starting the programme:* During the waiting period, you will be asked to re-complete the set of questionnaires after 4 and 8 weeks. You will then receive full access to the programme and will not be asked to complete the questionnaires again.

We will send you emails to let you know when it is time to complete all parts of the study, if you are happy for us to do so. If you choose to take part in this study, you will also be entered into a prize draw to win £100 Amazon voucher.

### **3. Who is involved in this study?**

The principle researcher for this study is Hannah Palma Carlos (Trainee Clinical Psychologist). The research will be overseen and supervised by Dr Jessica Kingston (Lecturer in Clinical Psychology at Royal Holloway, University of London) and Dr Emma O'Donoghue (Specialist Perinatal Clinical Psychologist).

### **4. Do I have to take part?**

It is up to you to decide if you would like to take part in the study. You are welcome to leave out any questions within the study that you do not wish to answer. You can also withdraw at any time without giving a reason. Please be aware that, if you would like to withdraw your data from the study, you should notify the researchers by 1<sup>st</sup> February 2021.

### **5. Who has reviewed the study?**

This study has been reviewed and approved by the Ethics Committee at Royal Holloway, University of London.

### **6. What are the possible disadvantages and risks of taking part?**

It is possible that some of the questions or activities could cause distress, however this is unlikely. In the event that the questionnaires, or the programme activities, do cause distress or upset, we advise that you contact your GP, call NHS 111 or contact the Samaritans (116 123). *If you feel you need immediate help, we advise you go to A&E or call 999.*

### **7. What are the possible benefits of taking part?**

We hope that taking part in this study will improve your understanding of mindfulness and how to bring mindful attention to your daily activities. We also hope you gain a greater insight into your personal values. Since research has found mindfulness-based programmes can have a positive impact on wellbeing, you may also experience this benefit, however this cannot be guaranteed. The information from this study is also likely to help us better understand whether new parents can engage, or be supported, by an online programme.

### **8. How will my data be used?**

The data will be used for a doctoral thesis and potentially published in an academic journal. If the study is published in a relevant peer-reviewed journal, the anonymised data may be made available to third parties. The people who analyse the information will not be able to identify you.

### **9. Important General Data Protection Information (GDPR)**

All information that is collected during the course of the research will be kept confidential; participants will be allocated a unique ID number. Data will all be stored in accordance with General Data Protection for Research (GDPR) and Data Protection ACT 2018.

Royal Holloway, University of London is the sponsor and the data controller for this study. This means that we are responsible for looking after your information and using it properly. Any data you provide during the completion of the study will be stored securely on local servers. Royal Holloway is designated as a public authority and in accordance with the Royal Holloway and Bedford New College Act 1985 and the Statutes which govern the College, we conduct research for the public benefit and in the public interest. Royal Holloway has put in place appropriate technical and organisational security measures to prevent your personal data from being accidentally lost, used or accessed in any unauthorised way or altered or disclosed. Royal Holloway has also put in place procedures to deal with any suspected personal data security breach and will notify you and any applicable regulator of a suspected breach where legally required to do so. To safeguard your rights, we will use the minimum personally identifiable information possible. The lead researcher will keep your contact details confidential and will use this information only as required (i.e., to provide a summary of the study results if requested and/or for the prize draw). The data gathered from the study will be kept for 5 years after the study has finished. Certain individuals from RHUL may look at your research records to check the accuracy of the research study. You can find out more about your rights under the GDPR and Data Protection Act 2018 by visiting <https://www.royalholloway.ac.uk/about-us/more/governance-and-strategy/data-protection/> and if you wish to exercise your rights, please contact [dataprotection@royalholloway.ac.uk](mailto:dataprotection@royalholloway.ac.uk)

**10. What should I do if I would like to find out more?**

Please do not hesitate to contact Hannah Palma Carlos via email ([Hannah.Palma.Carlos.2018@live.rhul.ac.uk](mailto:Hannah.Palma.Carlos.2018@live.rhul.ac.uk)) should you need any further information, or you would like a copy of the information sheet for you to keep.

## Appendix G

### Participant Consent Form

#### Consent Form

#### MINDFULNESS AND VALUES- Brief Online Programme

***(Please select Yes or No):***

Have you read the information sheet about the study?

- Yes
- No

Have you got access to computer, laptop, tablet or mobile?

- Yes
- No

Have you had an opportunity to ask questions and got satisfactory answers to your questions?

- Yes
- No

Have you understood that you are free to withdraw from the study at any time without giving a reason?

- Yes
- No

Have you understood that you are free to refrain from answering any questions that you do not want to?

- Yes
- No

Do you consent to being sent emails reminders throughout the study?

- Yes
- No

Have you understood that a computer will randomly decide which condition you will be allocated to: a) receiving the programme immediately or b) receiving it after an 8 week wait period.

- Yes
- No

Do you agree to take part in the study?

- Yes
- No

Would you be interested in being contact via email after the study to provide more detailed feedback regarding the programme?

- Yes
- No

Please provide your email address:

-

## Appendix H

### Debrief Sheet Not Eligible

#### Debrief Sheet

**Thank you for signing up and your interest in our Mindfulness and Values study!  
Unfortunately, you are not eligible for this study.**

At the start of the study you were asked to complete the Edinburgh Postnatal Depression Scale (EPDS) questionnaire to determine whether you were eligible for the study. Parents with a score of 10 or above were deemed as eligible for this study. This is because scores 10 or above suggests minor or major depression may be present. The study specifically wanted to examine the parents with potentially elevated depressive symptoms, as it is hoped that the findings from this study could be used to support a future larger research study examining the impact of the programme on parent's mood and wellbeing.

**Your score on the Edinburgh Postnatal Depression Scale was low on symptoms of depression (e.g. less than 10), meaning you are not eligible for the study.**

**If you are interested, the information below explains the purpose and aims of the study.**

Although becoming a parent can be a hugely rewarding, it is often a challenging time, with new responsibilities and lifestyle adjustments. Research has shown psychological difficulties, particularly low mood, are common during the postpartum period (e.g. the 12 months after giving birth).

There is a need for brief and easily accessible interventions that are effective in supporting new parents. To meet this need, we have created the four-week Mindfulness and Values programme based on Acceptance and Commitment Therapy (ACT). ACT aims to improve psychological flexibility. Psychological flexibility is the ability to stay in contact with the present moment regardless of unpleasant thoughts, feelings and bodily sensations, while choosing one's behaviours based on values (what matters most to you in life).

*Mindfulness + Values + Action = Psychological Flexibility*

In this study, we had several aims. We wanted to know whether:

- Postpartum parents (e.g. parents who have had a child in the last 12 months) sign up and complete the online programme?
- Whether postpartum parents find the programme acceptable, satisfying and useful?
- Whether postpartum parents experience an improvement in wellbeing during the programme. We intend to use this information to estimate the size of impact the programme had on parent's mood and wellbeing.

If taking part in this study has raised any specific concerns about your wellbeing or mental health then we advise that you contact your GP, call NHS 111 or contact the Samaritans (116 123). ***If you feel you need immediate help, we advise you go to A&E or call 999.***

If you would like further information about the study or would like to know about what the findings are when all the data has been collected and analysed then please contact me on [Hannah.palma.carlos.2018@live.rhul.ac.uk](mailto:Hannah.palma.carlos.2018@live.rhul.ac.uk).

If you know of any friends or acquaintances that are eligible to participate in this study, we request that you not discuss it with them until after they have had the opportunity to participate. Prior knowledge of questions asked during the study can invalidate the results. We greatly appreciate your cooperation.

**Once again, thank you for your interest in this study!**

## Appendix I

### Debrief Sheet

### Debrief Sheet

**Thank you for taking part in our Mindfulness and Values study! Your participation is greatly appreciated.**

Although becoming a parent can be a hugely rewarding, it is often a challenging time, with new responsibilities and lifestyle adjustments. Research has shown psychological difficulties, particularly low mood, are common during the postpartum period (e.g. the 12 months after giving birth).

There is a need for brief and easily accessible interventions that are effective in supporting new parents. To meet this need, we have created the four-week Mindfulness and Values programme based on Acceptance and Commitment Therapy (ACT). ACT aims to improve psychological flexibility. Psychological flexibility is the ability to stay in contact with the present moment regardless of unpleasant thoughts, feelings and bodily sensations, while choosing one's behaviours based on values (what matters most to you in life).

*Mindfulness + Values + Action = Psychological Flexibility*

In this study, we had several aims. We wanted to know whether:

- Postpartum parents (e.g. parents who have had a child in the last 12 months) sign up and complete the online programme?
- Whether postpartum parents find the programme acceptable, satisfying and useful?
- Whether postpartum parents experience an improvement in wellbeing during the programme. We intend to use this information to estimate the size of impact the programme had on parent's mood and wellbeing.

At the start of the study you were asked to complete the Edinburgh Postnatal Depression Scale (EPDS) questionnaire to determine whether you were eligible for the study. We only invited parents with a score of 10 or above to take part. A score of 10 on this scale means that you were experiencing at least mild symptoms of depression at the start of the study. Low mood is common following the birth of a child. We only invited parents who scored over 10 on this scale because we wanted to examine the parents with potentially elevated depressive symptoms, as it is hoped that the findings from this study could be used to support a future larger research study examining the impact of the programme on parent's mood and wellbeing.

If taking part in this study has raised any specific concerns about your wellbeing or mental health then we advise that you contact your GP, call NHS 111 or contact the Samaritans (116 123). ***If you feel you need immediate help, we advise you go to A&E or call 999.***

If you would like further information about the study or would like to know about what the findings are when all the data has been collected and analysed then please contact me on [Hannah.palma.carlos.2018@live.rhul.ac.uk](mailto:Hannah.palma.carlos.2018@live.rhul.ac.uk). I cannot however provide you with your individual results.



If you know of any friends or acquaintances that are eligible to participate in this study, we request that you not discuss it with them until after they have had the opportunity to participate. Prior knowledge of questions asked during the study can invalidate the results. We greatly appreciate your cooperation.

**Once again, thank you for your participation in this study!**

## Appendix J

### Reference Data for Reliable Change Index and Critically Significant Change Calculations

| Measure | Cronbach's $\alpha$<br>(source)                      | Clinical Sample<br>M (SD) | CSC<br>Criterion |
|---------|--|---------------------------|------------------|
| EPDS    | 0.8<br>(Monteiro et al., 2020;<br>Pugh et al., 2016) | 14.33 (3.46)              | A                |
| FS      | 0.87<br>(Diener et al., 2009)                        | 41.45 (7.28)              | A                |
| FFMQ    | 0.89<br>(Kantrowitz-Gordon, 2018)                    | 83.92 (12.25)             | A                |
| VQ_P    | 0.89<br>(Levin et al., 2017)                         | 14.71 (5.13)              | A                |
| VQ_O    | 0.84<br>(Levin et al., 2017)                         | 17.24 (3.91)              | A                |

*Note.* EPDS, Edinburgh Postnatal Depression Scale; FFMQ, Five Facet Mindfulness Questionnaire; FS, Flourishing Scale M, Mean; SD, Standard Deviation; VQ\_O, Valued Living Obstructing Subscale, VQ\_P, Valued Living Progress Subscale

## Appendix K

### Non-Completer Participant's verse Completer Participant's

**Table K1**

*Non-Completer Participant's verse Completer Participant's Sociodemographic*

*Characteristics*

| Sociodemographic Characteristics        |  | Non-completer<br>( <i>n</i> = 71) | Completer<br>( <i>n</i> = 67)    | Test Statistic   |
|---|--|-----------------------------------|----------------------------------|--|
| Age (years) -<br><i>M</i> ( <i>SD</i> ) |  | <i>n</i> = 69<br>33.23<br>(4.82)  | <i>n</i> = 67<br>34.19<br>(3.71) | $t_{(134)} = -1.302$<br><i>p</i> = .2                      |
| Sex<br>- <i>n</i> (%)                   |  | <i>n</i> = 70                     | <i>n</i> = 67                    | $\chi^2_{(1)} = 1.438$<br><i>p</i> = .23 <sup>a</sup>      |
|   | Female   | 70 (100%)                         | 66 (98%)                         |  |
|   | Male   | 0 (0%)                            | 1 (2%)                           |  |
| Ethnicity<br>- <i>n</i> (%)             |  | <i>n</i> = 70                     | <i>n</i> = 67                    | $\chi^2_{(11)} =$<br>18.752<br><i>p</i> = .07 <sup>a</sup> |
|   | <b>White</b> (British)                           | 49 (70%)                          | 45 (67%)                         |  |
|   | Any other White                                  | 10 (14%)                          | 20 (30%)                         |  |
|   | <b>Multiple</b> ethnic<br>groups (British)       | 2 (3%)                            | 0 (0%)                           |  |
|   | Any other<br>Mixed/Multiple<br>ethnic background | 1 (1%)                            | 1 (2%)                           |  |
|   | <b>Asian</b> (British)                           | 2 (3%)                            | 0 (0%)                           |  |
|   | Any other Asian<br>background                    | 1 (1%)                            | 0 (0%)                           |  |
|   | Indian   | 1 (1%)                            | 0 (0%)                           |  |
|   | Pakistani  | 1 (1%)                            | 0 (0%)                           |  |
|   | Bangladeshi                                      | 0 (0%)                            | 0 (0%)                           |  |
|   | Chinese  | 0 (0%)                            | 1 (2%)                           |  |
|   | <b>Black</b> (British)                           | 1 (1%)                            | 0 (0%)                           |  |
|   | African  | 0 (0%)                            | 0 (0%)                           |  |

|   |   |               |               |  |
|---|---|---------------|---------------|--|
|   | Caribbean                               | 1 (1%)        | 0 (0%)        |  |
|   | Any other Black Background              | 0 (0%)        | 0 (0%)        |  |
|   | <b>Arab</b>                             | 0 (0%)        | 0 (0%)        |  |
|   | Any <b>other</b> ethnic group           | 1 (1.4%)      | 0 (0%)        |  |
| Highest level of education - <i>n</i> (%) |   | <i>n</i> = 69 | <i>n</i> = 67 | $\chi^2_{(2)} = 3.075$<br><i>p</i> = .22             |
|   | GCSE (or equivalent)                    | 0 (0%)        | 0 (0%)        |  |
|   | A-Level (or equivalent)                 | 11 (16%)      | 5 (8%)        |  |
|   | Undergraduate degree                    | 24 (35%)      | 21 (31%)      |  |
|   | Postgraduate studies                    | 34 (49%)      | 41 (61%)      |  |
| Work Status - <i>n</i> (%)                |   | <i>n</i> = 70 | <i>n</i> = 67 | $\chi^2_{(2)} = .277$<br><i>p</i> = .87              |
|   | Maternity Leave                         | 52 (74%)      | 51 (76%)      |  |
|   | Unemployed (full-time parent)           | 7 (10%)       | 5 (8%)        |  |
|   | Employed (full-time, part-time or self) | 11 (16%)      | 11 (16%)      |  |
| Household Income (annual) - <i>n</i> (%)  |   | <i>n</i> = 66 | <i>n</i> = 66 | $\chi^2_{(5)} = 5.155$<br><i>p</i> = .4 <sup>a</sup> |
|   | <£10000                                 | 1 (2%)        | 0 (0%)        |  |
|   | £10,000-£19,999                         | 4 (6%)        | 1 (2%)        |  |
|   | £20,000-£39,999                         | 15 (23%)      | 11 (17%)      |  |
|   | £40,000-£59,999                         | 12 (18%)      | 11 (17%)      |  |
|   | £60,000-£79,999                         | 14 (21%)      | 16 (24%)      |  |
|   | >£80,000                                | 20 (30%)      | 27 (41%)      |  |
| Relationship Statue                       |   | <i>n</i> = 70 | <i>n</i> = 67 | $\chi^2_{(1)} = .988$<br><i>p</i> = .32 <sup>a</sup> |
|   |   | 3 (4%)        | 1 (2%)        |  |

|                          |   |               |               |                             |
|--------------------------|---|---------------|---------------|-----------------------------|
| - <i>n</i> (%)           | Single or Separated                     |               |               |                             |
|                          | Married/ Living together                | 67 (96%)      | 66 (99%)      |                             |
|                          | In a relationship (not living together) | 0 (0%)        | 0 (0%)        |                             |
|                          | Divorced                                | 0 (0%)        | 0 (0%)        |                             |
| Number of Children       |   | <i>n</i> = 70 | <i>n</i> = 67 | $\chi^2_{(4)} = 2.439$      |
| - <i>n</i> (%)           | 1                                       | 43 (61%)      | 37 (55%)      | <i>p</i> = .66 <sup>a</sup> |
|                          | 2                                       | 20 (29%)      | 25 (37%)      |                             |
|                          | 3                                       | 5 (7%)        | 4 (6%)        |                             |
|                          | 4                                       | 1 (1%)        | 1 (2%)        |                             |
|                          | 5+                                      | 1 (1%)        | 0 (0%)        |                             |
| Infant's age in months   |   | <i>n</i> = 70 | <i>n</i> = 67 | $t_{(135)} = 1.413$         |
| - <i>M</i> ( <i>SD</i> ) |   | 6.08 (3.32)   | 5.31 (3)      | <i>p</i> = .16              |

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Note. <sup>a</sup> Likelihood Ratio

**Table K2**

*Non-Completer Participant's verse Completer Participant's Pre-Intervention Score on Outcome and Process Measures*

| Measure | Pre-Intervention Scores<br><i>M (SD)</i> |                                   | Test Statistic                         |
|---------|--|-----------------------------------|--|
|         | Non-Completer<br>( <i>n</i> = 71)        | Completer<br>( <i>n</i> = 67)     |  |
| EPDS    | ( <i>n</i> = 71)<br>15.34 (4.12)         | ( <i>n</i> = 67)<br>14.36 (.42)   | $t_{(134.235)} = 1.562$<br>$p = .12^a$ |
| FS      | ( <i>n</i> = 68)<br>40.56 (8.06)         | ( <i>n</i> = 67)<br>41.45 (7.28)  | $t_{(133)} = -.672$<br>$p = .5$        |
| FFMQ    | ( <i>n</i> = 63)<br>82.02 (16.75)        | ( <i>n</i> = 66)<br>83.92 (12.25) | $t_{(113.295)} = -.736$<br>$p = .46^a$ |
| VQ      | ( <i>n</i> = 61)<br>32.41 (5.33)         | ( <i>n</i> = 66)<br>31.95 (4.45)  | $t_{(125)} = .524$<br>$p = .6$         |

*Note.* EPDS, Edinburgh Postnatal Depression Scale; FS, Flourishing Scale; FFMQ, Five Facet Mindfulness Questionnaire; VQ, Valuing Questionnaire; <sup>a</sup> Likelihood Ratio

