



UNIVERSIDADE D
COIMBRA

Mariana Cova Jorge Branquinho

BE A MOM COPING WITH DEPRESSION:
DEVELOPMENT, FEASIBILITY AND PRELIMINARY
EFFECTIVENESS OF A BLENDED INTERVENTION FOR
POSTPARTUM DEPRESSION IN PORTUGUESE WOMEN

Tese no âmbito do doutoramento em Psicologia, especialidade em Psicologia
Clínica, orientada pela Professora Doutora Maria Cristina Canavarro e pela
Doutora Ana Dias da Fonseca e apresentada à Faculdade de Psicologia e
Ciências da Educação da Universidade de Coimbra.

Abril de 2024

Mariana Cova Jorge Branquinho

BE A MOM COPING WITH DEPRESSION: DEVELOPMENT, FEASIBILITY
AND PRELIMINARY EFFECTIVENESS OF A BLENDED INTERVENTION
FOR POSTPARTUM DEPRESSION IN PORTUGUESE WOMEN

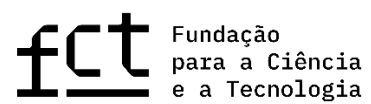
Doctoral thesis in Doctorate in Psychology, Specialty Clinical Psychology, supervised by Dr. Ana
Dias da Fonseca and Professor Maria Cristina Canavarro and submitted to the Faculty of
Psychology and Educational Sciences of the University of Coimbra.

Abril de 2024



UNIVERSIDADE D
COIMBRA

This research project was supported by a PhD Scholarship from the Portuguese Foundation for Science and Technology [SFRH/BD/145563/2019].



Acknowledgements | Agradecimentos

Este projeto de investigação só foi possível concretizar-se com o apoio de várias pessoas, não sendo de todo um trabalho individual. A elas, devo um agradecimento pelo contributo importante e significativo.

Tenho de começar por agradecer à Professora Doutora Ana Fonseca, pois sem ela este trabalho não seria possível. Foi com a minha dissertação de Mestrado, há 7 anos, que tive oportunidade de começar a trabalhar consigo e conhecer melhor o mundo da investigação. Foi talvez a primeira pessoa a acreditar em mim quando eu própria ainda não reconhecia o mérito ou potencial das minhas capacidades. Ainda hoje continua a fazê-lo e a incentivar-me a evoluir, estou muito grata por isso. Tem sido um privilégio aprender consigo e tenho a agradecer pela orientação excecional, pautada por um enorme respeito, rigor, cuidado, compreensão e empatia. O seu compromisso com a excelência e a sua dedicação foram fundamentais para a concretização deste trabalho.

Da mesma forma, agradeço à Professora Doutora Cristina Canavarro pela orientação e pela confiança que sempre depositou em mim, desde a orientação no Mestrado em 2017/2018. Desde então que tem contribuído para o meu crescimento pessoal e profissional, providenciando oportunidades de aprendizagem e propondo variados desafios. Agradeço ainda pela integração no grupo de investigação Relações, Desenvolvimento & Saúde e por me ajudar a embarcar neste projeto que fez parte do caminho do Be a Mom. Representa um exemplo de profissionalismo, dedicação e competência.

Agradeço à equipa de investigação Relações, Desenvolvimento & Saúde, a todos com quem tive oportunidade de cruzar caminhos ao longo destes anos e que contribuíram de forma positiva para a minha experiência: Alexandra Martins, Ana Luz, Ana Rita Martins, Anabela Araújo Pedrosa, Bárbara Caetano, Bárbara Pereira, Brígida Caiado, Carlos Carona, Carolina Góis, Catarina Cardoso, Catarina Francisco, Catarina Vitorino, Cláudia Melo, Cláudia Nogueira, Daniela Fernandes, Fabiana Monteiro, Helena Moreira, Inês Carvalho, Joana Pereira, João Pedro Leitão, Liliana Pedro, Marco Pereira, Maria Inês Caçador, Raquel Pires e Sandra Xavier.

Às companheiras de viagem de doutoramento, agradeço pelas partilhas, disponibilidade e espírito de entreajuda que são tão característicos deste grupo. Agradeço também pelas revisões atentas e críticas construtivas que contribuíram para este produto final.

Um agradecimento especial à Catarina e à Maria Inês que acompanharam de perto o início da jornada do Be a Mom Coping with Depression. À Daniela, pelo apoio constante nos meus pedidos, dúvidas e partilhas. À Fabiana, agradeço pela ajuda preciosa desde o início deste percurso até à sua etapa final, pela disponibilidade e pelas palavras fofinhas de apoio. É um privilégio poder aprender e trabalhar contigo.

Às alunas de Mestrado que colaboraram no projeto, seja na elaboração do protocolo de intervenção, na participação nas sessões, ou na divulgação dos estudos, obrigada pela dedicação e apoio fundamental.

A todas as mães que mostraram disponibilidade em participar nos estudos, e em particular às mães que tive oportunidade de acompanhar de forma próxima, expresso uma enorme gratidão. Aprendi com cada uma delas a ser melhor profissional e a ver beleza além da adversidade. Agradeço a todas pela confiança ao embarcarem neste projeto e pelas palavras de carinho.

Agradeço ainda às instituições e entidades que apoiaram este projeto de investigação. À Faculdade de Psicologia e de Ciências da Educação da Universidade de Coimbra e ao Centro de Investigação em Neuropsicologia e Intervenção Cognitivo-comportamental, assim como a todos os seus colaboradores, agradeço pelo acolhimento institucional e pelas oportunidades de formação disponibilizadas, que contribuíram para o meu crescimento profissional. À equipa informática da RedLight, responsável pelo desenvolvimento da plataforma, agradeço pela disponibilidade e contribuição para a concretização deste projeto. À Fundação para a Ciência e Tecnologia, pelo reconhecimento da relevância deste projeto e pelo seu financiamento.

Deixo um grande agradecimento a todas pessoas que foram pilares ao longo do meu percurso e que me transmitiram sempre força para que chegasse até aqui. Obrigada por estarem sempre presentes, nas gargalhadas e nas lágrimas.

À Nicas, pela extraordinária amiga que se tornou família. Obrigada por me apoiares nas loucuras e nos momentos mais difíceis e por compreenderes tão bem as minhas dores. À Sofia, pela paciência e pelas palavras sábias nos momentos certos. Agradeço ainda pela coragem em ler a tese! À Filipa, pelos risos e momentos de descontração, pelas conversas longas no carro. À Ana, a amiga desde sempre. Obrigada por continuares do meu lado, por crescermos juntas ao longo de tantos anos, pelo apoio e interesse genuíno.

À minha família – pais, irmãos, cunhadas, tios e padrinhos – pelo amor e apoio contante, nos vários desafios presentes ao longo deste percurso. Obrigada por me mostrarem que nunca estou sozinha. Aos meus pais, em particular, agradeço por me terem transmitido os valores pelos quais me guio, pela educação e pelas oportunidades que me deram. E à Alice, obrigada pela luz nos momentos de maior escuridão. Ver o mundo através dos olhos de uma criança é realmente um privilégio e uma aprendizagem.

À Mariana, pela força e resiliência presentes ao longo desta viagem.

Index

Index of Tables	xiv
Index of Figures	xvi
List of Abbreviations and Acronyms	xix
Abstract	xxi
Resumo	xxiv

Introductory Note	1
-------------------	---

Chapter I | Theoretical Framework

5

1. The transition to motherhood and the increased vulnerability to develop mental health problems	7
2. Postpartum depression	9
2.1. Clinical description: Symptoms, heterogeneity and risk factors	9
2.2. The negative consequences of untreated postpartum depression	10
2.3. Treatment for postpartum depression	12
2.4. Challenges in seeking professional help	14
3. E-mental health and new treatment approaches for postpartum depression	17
3.1. Web-based interventions for the treatment of postpartum depression	18
3.2. The role of human support	20
3.3. Blended interventions and current evidence	22
3.4. Research gaps and further directions	24

Chapter II | Objectives and Methods

29

1. Research objectives	32
2. Methods	34
2.1. Research project design	34
2.2. Participants and procedures	36
2.3. Variables and measures	41
2.4. Intervention	43
2.5. Methodological and statistical options	48

2.6. Ethical considerations	50
Chapter III Empirical studies	55
EMPIRICAL STUDY I Profiles of women with postpartum depressive symptoms: A latent profile analysis using the Edinburgh Postnatal Depression Scale factors	57
EMPIRICAL STUDY II A blended psychological intervention for postpartum depression: Acceptability and preferences in women presenting depressive symptoms	84
EMPIRICAL STUDY III A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: A Case Study	110
EMPIRICAL STUDY IV Be a Mom Coping with Depression: A feasibility study of a blended cognitive-behavioral intervention for postpartum depression	140
EMPIRICAL STUDY V Blended CBT intervention vs. a guided web-based intervention for postpartum depression: Results from a pilot randomized controlled trial	182
Chapter IV General Discussion	220
1. Summary of the main findings	222
2. General discussion of the main findings	226
2.1. Diversity of postpartum women’s emotional experience	226
2.2. Development and evaluation of Be a Mom Coping with Depression	228
3. Strengths and limitations	237
4. Implications and final considerations	240
4.1. Implications for future research	240
4.2. Implications for clinical practice and health policy	242
References	248
Appendix	278
Appendix I	281
Appendix II	304

Index of Tables

Chapter II | Objectives and Methods

Table 1. Specific research objectives for the empirical studies	33
Table 2. Overview of the samples in each empirical study	41
Table 3. Overview of variables and measures for each research phase and empirical study	42
Table 4. Structure and contents of Be a Mom Coping with Depression	45

Chapter III | Empirical Studies

EMPIRICAL STUDY I

Table 1. Factor loadings of confirmatory factor analysis of the EPDS for three-factor model	66
Table 2. Correlations between the EPDS dimensions and sociodemographic characteristics and risk factors for PPD	67
Table 3. Goodness-of-fit statistics for latent profile analyses	70
Table 4. The relationship between the three latent profiles and the covariates: Descriptives and differences between profiles	71

EMPIRICAL STUDY II

Table 1. Sociodemographic, clinical and infant-related characteristics of the sample	92
Table 2. Women's acceptability of blended psychological interventions for the treatment of PPD	94
Table 3. Univariate and multivariate logistic regressions of the factors associated with perceived utility of a blended intervention for PPD	96
Table 4. Univariate and multivariate logistic regressions of the factors associated	

with availability for use a blended intervention for PPD 98

Table 5. Women’s preferences for a blended psychological intervention’s characteristics 99

EMPIRICAL STUDY III

Table 1. General structure of the blended intervention Be a Mom Coping with Depression 115

Table 2. Patient’s pre- and postintervention assessments 128

EMPIRICAL STUDY IV

Table 1. Main themes, subthemes, and representative quotes from participants’ interviews 157

Table 2. Participants’ pre- and post-intervention assessments 164

EMPIRICAL STUDY V

Table 1. Participants’ sociodemographic and clinical characteristics at baseline 196

Table 2. Usage of web-based program 198

Table 3. Means, standard deviation, and mixed ANOVA with time, group and time x group effects 201

Appendix

APPENDIX II

Table 1. Study variables and assessment points 315

Index of Figures

Chapter I | Theoretical Framework

Figure 1. The phases of intervention development 26

Chapter II | Objectives and Methods

Figure 2. Flow of data collection and participants in Study IV 39

Figure 3. Flow of data collection and participants in Study V 40

Figure 4. Be a Mom Coping with Depression logotype 44

Chapter III | Empirical Studies

EMPIRICAL STUDY I

Figure 1. Three-profile model and means in the EPDS dimensions 68

EMPIRICAL STUDY III

Figure 1. Depressed mood reporting throughout the sessions 128

EMPIRICAL STUDY IV

Figure 1. Flowchart of the participants' inclusion in the study 149

Figure 2. General structure of the Be a Mom Coping with Depression intervention 151

EMPIRICAL STUDY V

Figure 1. Flowchart of the participants in the study 195

Figure 2. Participant's acceptability of both intervention arms 200

Figure 3. Mean scores on the EPDS across the three assessment points 202

Chapter IV | General Discussion

Figure 5. Proposal of a stepped-care model for PPD management	244
--	-----

Appendix

APPENDIX II

Figure 1. Flowchart of the study	311
Figure 2. Blended Be a Mom—structure and content of sessions	313

List of Abbreviations and Acronyms

AAQ-II	Acceptance and Action Questionnaire-II
ACT	Acceptance and Commitment Therapy
ANOVA	Analysis of variance
APA	American Psychiatric Association
CBT	Cognitive and Behavioral Therapy
CFA	Confirmatory factor analysis
CompACT	Comprehensive Assessment of Acceptance and Commitment Therapy Processes
CONSORT	Consolidated Standards of Reporting Trials
COVID-19	Coronavirus Disease – 2019
DERS-SR	Difficulties in Emotion Regulation Scale – Short Form
DSM-5	Diagnostic and Statistical Manual of Mental Disorders – fifth edition
EPDS	Edinburgh Postnatal Depression Scale
FCT	Fundação para a Ciência e a Tecnologia
HADS-A	Hospital Anxiety and Depression Scale - Anxiety subscale
ICTs	Information and Communication Technologies
IMS-S	Investment Model Scale – Satisfaction subscale
IPT	Interpersonal Psychotherapy
ITT	Intention-to-treat
LPA	Latent profile analysis
PDPI-R	Postpartum Depression Predictors Inventory – Revised
PMAD	Perinatal mood and anxiety disorders
PMPS-E	Perceived Maternal Parenting Self-Efficacy
PNTQ	Postnatal Negative Thoughts Questionnaire
PP	Per-protocol
PPD	Postpartum depression
RCI	Reliable Change Index
RCT	Randomized controlled trial
RD&H	Relationships, Development & Health
SCID-5	Structured Clinical Interview for the DSM-5
SCS-SF	Self-Compassion Scale—Short Form

SPSS	Statistical Package for the Social Sciences
TAU	Treatment as usual
WAI-SR	Working Alliance Inventory – Short Form
WHO	World Health Organization

Abstract

Background

Postpartum depression (PPD) is a prevalent condition that negatively impacts not only the woman but also the infant, the family environment and the society. Additionally, women face several structural, attitudinal and knowledge-related barriers that hinder their access to adequate treatment. Thus, it is paramount to make available evidence-based interventions for PPD using delivery formats that can facilitate the help-seeking process. Blended interventions combine face-to-face treatment with e-health tools, benefiting from the advantages of both components. Thus, a blended intervention for PPD can increase treatment's flexibility and accessibility, as women could access contents and practice therapeutic strategies autonomously. On the other hand, a psychologist can provide individual support and tailored feedback, adapting the intervention to women's needs. The literature on blended treatment is still scarce, and this intervention format has not been investigated for PPD. Thus, the main objectives of this research project were: 1) to understand postpartum women's emotional experience associated with depressive symptoms and their attitudes towards blended interventions; and 2) to develop and evaluate a blended intervention for the treatment of PPD – Be a Mom Coping with Depression.

Methods

This research work comprised two phases and included five empirical studies. In Phase I, a cross sectional study was conducted to understand the heterogeneity of PPD characteristics and to explore acceptability and preferences concerning blended psychological interventions, among a sample of postpartum women presenting clinically relevant depressive symptoms (487 and 235 participants, respectively). In Phase II, all studies followed a longitudinal design and aimed to evaluate Be a Mom Coping with Depression, consisting of: 1) a case study to describe the application of the blended intervention; 2) a study to assess the feasibility and acceptability of the blended intervention, in a sample of 9 women; and 3) a pilot randomized controlled trial to evaluate the acceptability and preliminary effectiveness of the intervention. In this study, a total of 34 women with clinically relevant depressive symptoms were randomly assigned to the blended intervention ($n=17$) or the control condition, a therapist guided web-based intervention ($n=17$), and completed baseline, post-intervention and 3-month follow-up assessments.

Participants completed self-report questionnaires to assess individual outcomes (e.g., depressive symptoms), relationship outcomes (marital satisfaction), psychological processes (e.g., self-compassion) and intervention's related information (e.g., e-health literacy).

Results

In Phase I, the confirmatory factor analysis revealed a three-factor structure of the Portuguese version of the Edinburgh Postnatal Depression Scale: depression, anxiety, and anhedonia. Based on these dimensions, three profiles of women presenting PPD symptoms were identified and labeled as mild anxious-depressive symptoms, moderate anxious-depressive symptoms, and severe PPD symptoms. Additionally, the results revealed that participants considered a blended intervention for PPD useful, advantageous and would be available to use it. Women who were married or in a relationship, employed, with younger babies or with less severe depressive symptoms had a higher likelihood of perceiving a blended intervention as useful. Higher educational levels increased the likelihood of being available to receive a blended treatment. The findings also provided insight about women's preferences for blended treatment.

Overall, the results of Phase II supported the feasibility, acceptability, usability and potential effectiveness of Be a Mom Coping with Depression. The description of the case study highlighted the clinical improvements and the perceived advantages of the intervention. The results suggested high adherence and completion rates, and the blended intervention was found to be feasible and acceptable. The findings of the pilot study showed a significant reduction in depressive symptoms and improvements in secondary outcomes (anxiety, negative thoughts, self-efficacy, emotion regulation, self-compassion and psychological flexibility) from baseline to post-intervention in both interventions (blended intervention and guided web-based intervention), but no time x group interaction effects were found.

Conclusions

The findings emphasize the importance of understanding PPD as a heterogeneous condition and the need to effectively detecting it through more tailored screening approaches. This research work has encouraged further evaluation of Be a Mom Coping with Depression and provided an opportunity to reflect on the potential of e-health tools in the treatment for PPD, particularly in the challenging context of postpartum women's access to mental health services.

Keywords

Postpartum depression; Heterogeneity of symptoms; Cognitive-behavioral therapy; Blended intervention; Be a Mom Coping with Depression; Feasibility; Pilot randomized controlled trial.

Resumo

Introdução

A depressão pós-parto (DPP) é uma condição prevalente que impacta negativamente não só a mulher, mas também o bebé, a família e a sociedade. Além disso, as mães enfrentam barreiras estruturais, atitudinais e associadas ao conhecimento que dificultam o acesso a tratamento adequado. Assim, é essencial disponibilizar intervenções baseadas em evidência para a DPP em formatos que facilitem a procura de ajuda. As intervenções combinadas integram o tratamento presencial com ferramentas *e-health*, beneficiando das vantagens de ambos. Uma intervenção combinada para a DPP pode aumentar a flexibilidade e acessibilidade do tratamento, pois as mães poderiam aceder a conteúdos e praticar estratégias terapêuticas autonomamente. Por sua vez, um psicólogo pode dar apoio individual e *feedback* personalizado, adaptando a intervenção às necessidades das mulheres. A literatura sobre o tratamento combinado é reduzida e este formato de intervenção não foi investigado para a DPP. Os principais objetivos deste projeto de investigação foram: 1) compreender a experiência emocional das mulheres no período pós-parto associada aos sintomas depressivos e as atitudes em relação às intervenções combinadas; e 2) desenvolver e avaliar uma intervenção combinada para o tratamento da DPP – Be a Mom Coping with Depression.

Metodologia

Este projeto compreendeu duas fases e incluiu cinco estudos. Na Fase I, foi realizado um estudo transversal para compreender a heterogeneidade de características da DPP e explorar a aceitabilidade e preferências quanto a intervenções psicológicas combinadas, numa amostra de mulheres no período pós-parto que apresentavam sintomas depressivos clinicamente relevantes (487 e 235 participantes, respetivamente). Na Fase II, os estudos seguiram um desenho longitudinal e pretenderam avaliar o Be a Mom Coping with Depression, consistindo em: 1) um estudo de caso para descrever a aplicação da intervenção combinada; 2) um estudo para avaliar a viabilidade e aceitabilidade da intervenção, numa amostra de 9 mulheres; e 3) um ensaio clínico aleatorizado piloto para avaliar a aceitabilidade e a eficácia preliminar da intervenção. Neste estudo, um total de 34 mulheres com sintomas depressivos clinicamente relevantes foram aleatoriamente alocadas à intervenção combinada ($n=17$) ou à condição de controlo, uma

intervenção online guiada por um terapeuta ($n=17$), e completaram um protocolo de avaliação nos momentos pré-intervenção, pós-intervenção e 3 meses após o pós-intervenção. Os participantes preencheram questionários de autorresposta para avaliar dados individuais (e.g., sintomas depressivos), relacionais (satisfação conjugal), processos psicológicos (e.g., autocompaixão) e dados relacionados com a intervenção (e.g., literacia em *e-health*).

Resultados

Na Fase I, a análise fatorial confirmatória revelou uma estrutura de três fatores na versão portuguesa da Escala de Depressão Pós-Parto de Edinburgo: depressão, ansiedade e anedonia. Com base nas dimensões, foram identificados e designados três perfis de mulheres com sintomas de DPP como sintomas leves de ansiedade-depressão, sintomas moderados de ansiedade-depressão e sintomas severos de DPP. Adicionalmente, as participantes consideraram uma intervenção combinada para a DPP como útil, vantajosa e estariam dispostas a utilizá-la. Mulheres casadas ou numa relação, empregadas, com bebés mais novos ou com sintomas depressivos menos severos tinham uma maior probabilidade de considerar uma intervenção combinada como útil. Níveis mais elevados de educação aumentaram a probabilidade de estar disponível para receber um tratamento combinado. Os resultados informaram ainda sobre as preferências para a intervenção combinada.

No geral, os resultados da Fase II apoiaram a viabilidade, aceitabilidade, usabilidade e potencial eficácia do *Be a Mom Coping with Depression*. A descrição do estudo de caso evidenciou as melhorias clínicas e as vantagens percebidas da intervenção. Os resultados sugeriram taxas de adesão e de conclusão elevadas, e a intervenção combinada mostrou ser viável e aceitável. Os resultados do estudo piloto mostraram uma redução significativa nos sintomas depressivos e melhorias nos resultados secundários (ansiedade, pensamentos negativos, autoeficácia, regulação emocional, autocompaixão e flexibilidade psicológica) desde o momento pré-intervenção até ao momento pós-intervenção, em ambas as intervenções (intervenção combinada e intervenção online guiada), mas não foram encontrados efeitos de interação tempo x grupo.

Conclusões

Os resultados realçam a importância de compreender a DPP como uma condição diversa e de a detetar eficazmente através de abordagens ao *screening* mais personalizadas. Este projeto

de investigação incentivou a avaliação futura do Be a Mom Coping with Depression e a reflexão sobre o potencial das ferramentas *e-health* no tratamento da DPP, especialmente no contexto desafiante de acesso das mulheres no período pós-parto aos serviços de saúde mental.

Palavras-chave

Depressão pós-parto; Heterogeneidade de sintomas; Terapia cognitivo-comportamental; Intervenção combinada; Be a Mom Coping with Depression; Viabilidade; Ensaio clínico aleatorizado piloto.

Introductory Note

The birth of a baby is a major life transition in women's lives that produces significant and profound changes. Women face a wide range of stress factors and challenges associated with the transition to motherhood, making it a time of increased vulnerability for developing mental health problems. Although the postpartum period is culturally characterized as a positive life period, it is not perceived like that by all women, and approximately 17% of women develop postpartum depression.

Postpartum depression is a mental health problem with clinical specificities, associated with the timing of its occurrence and the existence of different manifestation of symptoms. It can affect women in many spheres of their lives, with negative consequences extending to the infant, family and society. While psychological interventions, particularly cognitive-behavioral therapy, are recommended for its treatment, many women do not seek help nor receive adequate treatment for their depressive symptoms. This is often due to several structural (e.g., lack of time, childcare or job limitations), attitudinal (e.g., stigma) and knowledge-related barriers. Therefore, new treatment delivery formats are required and the integration of e-health tools in perinatal healthcare has the potential for improving accessibility to treatment.

In this context, *Be a Mom Coping with Depression* was developed in the Portuguese context as a blended intervention for the treatment of postpartum depression, combining sessions with a psychologist and online sessions through a web-based program. The intervention follows the principles of cognitive-behavioral therapy and includes content based on acceptance- and compassion-focused approaches. To the best of our knowledge, this is the first blended intervention specifically developed for postpartum depression, either nationally or internationally. Thus, this research project aims to address the identified gaps in the literature and to provide innovative contributions by investigating a blended treatment format, based on cognitive-behavioral therapy, for postpartum depression. The present work is organized in four chapters, hereby briefly described.

Chapter I | Theoretical Framework provides a literature review on the current state-of-the-art regarding postpartum depression and is organized into 3 major sections. First, it begins with a contextualization about the transition to motherhood and the increased vulnerability that women face in developing mental health problems. Secondly, the chapter focuses on the description of postpartum depression, including its clinical presentation(s), negative

consequences, treatment options and preferences, as well as challenges in seeking professional help. Afterwards, e-mental health and new treatment approaches for postpartum depression are addressed in the third section. Here, an overview of web-based interventions for the treatment of postpartum depression is presented, followed by a reflection about the role of human support and current evidence regarding blended interventions. This section ends with a summary of the research gaps and further directions identified in the literature, which guided the formulation of the objectives for the present research project.

Chapter II | Objectives and Methods presents the research aims and general methodologic options. This research work comprised two phases, each with distinct objectives: 1) to understand postpartum women's emotional experience associated with depressive symptoms and attitudes towards blended interventions; and 2) to develop and evaluate a blended intervention for the treatment of postpartum depression. In this chapter, information regarding the different study designs, procedures, variables and instruments used, as the methodological and statistical options, is described. The development process of Be a Mom Coping with Depression and the changes made to the initial research project are outlined. The chapter concludes with the presentation of ethical considerations involved in the conception, implementation and dissemination of the research work.

Chapter III | Empirical Studies includes the five studies that comprise the present research work, presented in the format of scientific papers. Four empirical studies are published in international peer-reviewed journals (Empirical studies I, II, III and IV) and one is submitted for publication (Empirical study V). In this chapter, papers are presented according to the standards of each scientific journal, but without the final publication formatting.

Empirical studies I and II integrate Phase I of this research project. Empirical study I, entitled *Profiles of women with postpartum depressive symptoms: A latent profile analysis using the Edinburgh Postnatal Depression Scale factors*, aimed to explore the multidimensionality of symptoms assessed with the Edinburgh Postnatal Depression Scale and to characterize the profiles of women with symptoms of postpartum depression. Empirical study II, entitled *A blended psychological intervention for postpartum depression: Acceptability and preferences in women presenting depressive symptoms*, assessed the acceptability and preferences for a blended intervention for the treatment of postpartum depression, among Portuguese postpartum women.

Empirical studies III, IV and V are part of Phase II. Empirical study III, entitled *A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: A Case Study*,

described the application of the blended intervention *Be a Mom Coping with Depression*. Empirical study IV, entitled *Be a Mom Coping with Depression: A feasibility study of a blended cognitive-behavioral intervention for postpartum depression*, sought to assess the intervention's feasibility and acceptability among women with postpartum depression. Finally, Empirical study V, entitled *Blended CBT intervention vs. a guided web-based intervention for postpartum depression: Results from a pilot randomized controlled trial*, aimed to evaluate the acceptability and preliminary effectiveness of *Be a Mom Coping with Depression*.

Chapter IV | General Discussion provides a comprehensive summary and discussion of the key findings obtained from this research work and their implications. This global discussion and evaluation of the research work is also explored through a critical analysis of its strengths and limitations. In the final section, a discussion of the broader implications of the findings and their relevance for future research, clinical practice, and health policy making in perinatal mental health is presented.

Attached to this work, two **Appendixes** can be found. Appendix I is an overview of the Therapist Manual that contains detailed information about the structure and content of each session of the blended intervention developed within this research project. Appendix II comprises a manuscript published in an international peer-reviewed journal entitled *A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: Study Protocol for a Randomized Controlled Trial*. This paper outlines the protocol for the randomized controlled trial proposed in the initial research project aimed to examine the acceptability and efficacy of the blended intervention for postpartum depression.

Chapter I | Theoretical Framework

1. The transition to motherhood and the increased vulnerability to develop mental health problems

The birth of a child is a major life transition in women's lives that produces significant and profound changes (Moustafa et al., 2020). Physiological changes from pregnancy to postpartum are numerous, including the changes in the body and hormone levels (Di Florio & Meltzer-Brody, 2015), and many women experience psychical consequences such as tiredness, back pain or breast problems (Woolhouse et al., 2014). In addition, women face several demands associated with childcare (e.g., sleep deprivation, low energy, changes in routines, financial constraints) and adaptations in their relationships during the postpartum period (Di Florio & Meltzer-Brody, 2015; O'Hara and McCabe, 2013). Indeed, women have to simultaneously adapt to a new role as a mother and develop a maternal identity, while managing their multiple social roles, relationships and responsibilities (Emmanuel & St John, 2010). For these reasons, many mothers also identify the increased need for social support as one of the challenges faced during the postpartum period (Kanotra et al., 2007).

Although the transition to motherhood is culturally characterized as a positive life period, it is not perceived like that by all women (Moustafa et al., 2020). There is a conception of motherhood replete with unrealistic expectations and myths, starting with the idea that postpartum period should be the happiest time in a woman's life (Barnes, 2006). Society also perpetuates the ideal of a good mother as someone with a maternal instinct, who knows everything, who will bond automatically with the baby and who can manage every responsibility on her own (Barnes, 2006). When comparing their reality and experiences with these expectations and society's standards for motherhood, women often feel inadequate and experience negative thoughts, being one of the most reported "I am a bad mother" (Cree, 2010; Law et al., 2021). It has been shown that having motherhood-related negative thoughts is associated to feelings of shame and guilt, since women feel that they are not corresponding to what was expected (by themselves and by others) and find those thoughts unacceptable in a period of life supposedly happy (Barnes, 2006; Law et al., 2021). Shame and guilt, in turn, seem to be related to the occurrence and maintenance of psychological symptoms and mental health problems in the postpartum period (Caldwell et al., 2021). Indeed, it has been found that women who perceived the transition to motherhood as difficult reported higher levels of shame, self-

criticism, and increased symptoms of depression and anxiety (Emmanuel & St John, 2010; Cree, 2010).

The wide range of stress factors and difficulties inherent to the postpartum period makes it a time of increased vulnerability for developing mental health problems (Howard & Khalifeh, 2020). Additionally, there is a heightened life-time vulnerability associated to gender, as women are more susceptible to develop mood and anxiety disorders than men (Moreno-Agostino et al., 2021; Steel et al., 2014). Perinatal mood and anxiety disorders (PMAD) occur during both pregnancy and the postpartum period, representing the most prevalent women's health problems. Among these disorders, postpartum depression has been extensively studied and is widely recognized (Howard & Khalifeh, 2020; Meltzer-Brody & Rubinow, 2021).

2. Postpartum depression

2.1. Clinical description: Symptoms, heterogeneity and risk factors

Postpartum depression (PPD) is the most common clinical condition after childbirth (Vesga-Lopez et al., 2008). According to several studies, PPD has a global prevalence of 17% (Shorey et al., 2018; Wang et al., 2021). In Portugal, a prevalence of 13% was found (Maia et al., 2011) and it is estimated that PPD affects 1 in 7 women.

According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, Text Revision (American Psychiatric Association [APA], 2013, 2022), PPD is classified as a depressive episode with peripartum onset when occurring during pregnancy or in the four weeks after childbirth. However, there is a clinical consensus that PPD can occur within the first 12 months postpartum (Di Florio & Meltzer-Brody, 2015; O'Hara and McCabe, 2013). Symptoms of PPD are similar to those of a depressive episode (e.g., sadness, irritability, loss of appetite, sleep disturbance, feelings of guilt, fatigue) persisting for more than two weeks (APA, 2013). However, PPD seems to be distinct from an episode of depression by the fact that it is associated with a major life transition, the birth of a baby (Moustafa et al., 2020). It is also more common for women to present depression after childbirth when compared to other periods in a woman's life (Di Florio & Meltzer-Brody, 2015). So, PPD presents some specificities related to the timing of its occurrence. In addition to the typical symptoms of a major depressive episode, it is also usually characterized by symptoms of anxiety, emotional lability, obsessive thoughts or excessive worries about the baby, increased difficulties in concentration and decision-making (Batt et al., 2020; Robertson et al., 2003).

In addition to its clinical specificities, recent research has also described heterogeneity among PPD symptoms and the possibility to distinguish three dimensions of symptoms, namely, depression, anxiety and anhedonia (Chiu et al., 2017; Flom et al., 2018). As mentioned, PPD is diagnosed as a major depressive episode, in which either depressed mood or anhedonia should be present (APA, 2013). Anhedonia, i.e., a lack of interest or pleasure in activities, was considered a distinctive feature between women with PPD (Sun et al., 2019), as well as anxiety, which is not surprising given the high levels of comorbidity between anxiety and depressive symptoms during the postpartum period (Falah-Hassani et al., 2016). Recently, a study reported that about 70% of postpartum women with depressive symptoms also reported anxiety symptoms (Radoš et al., 2018).

In addition to these dimensions of symptoms, Batt et al. (2020) also suggested that different subtypes of PPD can be found according to the severity of symptoms. For instance, the authors stated that a single episode of depression during the postpartum period can be less severe when compared to cases of women with previous history of depression. It has also been found that different subtypes of PPD symptoms were associated to different risk factors (Chiu et al., 2017). Tuohy and McVey (2008) conducted research on this topic and described, for example, that negative changes in the marital relationship could predict higher levels of symptoms in depression and anxiety dimensions. Although the literature on this topic is still scarce, understanding the heterogeneous dimensions of PPD symptoms could better inform diagnosis and treatment (Flom et al., 2018).

PPD can affect all women, but there are some factors that can significantly increase the risk of developing this mental health problem (Robertson et al., 2003). Hutchens et al. (2020) have recently conducted an umbrella review summarizing the evidence of current systematic reviews and meta-analyses and found a total of 25 risk factors for PPD reported in the literature. Consistently with other studies (Evagorou et al., 2016; O'Hara and McCabe, 2013; Robertson et al., 2003), the most common risk factors were stressful life events, lack of social support, current or past experience of violence, depression during pregnancy and low satisfaction in partner relationship (Hutchens et al., 2020). Hutchens et al. (2020) also found that previous history of depression, unwanted or unplanned pregnancy, low self-esteem, financial difficulties, stress related to childcare and difficult infant temperament can increase the likelihood of developing PPD, although the evidence is limited.

2.2. The negative consequences of untreated postpartum depression

O'Hara and McCabe (2013) mentioned that "PPD creates personal suffering and diminishes a woman's ability to function effectively in many spheres of her life" (p. 387). Indeed, when not properly treated, PPD can negatively impact not only the woman's health but also the baby and the family environment, and those consequences can extend beyond the postpartum period.

At the individual level, PPD has been associated with poorer overall mental health. Women with PPD can have lower levels of self-esteem, positive affect, quality of life and higher levels of anxiety and anger, when compared to women not presenting PPD (Slomian et al., 2019). In addition, symptoms of PPD may persist over time and women are likely to experience recurrent depressive episodes in the future (O'Hara & McCabe, 2013). When depressive

symptoms are more severe, they can also be associated with thoughts of self-harm or suicidal ideation (Orsolini et al., 2016; Slomian et al., 2019).

The mother-infant relationship is frequently affected, as women with PPD tend to be more irritable, unresponsive, less affective, less sensitive to infant's cues and are less likely to play and engage in interactions with their baby (Field, 2010). They can then engage in inadequate caregiving practices and provide poorer maternal care, including the involvement in unsafe or less-healthy practices with their baby (Slomian et al., 2019). PPD has then a negative effect on mother-child bonding, with several studies reporting an association between mother's depression and infant's attachment insecurity (Śliwerski et al., 2020). Women with PPD also have an increased probability to discontinue breastfeeding, to be less satisfied or to experience difficulties in breastfeeding (Field, 2010).

Moreover, literature has consistently showed that PPD has a negative impact on children's development, particularly in the physical health (e.g., lower weight, more gastrointestinal infections, poorer cardiovascular functioning) and in the socioemotional and cognitive development (e.g., poorer language development, less expressiveness; Gelaye et al., 2016; O'Hara & McCabe, 2013; Slomian et al., 2019). Studies also revealed that depression in the mother during the postpartum period can be associated with later behavioral problems in infant's childhood and adolescence (O'Hara & McCabe, 2013), which highlights the potential harmful effects of mother's PPD in the baby.

Concerning the consequences on the family environment, women with PPD report more difficulties in their social relationships (Slomian et al., 2019). In marital relationships, PPD can contribute to reduced satisfaction and decreased intimacy with the partner (Barnes, 2006; Slomian et al., 2019). Also, PPD in the mother increases the probability of depression occurring in the partner during the postpartum period. Incidences of depression ranging from 24% to 50% were found in fathers whose partners had PPD (Goodman, 2004).

Furthermore, PPD can negatively impact society since it is associated with higher health resources utilization and economic burden. Petrou et al. (2002) conducted a study to assess the costs associated with PPD and found significantly higher costs associated with community care services (related to a higher number of contacts with health professionals) for women with PPD compared to mothers without PPD. In fact, it has been shown that mothers presenting PPD had significantly higher average health costs in the first year following childbirth and that the economic burden was not only associated to the mother with PPD but also extended to the partner and the baby, who also incurred in higher health costs (Epperson et al., 2020). Bauer et

al. (2016) described a total lifetime cost per woman with PPD of 75 728£ in the United Kingdom, which included costs associated to health and social care, productivity losses, health-related quality of life losses, as well as the negative impact on children. Thus, PPD is associated with societal negative consequences that need to be considered.

2.3. Treatment for postpartum depression

Recently, clinical evidence-based guidelines specifically focused on depression during pregnancy and the postpartum period were developed, based on the work of an international network of researchers and professionals (Riseup-PPD COST Action¹), and recommended psychological treatment for PPD (Bina et al., 2023), aligning with previous European and International practice guidelines (Austin et al., 2011; Motrico et al., 2022). Moreover, there is a consensus that psychological interventions should be provided as the first option to women with mild to moderate symptoms of depression and be combined with pharmacological treatment for women with severe PPD (Austin et al., 2011; Molenaar et al., 2018).

Regarding the psychological treatment for PPD, Cognitive and Behavioral Therapy (CBT) and Interpersonal Psychotherapy (IPT) are the recommended interventions by clinical practice guidelines (Motrico et al., 2022; Bina et al., 2023) due to their strong evidence of efficacy in this population (Branquinho et al., 2021; Nillni et al., 2018). Psychological interventions for PPD based on IPT are usually focused on role transitions and life changes, improving relationships and communication with other people, as well as increasing social support (BC Reproductive Mental Health Program & Williams, 2014). CBT, on its hand, is based on the connection between thoughts, emotions and behaviors and considers that cognitions influence emotional and behavioral reactions (Beck, 1995). According to this model, previous individual's experiences and other factors (e.g., biological and psychological) contribute to the development of vulnerability to certain underlying beliefs and negative patterns of thinking. These beliefs, in turn, can be activated during stressful periods that evoke transitions or changes, such as the postpartum period (Wenzel & Kleiman, 2015). CBT aims to recognize and deal with maladaptive negative

¹ Riseup-PPD COST Action (COST Action Research Innovation and Sustainable Pan-European Network in Peripartum Depression Disorder) is a multidisciplinary network dedicated to the understanding of depression during pregnancy and the postpartum period, including its prevention, assessment, treatment and global impact. The main author of this research thesis contributed to the work developed by this COST Action.

thoughts and to develop healthy coping strategies (BC Reproductive Mental Health Program & Williams, 2014).

There are several systematic reviews demonstrating the effectiveness of CBT in the treatment of PPD (Huang et al., 2018; Sockol, 2015; Pettman et al., 2023). A review including 14 randomized controlled trials (RCT) evaluating CBT interventions for PPD identified psychoeducation, cognitive restructuring, problem-solving, behavior management, goal setting and stress management as the most used CBT components in PPD treatment (Stamou et al., 2018). In addition, considering the specificities inherent to the postpartum period, CBT interventions for PPD frequently address motherhood-specific beliefs, discuss expectations and cultural concepts, and include an interpersonal component for greater efficacy (Batt et al., 2020). Specifically, these interventions should cover aspects such as the importance of practical and emotional support and dealing with changes within a couple's relationship (O'Mahen et al., 2012; Finlayson et al., 2020).

More recently, new developments of CBT – third-wave approaches – have been applied to interventions targeting PPD treatment. These approaches focus not on the content but on the function of the internal experiences (e.g., thoughts, emotions) to understand psychological suffering. Specifically, they aim to change how one relates to internal experiences, by developing an accepting and non-judging attitude towards them, instead of trying to change the experiences themselves (Hayes et al., 2006; Hayes et al., 2011). Although there is still little research applied to the perinatal context, there is promising evidence that third-wave CBT interventions could be effective in reducing depressive symptoms for postpartum women (Rodriguez-Muñoz et al., 2023; Waqas et al., 2023). Third-wave CBT approaches for PPD include Acceptance and Commitment Therapy (ACT) and compassion-based interventions, among others.

ACT-based interventions ultimately aim to increase psychological flexibility – the ability to contact fully and consciously to the present moment and to respond to internal and external events in a way that is consistent with one's values (Hayes et al., 2006; 2011). The promotion of psychological flexibility can be particularly relevant during the postpartum period, since women with PPD can have difficulties in accepting and dealing with their internal experiences (e.g., negative thoughts) and may engage in avoidance strategies (Fonseca et al., 2019), which in turn can increase their depressive symptoms (Fonseca et al., 2018a). ACT skills applied to postpartum women may facilitate the awareness of those thoughts and emotions, such as guilt or shame. Also, it can be challenging for postpartum women to maintain their sense of self or individuality, and ACT can help to focus in chosen values and behave in accordance (Bonacquisti et al., 2017).

Some ACT interventions have been developed for depressive and anxiety disorders in perinatal women. For instance, Waters et al. (2020) designed and evaluated the effectiveness of a group ACT-based intervention and the findings revealed a reduction in depressive symptoms as well as an increase in psychological flexibility.

Compassion-based interventions rely on the concept of self-compassion, defined as an attitude of kindness and connection towards suffering and its acceptance as part of the human experience in a nonjudgmental way (Gilbert, 2014; Neff, 2003). The promotion of self-compassion can be quite helpful for women with PPD, who often present high levels of shame and self-criticism, as well as rigid self-imposed standards related to their role as mothers (Cree, 2010). In fact, cultivating self-compassion in postpartum women can foster a caring attitude towards themselves, rather than self-criticism, help them recognize that all women face difficulties during the postpartum period, rather than feeling isolated in suffering, and promote a mindful posture towards painful thoughts and emotions, instead of feeling overwhelmed or over-identifying with them (Fonseca et al., 2019; Neff, 2003; Neff & Germer, 2013). Also, it has been found that self-compassion can act as a protective emotional regulation strategy for women in the postpartum period, since it can reduce the effect of self-criticism on negative thoughts (Pedro et al., 2019). Although they are still scarce, there are some compassion-based interventions for PPD. For instance, Kelman et al. (2018) evaluated the preliminary effectiveness of a brief compassion-based intervention in a sample of 137 perinatal women, delivered through the internet, and found that it produced reductions in both symptoms of depression and anxiety.

The integration of ACT and compassion-based elements with the “traditional” CBT is a natural progressive path and holds great relevance for the treatment of PPD. First, third-wave CBT approaches introduced constructs such as self-criticism and psychological inflexibility that are relevant to understand the occurrence and maintenance of PPD (Fonseca et al., 2020). And second, by addressing not only cognitive vulnerabilities, dysfunctional beliefs and maladaptive behaviors, but also promoting the acceptance of the diverse emotional experience and a more self-compassionate posture, an integrated approach would allow to provide a more tailored and potentially effective intervention for PPD (Fonseca et al., 2020; Hayes & Hofmann, 2021; Waqas et al., 2023).

2.4. Challenges in seeking professional help

Psychological interventions are the preferred treatment option for PPD reported by women (Dennis & Chung-Lee, 2006; Goodman, 2009). Despite showing a greater willingness to

engage in psychotherapy and the existence of several options for psychological treatment, women often report several structural, attitudinal and knowledge-related barriers that often prevent them to receive treatment for PPD (Bina, 2020; Daehn et al., 2022). Fonseca and Canavarro (2021) described the help-seeking process of women with PMAD in four stages: (1) Being aware of emotional problems (recognition of symptoms and perception of the need for help); (2) Generating options (evaluating the available options to address the symptoms); (3) Decision-making (selection and implementation of a help-seeking plan); and (4) Evaluation of help-seeking behavior (evaluation of the outcomes of the choice made). In each phase, women may face different barriers and difficulties.

The identification of PPD symptoms and recognition that they represent a mental health problem is the first step of the help-seeking process, and mental health literacy may act as a barrier (Fonseca & Canavarro, 2021). Indeed, many postpartum women have poor knowledge about mental health problems and about PPD (Button et al., 2017; Grissette et al., 2018). The knowledge barriers also assume a relevant role in the second phase of help-seeking, since women often do not know where to seek help and what are the effective treatment options (Daehn et al., 2022; Grissette et al., 2018). Women also face attitudinal barriers during this phase, being reluctant to seek psychological help due to stigma associated to mental illness (Button et al., 2017; Daehn et al., 2022). In fact, a study found that maternal shame significantly predicted negative attitudes towards help-seeking during the postpartum period (Dunford & Granger, 2017). In the final steps of the help-seeking process for PPD treatment, women face many practical and structural barriers, among which are the lack of screening in healthcare, the unavailability or limited accessibility of providers and specialized mental health services, the costs of treatment and women's financial difficulties, time constraints, logistics/transportation issues, geographic mismatch and lack of childcare (Daehn et al., 2022; Fonseca & Canavarro, 2021; Grissette et al., 2018; Maloni et al., 2013).

Bina (2020) conducted a review to identify the factors associated with women's mental health services use for PPD. Findings allowed to identify societal factors (e.g., economic factors, cultural norms associated to the postpartum period), the healthcare system resources and structure (e.g., long waiting lists), healthcare providers characteristics (e.g., little time available for PPD screening, limited knowledge or experience with PDD) and individual determinants (e.g., socio-demographic factors, attitudes regarding mental health services, knowledge about PPD). All these factors act as barriers for women to seek psychological treatment for PPD, and therefore several women do not get the help they need (Dennis & Chung-Lee, 2006).

Help-seeking rates for perinatal mental health problems, including PPD, are under 40% (Daehn et al., 2022; Dunford & Granger, 2017). For instance, in a sample of 198 Portuguese perinatal women with depressive symptoms, only 13.6% sought treatment (Fonseca et al., 2015). In this study, about 53% of women who had not sought help identified at least five barriers that they considered to prevent them from seeking professional assistance. A more recent study in Portugal revealed that about 80% of a sample of 416 perinatal women presenting active symptoms of depression were not receiving any treatment (Fonseca et al., 2023). This is particularly concerning given the high prevalence of PPD and its negative consequences, revealing the need to increase access to mental health services and to facilitate the help-seeking process. Fortunately, there is growing interest and investment in perinatal mental health services, as well as in research and development of public health interventions (Howard & Khalifeh, 2020).

3. E-mental health and new treatment approaches for postpartum depression

The emergence of Information and Communication Technologies (ICTs) and the widespread use of the internet have created opportunities for the delivery of services and to support health and healthcare (Barak et al., 2009). The concept of e-health was conceptualized by Eysenbach (2001) as a new field that included the merge of informatics, health, and business. More recently, e-health was described as the use of digital technologies for three purposes: (1) to monitor, track, and inform; (2) to facilitate communication with health professionals and to support them; and (3) to use the data collected to improve quality of health and healthcare (Shaw et al., 2017). E-mental health, in turn, was defined as the application of ICT to the delivery of services or information related to mental health (Riper et al., 2010).

E-mental health is then aimed to apply the new technologies and internet to screening, health promotion, prevention, early intervention in non-clinical population and treatment for mental health problems (Christensen & Hickie, 2010; Riper et al., 2010). A recent systematic review about e-health practices and services reported that mental health problems represented 20% of the illnesses addressed by e-health tools worldwide (da Fonseca et al., 2021), revealing the growing research in the e-mental health field. In fact, there is an increasing number of e-health interventions being used for the treatment of diverse mental health disorders (Taylor et al., 2021) and they seem to have several advantages. The possibility to provide treatment on-distance and to access interventions according to patient's convenience and availability increases accessibility and reduces costs associated to treatment (Andersson & Titov, 2014; Lal & Adair, 2014). The interventions can also be tailored to individual's characteristics, representing a flexible option for patients, and the interactivity and engagement may facilitate learning and improve patients' self-management (Andersson & Titov, 2014). Therefore, it has been stated that e-mental health tools can potentially reduce the gap between health services' limited availability to provide adequate responses and the increasing demand for psychological treatment. Additionally, they can increase treatment efficiency and the dissemination of psychological interventions (Eysenbach, 2001; Fairburn & Patel, 2017; Lal & Adair, 2014).

E-mental health can assume different formats such as telepsychology/online therapy, mobile-based interventions, virtual reality, internet-based interventions, among others (Barak et al., 2009; Mohr et al., 2013). Particularly for internet-delivered interventions, different terms

have been used throughout the past decades, such as web-based interventions, internet-based therapy, computer-mediated interventions, online therapy or digital interventions (Andersson et al., 2016; Barak et al., 2009), and such inconsistency in the terminology used can be explained by the differences in the technological and support features (Smoktunowicz et al., 2020). The concept of web-based intervention seems to be one of the most common terms and it refers to structured psychological interventions delivered through the internet (e.g., using a platform, program or website) grounded on evidence-based therapeutic protocols (Andersson et al., 2016; Mohr et al., 2013). Web-based interventions generally aim to increase knowledge and awareness to both educate and promote therapeutic change through the use of multimedia and interactive elements (Barak et al., 2009).

According to Barak et al. (2009), guidance and support constitute important components of e-health tools and therefore web-based interventions can be classified as self-guided or human-supported. The main differences between these two – which can be seen as a continuous from the inexistence of feedback to high levels of support – rely on the type, amount, frequency, and immediacy of contact (Barak et al., 2009). For instance, the contact with a therapist or health professional can take place in real-time, through a synchronous communication channel (e.g., telephone calls), or be a delayed interaction, through asynchronous communication (e.g., email; Andersson & Titov, 2014).

CBT is the therapeutic model that has most been applied to other delivery formats, including to web-based interventions – also named as internet-based cognitive behavior therapy (Andersson et al., 2016). A large number of trials has been conducted and demonstrated that web-based interventions grounded on CBT were effective in both prevention and treatment of several mental health problems, including depressive and anxiety disorders (Carlbring et al., 2018; Sander et al., 2016; Taylor et al., 2021).

3.1. Web-based interventions for the treatment of postpartum depression

Literature has documented various potentials of applying web-based interventions to the treatment of PPD. First, women in the postpartum period already use the internet to search for information related to mental health and coping strategies for PPD (Maloni et al., 2013). Moreover, a study revealed that postpartum women with depressive symptoms reported engaging more often in e-health behaviors related to mental health (e.g., using the internet to search for information about symptoms or sharing experiences on forums) when compared to women without symptoms (Fonseca et al., 2016). In addition, women with PPD symptoms have

reported positive attitudes towards the use of digital tools, perceived them as useful and had intention to use web-based psychological interventions (Fonseca et al., 2016).

Second, web-based interventions can mitigate the impact of several barriers women face when seeking psychological help. In fact, both women and health professionals recognized as advantageous the possibility to remain anonymous, which reduces the fear of stigma, the easiness to access and use the web-based intervention as well as the reduction of waiting time for treatment as usual (TAU; Schmidt-Hantke & Jacobi, 2023). Web-based interventions can also increase treatment's accessibility, by reaching women from geographic distant areas or with limited access to healthcare, and reduce costs (Lal & Adair, 2014; Mu et al., 2021). Additionally, the flexibility to use the intervention according to women's availability and from any location is particularly relevant during the postpartum period, given the inherent challenges of this phase, including childcare constraints (Schmidt-Hantke & Jacobi, 2023). Thus, it seems that web-based interventions have the potential to expand women's access to psychological treatment for PPD (Novick et al., 2022).

Many web-based interventions for PPD treatment, mainly based on CBT, have been developed in the last years (Branquinho et al., 2021; Nair et al., 2018). For instance, the Netmums program was developed in the UK, consisting of 11 sessions delivered over a period of 15 weeks, with the option for online therapist feedback (O'Mahen et al., 2013). Later adaptations to this web-based program included phone call support (O'Mahen et al., 2014). MomMoodBooster is another example of a web-based CBT intervention for PPD and its feasibility and effectiveness have been evaluated in different studies (Danaher et al., 2013; Milgrom et al., 2016; Milgrom et al., 2021).

Although the evidence is still developing, some systematic reviews were conducted to assess the efficacy of web-based interventions for perinatal depression. Overall, improvements in depressive symptoms after the intervention were observed in several studies (Ashford et al., 2016; Lee et al., 2016; Nair et al., 2018). A recent review included 7 RCTs evaluating web-based interventions for PPD, with a total sample of 2227 women, and its findings corroborated the effectiveness of this treatment format, reporting moderate effect sizes (Mu et al., 2021). Another review conducted by Roman et al. (2020) included 6 studies and reported the following common elements between internet-based intervention for PPD: assistance and guidance from a therapist; a standardized program; the incorporation of therapeutic strategies such as cognitive restructuring, behavioral activation and psychoeducation.

Despite the advantages and the promising evidence on effectiveness, web-based interventions pose some important disadvantages in the treatment of PPD. The most reported limitation in the literature is related to the high attrition rates observed in the studies, which can range up to 60-80% (Lee et al., 2016; Nair et al., 2018). It is usually hypothesized that these dropouts can be explained by the absence of therapist support throughout the intervention (Andersson & Titov, 2014). Indeed, the study conducted by Schmidt-Hantke and Jacobi (2023) revealed that the absence of personal contact was a barrier to use e-mental health tools by women in the perinatal period. Also, the lack of verbal and non-verbal communication and the impossibility to discuss specific difficulties were pointed out as disadvantages of web-based interventions (Schmidt-Hantke & Jacobi, 2023; Schuster et al., 2018b).

Moreover, web-based interventions can raise privacy and security concerns, particularly regarding the data collection and storage (Andersson & Titov, 2014; Schuster et al., 2018b), and clinical concerns regarding its use by women with more severe symptoms (Schmidt-Hantke & Jacobi, 2023). In addition, the ability to assess and adequately respond to suicide risk is limited in this format of intervention and the possible negative or harmful effects are little investigated (Ebert et al., 2018). Web-based interventions may also not be accessible to vulnerable groups, such as women with low literacy levels in ICTs or without internet access (Andersson & Titov, 2014; Mendes-Santos et al., 2020). For these reasons, the use of web-based interventions for PPD can be limited and they should not replace face-to-face treatment completely, but they can rather be an important complement (Wentzel et al., 2016).

3.2. The role of human support

The therapeutic relationship can be defined as the bond established between the therapist and the patient and their agreement on the treatment course (Bur et al., 2022; Kazantzis & Dobson, 2022). This relationship aims to be a combination of elements of alliance, empathy and validation, constituting a central element in CBT (Kazantzis & Dobson, 2022), and there is an increased interest in understanding the role it assumes in web-based interventions for mental health problems.

Therapists' guidance in web-based interventions can vary in its form (using synchronous or asynchronous communication channels) and amount of time (Berger, 2017), and it usually aims to provide feedback, reinforce participants' progress and to answer questions (Wehmann et al., 2020). The relevance of human support in web-based interventions for mental health problems has been explored and it seems to have advantages but also some limitations.

Research has consistently found higher treatment adherence and lower attrition rates for guided web-based interventions, compared to interventions that are completely self-guided (Andersson et al., 2016; Fairburn & Patel, 2017). In addition, when there is therapist support, web-based interventions seem to be more effective than unsupported self-guided and as effective as face-to-face interventions (Fairburn & Patel, 2017). Baumeister et al. (2014) conducted a systematic review about the impact of guidance on the efficacy of web-based interventions in treating mental health problems and confirmed that treatment effects were higher when there was support. In terms of adherence, the number of completed modules and completion rates were also higher for guided interventions compared to unguided web-based interventions (Baumeister et al., 2014).

Moreover, several studies have demonstrated that therapeutic alliance can predict patient's outcomes in web-based interventions, although results are not consensual and there is some mixed evidence (Pihlaja et al., 2018). Considering web-based interventions for depression, a more positive therapeutic relationship was found to be associated with lower levels of depressive symptoms (Berger, 2017; Vernmark et al., 2019). However, some authors stated that it can be questionable whether a therapeutic alliance is established in web-based interventions given the reduced contact with a therapist and the format used (Berger, 2017; Roman et al., 2020).

In the context of PPD treatment, the presence of a therapist can likewise be of high significance. Pugh et al. (2015) conducted a qualitative study to explore postpartum women's perceptions of a guided web-based intervention for PPD, which included weekly emails from a therapist. Most women highlighted the importance of having support, particularly relevant during the postpartum period, a phase of their lives of higher isolation. On the other hand, some participants mentioned that face-to-face contact with a therapist would allow them to personalize treatment and improve their learning skills (Pugh et al., 2015). Another study assessed pregnant women's preferences for mental health treatments using ICTs, and the findings suggested a preference for traditional psychotherapy as a first choice. Regarding acceptability, more than half of the participants mentioned that they would consider psychotherapy through videoconference as well as receiving a web-based intervention combined with brief in-person sessions (Hantsoo et al., 2017), revealing a preference for the presence of a therapist.

3.3. Blended interventions and current evidence

A blended intervention is a treatment format that combines face-to-face treatment with e-mental health tools (e.g., web-based interventions) in an integrated and sequential way (Erbe et al., 2017). There could be different forms of blended interventions. According to the review conducted by Erbe et al. (2017), most blended interventions integrate and deliver the face-to-face and web-based elements within the same period, while others provide the internet elements before or after the face-to-face intervention.

This treatment format benefits from the advantages of both e-health and face-to-face interventions, since they can complement each other (Erbe et al., 2017; Wentzel et al., 2016). Web-based interventions (the most frequent digital elements used in blended interventions; Erbe et al., 2017) can increase treatment's flexibility and accessibility, as previously mentioned. Some time-consuming elements of psychotherapy, such as psychoeducation or exercises, can be delivered through the web-based program (Ebert et al., 2018). This allows patients to better prepare for face-to-face sessions, by using the input learned in the web-based program, to access contents and practice therapeutic strategies between sessions and to promote patients' self-management and autonomy (Schuster et al., 2018b; Titzler et al., 2018; van der Vaart et al., 2014). On the other hand, there is more time during the face-to-face sessions to focus on the patient's needs and to tailor the internet elements accordingly (Ebert et al., 2018). Therefore, blended interventions have the potential to decrease the number of sessions with a therapist and the treatment duration, while increasing clinical intensity (Ebert et al., 2018).

The presence of a therapist in blended interventions allows to provide guidance and to supervise the use of the web-based program (Fairburn & Patel, 2017), which in turn can increase treatment adherence and reduce dropouts (Andersson & Titov, 2014; Wentzel et al., 2016). Blended interventions offer the additional advantages of providing immediate and tailored feedback on a patient's progress and dealing with crises within the face-to-face sessions (van der Vaart et al., 2014). Face-to-face sessions with the therapist can also be delivered using videoconferencing tools and thus increase flexibility and accessibility, by giving the possibility to access treatment from any place and to save time and costs associated to transportation (Fairburn & Patel, 2017). From a healthcare perspective, blended interventions can decrease the treatment gap between face-to-face sessions, contribute to therapist's time savings and then reduce costs (Erbe et al., 2017; Fairburn & Patel, 2017; Titzler et al., 2018). However, some studies have shown that therapists consider that this treatment format increases their workload (Rasing, 2021). For instance, Titzler et al. (2018) found that the need to prompt patients to

complete the web-based modules was reported as time-consuming by the therapists, but more research on this topic is warranted.

In addition to the advantages of blended interventions, several studies reported health professionals' preference to use web-based interventions as a complement and adjunct to face-to-face therapy instead of using them as a standalone treatment (Mendes-Santos et al., 2020; Rai et al., 2013). A systematic review was recently conducted about health professionals' perspectives on the integration of web-based interventions in routine mental healthcare, including psychotherapists, psychologists, general practitioners, nurses, and others. This review indicated an overall preference to use web-based interventions for psychoeducation, symptoms monitoring and practice of strategies (Davies et al., 2020). Other study reported that therapists would allocate process-related elements of therapy (introduction to treatment, evaluation, clarifying doubts and sharing thoughts and feelings) to the face-to-face sessions in blended interventions (van der Vaart et al., 2014).

Furthermore, greater levels of acceptability towards blended interventions were found compared to self-guided web-based interventions among stakeholders in European countries (Schuster et al., 2020; Topooco et al., 2017). In fact, therapists who provided blended CBT treatment for depression have reported satisfaction and would recommend it to their patients (Mol et al., 2020). Overall, research demonstrated the acceptability of blended interventions for depression, as well as its feasibility (Schuster et al., 2018b; Urech et al., 2018). Compared to standalone web-based interventions, blended interventions have reported lower dropout rates (Rasing et al., 2020) ranging from 0% (Nakao et al., 2018; Schuster et al., 2018a) to 40% (Høifødt et al., 2013). It has also been reported that these attrition rates can be comparable to those found in face-to-face CBT interventions (Mol et al., 2020).

In the past decade, there has been an increased interest in developing blended interventions for different mental health problems (e.g., chronic somatic disorders; Kloek et al., 2017), in diverse populations (e.g., teenagers; Rasing, 2021), and in several countries (e.g., USA; Lungu et al., 2020). Most of the interventions are CBT-based and address depression and anxiety disorders (Erbe et al., 2017; Ebert et al., 2018). One of the first blended treatments for depression was developed by Høifødt et al. (2013) and it was tested in Norway. This intervention was based on the CBT model and combined 5 modules in a web-based program (MoodGYM) with 8 face-to-face therapist sessions (Høifødt et al., 2015). The results of the RCT comparing the blended intervention with a control group (waiting list), in a sample of 106 participants with mild to moderate depressive symptoms, revealed significant reductions in depressive and anxiety

symptoms (Høifødt et al., 2013). Later, in Europe, the E-COMPARED project aimed to assess the effectiveness of blended CBT treatment for depression for adults, in primary or specialized mental healthcare (Kemmeren et al., 2016; Kleiboer et al., 2016). In Netherlands, Kemmeren et al. (2016) evaluated a blended intervention that combined the web-based program Moodbuster (9 sessions) and face-to-face therapy (10 sessions) over a period of 20 weeks. The findings of the RCT comparing the blended treatment ($n = 53$) with TAU ($n = 50$) were promising, with significant decreases in depressive symptoms over time, in both conditions, suggesting comparable clinical effectiveness. Many other blended interventions for depression have been tested since then and revealed positive improvements in patients' depressive symptoms (Kooistra et al., 2019; Lungu et al., 2020; Mathiasen et al., 2022; Nakao et al., 2018). Additionally, there is evidence that blended interventions for depression were as effective as standard face-to-face CBT (Kooistra et al., 2019) and produced better results compared to unguided treatments (Sethi et al., 2010).

However, research on blended interventions is still scarce, in contrast to the amount of evidence on web-based interventions and face-to-face CBT (Erbe et al., 2017). Currently, there are no established clinical guidelines on how to implement blended interventions, including considerations such as the proportion of online and face-to-face sessions and the distribution of contents (van der Vaart et al., 2014), which may hinder its use among health professionals (Fairburn & Patel, 2017). Moreover, it is essential to better understand if blended treatment is suitable for everyone and to explore the influence of patient's individual characteristics, such as age, personality traits and severity of symptoms (Erbe et al., 2017; Kloek et al., 2020; Wentzel et al., 2016).

3.4. Research gaps and further directions

The literature review previously presented provided a summary of the current state of the art on PPD and its characterization. PPD is a mental health problem with clinical specificities, associated with the timing of its occurrence and to different manifestations of symptoms. It is important to understand postpartum women's diverse emotional experience and the heterogeneity in the dimensions of PPD symptoms, since that knowledge could better inform screening, diagnosis, and treatment (Flom et al., 2018).

Given the evidence reviewed about the challenges faced by postpartum women in accessing adequate treatment and the potential of combining web-based interventions with traditional face-to-face formats for mental health problems, it is paramount to develop new evidence-based treatment formats for PPD. Providing access to different treatment formats for

PPD, such as blended interventions, can potentially increase women's professional help-seeking rates and timely treatment. To the best of our knowledge, there is not any blended intervention specifically developed and tested for the treatment of PPD, either nationally or internationally.

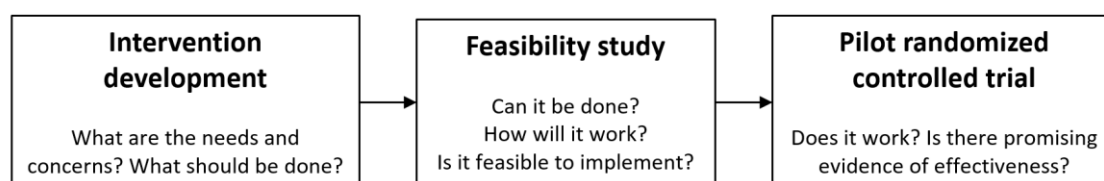
In Portugal, up to date, there is only a web-based intervention focused on PPD – Be a Mom. It is a self-guided and short-term web-based program originally designed as a preventive intervention for PPD among women presenting high risk for PPD (Fonseca et al., 2018b). Be a Mom is grounded in CBT principles, including recent third-generation CBT approaches, namely ACT and compassion-based therapy, applied to the specificities of the postpartum period. It is composed of 5 modules (Changes and emotions; Cognitions; Values and social support; Couple's relationship; PPD alert signs and help-seeking) that address CBT strategies for the prevention of depression and specific thematic contents (e.g., psychoeducation about the connection between thoughts, emotions and behaviors; changing the relationship with negative thoughts, promotion of interpersonal functioning; Fonseca et al., 2020; Xavier et al., 2022). The web-based program includes information presented in different formats (e.g., text, video, animations, audio), interactive exercises with personalized feedback and an asynchronous communication channel to obtain technical support (Fonseca et al., 2020).

The development of this web-based intervention's contents and structure was informed, in a first stage, by a scoping literature review and a focus group with mental health professionals (Fonseca et al., 2018b). Afterwards, a pilot RCT was conducted to evaluate the preliminary efficacy, feasibility, and acceptability of Be a Mom, compared to a waiting-list control group. A sample of 194 women presenting risk factors for PPD or early-onset PPD symptoms participated in the study and the results showed a significantly larger decrease in depressive and anxiety symptoms in the intervention group compared to the waiting-list control group. The participants also found the web-based intervention useful, relevant and were satisfied with the program (Fonseca et al., 2020). More recently, the findings of an RCT including 1053 postpartum women presenting high-risk for PPD revealed that the web-based program was effective in reducing depressive and anxiety symptoms, compared to the control group (Carona et al., 2023a). Notably, the reduction in these outcomes was more pronounced in women presenting higher levels of depressive and anxiety symptoms. Moreover, statistically significant improvements were observed in the levels of self-compassion, psychological flexibility and emotion regulation ability. This evidence is encouraging to consider using the Be a Mom intervention among women with clinical symptoms of PPD. However, the elevated rates of non-completion observed in the RCT (51.3%; Carona et al., 2023a) reinforce the importance of integrating this tool within a blended treatment format.

Thus, this research project aims to address identified gaps in the literature and to provide innovative contributions by investigating a blended treatment format based on CBT for PPD. In fact, CBT is the most widely used therapeutic model in various treatment formats (e.g., group, web-based, Andersson et al., 2016) not only for PPD treatment but for other mental health problems. Moreover, ACT and compassion-based approaches can be particularly relevant for postpartum women given the challenges experienced by this population, and should therefore be integrated into new developments of psychological treatment for PPD (Fonseca et al., 2020; Waqas et al., 2023).

When developing new psychological interventions, it is crucial to evaluate not only their effectiveness but also the process of development and implementation (Gadke et al., 2021). This process can be seen as a continuum of different study designs, each aiming to answer diverse questions about the intervention (Gadke et al., 2021; Orsmond & Cohn, 2015), as illustrated in Figure 1.

Figure 1. The phases of intervention development (adapted from Gadke et al., 2021)



At a first stage, it is important to evaluate indicators such as the needs of the target population and their acceptability of an intervention (Gadke et al., 2021). By definition, acceptability is a “multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention considered it to be appropriate based on anticipated or experiential cognitive and emotional responses to the intervention” (Sekhon et al., 2017, p. 8). This is an important indicator of an intervention’s success and potential effectiveness, as participants who consider an intervention acceptable will be more likely to engage in treatment and obtain improvements (Sekhon et al., 2017). Afterwards, feasibility and pilot studies are recommended to answer questions regarding the implementation and effectiveness (Gadke et al., 2021). Although RCTs provide the highest level of evidence in clinical studies, researchers increasingly recognize the relevance of conducting prior feasibility and pilot studies to accelerate the effectiveness of an intervention (Orsmond & Cohn, 2015).

A relevant aspect in the development of new interventions that incorporate e-health tools is the fact that it should be a participatory process involving relevant stakeholders, including the target population. This process is also characterized by its iterative, dynamic, and continuous nature intimately connected with the execution phase (van Gemert-Pijnen et al., 2011). For these reasons, diverse methods can be employed at different stages of the development process and for specific objectives. Kip et al. (2022) conducted a review to synthesize the knowledge about methods used in e-health development studies and identified literature study, individual interviews, focus groups, usability tests and quantitative questionnaires as relevant approaches that can be combined to gather new information from the target population.

In sum, to adhere to the recommendations for developing and evaluating new interventions, the process of creating a blended intervention for PPD should incorporate the conduction of studies with different designs, viewed as part of a continuum and iterative process, and should include the target population (postpartum women with depressive symptoms) throughout the entire process.

Chapter II | Objectives and Methods

This research project was conducted within the Relationships, Development & Health (RD&H) research group, of the Center for Research in Neuropsychology and Cognitive Behavioral Intervention (CINEICC), at the Faculty of Psychology and Educational Sciences of the University of Coimbra (FPCE-UC).

This chapter comprises considerations on the methodology adopted in the empirical studies conducted in the current project. It includes five empirical studies presented in the format of scientific articles already published (four studies) or submitted for publication (one study) in international peer-reviewed journals. More detailed information on each study methods (e.g., participants, instruments, statistical analyses) is given within each empirical study (in Chapter III).

The research project aimed to achieve two main objectives: I) To understand postpartum women's emotional experience associated with depressive symptoms and attitudes towards blended interventions; and II) To develop and evaluate a blended intervention for the treatment of PPD within the Portuguese context. Each objective corresponds to a research phase and will be further elaborated upon in this chapter.

1. Research objectives

Overall, the current project aims to address the gaps identified in the literature related to understanding postpartum women's emotional experience and to the development of new intervention formats for women with postpartum depressive symptoms aiming to increase women's access to evidence-based care. Accordingly, two general objectives were defined for this research:

1) To understand postpartum women's emotional experience related to depressive symptomatology and attitudinal factors towards blended interventions:

- To explore the heterogeneity of PPD characteristics among women presenting depressive symptoms [Empirical study I];
- To understand the acceptability and preferences concerning blended psychological interventions, among postpartum women presenting clinically relevant depressive symptoms [Empirical study II].

2) To develop and evaluate Be a Mom Coping with Depression, a blended intervention for the treatment of PPD:

- To explore the application of Be a Mom Coping with Depression through a case study report [Empirical study III];
- To test the feasibility and acceptability of Be a Mom Coping with Depression among women with PPD [Empirical study IV];
- To investigate the acceptability and preliminary effectiveness of Be a Mom Coping with Depression for postpartum women with depressive symptoms [Empirical study V].

Based on these research objectives, five empirical studies were conducted, and the specific objectives of each study are presented in Table 1.

Table 1. Specific research objectives for the empirical studies

Research phase	Empirical study	Objectives
Phase I	I	<ol style="list-style-type: none"> 1. To explore the existence of dimensions of PPD symptoms through the EPDS, in a sample of Portuguese postpartum women; 2. To examine the associations between EPDS dimensions and sociodemographic characteristics and risk factors; 3. To identify and characterize the profiles of PPD symptoms, and to examine differences between the profiles (in terms of sociodemographic characteristics and presence of risk factors).
	II	<ol style="list-style-type: none"> 1. To examine the acceptability of and preferences for a blended psychological intervention for the treatment of PPD among postpartum women; 2. To examine the factors (sociodemographic and clinical characteristics, the severity of depressive symptoms and e-health literacy) associated with the acceptability of a blended intervention for PPD.
Phase II	III	<ol style="list-style-type: none"> 1. To describe the application of Be a Mom Coping with Depression, a blended intervention for the treatment of PPD, through a case study.
	IV	<ol style="list-style-type: none"> 1. To evaluate the feasibility of Be a Mom Coping with Depression (recruitment, dropout rates, patterns of usage and therapist fidelity); 2. To assess the participant's acceptability, usability and satisfaction with Be a Mom Coping with Depression; 3. To explore preliminary effects of Be a Mom Coping with Depression on the reduction of depressive symptoms.
	V	<ol style="list-style-type: none"> 1. To evaluate the acceptability of the blended intervention Be a Mom Coping with Depression, compared to a guided web-based intervention; 2. To assess the preliminary effectiveness of the blended intervention on the reduction of depressive symptoms (primary outcome) at post-intervention and follow-up periods, compared to a guided web-based intervention; 3. To examine preliminary effects from pre- to post-intervention in secondary outcomes, compared to a guided web-based intervention.

2. Methods

2.1. Research project design

The empirical studies included in this project followed different study designs. In Phase I, studies had a cross-sectional design (Empirical studies I and II), meaning that the data were collected at a single moment of assessment. This type of studies allows to examine associations between variables, although no conclusions on causality can be made. In Phase II, Empirical studies III and IV followed a longitudinal design, in which the data were collected at two moments (baseline and post-intervention). Additionally, Empirical study IV had a mixed-methods design since both quantitative and qualitative data were collected. Finally, a two-arm open-label pilot RCT was conducted comparing the blended intervention (Be a Mom Coping with Depression) with a control group receiving a guided web-based intervention (Empirical study V). In this study, data were collected at three different moments (baseline, post-intervention and 3-month follow-up) and changes in variables were analyzed over time.

2.1.1. Considerations on reporting case studies

A case study was reported to describe the application of Be a Mom Coping with Depression, corresponding to Empirical study III. This methodological choice was justified by the increasingly recognized value of case reports in Psychology.

A case study report provides detailed descriptions of patient's symptoms, diagnosis, treatment, and follow-up, thereby serving as an educational and instructive resource for other clinicians. In psychology, this type of paper is usually focused on the description of new formats of treatments, including new formats of CBT. Therefore, case reports can make important contributions and be valuable complements to the development and assessment of new evidence-based interventions (Rison et al., 2017; Virués-Ortega & Moreno-Rodríguez, 2008), such as a blended treatment for PPD.

Despite lacking statistical significance and being considered at the lower levels of the hierarchy of evidence, it is argued that case studies should be included more systematically in psychological research as a first line of evidence (Radley & Chamberlain, 2012). In fact, the growing number of journals solely dedicated to case studies (e.g., *Clinical Case Studies*; *Clinical Case Reports*) is an indicator of their relevance to clinical research (Rison et al., 2017). Virués-

Ortega and Moreno-Rodríguez (2008) published a set of guidelines for case reports in Clinical Psychology, which were followed in Empirical study III.

2.1.2. Considerations on designing and reporting feasibility studies and pilot randomized-controlled trials

In Phase II of this research project, a feasibility study was conducted (corresponding to Empirical study IV). Feasibility studies focus on the process of applying an intervention and aim to evaluate recruitment and data collection methods, appropriateness of measures, acceptability and viability of the intervention and preliminary responses of participants to the intervention (Orsmond & Cohn, 2015). The results of a feasibility study can help decide whether to proceed to a future larger trial and to inform what changes are needed to conduct (Gadke et al., 2021).

Phase II of the research project also included a pilot RCT (Empirical study V). Pilot studies focus on outcomes, rather than the process (Orsmond & Cohn, 2015). They are usually described as a study conducted on a smaller scale than the RCT, since pilot studies aim to assess an intervention's potential effectiveness (Eldridge et al., 2016). So, they include a more controlled assessment of participant's responses, although they can also evaluate feasibility (Eldridge et al., 2016; Orsmond & Cohn, 2015). The sample size for feasibility and pilot studies tends to be small, and it increases through the continuum as the investigation moves to the next phase (Mohr et al., 2009).

To ensure internal validity within an RCT, it is recommended the use of control conditions and randomization (Mohr et al., 2009). In the pilot RCT conducted by the research team (Empirical study V), the control group received a guided web-based intervention, in which the participants had access to the web-based program included in the blended intervention (experimental group). According to Mohr et al. (2009), providing a component of the experimental condition to the control group (in this case, the web-based program) can be beneficial in the evaluation of the intervention and may allow for strong causal inferences. Moreover, the existence of treatment manuals for both intervention arms reduces threats to internal validity and improves treatment fidelity (Mohr et al., 2009).

Randomization reduces the predictability in the allocation to the intervention, being an important aspect to ensure a balance in characteristics between groups (Eldridge et al., 2016). In the pilot RCT conducted within this research project, randomization was performed using a

computerized random number generator (parallel assignment; allocation rate 1:1). Although it is recommended that both therapist and participants are blinded to the type of intervention received, it was not possible in our project. Due to limitations in human resources, the main researcher was responsible for the enrolment and assignment of the participants, as well as for delivering the intervention to both conditions (intervention and control arms). In addition, given the nature of the interventions, the participants could not be blinded to the treatment allocation.

To increase the transparency and improve the quality of reports for RCTs, the Consolidated Standards of Reporting Trials (CONSORT) statement was created (Begg et al., 1996; Schulz et al., 2010). The CONSORT statement is a guideline for researchers that comprises a checklist of items that should be addressed (e.g., description of trial design; eligibility criteria for participants; type of randomization). In addition to the CONSORT statement, an extension for reporting randomized pilot and feasibility trials was developed (Eldridge et al., 2016). It adds to the previous statement the need to inform how participants were identified and consent was obtained, the criteria used to evaluate whether or how to proceed with a future trial, the rationale for number of participants in the study, the occurrence of important unintended consequences and an ethical approval or approval by a research review committee. Other CONSORT recommendations, namely the extensions of the CONSORT-EHEALTH (Eysenbach & Consort-EHEALTH Group, 2011) and CONSORT-SPI 2018 Extension (Montgomery et al., 2018), will be also used for reporting the findings for the studies conducted in research phase II of this research project.

2.2. Participants and procedures

In this section, the data collection procedures and samples' characteristics are described in more detail.

2.2.1. Procedures for Phase I

Data were collected through an online self-report questionnaire using a platform (LimeSurvey®) hosted on the server of the University of Coimbra. The researchers created social media pages (Facebook and Instagram) for the dissemination of the study through both unpaid and paid boosting campaigns. Online advertisements were created in these platforms, which included information about the study aims, inclusion criteria, and a weblink to the online survey.

The study was also disseminated through email, thematic forums, and social media groups related to maternity.

After accessing the survey weblink, participants were provided with more information about the confidential, voluntary, and anonymous nature of their participation, as well as the absence of monetary compensation. Participants had to fulfill the following inclusion criteria to participate in the study: (i) being an adult Portuguese woman (aged 18 years or older); (ii) being in the postpartum period (up to 12 months after childbirth) and (iii) presenting clinically relevant depressive symptoms (indicated by a score higher than 9 on the EPDS; Areias, 1996).

Although data collection was used for both Empirical studies I and II, study II only included data collected until June 2020. Therefore, the final sample for Empirical study I consisted of 487 participants and the final sample of Empirical study II consisted of 235 participants. The characteristics of the participants are described in detail elsewhere (see Chapter III).

2.2.2. Procedures for Phase II

Empirical studies III and IV

Recruitment occurred online by disseminating the study on social media and maternity forums. Online advertisements were placed on social media pages (Facebook and Instagram) created for the dissemination of the research project, through paid and unpaid boosting campaigns targeting women between 18 and 45 years of age with interest in maternity topics. The study was also disseminated through other social media pages and groups related to maternity. Information about the study, including its goals and procedures, was given, along with a weblink to an online survey to assess eligibility criteria and collect contact information (e-mail and telephone number).

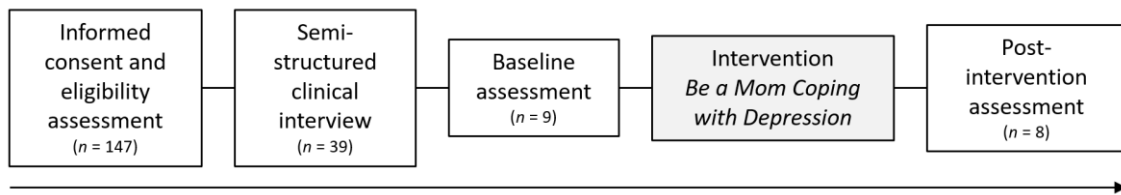
The eligibility criteria to participate in the study were (1) being a woman in the postpartum period (up to 12 months after childbirth); (2) age \geq 18 years; (3) being Portuguese; (4) having a diagnosis of a major depressive episode according to the Diagnostic and Statistical Manual of Mental Disorders – fifth edition (DSM-5; APA, 2013); (5) having the necessary technological means (a computer or smartphone with internet access); and (6) being able to write and read Portuguese. After the study started, the following adjustments were made to the eligibility criteria: 1) residence in Portugal was no longer required as an inclusion criterion, given that the intervention was delivered online; 2) women currently receiving pharmacological

treatment for depressive symptoms were allowed to participate, as long as the medication dosage had remained stable for the prior 3 months, because they could also benefit from combined psychological treatment. Participants were excluded if they had a psychiatric comorbidity requiring primary treatment, exhibited severe suicidal ideation, had a serious medical condition (the mother or the baby) or were receiving current psychological or pharmacological treatment for depression (medication was allowed if the dosage had remained stable for 3 months prior to study onset). These details were self-reported by the mothers.

After accessing the weblink to the screening questionnaire, participants were presented with detailed information about the study, as well as information on confidentiality and anonymity. They were informed about the possibility to withdraw at any time and that participation was free of costs. Subsequently, they were asked to provide their informed consent to participate in the study. The survey included questions on sociodemographic information, the EPDS and other relevant information (e.g., having internet access). Women with a positive screen for symptoms of PPD (indicated by an EPDS score > 9 ; Areias et al., 1996) who met the eligibility criteria were contacted to schedule an interview by telephone. The main researcher conducted a semi-structured clinical interview based on the Structured Clinical Interview for the DSM-5 (SCID-5; First et al., 2017) to assess the presence of a major depressive episode. Participants who did not meet the inclusion criteria were informed about the end of their participation and were informed about treatment options (e.g., through the national health system).

The participants included in the study were asked to complete a self-report questionnaire (baseline assessment) that was accessed through a weblink sent by email. After the end of the intervention, participants were asked to complete a post-intervention protocol. All questionnaires were hosted on the LimeSurvey® platform.

Out of the 147 participants enrolled in the study, 108 were excluded for several reasons, including not completing the questionnaire, failing to respond to email or phone contacts, not meeting all eligibility criteria, or choosing not to participate. A total of 39 participants were assessed for the presence of a major depressive episode and 9 women fulfilled the eligibility criteria (see Figure 2). The sample of Empirical study III consists of one participant who is also part of the sample of Empirical study IV, composed of nine postpartum women presenting PPD.

Figure 2. Flow of data collection and participants in Study IV*Empirical study V*

A pilot RCT was conducted and previously registered on ClinicalTrials.gov (NCT04441879). Recruitment occurred between April 2022 and April 2023 and the recruitment procedures were identical to those in Empirical studies III and IV. Dissemination of the study was made through online advertisements containing information about the study (e.g., study goals, procedures, participants' and researchers' roles) posted on social media and websites focusing on maternity topics. A weblink to a screening online questionnaire (hosted on LimeSurvey) was available, which was accessed by participants after providing their informed consent to participate in the study.

Participants were eligible if they were: (a) 18 years or older; (b) female; (c) Portuguese; (d) mothers of babies aged up to 12 months; (e) presenting at least four symptoms of a major depressive episode according to the DSM-5, being one depressed mood or loss of pleasure or interest; (f) able to write and read Portuguese and (f) had Internet and computer access. Women were excluded if they had a current psychiatric diagnosis requiring treatment (e.g., substance abuse, bipolar disorder), if they or their baby had a serious health condition (self-reported), or if they were currently on psychological or pharmacological treatment for depression (medication was allowed only if dosage was stabilized for 3 months prior to study onset). Women were also excluded if they presented suicidal ideation (active or passive), which was assessed through item 10 of the EPDS (score > 2) and during the semi-structured clinical interview.

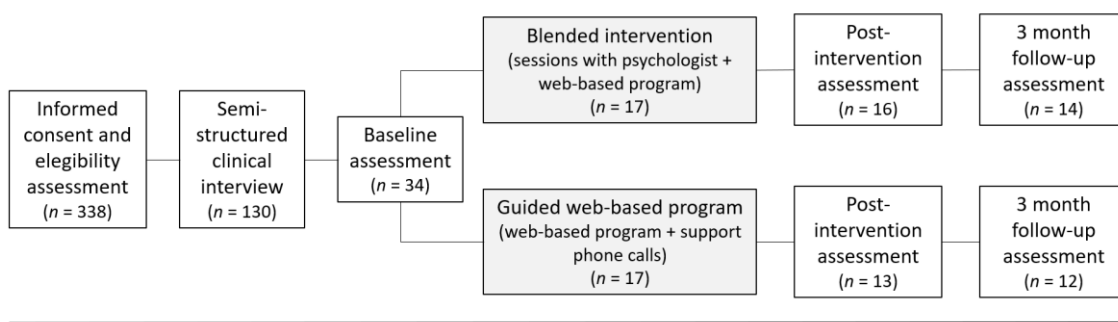
After completing the screening questionnaire (including the EPDS), participants who met the eligibility criteria and had a positive screen for postpartum depressive symptoms (indicated by a score > 9 on the EPDS) were interviewed by telephone to assess the presence of clinically significant depressive symptoms. Participants presenting at least four symptoms of a major depressive episode according to the DSM-5, being one depressed mood or loss of pleasure or

interest, were included in the trial². Women who did not fulfill the eligibility criteria were informed and were proposed to other treatment options, if needed.

Participants included in the study were sent a weblink to complete the baseline assessment. After completing the questionnaire, participants were randomly assigned (parallel assignment; allocation rate 1:1) to either the intervention group (blended intervention) or to the control group (guided web-based intervention). Randomization was performed using a computerized random number generator (<https://www.randomizer.org/>) and participants were assigned to the treatment condition based on the sequence code generated. After randomization, participants were informed by e-mail about their assigned group and the first session was scheduled. Both interventions (blended and guided web-based) started with a session with the psychologist to introduce the treatment and understand participants' difficulties. By the end of the session, an invitation email was sent to participants to register in the web-based program. Email reminders and a written text message were sent to participants to encourage engagement with the web-based program and to remind them of the next contact with the therapist (session or phone call).

After the end of the intervention, participants were asked to complete an online questionnaire through a weblink sent by email, at two moments: post-intervention and at the 3-month follow-up. Participants who did not complete either the blended or the guided web-based interventions were also asked to complete the assessments. Figure 3 schematically represents the data collection procedures adopted in this pilot RCT.

Figure 3. Flow of data collection and participants in Study V



² In Empirical study IV, a considerable number of participants did not meet the criteria for a major depressive episode (according to the DSM-5), despite presenting depressive symptoms and emotional difficulties. Since a larger sample was necessary to the conduction of the pilot RCT, this eligibility criteria was adjusted, as previously proposed by other authors (e.g., Topoco et al., 2019), since those mothers who present clinically significant depressive symptoms but do not fulfill the criteria for a major depressive episode can also benefit from psychological intervention.

Out of the 338 women who accessed the screening questionnaire, 208 were excluded (most of them did not complete the questionnaire, did not meet inclusion criteria or did not reply to contact attempts). A total of 130 participants were assessed for the presence of clinically significant depressive symptoms (via telephone interview). Thirty-four women met the eligibility criteria and completed the baseline assessment. They were then randomized and allocated to either the intervention group ($n = 17$) or to the control group ($n = 17$).

2.2.3. Participants

All participants were selected using a non-probabilistic convenience sampling procedure and through online recruitment. Table 2 displays an overview of the samples of each empirical study.

Table 2. Overview of the samples in each empirical study

Empirical study	Recruitment Period	Population	<i>N</i>
I	June 2020 – March 2021	Adult women in the postpartum period presenting depressive symptoms (EPDS > 9)	487
II	June 2020 – November 2020		235
III	April 2021	Adult women in the postpartum period presenting PPD (diagnosed with a major depressive episode according to the DSM-5)	1
IV	March 2021 – November 2021		9
V	April 2022 – April 2023	Adult women in the postpartum period presenting clinically relevant depressive symptoms (at least four symptoms of a major depressive episode according to the DSM-5, being one depressed mood or loss of pleasure or interest)	34

2.3. Variables and measures

To address the objectives defined for this research project, different assessment protocols were created, according to the aims of each empirical study. The assessment protocols consisted of a set of questions to assess sociodemographic (e.g., age, marital status, professional status), clinical (e.g., history of psychiatric problems, history of psychiatric/psychological

treatment) and infant-related (e.g., age, sex) data, along with self-report questionnaires. The instruments were selected based on their adequacy to the operationalization of the constructs in study and, whenever possible, short versions of the measures were preferred to facilitate quicker assessment and reduce participant burden. All self-report measures used were translated and validated for the Portuguese population and prior permission was obtained from the authors. Table 3 presents an overview of the questionnaires used in each empirical study, as well as the variables assessed. A detailed description of the measures and their psychometric properties is provided in each empirical study.

Table 3. Overview of variables and measures for each research phase and empirical study

Variables	Measures	Phase I		Phase II		
		I	II	III	IV	V
		Empirical studies				
		I	II	III	IV	V
Sociodemographic, clinical, and infant-related information						
	Data sheet developed by the research team	●	●	●	●	●
Individual outcomes						
Depressive symptoms	Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987; Areias et al., 1996)	●	●	●	●	●
Anxiety symptoms	Hospital Anxiety and Depression Scale - Anxiety subscale (HADS-A; Zigmond & Snaith, 1983; Pais-Ribeiro et al., 2007)			●		●
Negative thoughts	Postnatal Negative Thoughts Questionnaire (PNTQ; Hall & Papageorgiou, 2005; Rodrigues et al., 2017)					●
Risk factors for PPD	Postpartum Depression Predictors Inventory – Revised (PDPI-R; Beck, 2002; Alves et al., 2018)	●				
Parental outcomes						
Maternal self-efficacy	Perceived Maternal Parenting Self-Efficacy (PMPS-E; Barnes & Adamson-Macedo, 2007; Monteiro et al., 2022)			●		●
Relationship outcomes						
Marital satisfaction	Investment Model Scale – Satisfaction subscale (IMS-S; Rusbult, 1998; Rodrigues & Lopes, 2013)			●		
Psychological processes						
Self-compassion	Self-Compassion Scale—Short Form (SCS-SF; Raes et al., 2011; Castilho et al., 2015)			●	●	●

the intervention, number of sessions) were identified. For instance, we observed that the number of sessions with the therapist ranged from 7 to 10 in several studies assessing the efficacy of blended interventions for depression (e.g., Kooistra et al., 2016; Kemmeren et al., 2016; Schuster et al., 2018a; Topooco, 2018). Also, we identified the most relevant topics to include in this intervention for PPD (e.g., psychoeducation, cognitive restructuring, behavioral activation, values, social support, etc.).

Simultaneously, we conducted a cross-sectional study (cf. detailed information in Empirical study II) to collect information on the acceptability and preferences for a blended psychological intervention for PPD among Portuguese postpartum women. The results revealed that most participants demonstrated a preference for an equal distribution of content across face-to-face and online sessions. Approximately one-third of the sample preferred a 75% face-to-face/25% online proportion, whereas an equal proportion of sessions (50% online and 50% face-to-face) was preferred by 28% of the sample. Most women preferred a duration of 45–60 minutes for face-to-face sessions and 30–45 minutes for online sessions. These results were also taken into consideration when developing the blended intervention (for detailed information, see Empirical study II).

In the second phase, and based on the information gathered, the general structure of Be a Mom Coping with Depression was created and is presented in Table 4. The intervention is composed of seven sessions with a psychologist and six sessions in the online program, which are alternated weekly. Then, a detailed Therapist Manual for the sessions with the psychologist was developed and the web-based program was adapted from the original version (Be a Mom) to address some specificities of PPD treatment (rather than prevention) and to be delivered in a blended format. This adaptation included the development of a new logotype for the blended version of the web-based program (see Figure 4).

Figure 4. Be a Mom Coping with Depression logotype



Table 4. Structure and contents of Be a Mom Coping with Depression

Sessions	Format	Main Contents
1) Evaluation and Introduction to treatment	Therapist	<ul style="list-style-type: none"> Brief cognitive–behavioral clinical evaluation Motivation for treatment and goal setting Introduction to the intervention
2) Maternity changes, PPD and Emotions	Online	<ul style="list-style-type: none"> Changes during the transition to motherhood Psychoeducation about PPD Diversity of emotional responses in the postpartum period
3) CBT model	Therapist	<ul style="list-style-type: none"> Expectations towards motherhood Emotions and their adaptative function Connection between thoughts, emotions and behaviors Introduction to cognitive flexibility
4) Thoughts	Online	<ul style="list-style-type: none"> Thoughts: distinction between useful and negative thoughts Negative thoughts and their influence on emotions Strategies to deal with thoughts Self-criticism and self-compassion
5) Thoughts	Therapist	<ul style="list-style-type: none"> Recognizing automatic negative thoughts Practice of adaptative strategies to deal with negative thoughts (acceptance and defusion, questioning, self-compassion)
6) Values	Online	<ul style="list-style-type: none"> Definition, identification and clarification of parenthood values Definition of committed and value-based behaviors
7) Values	Therapist	<ul style="list-style-type: none"> Importance of committed value-based actions Strategies to increase and practice pleasant and value-based activities
8) Interpersonal relationships	Online	<ul style="list-style-type: none"> Identification of social support needs and networks Assertive communication Assertive communication skills to ask for help
9) Social support and Interpersonal competences	Therapist	<ul style="list-style-type: none"> Importance of social support in the postpartum period and identification of difficult situations Communication styles (passive, aggressive and assertive) Practice of communication skills (role-play)
10) The couple's relationship	Online	<ul style="list-style-type: none"> Changes in the couple's relationship during the postpartum period Possible sources of conflict and negotiation

		<ul style="list-style-type: none"> • Sharing parenthood values and commitments
11) The couple's relationship	Therapist	<ul style="list-style-type: none"> • Strategies to promote affection and intimacy • Assertive communication within the relationship • Promotion of cognitive flexibility • Problem solving strategies for negotiation and conflict management
12) Final Balance and Relapse Prevention	Online	<ul style="list-style-type: none"> • Reflection on the learned strategies and changes obtained • Problem anticipation and skills integration
13) Final Balance and Relapse Prevention	Therapist	<ul style="list-style-type: none"> • Revision of the learned therapeutic skills • Relapse prevention plan • Evaluation of treatment progress

Concerning the web-based program, the main changes included the addition of new information (e.g., brief description of the blended intervention; normalization about the difficulties felt in the postpartum period; brief psychoeducation about emotions; normalization of decreased sexual intimacy in the couple; relapse prevention) and minor reorganization of information (e.g., psychoeducation about PPD was moved from the final module to module 1). In the original program, a video with a psychologist summarizing the contents was presented at the end of each module, and this was removed from the blended version of the program. Connection between the online and face-to-face sessions was an important aspect to ensure that the treatment was perceived as “one”. At the end of each module, a reminder of the next session with the psychologist was included.

The Therapist Manual was developed to provide a guide and a structured approach to face-to-face sessions, which can be used by psychologists with different levels of clinical experience, although it is recommended to be delivered by psychologists with training in CBT. The manual contains information about the general structure of the intervention and detailed information about each session. For each session, specific objectives, contents and exercises are outlined, along with an indication of the time spent in each topic and the materials needed. Throughout the manual, there are instructions and examples of sentences to guide the therapist's speech during the session.

In the next phase, the web-based program (blended version: <https://beamomcopingwithdepression.pt/>) was tested by other researchers so that errors could be identified and corrected. In addition, the sessions with the psychologist were trained through role-play, to assure that the contents and duration of each session were appropriate. The

simulation involved the collaboration of a junior psychologist in training who role-played a woman with PPD. The intervention protocol of Be a Mom Coping with Depression was reviewed and approved by the other two members of the research team (clinical psychologists and researchers in the field of perinatal mental health, who are the supervisors of the main author of this research project).

After the development of the intervention, Be a Mom Coping with Depression was tested in a small group of women with PPD (for detailed information, see Empirical study IV). This feasibility study allowed the research team to make adjustments to the intervention protocol regarding the content and duration of each session. In addition, the qualitative feedback provided by the participants, the supervisor and the collaborating psychologists in training was taken into consideration to reach the final version of the intervention, that was applied in the pilot RCT. The Therapist Manual is presented in more detail in Appendix I, providing an overview of each session's objectives.

2.4.2. Changes to the initial research project

Be a Mom Coping with Depression was initially conceptualized as a combination of face-to-face sessions with a therapist and a web-based program. It was planned to conduct an RCT to assess the efficacy and cost-effectiveness of Be a Mom Coping with Depression in the last phase of this research project. The study protocol for this trial was published and can be found in Appendix II. In this RCT, participants would be allocated to either the blended intervention or to TAU (control group), provided in Portuguese healthcare centers.

After the beginning of this research project, the Coronavirus Disease - 2019 (COVID-19) had spread worldwide and was declared a pandemic in March 2020. Given the state of emergency declared in November 2020 in Portugal and the declaration of mandatory confinement in January 2021, along with several restrictions imposed to face-to-face activities, it became necessary to proceed with some changes to the initial research project.

First, it was necessary to adapt the intervention protocol so that Be a Mom Coping with Depression could be delivered entirely online. Therefore, face-to-face sessions with the therapist were delivered via video call, using videoconference tools (e.g., Zoom). Second, recruitment for participation in the empirical studies occurred entirely online, through advertisements posted on social media and maternity forums. Third, the development of the blended intervention protocol (including the technological component of the web-based program) and the

adaptations made due to the pandemic context influenced the initial proposed timeline for the project, resulting in a delay of the start of the empirical studies from research phase II.

The pandemic context (associated with mothers' concerns related to the transmission of the virus to their babies and limitations on face-to-face activity) also contributed to the difficulty in accessing health centers by the research team, as initially proposed for the RCT. Therefore, a pilot RCT was conducted instead, given that the study objectives were adapted, with 2 arms: the blended intervention (intervention group) and the guided web-based intervention (control group). There were insufficient human resources to ensure the delivery of individual face-to-face CBT to women allocated to the control group. Furthermore, it is considered that a waiting-list control for women suffering from PPD symptoms would not be ethically responsible. Thus, based on previous evidence of the effectiveness of the web-based program in the reduction of depressive symptoms (Carona et al., 2023a), it was selected to be delivered as a therapist-guided web-based intervention for women allocated to the control group. It was also necessary to reduce the follow-up period, including only one assessment at the 3-month follow-up (instead of two assessment moments).

2.5. Methodological and statistical options

In this section, methodological and statistical strategies, which were selected according to the specific aims of each empirical study, are briefly presented. A more detailed description of statistical analyses is presented for each empirical study in Chapter III. Statistical analyses were conducted using the SPSS software (Statistical Package for the Social Sciences; IBM SPSS; versions 25.0 or 27.0), the Mplus software (version 7.4) [Empirical study I] and the MAXQDA software (version 22.0.1) [Empirical study IV]. Statistical significance was considered at the level of $\alpha = 0.05$ in all statistical procedures.

Cronbach alphas were calculated to analyze measures' internal consistency. Values $> .70$ are indicative of good reliability, with some authors considering values $> .60$ acceptable for smaller samples (Maroco & T. Garcia-Marques, 2006). In all studies, descriptives statistics were computed to characterize the sample as well as the study variables. Correlational analyses (Spearman and Pearson correlations) were calculated to examine associations between variables in terms of direction and magnitude of association. The magnitude of the effect of these associations were classified as small ($r \geq 0.10$) medium ($r \geq 0.30$) or large ($r \geq 0.50$) (Cohen, 1988).

Comparison tests were performed to identify differences between groups. Independent samples *t*-tests were used for continuous variables, and chi-squared tests for categorical variables. Non-parametric alternatives were used when the variables did not follow a normative distribution.

In Empirical study I, a confirmatory factor analysis (CFA) using maximum likelihood estimation was computed to test the EPDS factor structure. The goodness of fit of the CFA was examined using reference values for the following indices: the overall χ^2 goodness-of-fit test (p value > 0.05), the comparative fit index (CFI; ≥ 0.95), the root mean square error of approximation (RMSEA; ≤ 0.08) and the standardized root mean square residual (SMSR; ≤ 0.05) (Brown, 2015; Hu & Bentler, 1999). Additionally, a latent profile analysis (LPA) was performed to identify participants' probability of belonging to different groups or profiles (Ferguson et al., 2020). This is a multi-stage approach in which several models are fitted and evaluated, starting with a one class model, and subsequently increasing the number of classes until there is no further improvement in the model. Each model is compared against the previous model to decide on model retention. The optimal number of classes was decided based on the Lo–Mendell–Rubin (LMR) test, Akaike information criterion (AIC), Bayesian information criterion (BIC), adjusted BIC, entropy value (ranging between 0 and 1), and theoretical and clinical interpretability (Ferguson et al., 2020; Spurk, et al., 2020).

In Empirical study II, logistic regressions were calculated to explore the variables that influenced the acceptability of blended psychological interventions, allowing for the estimation of the influence of an independent variable on a dependent variable. Multivariate binary logistic regression models were calculated to evaluate the relative influence and predictive role of each variable on another variable. To estimate multicollinearity, tolerance and VIF values were analyzed. There was no multicollinearity among the predictors if the tolerance values were higher than 0.1, and the variance inflation factor values were lower than 10 (Field, 2009).

Qualitative data are particularly valuable to obtain information from the target population regarding a psychological intervention in a feasibility study (Ayala & Elder, 2011; O’Cathain et al., 2015). A thematic analysis was used in Empirical study IV, following a data-driven approach and the procedures recommended by Braun and Clarke (2006). Standards for reporting qualitative data were considered (O’Brien et al., 2014; Tong et al., 2007).

In Empirical study V, mixed analysis of variance (ANOVA) were calculated to explore mean differences between groups over time, considering within-group (time), between-group (group) and interaction effects (time x group), in Empirical study V. Effect sizes were estimated

using partial eta-square (small: $\eta^2 p \geq .01$; medium: $\eta^2 p \geq .06$, and large: $\eta^2 p \geq .14$; Tabachnick & Fidell, 2013). In this study, statistical analyses were conducted following the intention-to-treat (ITT) and per-protocol (PP) principles in accordance with the CONSORT recommendations (Eysenbach & Consort-EHEALTH Group, 2011). ITT analyses include all randomized participants, even if they present missing data, and PP analysis includes only participants who completed the treatment. According to Tripepi et al. (2020), the ITT principle allows to analyze the effect of assigning a treatment, while the PP principle analyze the effect of receiving a certain treatment, and the two approaches are complementary.

The Reliable Change Index (RCI) was calculated to examine individual participants' clinical changes (Empirical studies III, IV and IV), which is considered to be an appropriate approach to measure significant change in psychotherapy research (Jacobson & Truax, 1991). The RCI is obtained by dividing the difference between post- and pre-treatment scores by the measurement error of the instrument, and scores greater than ± 1.96 suggest a reliable change (Tingey et al., 1996).

2.6. Ethical considerations

The current research project followed all ethical standards and recommendations for research with human beings, from its conception and application, as well as on the dissemination of the scientific findings. The research project was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra, on June 3rd, 2020, and the changes to the original research project were approved on January 13th, 2022 (CEDI/FPCEUC:58/5).

The procedures adopted were compliant with the recommendations of important national (Order of Portuguese Psychologists; Regulation number 637/2021, July 13th, 2021) and international (World Medical Association – Helsinki Declaration, 2013; American Psychological Association – Ethical principles of psychologists and code of conduct, 2017) scientific associations. Overall, the following fundamental ethical principles were considered throughout this research project: 1) the principle of beneficence and non-maleficence, which states that researchers/psychologists should seek the benefit of participants, safeguard their welfare and rights, and do not cause them harm; 2) the principle of respect for people's rights and dignity, which highlights the respect for participants' rights to privacy, confidentiality, and self-determination; 3) the principle of responsibility, which promotes the recognition of the impact in the participants' well-being and reinforces the compliance with professional standards of

conduct; 4) the principle of integrity, which asserts that researchers/psychologists should be transparent, honest and accurate in their practices and prevent conflicts of interest; 5) the principle of competence, which refers to the technical and scientific training needed to conduct research and psychological intervention.

During the conceptualization of the research project, and following the principle of beneficence and non-maleficence, the research team carefully reflected on the objectives, methodological choices and potential risks and benefits for participants. Accordingly, the assessment protocols were developed to include only the necessary questionnaires to address the research goals, and when possible, in their short form. This allowed to reduce the length and the burden associated with fulfilling the assessment protocol, particularly relevant for the participants of our studies (women in the postpartum period).

Also, during the conceptualization of the procedures for Empirical study V, and considering the principle of beneficence and non-maleficence, as well as the vulnerability of the target population of this project (women in the postpartum period with depressive symptoms), it would be ethically undesirable to allocate participants to a waiting-list control group. In fact, no-treatment controls are not recommended when the trial includes participants with severe conditions for which there is effective treatment (Mohr et al., 2009). Congruently, in the pilot trial, it was decided to provide an intervention to both arms, instead of choosing a waiting list-control. To comply with the CONSORT guidelines (Schulz et al., 2010), the pilot RCT was registered in ClinicalTrials.gov (NCT04441879).

The data collection phases took in consideration the principle of respect for people's rights and dignity and the principle of integrity. Samples were collected online for all empirical studies included in this research project, and therefore detailed information about the study was provided by accessing a weblink containing the assessment protocol. Potential participants were first informed about the following information: study objectives, including inclusion criteria; procedures and expected duration; the voluntary nature of their participation, without monetary compensation; guarantee of confidentiality and anonymity; the possibility of withdrawal from the study at any moment without any consequences; the right to access, change, delete and limit the processing of their data or revoke their consent by contacting the researchers; the use of the collected data strictly for research purposes; the researchers' role, including their ethical obligations, institutional affiliations and contacts; and the funding sources of the research project. Participants were then asked to provide their informed consent after agreeing with the conditions of their participation in the study, by selecting the option "I agree to participate in the

study". The assessment protocols were designed to only collect necessary personal data and participants were identified by a code. In research phase II, contact information (telephone number and email address) was requested so that women could be further contacted for eligibility evaluation. Also, participants had specific codes to link the data from the different assessment moments.

In research phase II, the ethical principles of responsibility and integrity were also considered. First, women who did not meet the inclusion criteria were given feedback about the reasons why they would not participate in the study and were provided with contact information/resources to seek professional help, if needed. Second, particularly in Empirical study V, participants were informed about the randomization process and allocation into two different groups. Third, at the end of the study (after the last assessment moment), participants who had not obtained clinical improvement in the control group were given the opportunity to access the blended intervention and have the sessions with the psychologist. Participants in the intervention group considered in need of continuing treatment were assisted in the process of referral to other mental health services, after the end of their participation in the study.

In all phases of the project, the ethical principle of competence was ensured since all researchers involved in the research project were qualified to conduct it, possessing an academic degree in Clinical Psychology. In addition, the researchers participated in conferences, short-length courses, and workshops in order to constantly update theoretical and methodological knowledge, and participated in meetings with the research group RD&H to discuss research objectives and methodologies. Clinical practice was supervised in biweekly sessions by a senior psychologist member of the research team (in Empirical studies III to V).

Regarding the dissemination of the research project, the scientific results were published in international scientific peer reviewed journals and presented in oral and poster communications at national and international scientific meetings, following the ethical principles of integrity and responsibility. Besides being disseminated among the scientific community, several activities directed at the general community were conducted aiming to disseminate the research project and to increase health literacy on themes related to the project (e.g., maternal mental health, e-mental health tools). The results of the research project were analyzed with accuracy and truthfulness, derived from original and not fabricated data. Databases were not made publicly available to protect participants' privacy but can be provided upon reasonable request. Each empirical study presents the results obtained, whether expected or not, with or without statistical significance, and they were interpreted considering the listed limitations of

each study. The main findings of our research are available on the webpage of the Research Centre (<https://cineicc.uc.pt/publications/>) and of the research group RD&H (https://www.fpce.uc.pt/saude/artigos_internacionais.html).

In the empirical studies included in this research, all third-party ideas were appropriately attributed to the original authors, who were cited to avoid plagiarism. The authorships of the studies were decided according to the relative scientific or professional contributions of the researchers involved, and all sources of funding, institutional affiliations and conflicts of interest were stated.

Chapter III | Empirical studies

Empirical study I

Profiles of women with postpartum depressive symptoms: A latent profile analysis using the Edinburgh Postnatal Depression Scale factors

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2022

Journal of Clinical Psychology, 78(7), 1500-1515.

<https://doi.org/10.1002/jclp.23320>

Profiles of women with postpartum depressive symptoms: A latent profile analysis using the Edinburgh Postnatal Depression Scale factors

Abstract

Objectives: To examine the multidimensionality of symptoms assessed with the Edinburgh Postnatal Depression Scale (EPDS) and to identify and characterize the profiles of women with Postpartum Depression (PPD) symptoms. Methods: A sample of 487 Portuguese postpartum women with clinically relevant depressive symptoms participated in this cross-sectional online study. Confirmatory factor analysis was conducted to analyze the factor structure of the EPDS. A latent profile analysis based on the EPDS factors was conducted. Differences in sociodemographic characteristics and risk factors between profiles were explored. Results: Three EPDS factors were confirmed: depression, anxiety, and anhedonia. Based on these dimensions, three profiles with different symptom severities were found: mild anxious-depressive symptoms; severe PPD symptoms; and moderate anxious-depressive symptoms. Conclusion: Identifying profiles of women with PPD symptoms according to the EPDS factors allows to understand the distinct paths of development of PPD and can inform the development of tailored interventions.

Keywords: Confirmatory factor analysis, Edinburgh Postnatal Depression Scale, latent profile analysis, postpartum depression, risk factors

Introduction

Postpartum depression (PPD) is a common health problem worldwide. According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5), a depressive episode with peripartum onset is established when occurring during pregnancy or in the four weeks postpartum (American Psychiatric Association [APA], 2013). However, the World Health Organization (WHO) expanded the definition of PPD as a depressive episode occurring up to 12 months postpartum and it appears to exist a clinical consensus on this time frame (O'Hara & McCabe, 2013; O'Hara, 2009; World Health Organization, 1992). PPD is one of the most common conditions experienced during this period (O'Hara & McCabe, 2013), and it can negatively impact women's health and the entire family environment, including mother–child relationships, couple relationships, and infant development (Field, 2010; Slomian et al., 2019). Given its consequences and high prevalence (global prevalence of 17%; Shorey et al., 2018; approximately 13% in Portugal; Maia et al., 2011), screening is crucial for the early identification and treatment of PPD (Rafferty et al., 2019). Clinical guidelines recommend that health professionals integrate universal screening for perinatal depression into routine care, which could improve the accuracy of diagnoses and the effectiveness of treatment for PPD (Public Health Ontario, 2018).

The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) is the most common and most widely recommended screening tool for PPD symptoms (Gibson et al., 2009; Public Health Ontario, 2018) and is considered to be sensitive and specific in assessing depressive symptoms among postpartum women (Levis et al., 2020). The EPDS is composed of 10 items assessing how women have felt over the last 7 days in terms of the presence and severity of relevant symptoms (e.g., sadness, tearfulness, and anxiety). This instrument has been validated in different languages and cultural contexts, including in Portugal (Areias et al., 1996). Originally conceived as a one-dimensional instrument by Cox et al. (1987), several studies have reported that EPDS may have a multidimensional structure (e.g., Chiu et al., 2017; Della Vedova et al., 2020; Jomeen & Martin, 2005) and therefore could allow for the identification of different subtypes of PPD symptoms (Putnam et al., 2017).

An increasing number of studies have identified depression, anhedonia, and anxiety as the three dimensions measured by the EPDS (Chiu et al., 2017; Flom et al., 2018; Kubota et al., 2014; Putnam et al., 2017; Tuohy & McVey, 2008b). In fact, PPD is diagnosed by the presence of either depressed mood or anhedonia, that is, a lack of interest or pleasure (APA, 2013). Sun et al. (2019) described different subtypes of perinatal depressive symptoms, considering anhedonia as a distinctive feature between groups. Several authors have also found an anxiety subscale

within the EPDS (e.g., Loyal et al., 2020), and indeed, comorbidity between anxiety and depressive symptoms during the postpartum period has been reported in the literature (Falah-Hassani et al., 2016). Thus, heterogeneity in PPD symptoms should also be understood in light of both anhedonia and anxiety symptoms, in addition to depressive symptoms (Sun et al., 2019).

However, differences in the findings of the studies evaluating the subtypes or dimensions of PPD symptoms were found, in particular, slight discrepancies in the item loadings for each factor. This may arise not only from the statistical approaches used (e.g., exploratory factor analysis with different rotation techniques or confirmatory factor analysis [CFA]; Kubota et al., 2014) but also from the cultural contexts in which those studies were conducted (e.g., Brazil [Reichenheim et al., 2011]; Mexico [Flom et al., 2018]; Japan [Kubota et al., 2014]). To our knowledge, there has been no study evaluating the subtypes of PPD symptoms using the EPDS in Portugal. Additionally, different subtypes of symptoms may be related to different risk factors for PPD and different characteristics in postpartum women (Chiu et al., 2017). Tuohy and McVey (2008b) reported that women in the postpartum period with a partner were more likely to have lower scores on the depression subscale. Changes in the quality of marital relationships were found to predict depression and anxiety symptoms using the EPDS dimensions, with higher levels of these symptoms being associated with decreased quality of marital relationships (McVey & Tuohy, 2007). In addition, depressive symptoms were also predicted by the availability of and satisfaction with social support. Anxiety, on the other hand, was not predicted by any of these risk factors (McVey & Tuohy, 2007). Another study reported that the number of pregnancies and the number of children were not significant predictors of the scores for the three EPDS factors (Tuohy & McVey, 2008a).

The existence of dimensions within the EPDS may have clinical implications, since the sum of the total score may not translate into an accurate depiction of women's PPD symptoms (Reichenheim et al., 2011), which may also present differences in terms of their severity. A recent systematic review confirmed the existence of heterogeneity in PPD symptoms' intensity among studies using different methodological approaches (e.g., latent class analysis or latent profile analysis [LPA]), revealing that it can vary from nonexistent to severe (Santos et al., 2017). The number of classes or profiles found in several studies (depending on the statistical method and the instruments used) ranged from three (e.g., Felder et al., 2018: LPA using the Patient Health Questionnaire) to five (e.g., Campbell et al., 2009: latent class analysis using the Center for Epidemiological Studies-Depression Scale) subgroups that differed in terms of symptom intensity. A study conducted by the Postpartum Depression: Action Towards Causes and Treatment (PACT) Consortium (2015) identified three latent classes using the EPDS, with distinct

characteristics in terms of PPD symptom severity, anxiety symptoms, time of onset, and presence of suicidal ideation. Putnam et al. (2017) further explored the existence of phenotypes in perinatal depression using the three underlying dimensions of the EPDS (depression, anxiety, and anhedonia) and found evidence for five subtypes that differed in the severity and type of symptoms, ranging from “resolved depression” to “severe anxious depression.” Therefore, these findings suggest the existence of different profiles of women in the perinatal period according to the severity of their depressive symptoms.

Despite these findings, few studies have investigated the differences between subgroups of women with PPD symptoms in terms of their sociodemographic characteristics and risk factors. The results from PACT Consortium (2015) suggest the existence of differences concerning suicidal thoughts and obstetric complications between subgroups. In particular, women in the class with more severe PPD symptoms presented significantly more obstetric complications and more thoughts about death (PACT Consortium, 2015). Moreover, postpartum women in the subgroup of severe depressive symptoms presented a higher probability of having health issues (Campbell et al., 2009). Compared with women with more severe symptoms, mothers with subclinical symptoms of depression in the postpartum period appeared to be older and to have unplanned pregnancies (Campbell et al., 2009).

The literature supports the existence of heterogeneous dimensions of PPD symptoms and profiles of women presenting PPD symptoms, both of which are associated with different factors (PACT Consortium, 2015; Tuohy & McVey, 2008a). Understanding the heterogeneity in PPD symptoms (by identifying and characterizing their different subtypes through the EPDS and the different profiles of PPD symptom severity among postpartum women) will allow us to understand different paths of development of PPD symptoms and will inform the development of targeted and tailored interventions for these groups (Putnam et al., 2017; Santos et al., 2017). Therefore, the present study aims to: (1) examine the multidimensionality of the symptoms assessed with the EPDS in Portuguese postpartum women and to analyze the associations between sociodemographic characteristics and risk factors and the EPDS factors; (2) identify and characterize the severity profiles of women with PPD symptoms using the EPDS factors; and (3) explore differences between the profiles in their sociodemographic characteristics and risk factors.

Methods

Procedures

This cross-sectional study was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra. Inclusion criteria for the study were: (i) being an adult Portuguese woman (18 years or older); (ii) being in the postpartum period (up to 12 months after childbirth) and (iii) presenting clinically relevant depressive symptoms (EPDS score > 9; Areias et al., 1996).

The sample was recruited online through advertisements in thematic forums and through both unpaid and paid boosting campaigns on social media pages created by the researchers for the dissemination of the study (Facebook and Instagram), targeting women aged between 18 and 45 years old with interest in maternity topics. The advertisements included information about the study aims, the inclusion criteria, and a link to the online survey (hosted on LimeSurvey®). At the beginning of the survey, participants were informed about the confidential, voluntary, and anonymous nature of their participation, and they were asked to give their informed consent (by affirmatively answering the question, “Do you agree to participate in this study?”). Data collection took place between June 2020 and March 2021.

Instruments

A sociodemographic self-report form was used to collect information on women's age, primiparity, educational level, professional status, monthly household income, place of residence, and infant age.

The Edinburgh Postnatal Depression Scale (Portuguese version: Areias et al., 1996) was used to assess depressive symptoms in postpartum women. The EPDS is composed of 10 items (e.g., “I have felt sad or miserable”) that assess how women have felt over the last seven days. Responses are rated using a 4-point Likert scale (ranging from 0 to 3), and the total score is calculated by summing the points across all items, varying between 0 and 30. Higher scores are indicative of more severe depressive symptoms. According to Portuguese validation studies, a score higher than 9 suggests the presence of clinically relevant depressive symptoms (Areias et al., 1996). The Cronbach's alpha value was 0.77 in our sample.

The postnatal version of the Postpartum Depression Predictors Inventory-Revised (PDPI-R; Portuguese version: Alves et al., 2018) was used to assess PPD risk factors (e.g., marital status of single; lack of social support; unwanted/unplanned pregnancy; marital dissatisfaction). The PDPI-R is composed of 39 items answered on a yes versus no scale (except for the first two items

regarding marital and economic status). The total score ranges from 0 to 39, and higher scores indicate an increased risk for PPD. According to Portuguese validation studies, a score of 5.5 or higher is indicative of higher PPD risk (Alves et al., 2018).

Statistical analysis

Descriptive statistics were calculated to characterize the sample's sociodemographic information using SPSS (version 25.0).

Confirmatory factor analysis (CFA) was performed using Mplus (version 7.4; Muthén & Muthén, 2012) to evaluate the dimensions underlying the EPDS. The number of factors was chosen by considering the number of factors most common in the literature (three factors; e.g., Chiu et al., 2017; Flom et al., 2018). The item loadings for each factor were based on previous studies (Chiu et al., 2017; Flom et al., 2018; Tuohy & McVey, 2008b): anhedonia (items 1–2), anxiety (items 3–5), and depression (items 6–10). The goodness of fit of the CFA was examined using reference values for the following indices: the overall χ^2 goodness-of-fit test (p value > 0.05), the comparative fit index (CFI; ≥ 0.95), the root mean square error of approximation (RMSEA; ≤ 0.08) and the standardized root mean square residual (SMSR; ≤ 0.05) (Brown, 2015; Hu & Bentler, 1999). The associations between the EPDS dimensions and the sociodemographic characteristics and risk factors were examined through Pearson's correlation coefficients, and effect size measures were presented (small: $r \geq 0.10$; medium: $r \geq 0.30$; large: $r \geq 0.50$; Cohen, 1988).

Latent profile analysis (LPA) is a technique used to identify the probability that participants belong to different groups or profiles (Ferguson et al., 2020). LPA was conducted using Mplus software to determine the participants' profile memberships according to the EPDS factors. Several models were estimated by increasing the number of classes, and each model was compared with the previous model to determine model retention (Ferguson et al., 2020). The LPA was stopped at a model when there was no improvement from adding one more class, with improvement being indicated by the Lo–Mendell–Rubin (LMR) test. A nonsignificant LMR p value indicates that the previous model ($k-1$) has the better fit (Ferguson et al., 2020). The optimal number of classes was decided based on the Akaike information criterion (AIC), Bayesian information criterion (BIC), adjusted BIC, entropy value (ranging between 0 and 1), LMR, and theoretical and clinical interpretability. A model with better fit should have lower AIC, BIC, and adjusted BIC values, higher levels of entropy (≥ 0.8), and a statistically significant LMR (Ferguson et al., 2020). The BIC is considered a better fit index than the ABIC and is used more often (Spurk et al., 2020). Class sizes and the average probabilities of belonging to the classes were also

considered, with classes containing at least 3% of the sample and probability values equal to or higher than 0.80 suggesting a good model fit (Ferguson et al., 2020; Spurk et al., 2020). Afterward, descriptive statistics were calculated for class characterization purposes. Differences between profiles in terms of covariates (sociodemographic characteristics and risk factors for PPD) were examined through the BCH approach, which is a procedure recommended for analyzing relationships between classes and covariates (Asparouhov & Muthén, 2014). The overall χ^2 statistical tests were calculated, and when covariates produced statistically significant differences across profiles, the χ^2 statistics for pairwise differences between profiles are presented.

Results

Participants

A total of 1248 women participated in the study and completed the questionnaire, of which 89 participants were excluded for not meeting the inclusion criteria (age under 18 years old; baby's age over 12 months) and 672 were excluded because their EPDS scores were below the EPDS cutoff score (< 10) for the Portuguese population (i.e., women who did not present clinically relevant depressive symptoms). The final sample was composed of 487 postpartum women.

The participants' mean age was 32.34 years (standard deviation [SD] = 5.32, range 18–45), and the majority were primiparous ($n = 342$, 70.2%). Most of the participants were married or in a relationship ($n = 442$, 90.8%), had completed higher education ($n = 302$, 62.0%), were employed ($n = 414$, 85.0%), had a monthly household income up to €1000 ($n = 299$, 61.4%) and lived in an urban area ($n = 359$, 73.7%). Infant age was on average 5.39 months ($SD = 3.54$). The mean EPDS score was 14.27 ($SD = 3.91$).

Dimensionality of symptoms assessed through the EPDS

CFA confirmed that the three-factor model provided a good fit to our data ($\chi^2 = 90.067$, $p < 0.001$, CFI = 0.942, SRMR = 0.042, and RMSEA = 0.061). Following previous studies (Chiu et al., 2017; Flom et al., 2018; Tuohy & McVey, 2008b), the factors were labeled “depression” (factor 1), “anxiety” (factor 2) and “anhedonia” (factor 3). The item loadings for each factor of the EPDS are presented in **Table 1**.

Table 1*Factor loadings of confirmatory factor analysis of the EPDS for three-factor model*

EPDS items	Factors		
	Depression	Anxiety	Anhedonia
1. I have been able to laugh and see the funny side of things.			.623
2. I have looked forward with enjoyment to things.			.627
3. I have blamed myself unnecessarily when things went wrong.		.379	
4. I have been anxious or worried for no good reason.		.708	
5. I have felt scared or panicky for no very good reason.		.640	
6. Things have been getting on top of me.	.445		
7. I have been so unhappy that I have had difficulty sleeping.	.623		
8. I have felt sad or miserable.	.780		
9. I have been so unhappy that I have been crying.	.723		
10. The thought of harming myself has occurred to me.	.556		

The three factors were significantly correlated with each other. Anxiety was moderately correlated with depression ($r = 0.367, p < 0.001$) and with anhedonia ($r = 0.309, p < 0.001$), and the correlation between depression and anhedonia was large ($r = 0.702, p < 0.001$).

Correlations between the EPDS factors and sociodemographic characteristics and risk factors for PPD

Regarding the sociodemographic variables, age and educational level were negatively correlated with the factor anxiety (**Table 2**). In particular, being younger and having a lower educational level were both associated with more severe anxiety symptoms. Regarding the risk factors for PPD, having low self-esteem and depression during pregnancy were correlated with all three dimensions of the EPDS. Having an unplanned and unwanted pregnancy, receiving low levels of social support, experiencing marital dissatisfaction, presenting life stress and childcare stress, and having a baby with a difficult temperament were positively associated with higher levels of both anhedonia and depression but not anxiety. A significant correlation was found between a history of depression and the dimensions of anxiety and depression, with the results indicating that previously having depression was associated with more severe anxiety and

depressive symptoms. A positive correlation was found between prenatal anxiety and the factor anxiety.

Table 2

Correlations between the EPDS dimensions and sociodemographic characteristics and risk factors for PPD

	Anhedonia	Anxiety	Depression
<i>Sociodemographic characteristics</i>			
Age	.025	-.143**	-.029
Primiparous (0 = no; 1 = yes)	.005	.043	-.066
Infant's age in months	.020	.027	.027
Educational level (0 = up to secondary; 1 = higher education)	-.042	-.121**	-.070
Professional Status (0 = other; 1 = employed)	.056	-.047	-.021
Monthly household income (0 = other; 1 = more than 1000€)	-.065	-.074	-.084
Residence (0 = urban; 1 = rural)	-.059	.074	.030
<i>Risk factors for PPD</i>			
Marital Status (0 = married/in a relationship; 1 = single/divorced)	-.029	-.037	.037
Socioeconomic status (middle/high = 0; low = 1)	.088	.113*	.074
Self-esteem (0 = high; low = 1)	.343***	.311***	.430***
Prenatal depression (0 = no; 1 = yes)	.200***	.178***	.317***
Prenatal anxiety (0 = no; 1 = yes)	.021	.183***	.087
Planned pregnancy (yes = 0; no = 1)	.094*	.047	.119**
Wanted pregnancy (yes = 0; no = 1)	.175**	.050	.110*
History of depression (0 = no; 1 = yes)	.028	.158***	.162***
Social support (0 = high; low = 1)	.192**	.026	.235***
Marital satisfaction (yes = 0; no = 1)	.157**	-.025	.263***
Life stress (0 = no; 1 = yes)	.128**	.014	.183***
Childcare stress (0 = no; 1 = yes)	.107*	.068	.137**
Infant temperament (0 = easy; 1 = difficult)	.118**	.082	.179**
Maternity blues (0 = no; 1 = yes)	.051	.072	.085

* $p < .01$; ** $p < 0.05$; *** $p < 0.001$.

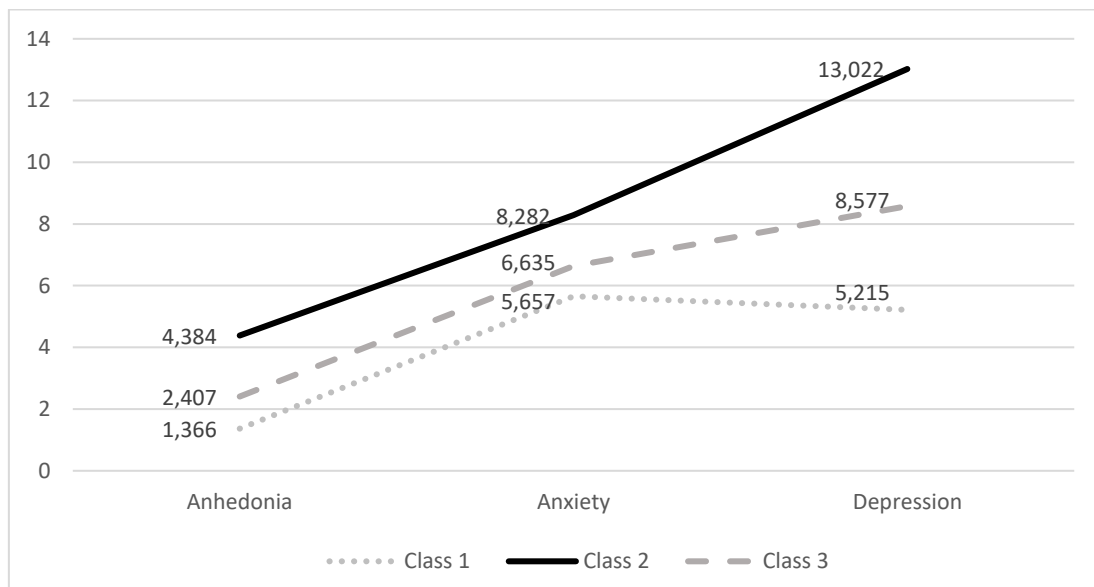
Symptom severity profiles

Four latent profile models were evaluated, ranging from one to four classes (**Table 3**). The LPA was stopped at the four-class model due to a nonsignificant LMR p value. The three-class model provided the best fit for our data: LMR $p = 58.497$, $p < 0.001$; BIC 3 < BIC 4; entropy score 3 > entropy score 4; average probability of belonging to Class 1 in model 4 < 0.8 (see **Table 3**).

The LPA revealed three profiles that were named as a function of their PPD symptom severity. Class 1 was named “mild anxious-depressive symptoms,” with low levels of depressive and anxiety symptoms and very low levels of anhedonia and was the largest class ($n = 332$), representing more than half of the sample (68.2%). Class 2, the least frequent profile, was composed of 17 women from the sample (3.5%) and was labeled “severe PPD symptoms,” characterized by higher levels of depression, followed by high levels of anxiety and moderate levels of anhedonia. Class 3 was labeled “moderate anxious-depressive symptoms,” with elevated levels of depression and anxiety and decreased anhedonia. Approximately 28.3% ($n = 138$) of the participants presented moderate anxious-depressive symptoms. The means of each dimension from the EPDS (anhedonia, anxiety, and depression) for each profile are presented in **Figure 1**.

Figure 1

Three-profile model and means in the EPDS dimensions



Note. Class 1: mild anxious-depressive symptoms; Class 2: severe PPD symptoms; Class 3: moderate anxious-depressive symptoms.

Description of profiles: Differences as a function of sociodemographic characteristics and risk factors

The description of each profile in terms of sociodemographic characteristics and risk factors for PPD are reported in **Table 4**, as well as the existence of significant differences between the profiles in these covariates.

In terms of sociodemographic characteristics, differences were found between Class 1 and Class 3 concerning educational levels and monthly household income. The group with mild anxious-depressive symptoms (Class 1) had higher education and higher monthly household income than the group with moderate anxious-depressive symptoms (Class 3).

In general, differences in the presence of risk factors for PPD were found across the three classes. Women in Class 2, those with severe PPD symptoms, presented more frequently low self-esteem and prenatal depression than the women in the other two profiles. Moreover, severe PPD symptoms were significantly associated with the presence of prenatal anxiety, history of depression, and life stress and with low social support and marital dissatisfaction when compared to mild anxious-depressive symptoms. Class 1 and Class 3 were distinct in terms of almost every risk factor for PPD, with a higher proportion of women in the group with moderate anxious-depressive symptoms presenting more risk factors than the women in the group with mild anxious-depressive symptoms.

Table 3*Goodness-of-fit statistics for latent profile analyses*

Number of profiles	Free parameters	Log Likelihood	AIC	BIC	Adjusted BIC	Entropy	LMRp (adjusted)	BLRTp	% categories	Average probabilities
1	6	-2779.05	5570.09	5595.22	5576.8	-	-	-	1 – 487 (100%)	-
2	10	-2673.894	5367.787	5409.67	5377.93	0.83	Value = 202.14, $p = .0031$	$p < .001$	1 – 422 (86.7%) 2 – 65 (13.3%)	Class 1 – 0.967 Class 2 – 0.855
3	14	-2643.46	5314.93	5373.56	5329.13	0.79	Value = 58.497, $p = .008$	$p < .001$	1 – 332 (68.2%) 2 – 17 (3.5%) 3 – 138 (28.3%)	Class 1 – 0.932 Class 2 – 0.917 Class 3 – 0.839
4	18	-2635.463	5306.93	5382.315	5325.183	0.74	Value = 15.379, $p = .229$	$p = .002$	1 – 27 (5.5%) 2 – 315 (64.9%) 3 – 128 (26.3%) 4 – 17 (3.5%)	Class 1 – 0.666 Class 2 – 0.883 Class 3 – 0.843 Class 4 – 0.912

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; LMRp = p -Value for the adjusted Lo-Mendell-Rubin-test; BLRTp = p -Value for the bootstrapped likelihood ratio test.

Table 4

The relationship between the three latent profiles and the covariates: Descriptives and differences between profiles

	Class 1 (N = 332)	Class 2 (N = 17)	Class 3 (N = 138)	Comparison	Class 1 vs. Class 2	Class 1 vs. Class 3	Class 2 vs. Class 3
	<i>M (SD) / n (%)</i>	<i>M (SD) / n (%)</i>	<i>M (SD) / n (%)</i>	between classes	$\chi^2 (p)$	$\chi^2 (p)$	$\chi^2 (p)$
				$\chi^2 (p)$			
<i>Sociodemographic characteristics</i>							
Age in years	32.64 (5.24)	32.41 (3.61)	31.64 (5.64)	3.204 (0.202)			
Primiparous	235 (70.8%)	12 (70.6%)	95 (68.8%)	0.174 (0.917)			
Infant's age in months	5.28 (3.54)	4.0 (3.22)	5.83 (3.55)	5.833 (0.054)			
Educational level (higher education)	220 (66.3%)	8 (47.1%)	74 (53.6%)	8.096 (0.017)	2.348 (0.125)	6.185 (0.013)	0.103 (0.749)
Professional Status (employed)	288 (86.7%)	16 (94.1%)	110 (79.7%)	5.543 (0.063)			
Monthly household income (more than 1000€)	125 (37.7%)	6 (35.3%)	34 (24.6%)	8.272 (0.016)	0.031 (0.860)	8.269 (0.004)	1.115 (0.291)
Residence (rural)	89 (26.8%)	6 (35.3%)	33 (23.9%)	1.075 (0.584)			
<i>Risk factors for PPD</i>							
Marital Status (single/divorced)	28 (8.4%)	1 (5.9%)	16 (11.4%)	1.342 (0.511)			
Socioeconomic status (low)	36 (10.8%)	3 (17.6%)	31 (22.5%)	8.928 (0.012)	0.490 (0.484)	8.560 (0.003)	0.472 (0.492)
Self-esteem (low)	96 (28.9%)	17 (100.0%)	101 (73.2%)	767.313 (<0.001)	752.316 (<0.001)	91.176 (<0.001)	15.909 (<0.001)
Prenatal depression (yes)	132 (39.8%)	16 (94.1%)	94 (68.1%)	89.503 (<0.001)	72.411 (<0.001)	33.120 (<0.001)	7.692 (0.006)
Prenatal anxiety (yes)	269 (81.0%)	17 (100.0%)	119 (86.2%)	96.357 (<0.001)	77.950 (<0.001)	1.836 (0.175)	13.230 (<0.001)

Planned pregnancy (no)	82 (24.7%)	7 (41.2%)	45 (32.6%)	4.324 (0.115)			
Wanted pregnancy (no)	8 (2.4%)	3 (17.6%)	11 (8.0%)	7.599 (0.022)	2.654 (0.103)	4.690 (0.030)	0.802 (0.371)
History of depression (yes)	205 (61.7%)	15 (88.2%)	98 (71.0%)	12.252 (0.002)	10.163 (0.001)	3.582 (0.058)	2.908 (0.088)
Social support (low)	273 (82.2%)	17 (100.0%)	135 (97.8%)	73.714 (<0.001)	71.649 (<0.001)	40.229 (<0.001)	0.224 (0.636)
Marital satisfaction (no)	120 (36.1%)	13 (76.5%)	74 (53.6%)	23.534 (<0.001)	14.164 (<0.001)	11.419 (0.001)	2.908 (0.088)
Life stress (yes)	227 (68.4%)	16 (94.1%)	111 (80.4%)	20.507 (<0.001)	16.702 (<0.001)	7.651 (0.006)	2.665 (0.103)
Childcare stress (yes)	184 (55.4%)	11 (64.7%)	102 (73.9%)	15.994 (<0.001)	0.562 (0.453)	15.828 (<0.001)	1.038 (0.308)
Infant temperament (difficult)	118 (35.5%)	10 (58.8%)	74 (53.6%)	15.373 (<0.001)	3.524 (0.060)	12.658 (<0.001)	0.020 (0.888)
Maternity blues (yes)	279 (84.0%)	16 (94.1%)	126 (91.3%)	6.829 (0.033)	2.709 (0.100)	5.218 (0.022)	0.052 (0.820)

Note. Class 1: mild anxious-depressive symptoms; Class 2: severe PPD symptoms; Class 3: moderate anxious-depressive symptoms. Statistically significant differences are highlighted in bold.

Discussion

This is the first study to identify different dimensions of PPD symptoms through the EPDS and to assess the existence of profiles of women presenting clinically significant depressive symptoms in a Portuguese sample.

One main finding is the confirmation of the three-factor structure of the Portuguese version of the EPDS (depression, anxiety, and anhedonia). This corroborates the findings of prior studies (e.g., Chiu et al., 2017; Putnam et al., 2017) that the EPDS is not an unifactorial measure of PPD symptoms, as initially proposed by Cox et al. (1987). Additionally, this study contributes to an understanding of EPDS through a multidimensional structure that is transversal across several cultural contexts, such as European (e.g., Petrozzi & Gagliardi, 2013), Asian (e.g., Kubota et al., 2014), and Latin American countries (e.g., Flom et al., 2018). The coexistence of depression, anxiety, and anhedonia within PPD has been little explored (Coates et al., 2017). A recent review (Batt et al., 2020) has identified anxiety as more common in PPD than in other major depressive episodes, with women who have PPD reporting more frequent or more severe anxiety symptoms. Another study reported high comorbidity between depressive and anxiety symptoms in women 6 weeks postpartum, emphasizing the heterogeneity in PPD symptoms (Radoš et al., 2018). Moreover, in our study, a strong correlation was found between the dimensions of depression and anhedonia, which could be somewhat expected given the inclusion of both as main symptoms in the DSM-V diagnostic criteria for PPD (APA, 2013). Nevertheless, anhedonia can sometimes be forgotten by clinicians when assessing depressive symptoms, which should be reversed (Sibitz et al., 2010).

Additionally, the three dimensions of the EPDS were associated with different sociodemographic variables and risk factors, as previously suggested by Flom et al. (2018). Anxiety was significantly associated with age and educational level, with younger women and those with lower education (up to secondary) presenting higher levels in anxiety symptoms in our sample. A similar result was previously reported in the study of Reck et al. (2008), with younger new mothers and those with lower education presenting a higher risk of developing depressive symptoms. We hypothesize that this could be related to difficulties dealing with the transition to motherhood and the challenges of taking on a new role that is sometimes difficult to make compatible with other roles (such as professional roles; Reck et al., 2008), which could translate into higher levels of anxiety. The results also showed that several risk factors were associated with the three dimensions of the EPDS. We underscore, in particular, the correlations between low levels of social support and increased marital dissatisfaction and higher levels of

depression, as well as anhedonia, which is in line with previous findings (McVey & Tuohy, 2007). These two risk factors are recognized as two of the most common risk factors for PPD, together with prenatal depression and low self-esteem (Hutchens & Kearney, 2020), which were also revealed to be significantly associated with the PPD symptom dimensions, with higher correlation values. In fact, some risk factors, such as low maternal self-esteem and low partner support, have been found to be predictive of the comorbidity between anxiety and PPD (Falah-Hassani et al., 2016). Further studies could assess how the risk factors for PPD can distinctly predict the subtypes of PPD symptoms.

Another central finding of this study is the identification of three profiles of women presenting PPD symptoms, namely, mild anxious-depressive symptoms, severe PPD symptoms, and moderate anxious-depressive symptoms. These three profiles were distinct based on the severity of the depressive, anhedonia, and anxiety symptoms as measured through the EPDS. The most frequent profile, which included approximately 68% of the sample, was the group with mild anxious-depressive symptoms, which was characterized by clinically significant levels of PPD (EPDS > 9) but considered to have low severity.

Moreover, this study provided evidence that sociodemographic characteristics and the presence of risk factors for PPD were associated with distinct profiles of symptom severity. Women in the moderate anxious-depressive symptoms profile had lower education than those matching the mild anxious-depressive symptoms profile, and indeed, Sun et al. (2019) found that members of the group with more severe symptoms were more likely to have lower educational levels. We can conclude that lower educational levels, together with lower household income, are distinct features across profiles that can be expected to be associated with more severe PPD symptoms. Our results also showed that women with severe PPD symptoms presented more frequently presented low self-esteem and a history of prenatal depression than women in the other two profiles. As already mentioned, these two risk factors seem to play an important role, since they are associated with the three EPDS factors and therefore should be a further focus of attention. In our sample, a higher proportion of women with severe PPD symptoms presented prenatal anxiety, a history of depression, and life stress than women with mild anxious-depressive symptoms. This is consistent with prior studies that have found evidence for these differences in PPD symptom intensity as a function of having a previous history of depression (Kettunen et al., 2014). Women with severe PPD symptoms presented significantly more risk factors than women with mild anxious-depressive symptoms in our sample. Similarly, the profile of moderate anxious-depressive symptoms was associated with more risk factors than the profile of mild anxious-depressive symptoms. These results highlight that the presence of risk factors

for PPD can not only help to detect the possibility of a woman developing PPD (Alves et al., 2019) but also help to estimate the severity of her PPD symptoms.

Implications for PPD screening and treatment

This study provides evidence that PPD is a heterogeneous clinical condition and can have distinct subtypes of symptoms that present with different intensities, as previously proposed by some authors (Kettunen et al., 2014; Santos et al., 2017), which has implications for clinical practice. First, this finding emphasizes the need to consider the diversity of PPD symptoms, i.e., anxiety and anhedonia symptoms, and not only depressive symptoms, during both screening and treatment for PPD (Kettunen et al., 2014; Kubota et al., 2014). Additionally, when using the EPDS during screening for PPD, in addition to looking only at the total score, the scores of the factors should also be analyzed since they provide information on these specific symptoms (Tuohy & McVey, 2008a). For instance, a woman with a high EPDS score may have mainly anxiety or anhedonia symptoms, which can be detected through those dimensions and which may influence further prognoses.

Second, this study identified different profiles of women with PPD symptoms according to the EPDS dimensions. In our sample, the majority of women presented mild anxious-depressive symptoms. Among the existing evidence-based treatments, psychological interventions are recommended as the first treatment option for mild to moderate forms of PPD (Guille et al., 2013). For the severe PPD symptoms group, the smallest profile in our sample, a combination of pharmacotherapy and psychotherapy is advised (Guille et al., 2013).

As stated by Kettunen and colleagues, “screening alone is not effective” (Kettunen et al., 2014, p. 8); therefore, it is necessary to effectively prevent and to provide adapted treatment options for PPD. Prevention strategies should take into account the risk factors for PPD. In particular, the factors that can be addressed during pregnancy, such as prenatal anxiety and depression, can potentially impact the postpartum period and the development of PPD symptoms. In addition, psychological interventions for PPD should also focus on risk factors that can be mitigated, such as social support, partner satisfaction, and maternal self-esteem, and should integrate components and strategies directed toward anxiety, depression, and anhedonia symptoms.

In the Portuguese context, a web-based program for the prevention of PPD based on cognitive-behavioral therapy has been developed (Fonseca et al., 2018). It includes therapeutic strategies such as psychoeducation, cognitive restructuring, and behavioral activation and focuses on reducing the impact of some risk factors, such as marital dissatisfaction and poor

social support, identified in this study as important issues to be addressed in clinical PPD management. This intervention was found to reduce depressive and anxiety symptoms among postpartum women (Fonseca et al., 2019) and could potentially improve anhedonic symptoms as well. Similar interventions for PPD treatment should also be developed, integrating strategies directed at the heterogeneous symptoms of PPD and focused on minimizing the impact of risk factors.

There are some limitations to these findings. This is a cross-sectional study, so no causal relationships between the variables can be derived. Given the online nature of recruitment, the sample was self-selected, and so women with more interest or concerned about the topic (e.g., women presenting depressive symptoms) may have been more motivated to participate, which may represent a selection bias. Most of the participants were in a relationship, employed, and highly educated. Hence, the findings of this study may not be generalizable to the Portuguese population, and the population to whom the study was targeted could not be described. In addition, we could not identify the women presenting severe PPD symptoms (due to the anonymous nature of participation), who might be at increased risk and should be immediately referred to treatment.

Conclusion

To our knowledge, this is the first study to assess the EPDS's factorial structure and to conduct a latent profile analysis of PPD symptoms in a Portuguese sample of postpartum women. In particular, choosing a sample with clinically significant depressive symptoms allowed us to explore the range of PPD symptoms only, in contrast to some studies that have included women without significant symptoms (e.g., Putnam et al., 2017; Tuohy & McVey, 2008b). Finally, our study demonstrated the existence of three PPD symptom severity profiles and enabled the discovery of distinct paths of development of PPD, which can be associated with the presence of certain risk factors and thus can further inform the development of tailored interventions for PPD.

References

- Alves, S., Fonseca, A., Canavarro, M. C., & Pereira, M. (2018). Preliminary psychometric testing of the Postpartum Depression Predictors Inventory-Revised (PDPI-R) in Portuguese women. *Maternal and Child Health Journal*, *22*, 571–578. <https://doi.org/10.1007/s10995-017-2426-5>
- Alves, S., Fonseca, A., Canavarro, M. C., & Pereira, M. (2019). Predictive validity of the Postpartum Depression Predictors Inventory-Revised (PDPI-R): A longitudinal study with Portuguese women. *Midwifery*, *69*, 113–120. <https://doi.org/10.1016/j.midw.2018.11.006>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental disorders: DSM-5*. American Psychiatric Association.
- Areias, M. E. G., Kumar, R., Barros, H., & Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth. *The British Journal of Psychiatry*, *169*(1), 30–35. <https://doi.org/10.1192/bjp.169.1.30>
- Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Using the BCH method in Mplus to estimate a distal outcome model and an arbitrary secondary model. *Mplus web notes*, *21*(2), 1–22.
- Batt, M. M., Duffy, K. A., Novick, A. M., Metcalf, C. A., & Epperson, C. N. (2020). Is postpartum depression different from depression occurring outside of the perinatal period? A review of the evidence. *Focus*, *18*(2), 106–119. <https://doi.org/10.1176/appi.focus.20190045>
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. Guilford publications.
- Campbell, S. B., Morgan-Lopez, A. A., Cox, M. J., & McLoyd, V. C. (2009). A latent class analysis of maternal depressive symptoms over 12 years and offspring adjustment in adolescence. *Journal of Abnormal Psychology*, *118*(3), 479–493. <https://doi.org/10.1037/a0015923>
- Chiu, Y. H. M., Sheffield, P. E., Hsu, H. H. L., Goldstein, J., Curtin, P. C., & Wright, R. J. (2017). Subconstructs of the Edinburgh Postnatal Depression Scale in a multi-ethnic inner-city population in the US. *Archives of Women's Mental Health*, *20*(6), 803–810. <https://doi.org/10.1007/s00737-017-0765-2>

- Coates, R., Ayers, S., & de Visser, R. (2017). Factor structure of the Edinburgh Postnatal Depression Scale in a population-based sample. *Psychological Assessment, 29*(8), 1016–1027. <https://doi.org/10.1037/pas0000397>
- Cohen, J. (1988). *Statistical power analysis for the behavioral science*. Hillsdale.
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry, 150*(6), 782–786.
- Della Vedova, A. M., Loscalzo, Y., Giannini, M., & Matthey, S. (2020). An exploratory and confirmatory factor analysis study of the EPDS in postnatal Italian-speaking women. *Journal of Reproductive and Infant Psychology, 1*–13. <https://doi.org/10.1080/02646838.2020.1822993>
- Falah-Hassani, K., Shiri, R., & Dennis, C. L. (2016). Prevalence and risk factors for comorbid postpartum depressive symptomatology and anxiety. *Journal of Affective Disorders, 198*, 142–147. <https://doi.org/10.1016/j.jad.2016.03.010>
- Felder, J. N., Roubinov, D., Bush, N. R., Coleman-Phox, K., Vieten, C., Laraia, B., Adler, N. E., & Epel, E. (2018). Effect of prenatal mindfulness training on depressive symptom severity through 18-months postpartum: A latent profile analysis. *Journal of Clinical Psychology, 74*(7), 1117–1125. <https://doi.org/10.1002/jclp.22592>
- Ferguson, S. L., G. Moore, E. W., & Hull, D. M. (2020). Finding latent groups in observed data: A primer on latent profile analysis in Mplus for applied researchers. *International Journal of Behavioral Development, 44*(5), 458–468. <https://doi.org/10.1177/0165025419881721>
- Field, T. (2010). Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behavior and Development, 33*, 1–6. <https://doi.org/10.1016/j.infbeh.2009.10.005>
- Flom, J. D., Chiu, Y. H. M., Tamayo-Ortiz, M., Schnaas, L., Curtin, P. C., Wright, R. J., Téllez-Rojo, M. M., & Rosa, M. J. (2018). Subconstructs of the Edinburgh Postpartum Depression Scale in a postpartum sample in Mexico City. *Journal of Affective Disorders, 238*, 142–146. <https://doi.org/10.1016/j.jad.2018.05.049>
- Fonseca, A., Monteiro, F., Alves, S., Gorayeb, R., & Canavarro, M. C. (2019). Be a Mom, a web-based intervention to prevent postpartum depression: The enhancement of self-

regulatory skills and its association with postpartum depressive symptoms. *Frontiers in Psychology*, 10, 265. <https://doi.org/10.3389/fpsyg.2019.00265>

Fonseca, A., Pereira, M., Araújo-Pedrosa, A., Gorayeb, R., Ramos, M. M., & Canavarro, M. C. (2018). Be a mom: Formative evaluation of a web-based psychological intervention to prevent postpartum depression. *Cognitive and Behavioral Practice*, 25(4), 473–495. <https://doi.org/10.1016/j.cbpra.2018.02.002>

Gibson, J., McKenzie-McHarg, K., Shakespeare, J., Price, J., & Gray, R. (2009). A systematic review of studies validating the Edinburgh Postnatal Depression Scale in antepartum and postpartum women. *Acta Psychiatrica Scandinavica*, 119(5), 350–364. <https://doi.org/10.1111/j.1600-0447.2009.01363.x>

Guille, C., Newman, R., Fryml, L. D., Lifton, C. K., & Epperson, C. N. (2013). Management of postpartum depression. *Journal of Midwifery & Women's Health*, 58(6), 643–653. <https://doi.org/10.1111/jmwh.12104>

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55. <https://doi.org/10.1080/10705519909540118>

Hutchens, B. F., & Kearney, J. (2020). Risk factors for postpartum depression: An umbrella review. *Journal of Midwifery & Women's Health*, 65(1), 96–108. <https://doi.org/10.1111/jmwh.13067>

Jomeen, J., & Martin, C. R. (2005). Confirmation of an occluded anxiety component within the Edinburgh Postnatal Depression Scale (EPDS) during early pregnancy. *Journal of Reproductive and Infant Psychology*, 23(2), 143–154. <https://doi.org/10.1080/02646830500129297>

Kettunen, P., Koistinen, E., & Hintikka, J. (2014). Is postpartum depression a homogenous disorder: Time of onset, severity, symptoms and hopelessness in relation to the course of depression. *BMC Pregnancy and Childbirth*, 14(1), 1–9. <https://doi.org/10.1186/s12884-014-0402-2>

Kubota, C., Okada, T., Aleksic, B., Nakamura, Y., Kunimoto, S., Morikawa, M., Shiino, T., Tamaji, A., Ohoka, H., Banno, N., Morita, T., Murase, S., Goto, S., Kanai, A., Masuda, T., Ando, M., & Ozaki, N. (2014). Factor structure of the Japanese version of the Edinburgh Postnatal

Depression Scale in the postpartum period. *PLoS One*, 9(8), e103941. <https://doi.org/10.1371/journal.pone.0103941>

Levis, B., Negeri, Z., Sun, Y., Benedetti, A., & Thombs, B. D. (2020). Accuracy of the Edinburgh Postnatal Depression Scale (EPDS) for screening to detect major depression among pregnant and postpartum women: Systematic review and meta-analysis of individual participant data. *BMJ (London)*, 371. <https://doi.org/10.1136/bmj.m4022>

Loyal, D., Sutter, A. L., & Rasclé, N. (2020). Screening beyond postpartum depression: Occluded anxiety component in the EPDS (EPDS-3A) in French mothers. *Maternal and Child Health Journal*, 24(3), 369–377. <https://doi.org/10.1007/s10995-020-02885-8>

Maia, B. R., Marques, M., Bos, S., Pereira, A. T., Soares, M. J., Valente, J., Macedo, A., & Azevedo, M. H. (2011). Epidemiology of perinatal depression in Portugal: Categorical and dimensional approach. *Acta Medica Portuguesa*, 24, 443–448.

McVey, C., & Tuohy, A. (2007). Differential effects of marital relationship and social support on three subscales identified within the Edinburgh Postnatal Depression Scale. *Journal of Reproductive and Infant Psychology*, 25(3), 203–209. <https://doi.org/10.1080/02646830701467256>

Muthén, L., & Muthén, B. (2012). Mplus user's guide (6th ed.). Muthén & Muthén. O'Hara, M. W. (2009). Postpartum depression: What we know. *Journal of Clinical Psychology*, 65(12), 1258–1269. <https://doi.org/10.1002/jclp.20644>

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: Current status and future directions. *Annual Review of Clinical Psychology*, 9, 379–407. <https://doi.org/10.1146/annurev-clinpsy-050212-185612>

Ontario Agency for Health Protection and Promotion (Public Health Ontario). (2018). *Screening for perinatal depression: Adapting existing guidelines to the Ontario public health system context*. Queen's Printer for Ontario.

Petrozzi, A., & Gagliardi, L. (2013). Anxious and depressive components of Edinburgh Postnatal Depression Scale in maternal postpartum psychological problems. *Journal of Perinatal Medicine*, 41(4), 343-348. <https://doi.org/10.1515/jpm-2012-0258>

Postpartum Depression: Action Towards Causes and Treatment (PACT) Consortium. (2015). Heterogeneity of postpartum depression: A latent class analysis. *The Lancet Psychiatry*, 2(1), 59–67. [https://doi.org/10.1016/S2215-0366\(14\)00055-8](https://doi.org/10.1016/S2215-0366(14)00055-8)

- Putnam, K. T., Wilcox, M., Robertson-Blackmore, E., Sharkey, K., Bergink, V., Munk-Olsen, T., Deligiannidis, K. M., Payne, J., Altemus, M., Newport, J., Apter, G., Devouche, E., Viktorin, A., Magnusson, P., Penninx, B., Buist, A., Bilszta, J., O'Hara, M., Stuart, S., ... Postpartum depression: Action Towards Causes and Treatment (PACT), C. (2017). Clinical phenotypes of perinatal depression and time of symptom onset: Analysis of data from an international consortium. *The Lancet Psychiatry*, 4(6), 477–485. [https://doi.org/10.1016/S2215-0366\(17\)30136-0](https://doi.org/10.1016/S2215-0366(17)30136-0)
- Radoš, S. N., Tadinac, M., & Herman, R. (2018). Anxiety during pregnancy and postpartum: Course, predictors and comorbidity with postpartum depression. *Acta Clinica Croatica*, 57(1), 39–51. <https://doi.org/10.20471/acc.2018.57.01.05>
- Rafferty, J., Mattson, G., Earls, M. F., & Yogman, M. W., Committee on Psychosocial Aspects of Child and Family Health. (2019). Incorporating recognition and management of perinatal depression into pediatric practice. *Pediatrics*, 143(1), e20183260.
- Reck, C., Struben, K., Backenstrass, M., Stefenelli, U., Reinig, K., Fuchs, T., Sohn, C., & Mundt, C. (2008). Prevalence, onset and comorbidity of postpartum anxiety and depressive disorders. *Acta Psychiatrica Scandinavica*, 118(6), 459–468. <https://doi.org/10.1111/j.1600-0447.2008.01264.x>
- Reichenheim, M. E., Moraes, C. L., Oliveira, A. S., & Lobato, G. (2011). Revisiting the dimensional structure of the Edinburgh Postnatal Depression Scale (EPDS): Empirical evidence for a general factor. *BMC Medical Research Methodology*, 11(1). <https://doi.org/10.1186/1471-2288-11-93>
- Santos, H., Tan, X., & Salomon, R. (2017). Heterogeneity in perinatal depression: How far have we come? A systematic review. *Archives of Women's Mental Health*, 20(1), 11–23. <https://doi.org/10.1007/s00737-016-0691-8>
- Shorey, S., Chee, C. Y. I., Ng, E. D., Chan, Y. H., San Tam, W. W., & Chong, Y. S. (2018). Prevalence and incidence of postpartum depression among healthy mothers: A systematic review and meta-analysis. *Journal of Psychiatric Research*, 104, 235–248. <https://doi.org/10.1016/j.jpsychires.2018.08.001>
- Sibitz, I., Berger, P., Freidl, M., Topitz, A., Krautgartner, M., Spiegel, W., & Katschnig, H. (2010). ICD-10 or DSM-IV? Anhedonia, fatigue and depressed mood as screening symptoms for diagnosing a current depressive episode in physically ill patients in general hospital. *Journal of Affective Disorders*, 126, 245–251. <https://doi.org/10.1016/j.jad.2010.03.023>

- Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health, 15*, 1745506519844044. <https://doi.org/10.1177/1745506519844044>
- Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: a review and “how to” guide of its application within vocational behavior research. *Journal of Vocational Behavior, 120*, 103445. <https://doi.org/10.1016/j.jvb.2020.103445>
- Sun, J. W., Cao, D. F., Li, J. H., Zhang, X., Wang, Y., Bai, H. Y., Lin, P. Z., Zhang, H. H., & Cao, F. L. (2019). Profiles and characteristics of clinical subtypes of perinatal depressive symptoms: A latent class analysis. *Journal of Advanced Nursing, 75*(11), 2753–2765. <https://doi.org/10.1111/jan.14136>
- Tuohy, A., & McVey, C. (2008a). Experience of pregnancy and delivery as predictors of postpartum depression. *Psychology, Health and Medicine, 13*(1), 43–47. <https://doi.org/10.1080/13548500701294531>
- Tuohy, A., & McVey, C. (2008b). Subscales measuring symptoms of non-specific depression, anhedonia, and anxiety in the Edinburgh Postnatal Depression Scale. *British Journal of Clinical Psychology, 47*(2), 153–169. <https://doi.org/10.1348/014466507X238608>
- World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. World Health Organization.

Empirical study II

A blended psychological intervention for postpartum depression: Acceptability and preferences in women presenting depressive symptoms

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2021

Journal of Reproductive and Infant Psychology, 41(1), 78-92.

<https://doi.org/10.1080/02646838.2021.1969350>

A blended psychological intervention for postpartum depression: Acceptability and preferences in women presenting depressive symptoms

Abstract

Objectives: To evaluate the acceptability of and preferences for a blended psychological intervention (combining face-to-face sessions and web-based interventions) for the treatment of postpartum depression among Portuguese women presenting depressive symptoms and to explore the factors associated with its acceptability. **Background:** Despite its high prevalence and the existence of effective treatment, still few women seek professional help for postpartum depression, demanding for new treatment formats, such as blended interventions. **Methods:** Women ($n = 235$) presenting postpartum depressive symptoms ($EPDS > 9$) completed an internet survey assessing sociodemographic and clinical information, depressive symptoms, e-health literacy and the acceptability of and preferences for a blended intervention for postpartum depression. **Results:** Most of the participants considered a blended intervention for postpartum depression to be useful and would be available to use it. Women reported significantly more advantages than disadvantages in regard to this treatment format. Married women, employed, with younger babies and with less severe depressive symptoms had a higher likelihood of finding a blended intervention useful. Higher educational levels increased the likelihood of being available to obtain a blended treatment. Most participants preferred an equal distribution of content across face-to-face and online sessions. Approximately one-third of the sample preferred a 75% face-to-face/ 25% online proportion. Most of the women preferred a duration of 45–60 minutes for face-to-face sessions and 30–45 minutes for online sessions. **Conclusion:** Our findings support and inform the development of blended psychological treatments for postpartum depression, according to women's preferences, and highlight the prioritisation of this format according to women's characteristics.

Keywords: Acceptability; blended intervention; cognitive behavioural therapy; postpartum depression; preferences

Introduction

Postpartum depression (PPD) affects approximately 12%-20% of mothers (Evagorou et al., 2016) and, when untreated, it negatively impacts the entire family system (Slomian et al., 2019). Psychological interventions (e.g., cognitive-behavioural therapy; CBT) are recommended as first-line treatment options for moderate PPD (Langan & Goodbred, 2016). However, the women's help-seeking rates are very low (Fonseca et al., 2015). Women often report lack of time, transportation issues, childcare difficulties, and high costs as barriers to seeking PPD treatment (Maloni et al., 2013). Long waiting lists to access psychological treatment and long time periods between sessions (Serviço Nacional de Saúde, 2020) can also hinder women's help-seeking behaviours. Therefore, new treatment delivery formats are required to overcome these barriers and increase women's access to PPD treatment.

A blended intervention is a recently developed treatment format that integrates face-to-face sessions with e-mental health tools (e.g., web-based interventions), benefiting from the advantages of both modalities incorporated into one treatment protocol (Erbe et al., 2017). Reduced costs, flexibility and improved accessibility are some of the advantages of using web-based interventions for the treatment of mental disorders (Lal & Adair, 2014). The use of web-based programs within blended treatments for mental health problems can improve patients' self-management, help them to better prepare for face-to-face sessions and make important content available between sessions (Schuster et al., 2018b; Titzler et al., 2018).

Blended treatments also benefit from guidance through therapy within face-to-face sessions (Wentzel et al., 2016), which can overcome some of the disadvantages of using web-based interventions alone, such as low engagement and high dropout rates (Nair et al., 2018), which can be explained by the lack of assistance (Andersson & Titov, 2014). Therapist support can increase patient adherence and treatment intensity, as well as decrease attrition rates (Wentzel et al., 2016). Blended interventions allow to provide immediate feedback, discuss specific problems and deal with crises within face-to-face sessions (van der Vaart et al., 2014).

The benefits of blended interventions are recognised both by patients and therapists (van der Vaart et al., 2014). According to Rai et al. (2013), patients prefer to use e-mental health tools as a complement to face-to-face treatment rather than as a substitute for such treatment. CBT therapists report that blended treatments can increase patients' motivation and be adapted to their individual needs (Titzler et al., 2018; Wentzel et al., 2016), and recognise that the common treatment gap between sessions can be reduced by replacing some face-to-face sessions with online sessions using web-based programs, being a potentially more cost-effective

treatment option for mental health problems (Erbe et al., 2017). Research has shown that blended interventions are effective in treating psychological disorders (Erbe et al., 2017), such as depression (Kooistra et al., 2019). However, to the best of our knowledge, there is currently no blended intervention for the treatment of PPD. Despite that, both web-based (e.g., Milgrom et al., 2016) and face-to-face psychological interventions for PPD (Chabrol et al., 2004) are perceived as acceptable by women (Hantsoo et al., 2017). Some studies have assessed the effectiveness of online interventions for PPD, with a therapist providing individualised feedback through email or phone calls (Pugh et al., 2016; Sheeber et al., 2012) and participants reported overall satisfaction and perceived them as useful (Pugh et al., 2016). Hantsoo et al. (2017) described a high acceptability of computer-based therapies among pregnant women, with CBT web-based programs with brief therapist support being among their preferred treatment options, which supports the development of blended interventions for PPD.

From a patient perspective, some factors need to be addressed to develop a blended intervention for PPD. For example, concerning the distribution of contents between face-to-face and online sessions and the optimal proportion of sessions (Erbe et al., 2017; Mol et al., 2020). Previous studies revealed that online sessions were preferred for practical exercises, while face-to-face sessions were ideal for discussing thoughts and feelings (van der Vaart et al., 2014), and that patients disagreed on the ideal proportion of sessions (Mol et al., 2020). Another important topic concerns the perceived advantages and disadvantages of blended interventions for postpartum women (Mol et al., 2020). There is also little evidence about the suitability of blended treatment for every woman (Erbe et al., 2017; Mol et al., 2020). Patients' characteristics, such as age, levels of e-health literacy and severity of symptoms (Erbe et al., 2017; Kloek et al., 2020), should be considered to better understand who will benefit most from this blended treatment format (Wentzel et al., 2016).

The present study aims to evaluate the acceptability of and preferences for a blended psychological intervention for the treatment of PPD among Portuguese women presenting clinically relevant depressive symptoms in the postpartum period. Moreover, it aims to analyse the associations between the acceptability of a blended intervention for PPD and sociodemographic and clinical characteristics, the severity of depressive symptoms and e-health literacy.

Method

Procedure

A cross-sectional online survey was conducted. This study was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra. Adult Portuguese women (aged over 18 years old) in the postpartum period (up to 12 months after childbirth) presenting clinically significant depressive symptoms (score on Edinburgh Postnatal Depression Scale > 9; Areias et al., 1996) were eligible to participate in this study. Data collection occurred between June and November 2020.

Recruitment occurred through online advertisements posted on social media websites, in thematic forums and through email. Information about the study goals was presented, followed by a weblink to the online survey (hosted on LimeSurvey®). No compensation was offered to participate in the study. After accessing the weblink, the participants were asked to give their informed consent to participate in the study by affirmatively answering the question, 'Do you agree to participate in this study?'

Measures

Sociodemographic and clinical information

Women's sociodemographic (e.g., age, marital status, educational level), clinical (e.g., current psychological/psychiatry treatment) and infant's information (e.g., infant's age,) were collected.

Depressive symptoms

The Portuguese version of the Edinburgh Postnatal Depression Scale (EPDS; Areias et al., 1996) was used to evaluate depressive symptoms. The EPDS is a 10-item instrument (e.g., 'I have felt sad or miserable') using an individualised four-point Likert scale (ranging from 0 to 3). Higher scores are indicative of more severe depressive symptoms. In Portuguese validation studies, a score higher than 9 suggests the presence of clinically relevant depressive symptoms (Areias et al., 1996). In our sample, the Cronbach's alpha value was .79.

E-Health literacy

The Portuguese version of the e-health Literacy Scale (Tomás et al., 2014) was used to assess e-health literacy. It comprises 8 items (e.g., 'I know where to find helpful health resources on the internet'), answered on a Likert scale (ranging from 1 = strongly disagree to 5 = strongly

agree). Higher scores indicate higher levels of e-health literacy. The Cronbach's alpha value was .93 in our sample.

Acceptability of blended psychological interventions for the treatment of PPD

Specific questions were developed for the present study based on the existing literature (e.g., Arjadi et al., 2018; Urech et al., 2018) to evaluate the acceptability of blended psychological interventions for the treatment of PPD. A brief definition of blended psychological interventions was presented to the participants ('There are psychological interventions that combine face-to-face sessions and sessions through an online program. In particular, the face-to-face sessions conducted with the therapist are combined with the sessions that the person do at home, through an online program in the computer or phone'). Acceptability was assessed through the participants' perceived utility ('Do you consider a psychological intervention with online components for the treatment of postpartum depression to be useful?', which was answered with Yes or No) and availability for use ('If you were experiencing emotional difficulties and were diagnosed with postpartum depression, would you be available to receive this type of treatment?', which was answered on a four-point scale [1 = No, I would not be available to get any psychological intervention; 2 = No, I would only be available to get face-to-face psychological intervention; 3 = Yes, I would be available to get this intervention (face-to-face and online) but it would not be my preferential option; 4 = Yes, I would be available to get this intervention (face-to-face and online) and it would be my preferential option]).

Two additional questions were asked to assess the participants' perceived advantages ('In your opinion, what are the advantages of choosing this type of treatment?') and disadvantages ('In your opinion, what are the disadvantages of choosing this type of treatment?') of blended treatments. Closed answer options were presented, with a possibility of adding other advantages and disadvantages that were not contemplated.

Preferences for blended psychological intervention characteristics

The participants were asked about the ideal proportion of face-to-face and online sessions (on a four-point answer scale ranging from '25% online and 75% face-to-face' to '75% online and 25% face-to-face') and the ideal distribution of the contents and strategies between face-to-face and online sessions (e.g. 'Introduction to treatment – first session'), answered on a three-point scale consisting of 'in face-to-face sessions only', 'in online session only', and 'in both face-to-face and online sessions'. Two additional questions about the ideal duration of both face-to-face and online sessions were asked (using a four-point answer scale ranging from 1 = between 30 and 45 minutes and 4 = between 75 and 90 minutes).

Data analyses

Statistical analyses were conducted using the Statistical Package for the Social Sciences (IBM SPSS, version 25.0; IBM SPSS, Chicago, IL). Descriptive statistics were used to explore the sample's sociodemographic and clinical characteristics, depressive symptoms, e-health literacy, and acceptability and preferences for a blended intervention for PPD. A comparison test (Student's t-test within subjects) was calculated to analyse the differences between the average number of identified advantages and disadvantages of a blended intervention for PPD.

Univariate binary logistic regressions were used to study the associations between sociodemographic and clinical variables, the severity of depressive symptoms and e-health literacy, and the acceptability of blended psychological interventions (perceived utility and availability for use). Two multivariate binary logistic regression models were performed to evaluate the relative influence of each variable on the perceived utility and availability of using a blended intervention for PPD. In the multivariate models, only the variables that were significantly associated with perceived utility and use availability were introduced in the regression models. Preliminary analyses were conducted and revealed that there was no multicollinearity among the predictors in the two models (the tolerance values were higher than 0.1, and the variance inflation factor values were lower than 10; Field, 2009).

Results

Participants

A total of 1155 women accessed the survey but only 644 participants completed the questionnaire. From these, 376 participants were excluded because they did not present clinically significant depressive symptoms (EPDS scores ≤ 9), 3 participants were excluded for reporting being younger than 18 years, and 30 participants were excluded because baby's age was more than 12 months. The final sample was composed of 235 women. Most of the participants were married or in a relationship (91.9%), were employed (85.5%) and had higher education (66.4%). In the sample, 15.4% of the women were currently undergoing psychological/psychiatric treatment. The sociodemographic and clinical characteristics of the participants are presented in **Table 1**.

Table 1*Sociodemographic, clinical and infant-related characteristics of the sample*

	Total sample (N = 235)
Sociodemographic characteristics	
Age (years), <i>M</i> (SD)	31.94 (5.20)
Primiparity, <i>n</i> (%)	
Yes	162 (68.9)
No	73 (31.1)
Marital Status, <i>n</i> (%)	
Married, cohabitating or in a relationship	216 (91.9)
Single, divorced or separated	19 (8.1)
Educational level, <i>n</i> (%)	
Basic or secondary education	77 (32.8)
Higher education	156 (66.4)
Other or did not answer	2 (0.9)
Professional Status, <i>n</i> (%)	
Employed	201 (85.5)
Unemployed, student, housewives or other	34 (14.5)
Household monthly income, <i>n</i> (%)	
Up to 1000€	132 (56.2)
1000€ - 2000€	74 (31.5)
More than 2000€	19 (8.1)
Did not answer or did not know	10 (4.3)
Residence, <i>n</i> (%)	
Rural	53 (22.6)
Urban	182 (77.4)
e-Health literacy score, <i>M</i> (SD)	3.47 (0.77)
Clinical characteristics	
History of psychiatric or psychological problems, <i>n</i> (%)	
Yes	100 (42.6)
No	135 (57.4)
Previous psychiatric or psychological treatment, <i>n</i> (%)	
Yes	107 (45.5)
No	128 (54.5)
Current psychiatric or psychological treatment, <i>n</i> (%)	
Yes	36 (15.4)

No	199 (84.7)
EPDS score, <i>M</i> (<i>SD</i>)	14.41 (4.19)
Infant's characteristics	
Infant's age (in months), <i>M</i> (<i>SD</i>)	5.64 (3.61)
Infant's gestational weeks at birth, <i>M</i> (<i>SD</i>)	38.84 (1.84)
Medical problems, <i>n</i> (%)	
Yes	26 (11.1)
No	209 (88.9)

Acceptability of blended psychological interventions for the treatment of PPD

Most of the sample (89.8%) agreed that a blended psychological intervention would be useful for the treatment of PPD (see **Table 2**). Most of the women in the sample stated that they would be available to use this intervention, of which 48.5% reported that it would be their preferred option.

Table 2*Women's acceptability of blended psychological interventions for the treatment of PPD*

	Total sample (N = 235)
Perceived utility, n (%)	
Yes	211 (89.8)
No	24 (10.2)
Availability for use, n (%)	
No, I would not be available to get any psychological intervention	4 (1.7)
No, I would only be available to get face-to-face psychological intervention	16 (6.8)
Yes, I would be available to get this intervention (face-to-face and online) but it would not be my preferential option	101 (43.0)
Yes, I would be available to get this intervention (face-to-face and online) and it would be my preferential option	114 (48.5)
Perceived advantages, n (%)	
Flexibility (e.g. to choose when and where to take the online sessions)	161 (68.5)
More autonomy (e.g. to manage my own time, to go on my own pace)	153 (65.1)
Cost reductions (e.g. travel costs)	107 (45.5)
Possibility to review content and to access the online platform whenever I want	94 (40.0)
Access to online content between sessions and after treatment ends	85 (36.2)
Possibility to share content with family or partner	62 (26.4)
Maintaining a face-to-face relationship with the therapist	58 (24.7)
Better preparation for face-to-face sessions	32 (13.6)
I do not recognise any advantage	13 (5.5)
Others	3 (1.3)
Perceived disadvantages, n (%)	
The therapeutic relationship can be "weaker"	137 (58.3)
Lack of motivation	78 (33.2)
Data protection issues	63 (26.8)
Lack of support in online sessions	46 (19.6)
Difficulty in dealing with crises	38 (16.2)
I don't recognise any disadvantage	36 (15.3)
Additional effort over traditional therapy	21 (8.9)
The need to work with technology or to have technological skills	20 (8.5)
Possible side effects	15 (6.4)
Others	2 (0.9)

The participants recognised significantly more advantages ($M = 3.20$, $SD = 2.00$) than disadvantages ($M = 1.78$, $SD = 1.41$) of blended psychological interventions for PPD ($t(234) = 10.99$, $p < 0.001$). The main perceived advantages were flexibility (68.5%), autonomy (65.1%) and cost savings (45.5%). Other advantages reported under the option of 'other' included avoiding exposure to COVID-19 and better time management. Concerns about the therapeutic relationship (58.3%), lack of motivation (33.2%) and data protection issues (26.8%) were the most frequently reported disadvantages. Another disadvantage stated by the participants under the option of 'other' was the lack of privacy at home ($n = 2$).

Variables that influence the acceptability of blended psychological interventions

As presented in **Table 3**, the univariate analyses showed that women with higher levels of education, employed women and women with higher income were more likely to perceive a blended intervention for PPD as being useful. Being single, divorced or separated and having an older infant were associated with a decreased likelihood of perceiving a blended intervention useful. Finally, women with more severe depressive symptoms were less likely to perceive a blended intervention for PPD as being useful.

Table 3

Univariate and multivariate logistic regressions of the factors associated with perceived utility of a blended intervention for PPD

	Univariate analysis		Multivariate analysis R ² = .16 (Cox and Snell); R ² = .33 (Nagelkerke)		
	O.R.	95% CI	B (SE)	O.R.	95% CI
Age	1.03	[0.95, 1.12]	-	-	-
Primiparity (0 = no; 1 = yes)	0.91	[0.34, 2.29]	-	-	-
Marital Status (0 = married, cohabitating or in a relationship; 1 = single, divorced or separated)	0.20**	[0.07, 0.58]	-2.15 (0.75)	0.11**	[0.03, 0.51]
Educational level	1.66*	[1.05, 2.64]	-0.27 (0.33)	0.76	[0.40, 1.45]
Professional Status (0 = unemployed, student, housewives; 1 = employed)	3.24*	[1.21, 8.64]	1.20 (0.61)	3.32*	[1.01, 10.94]
Household monthly income	1.92*	[1.12, 3.30]	0.43 (0.32)	1.53	[0.82, 2.85]
Residence (0 = urban; 1 = rural)	1.12	[0.40, 3.15]	-	-	-
History of psychiatric or psychological problems (0 = no; 1 = yes)	1.04	[0.44, 2.45]	-	-	-
Infant's age	0.84**	[0.74, 0.95]	-0.22 (0.08)	0.80**	[0.69, 0.93]
Depressive symptoms severity (EDPS score)	0.84***	[0.77, 0.92]	-0.21 (0.06)	0.81**	[0.72, 0.91]
e-health literacy	1.50	[0.80, 2.79]	-	-	-

Note. Dependent variable: 0 = not useful; 1 = useful.

* $p < .05$; ** $p < .01$; *** $p < .001$.

The multivariate logistic regression model was significant ($\chi^2(6) = 39.07, p < .001$). The odds of perceiving a blended intervention for PPD as being useful were significantly higher for women who were married or in a relationship, women who were employed, women with younger babies and women with less severe depressive symptoms (see **Table 3**).

The univariate analyses revealed that women with higher levels of education were more likely to be available to receive a blended intervention for PPD, as presented in **Table 4**. The results also revealed that women with less severe depressive symptoms and those with higher levels of e-health literacy had a higher likelihood of being available to use a blended treatment format for PPD.

The logistic regression model predicting the availability of using a blended intervention for PPD was significant ($\chi^2(4) = 17.64, p = 0.001$). According to the model, only educational level influenced the availability of using blended interventions, with an increased likelihood of women with higher levels of education being available to participate in a blended psychological intervention for PPD (see **Table 4**).

Table 4

Univariate and multivariate logistic regressions of the factors associated with availability for use a blended intervention for PPD

	Univariate analysis		Multivariate analysis R ² = .08 (Cox and Snell); R ² = .18 (Nagelkerke)		
	O.R.	95% CI	B (SE)	O.R.	95% CI
Age	1.04	[0.95, 1.13]	-	-	-
Primiparity (0 = no; 1 = yes)	1.54	[0.60, 3.94]	-	-	-
Marital Status (0 = married, cohabitating or in a relationship; 1 = single, divorced or separated)	0.46	[0.12, 1.72]	-	-	-
Educational level	2.33**	[1.39, 3.92]	0.94 (0.32)	2.56**	[1.37, 4.78]
Professional Status (0 = unemployed, student, housewives; 1 = employed)	1.65	[0.52, 5.30]	-	-	-
Household monthly income	1.38	[0.83, 2.28]	-	-	-
Residence (0 = urban; 1 = rural)	0.86	[0.30, 2.49]	-	-	-
History of psychiatric or psychological problems (0 = no; 1 = yes)	0.90	[0.36, 2.25]	-	-	-
Infant's age	0.92	[0.81, 1.04]	-	-	-
Depressive symptoms severity (EDPS score)	0.90*	[0.82, 0.99]	0.01 (0.07)	1.01	[0.88, 1.16]
e-health literacy	2.09*	[1.13, 3.83]	0.52 (0.39)	1.69	[0.79, 3.63]

Note. Dependent variable: 0 = not available to use; 1 = available to use.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Preferences for blended psychological interventions for the treatment of PPD

Most of the participants agreed that all presented contents and strategies should be approached in both face-to-face and online sessions (see **Table 5**), except for the introduction to the treatment, whereas 46.4% of the sample reported it should be addressed only in face-to-face sessions.

Concerning the proportion of sessions, 76 participants (32.3%) preferred a treatment breakdown of 25% online and 75% face-to-face. An equal proportion of sessions (50% online and 50% face-to-face) was selected by 66 participants (28.1%). Most participants agreed that the ideal duration for face-to-face sessions is between 45 and 60 minutes (60.4%). For online sessions, most women reported an ideal duration between 30 and 45 minutes (54.5%).

Table 5

Women's preferences for a blended psychological intervention's characteristics

Distribution of contents and strategies, <i>n</i> (%)	Total sample (<i>N</i> = 235)		
	Only face-to-face	Both face-to-face and online	Only online
Introduction to treatment – first session	109 (46.4)	97 (41.3)	29 (12.3)
Tasks and exercises	30 (12.8)	169 (71.9)	36 (15.3)
Mood recording and activities	34 (14.5)	161 (68.5)	40 (17.0)
Psychoeducation	41 (17.4)	174 (74.0)	20 (8.5)
To express feelings, thoughts and difficulties	66 (28.1)	150 (63.8)	19 (8.1)
To clarify doubts or ask questions about tasks or exercises	20 (8.5)	168 (71.5)	47 (20.0)
To remember task and exercises completion	13 (5.7)	159 (67.7)	63 (26.8)
To receive feedback	37 (15.7)	172 (73.2)	26 (11.1)
Treatment assessment (participant's evaluation of the therapy)	88 (37.4)	133 (56.6)	14 (6.0)

Discussion

This is the first study to evaluate the acceptability of and preferences for a blended psychological intervention for PPD treatment among women presenting depressive symptoms, as well as to explore the factors associated with its acceptability.

A blended intervention for PPD was regarded as acceptable by the sample, who generally perceived it as useful and demonstrated their availability for using this type of treatment. In fact, the literature indicates that patients are willing to receive blended therapy (Kooistra et al., 2016) and perceive it positively regarding the treatment of depression (van der Vaart et al., 2014). These results are encouraging for the development of blended treatments for PPD. Despite the low levels of professional help-seeking among Portuguese postpartum women (Fonseca et al., 2015), they still reported being available to use this innovative treatment format. Interestingly, a high proportion of the participants (43%) reported being available to use a blended intervention despite this format not being their preferred option, perhaps due to an unawareness of treatments for PPD (Fonseca et al., 2015), which may include web-based or blended interventions.

The participants reported more advantages than disadvantages of a blended intervention for PPD, which reinforces the sample's acceptability of this treatment format. Consistent with the findings from prior studies (Lal & Adair, 2014; Schuster et al., 2018a), flexibility, autonomy and reduced costs were the main benefits identified. A blended intervention for PPD was also considered beneficial in the current pandemic context of COVID-19. In fact, the restrictions imposed (e.g. social distancing) have increased the availability of online services for mental health (Zhou et al., 2020). A blended psychological intervention for PPD can reduce the risk of COVID-19 exposure by reducing face-to-face contact with the therapist, while still providing support and guidance (Wentzel et al., 2016). Additionally, these constraints could be an opportunity to offer new treatment delivery formats to postpartum women, who could possibly present more help-seeking barriers in this pandemic context (Motrico et al., 2020).

Consistent with prior studies (van der Vaart et al., 2014), the participants perceived that a blended intervention could raise issues about the therapeutic relationship. This concern was shared by therapists in one study due to the reduction of face-to-face sessions (Mol et al., 2020). However, in Schuster et al. (2018a), the inclusion of a remote communication channel between the patient and the therapist was reported as an important component. It could be included in a blended intervention for PPD to increase the level of contact frequency made with women

(Mol et al., 2020) to maintain the strength of the therapeutic relationship. Lack of motivation was also identified as one disadvantage of blended treatments for PPD. Some women may skip online sessions or not complete them, while others may perceive the online part of the therapy as burdensome and complex (Titzler et al., 2018), which could contribute to decreasing levels of motivation. A possible solution could be using an appealing and easy-to-use program with multimedia and interactive content (Barak et al., 2009), which could potentially increase levels of motivation.

Our study also elucidated about the factors associated with women's acceptability of blended psychological interventions (in terms of perceived utility and availability for use). The results showed that married women or those in a relationship were more likely to perceive a blended intervention for PPD as being useful. This result is in line with the findings of Høifødt et al. (2015), who reported that being married or cohabiting was a strong predictor of a positive response for blended treatment for depression. In fact, having a supportive partner was described as an important motivation factor for encouraging the completion of online sessions or the attendance of face-to-face sessions (Wilhelmsen et al., 2013). In addition, in blended treatments for PPD, women in a relationship can perceive as valuable the possibility of sharing online content with their partner, which was reported as an advantage of this format by 26.4% of the sample. Employed women with younger babies also had a higher likelihood of finding a blended intervention useful. These women may present higher perception levels of practical barriers (e.g., childcare issues; Bina, 2019) and therefore may have a higher perception of the advantages of this type of intervention, such as flexibility and time savings. This study also revealed that higher educational levels increased the likelihood of being available to use blended treatments for PPD. In fact, Kemmeren et al. (2019) found that a higher proportion of patients with higher levels of education completed a blended intervention than did participants with lower levels of education.

A blended treatment format may be more appropriate for women presenting mild symptoms of depression and not recommended for women with severe PPD (Topooco et al., 2017). Women with more severe symptoms were less likely to perceive a blended intervention for PPD as being useful. Another study found that patients with more severe depression reported more disadvantages than did participants with mild or moderate symptoms (Urech et al., 2018). Women with more severe depressive symptoms may prefer face-to-face therapy to discuss their difficulties and may lack the motivation to use an online program. However, according to Høifødt et al. (2015), who conducted a blended treatment for depression, treatment effects are not associated with baseline depressive symptom severity. Moreover, the presence of previous

depressive episodes predicted more positive treatment effects. Therefore, blended treatments could also be effective for more severe symptoms of PPD, despite of women's preferences. Furthermore, e-health literacy would be expected to be an individual characteristic associated with the perceived utility and availability for use a blended intervention for PPD. However, the multivariate logistic regression models did not reveal significant results. Therefore, more important than e-health literacy (i.e. the knowledge, comfort and perceived skills in searching and using information technology for health; Tomás et al., 2014), the willingness to learn about and to use e-mental health tools taken together with positive attitudes towards the use of technology (Kloek et al., 2020) can have a significant role in determining women's perceptions of a blended intervention for PPD, which should be studied in future studies.

Concerning the sample's preferences in the distribution of content across face-to-face and online sessions, our results globally suggested an equal distribution of most content. The participants reported that the introduction to the treatment (i.e., the first session) should be face-to-face, which was also reported in another study (van der Vaart et al., 2014). This highlights the importance of including face-to-face elements in the treatment since it allows one to discuss emotional issues, obtain individualised feedback, and clarify specific technical questions about the online component of treatment (Urech et al., 2018; Wilhelmsen et al., 2013).

The optimal proportion of face-to-face and online sessions is still not clear (Erbe et al., 2017; Mol et al., 2020). For some participants, a breakdown of 75% face-to-face and 25% online was the preferred option and for others a 50%-50% proportion was the most beneficial. The preferred duration of sessions reported by the sample was 45–60 minutes for face-to-face and 30–45 minutes for online. These results also emphasise the perceived importance of having face-to-face sessions with the therapist by postpartum women, consisting of longer durations than online sessions. This may be of relevance given the presence of depressive symptoms and the need to address particular difficulties or needs with the therapist (van der Vaart et al., 2014).

Some limitations should be considered when interpreting the results of this study. Its cross-sectional design prevents the establishment of causal relationships between the study variables. Online recruitment can create a selection bias, since only women with internet access could participate in the study. Because the sample was self-selected, the participants who accessed and completed the survey could potentially have more interest in the research topics than the general public. Moreover, most of the sample was either married or in a relationship, employed and highly educated. Therefore, caution is needed in the generalisation of results to the Portuguese postpartum population, in particular, to women with lower incomes and lower

educational levels who may not have the accessibility to the resources (e.g., internet) or technologic competences (e.g., e-health literacy) needed for a blended intervention and therefore could present different treatment preferences. Future studies could use other designs (e.g., qualitative or longitudinal) and different recruitment methods to address these limitations. Finally, although these findings were found for the Portuguese population, they can provide important information for the implementation of e-mental health tools in clinical practice for PPD treatment in other similar developed countries.

Conclusion

To our knowledge, no other study has examined the acceptability of and preferences for a blended treatment for PPD among postpartum women presenting depressive symptoms. Moreover, our study addressed some questions that had remained unanswered about the suitability of blended treatments concerning sociodemographic and clinical characteristics, e-health literacy and the severity of depressive symptoms. These findings support the development of blended psychological treatments for PPD and show good levels of acceptability among women presenting depressive symptoms. This study also presents evidence about the characteristics of the women who find this treatment more acceptable and their preferences regarding this format.

References

- Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry, 13* (1), 4–11. <https://doi.org/10.1002/wps.20083>
- Areias, M. E. G., Kumar, R., Barros, H., & Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth. *The British Journal of Psychiatry, 169*(1), 30–35. <https://dx.doi.org/10.1192/bjp.169.1.30>
- Arjadi, R., Nauta, M. H., & Bockting, C. L. (2018). Acceptability of internet-based interventions for depression in Indonesia. *Internet Interventions, 13*, 8–15. <https://doi.org/10.1016/j.invent.2018.04.004>
- Barak, A., Klein, B., & Proudfoot, J. G. (2009). Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine, 38*(1), 4–17. <https://doi.org/10.1007/s12160-009-9130-7>
- Bina, R. (2019). Predictors of postpartum depression service use: A theory-informed, integrative systematic review. *Women and Birth, 33*(1), e24–e32. <https://doi.org/10.1016/j.wombi.2019.01.006>
- Chabrol, H., Teissedre, F., Armitage, J., Danel, M., & Walburg, V. (2004). Acceptability of psychotherapy and antidepressants for postnatal depression among newly delivered mothers. *Journal of Reproductive and Infant Psychology, 22*(1), 5–12. <https://doi.org/10.1080/02646830310001643094>
- Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research, 19*(9), e306. <https://doi.org/10.2196/jmir.6588>
- Evagorou, O., Arvaniti, A., & Samakouri, M. (2016). Cross-cultural approach of postpartum depression: Manifestation, practices applied, risk factors and therapeutic interventions. *Psychiatric Quarterly, 87*(1), 129–154. <https://doi.org/10.1007/s11126-015-9367-1>
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Sage. Fonseca, A., Gorayeb, R., & Canavarro, M. C. (2015). Women's help-seeking behaviours for depressive symptoms during the perinatal period: Socio-demographic and clinical correlates and perceived barriers to seeking professional help. *Midwifery, 31*(12), 1177–1185. <https://doi.org/10.1016/j.midw.2015.09.002>

- Hantsoo, L., Podcasy, J., Sammel, M., Epperson, C. N., & Kim, D. R. (2017). Pregnancy and the acceptability of computer-based versus traditional mental health treatments. *Journal of Women's Health, 26*(10), 1106–1113. <https://doi.org/10.1089/jwh.2016.6255>
- Høifødt, R. S., Mittner, M., Lillevoll, K., Katla, S. K., Kolstrup, N., Eisemann, M., Friberg, O., & Waterloo, K. (2015). Predictors of response to web-based cognitive behavioral therapy with high-intensity face-to-face therapist guidance for depression: A Bayesian analysis. *Journal of Medical Internet Research, 17*(9), e197. <https://doi.org/10.2196/jmir.4351>
- Kemmeren, L. L., van Schaik, A., Smit, J. H., Ruwaard, J., Rocha, A., Henriques, M., Zukowska, K., Hazo, J.-B., Dorsey, M., Zukowska, K., Riper, H., & Ebert, D. D. (2019). Unraveling the black box: Exploring usage patterns of a blended treatment for depression in a multicenter study. *JMIR Mental Health, 6*(7), e12707. <https://doi.org/https://doi.org/10.2196/12707>
- Kloek, C. J., Janssen, J., & Veenhof, C. (2020). Development of a checklist to assist physiotherapists in determination of patients' suitability for a blended treatment. *Telemedicine and e-Health, 26*(8), 1051–1065. <https://doi.org/10.1089/tmj.2019.0143>
- Kooistra, L. C., Ruwaard, J., Wiersma, J. E., Van Oppen, P., van der Vaart, R., van Gemert-Pijnen, J. E., & Riper, H. (2016). Development and initial evaluation of blended cognitive behavioural treatment for major depression in routine specialized mental health care. *Internet Interventions, 4*, 61–71. <https://doi.org/10.1016/j.invent.2016.01.003>
- Kooistra, L. C., Wiersma, J. E., Ruwaard, J., Neijenhuijs, K., Lokkerbol, J., van Oppen, P., Smit, F., & Riper, H. (2019). Cost and effectiveness of blended versus standard cognitive behavioral therapy for outpatients with depression in routine specialized mental health care: Pilot randomized controlled trial. *Journal of Medical Internet Research, 21*(10), e14261. <https://doi.org/10.2196/14261>
- Lal, S., & Adair, C. E. (2014). E-mental health: A rapid review of the literature. *Psychiatric Services, 65*(1), 24–32. <https://doi.org/10.1176/appi.ps.201300009>
- Langan, R. C., & Goodbred, A. J. (2016). Identification and management of peripartum depression. *American Family Physician, 93*(10), 852–858. <https://www.aafp.org/afp/2016/0515/afp20160515p852.pdf>
- Maloni, J. A., Przeworski, A., & Damato, E. G. (2013). Web recruitment and internet use and preferences reported by women with postpartum depression after pregnancy

complications. *Archives of Psychiatric Nursing*, 27(2), 90–95.
<https://doi.org/10.1016/j.apnu.2012.12.001>

- Milgrom, J., Danaher, B. G., Gemmill, A. W., Holt, C., Holt, C. J., Seeley, J. R., Tyler, M. S., Ross, J., & Ericksen, J. (2016). Internet cognitive behavioral therapy for women with postnatal depression: A randomized controlled trial of mum moodbooster. *Journal of Medical Internet Research*, 18(3), e54. <https://doi.org/10.2196/jmir.4993>
- Mol, M., van Genugten, C., Dozeman, E., van Schaik, D. J., Draisma, S., Riper, H., & Smit, J. H. (2020). Why uptake of blended internet-based interventions for depression is challenging: A qualitative study on therapists' perspectives. *Journal of Clinical Medicine*, 9(1), 91. <https://doi.org/10.3390/jcm9010091>
- Motrico, E., Mateus, V., Bina, R., Felice, E., Bramante, A., Kalcev, G., Maurig, M., Martinsh, S., & Mesquita, A. (2020). Good practices in perinatal mental health during the COVID-19 pandemic: A report from task-force RISEUP-PPD COVID-19. *Clínica y Salud*, 31(3), 155–160. <https://doi.org/10.5093/clysa2020a26>
- Nair, U., Armfield, N. R., Chatfield, M. D., & Edirippulige, S. (2018). The effectiveness of telemedicine interventions to address maternal depression: A systematic review and meta-analysis. *Journal of Telemedicine and Telecare*, 24(10), 639–650. <https://doi.org/10.1177/1357633X18794332>
- Pugh, N. E., Hadjistavropoulos, H. D., Dirkse, D., & Coyne, J. (2016). A randomised controlled trial of therapist-assisted, internet-delivered cognitive behavior therapy for women with maternal depression. *PloS One*, 11(3), e0149186. <https://doi.org/10.1371/journal.pone.0149186>
- Pugh, N. E., Hadjistavropoulos, H. D., Hampton, A. J., Bowen, A., & Williams, J. (2015). Client experiences of guided internet cognitive behavior therapy for postpartum depression: a qualitative study. *Archives of Women's Mental Health*, 18, 209–219. <https://doi.org/10.1007/s00737-014-0449-0>
- Rai, A., Chen, L., Pye, J., & Baird, A. (2013). Understanding determinants of consumer mobile health usage intentions, assimilation, and channel preferences. *Journal of Medical Internet Research*, 15(8), e149. <https://doi.org/10.2196/jmir.2635>
- Schuster, R., Fichtenbauer, I., Sparr, V. M., Berger, T., & Laireiter, A. R. (2018a). Feasibility of a blended group treatment (bGT) for major depression: Uncontrolled interventional study

in a university setting. *BMJ Open*, 8(3), e018412. <https://dx.doi.org/10.1136/bmjopen-2017-018412>

Schuster, R., Pokorny, R., Berger, T., Topooco, N., & Laireiter, A. R. (2018b). The advantages and disadvantages of online and blended therapy: Survey study amongst licensed psychotherapists in Austria. *Journal of Medical Internet Research*, 20(12), e11007. <https://doi.org/10.2196/11007>

Serviço Nacional de Saúde. (2020). *Tempos médios de espera*. <http://tempos.min-saude.pt/#/instituicoes-especialidade-cth>

Sheeber, L. B., Seeley, J. R., Feil, E. G., Davis, B., Sorensen, E., Kosty, D. B., & Lewinsohn, P. M. (2012). Development and pilot evaluation of an internet-facilitated cognitive-behavioral intervention for maternal depression. *Journal of Consulting and Clinical Psychology*, 80(5), 739. <https://doi.org/10.1037/a0028820>

Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health*, 15, 1745506519844044. <https://doi.org/10.1177/1745506519844044>

Titzler, I., Saruhanjan, K., Berking, M., Riper, H., & Ebert, D. D. (2018). Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists' perspective. *Internet Interventions*, 12, 150–164. <https://doi.org/10.1016/j.invent.2018.01.002>

Tomás, C., Queirós, P., & Ferreira, T. (2014). Análise das propriedades psicométricas da versão portuguesa de um instrumento de avaliação de e-literacia em Saúde. *Journal of Nursing Referência (Revista De Enfermagem Referência)*, 4(2), 19–28. <https://doi.org/10.12707/RIV14004>

Topooco, N., Riper, H., Araya, R., Berking, M., Brunn, M., Chevreur, K., Cieslak, R., Ebert, D. D., Etchmendy, E., Herrero, R., Kleiboer, A., Krieger, T., García-Palacios, A., Cerga-Pashoja, A., Smoktunowicz, E., Urech, A., Vis, C., & Kleiboer, A. (2017). Attitudes towards digital treatment for depression: A European stakeholder survey. *Internet Interventions*, 8, 1–9. <http://dx.doi.org/10.1016/j.invent.2017.01.001>

Urech, A., Krieger, T., Möseneder, L., Biaggi, A., Vincent, A., Poppe, C., Meyer, B., Riper, H., & Berger, T. (2018). A patient post hoc perspective on advantages and disadvantages of blended cognitive behaviour therapy for depression: A qualitative content analysis.

Psychotherapy Research, 29(8), 986–998.
<https://doi.org/10.1080/10503307.2018.1430910>

van der Vaart, R., Witting, M., Riper, H., Kooistra, L., Bohlmeijer, E. T., & van Gemert-Pijnen, L. J. (2014). Blending online therapy into regular face-to-face therapy for depression: Content, ratio and preconditions according to patients and therapists using a delphi study. *BMC Psychiatry*, 14(1), 355. <https://doi.org/10.1186/s12888-014-0355-z>

Wentzel, J., van der Vaart, R., Bohlmeijer, E. T., & van Gemert-Pijnen, J. E. (2016). Mixing online and face-to-face therapy: How to benefit from blended care in mental health care. *JMIR Mental Health*, 3(1), e9. <https://doi.org/10.2196/mental.4534>

Wilhelmsen, M., Lillevoll, K., Risør, M. B., Høifødt, R., Johansen, M. L., Kolstrup, N., Kolstrup, N., & Kolstrup, N. (2013). Motivation to persist with internet-based cognitive behavioural treatment using blended care: A qualitative study. *BMC Psychiatry*, 13(1), 296. <https://doi.org/https://doi.org/10.1186/1471-244X-13-296>

Zhou, X., Snoswell, C. L., Harding, L. E., Bambling, M., Edirippulige, S., Bai, X., & Smith, A. C. (2020). The role of telehealth in reducing the mental health burden from COVID-19. *Telemedicine and e-Health*, 26(4), 377–379. <https://doi.org/10.1089/tmj.2020.0068>

Empirical study III

A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: A Case Study

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2022

Clinical Case Studies, 21(5), 1-19.

<https://doi.org/10.1177/15346501221082616>

A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: A Case Study

Abstract

Postpartum depression is a highly prevalent mental health problem with harmful consequences for women, babies, and mother–infant relationships. Cognitive–behavioral therapy (CBT) is among the most effective treatment options for postpartum depression. However, a large number of postpartum women do not seek professional help, suggesting the need for new treatment delivery formats. The present article describes the application of Be a Mom Coping with Depression, a blended CBT treatment for postpartum depression, for a 31-year-old postpartum woman. The intervention was provided over a period of 13 weeks, integrating seven biweekly sessions with a psychologist and six sessions within an online program, and it is described in detail. A summary of the patient’s progress and the results obtained throughout treatment is reported. At the end of the intervention, a significant decrease in depressive and anxiety symptoms was observed, as well as increased perceived maternal self-efficacy, higher psychological flexibility, and higher self-compassion. This case study provides encouraging data for the preliminary evidence of the acceptability, feasibility, and efficacy of the Be a Mom Coping with Depression intervention in the reduction of depressive symptoms during the postpartum period. Advantages of this treatment format and implications for clinical practice and future research are discussed.

Keywords: be a mom coping with depression, blended intervention, case study, cognitive–behavioral intervention, postpartum depression

Theoretical and Research Basis for Treatment

The transition to motherhood is a demanding period in which women face challenges related to their identity, their interpersonal relationships, and emotional and physical changes (Finlayson et al., 2020), and for these reasons, it may represent a time of increased risk for women to develop mental health problems (Woolhouse et al., 2014). Postpartum depression (PPD) is among the most prevalent mental health conditions after childbirth, with an estimated prevalence of 20% (Gelaye et al., 2016; Yan et al., 2020). PPD is defined as an episode of depression occurring up to 12 months after birth (American Psychiatric Association, 2013; O'Hara & McCabe, 2013) and it poses negative consequences for the woman, the newborn, and the mother–infant relationship (Field, 2010; Śliwerski et al., 2020).

Psychological interventions are effective in the treatment of PPD (Nillni et al., 2018) and are among the preferred options reported by postpartum women (Goodman, 2009). A recent systematic review of systematic reviews and meta-analyses revealed that cognitive–behavioral therapy (CBT) is the most effective evidence-based psychological treatment for PPD (Branquinho et al., 2021b). According to the CBT model, cognitions are the “key” to understanding emotional and behavioral reactions in certain situations (Beck, 1995). Cognitions are based on a person's previous experiences and held beliefs, and they manifest through automatic thoughts, which in turn influence emotional and behavioral reactions (Wenzel & Kleiman, 2015). CBT-based interventions for PPD are grounded in this principle, which also assumes that previous experiences and factors (e.g., biological and psychological) contribute to the development of vulnerability to certain underlying beliefs (Wenzel & Kleiman, 2015). Wenzel and Kleiman (2015) also hypothesized that these beliefs, which manifest through automatic negative thoughts, are activated during stressful periods that evoke transitions or changes and therefore play a central role in the development and maintenance of PPD. Given the particular and demanding challenges that are inherent to the postpartum period, CBT treatment in this context should focus on specific beliefs about motherhood and include an interpersonal component for greater efficacy (Batt et al., 2020), covering aspects such as the importance of practical and emotional support and dealing with changes within a couple's relationship (O'Mahen et al., 2012; Finlayson et al., 2020).

Blended Psychological Interventions for PPD

Despite the existence of effective treatment, many women do not seek professional help for their depressive symptoms during the postpartum period (Fonseca et al., 2015) due to lack of knowledge (e.g., where to obtain help) and practical barriers (e.g., lack of time and childcare

constraints), as well as stigma perceptions (Button et al., 2017; Goodman, 2009). Recent efforts to develop new formats of psychological interventions have been conducted, such as blended interventions.

Blended interventions combine “traditional” face-to-face psychotherapy with e-mental health tools, such as web-based programs, which complement each other in a sequential and integrated protocol (Erbe et al., 2017). In this format, sessions through online programs can replace some face-to-face sessions with a therapist. It is common to incorporate the time-consuming elements of psychotherapy, such as psychoeducation and exercises, to web-based programs to provide patients the opportunity to practice between sessions and integrate the strategies into daily routines (Ebert et al., 2018). A blended treatment for PPD could therefore present many advantages for postpartum women, such as cost reduction (decreased number of sessions with a therapist, reduction of travel costs), and increased flexibility, accessibility, and intensity, by decreasing the time gap between face-to-face sessions (Erbe et al., 2017; Lal & Adair, 2014; Titzler et al., 2018). In addition, a blended treatment also contributes to increasing women’s autonomy, by allowing them to advance in their own time and at their own pace, to access contents and exercises between sessions with a psychologist (Titzler et al., 2018), and reducing the shame and stigma associated with help-seeking (Ebert et al., 2018).

Be a Mom Coping with Depression is a blended intervention for PPD, combining sessions with a psychologist and online sessions through a web-based program, which is currently being developed in Portugal (Branquinho et al., 2020). The web-based program was previously created and evaluated as a self-guided tool for the prevention of PPD among Portuguese women presenting high risk for PPD (Fonseca et al., 2018b, 2020a). The blended intervention was developed according to CBT principles applied to PPD—it is problem-oriented, educative, structured and time-limited, promotes women’s active collaboration and participation, and is focused on the present (Fonseca et al., 2020b). It also included third-wave CBT contributions applied to the postpartum period, namely, elements of self-compassion and acceptance and commitment therapy (ACT) (Bonacquisti et al., 2017).

The general structure of Be a Mom Coping with Depression and the contents of each session are presented in **Table 1**. The blended intervention was composed of seven sessions with a psychologist that were alternated weekly with six sessions in the online program. The intervention incorporated CBT components of psychoeducation, strategies to deal with negative thoughts, value-based behavioral activation, and relapse prevention. It also promoted the

activation of social support networks, the development of communication and problem-solving skills, and strategies to improve couples' intimacy and connection.

Table 1

General structure of the blended intervention Be a Mom Coping with Depression

Sessions	Nature	Contents
Session 1 Evaluation and Introduction to Treatment	Face-to-face (video call)	<ul style="list-style-type: none"> • Cognitive–behavioral clinical evaluation • Treatment motivation and goal setting • Introduction to the blended intervention
Session 2 Maternity changes, Postpartum Depression and Emotions	Online	<ul style="list-style-type: none"> • Changes during the transition to motherhood • Psychoeducation about postpartum depression: symptoms, risk factors, myths • Diversity of emotional responses in the postpartum period
Session 3 CBT model	Face-to-face (video call)	<ul style="list-style-type: none"> • Expectations toward motherhood • Emotions and their adaptative function • CBT model: the connections between thoughts, emotions and behaviors. • Introduction to cognitive flexibility
Session 4 Thoughts	Online	<ul style="list-style-type: none"> • Thoughts: distinction between useful and negative thoughts • Negative thoughts and their influence on emotions • Strategies to deal with negative thoughts (questioning and defusion) • Self-criticism and self-compassion
Session 5 Thoughts	Face-to-face (video call)	<ul style="list-style-type: none"> • Recognizing automatic negative thoughts • Adaptative strategies to deal with negative thoughts (acceptance and defusion, questioning, self-compassion)
Session 6 Values	Online	<ul style="list-style-type: none"> • Definition, identification and clarification of parenthood values • Definition of committed and value-based behaviors
Session 7 Values	Face-to-face (video call)	<ul style="list-style-type: none"> • Identification of personal values • Importance of committed value-based actions

		<ul style="list-style-type: none"> • Strategies to increase and practice pleasant and value-based activities
Session 8	Online	<ul style="list-style-type: none"> • Identification of social support needs and networks • Assertive communication • Assertive communication skills to ask for help
Interpersonal relationships		
Session 9	Face-to-face (video call)	<ul style="list-style-type: none"> • Importance of social support in the postpartum period and the identification of difficult situations (to ask for help and/or to deal with other people's opinions and negative comments) • Communication styles (passive, aggressive and assertive) • Practice of communication skills (role-play)
Social support and Interpersonal competences		
Session 10	Online	<ul style="list-style-type: none"> • Changes in the couple's relationship during the postpartum period • Possible sources of conflict and negotiation • Sharing parenthood values and commitments
The couple's relationship		
Session 11	Face-to-face (video call)	<ul style="list-style-type: none"> • Strategies to promote affection and intimacy • Assertive communication within the relationship • Impact of different interpretations in conflicts and communication problems within the relationship: promotion of cognitive flexibility • Problem solving strategies for negotiation and conflict management within the relationship
The couple's relationship		
Session 12	Online	<ul style="list-style-type: none"> • Reflection on the learned strategies and changes obtained • Problem anticipation and skills integration
Final Balance and Relapse Prevention		
Session 13	Face-to-face (video call)	<ul style="list-style-type: none"> • Revision of the learned therapeutic skills • Relapse prevention plan • Goal setting for the future • Evaluation of treatment progress • Conclusion
Final Balance and Relapse Prevention		

Note. CBT = Cognitive-behavioral therapy.

Online sessions included information and exercises that did not require the therapist's intervention, and further discussion of the individual's experience and practice with strategies was incorporated in the sessions with the psychologist. The online program

(<https://beamomcopingwithdepression.pt/>) was organized into five modules that participants accessed between the sessions with the psychologist, according to the instructions given. Each online session took approximately 30–45 minutes to complete and included information and exercises in different formats (e.g., text, video, and audio). The sessions with the psychologist were provided biweekly. Each session lasted approximately 1 hour and included an initial mood check, a review of the experience with the online program and its contents, doubt clarification, and further discussion of each week's theme and in-session practice of the therapeutic strategies. At the end of the session, the next online module theme and objectives were presented. Email reminders and phone calls between the sessions were delivered to remind the participant of the next week's module and session appointment, to motivate and to encourage engagement in the online sessions. This blended intervention was developed before COVID-19 pandemic. Given the restrictions imposed in Portugal to activities delivered face-to-face, the intervention was adapted, so that the sessions with the psychologist occurred through video call using videoconference tools (e.g., Zoom).

Case Introduction

Sofia (pseudonym) was a 31-year-old Portuguese woman, married for 5 years, with a 10-month-old infant. This was her first child and she did not have any serious medical problems. Sofia had a high education level (master's degree) and was a health professional. She was employed, had a part-time job, and lived in a rural area. Sofia reported having depression when she made the first contact to get help through this intervention.

Presenting complaints

Sofia reported depressed mood, sadness, loss of interest and pleasure in activities, decreased appetite and weight loss, insomnia and sleep deprivation, fatigue, feelings of depreciation and guilt, and decreased concentration during 2 weeks in the previous month to the assessment. She did not present suicidal ideation or suicide attempts. Sofia mentioned feeling more isolated, lack of partner support, and reported difficulties managing daily household tasks and disagreeing with other people's opinions. In addition, she described that her baby had a difficult temperament (being agitated, crying a lot, having difficulty to settle her down), and manifested worries about financial issues.

History

Sofia had a history of depression, reporting a previous episode of depression when she was 20 years old and was studying at university. At that time, she sought professional help and took antidepressant medication prescribed by her general physician. After that episode of depression, Sofia pointed out that she experienced difficulties again in the perinatal period. Sofia said this was a planned pregnancy. She described the last 2 months of pregnancy, which were coincident with the period of lockdown due to the COVID-19 pandemic in Portugal, as “a very difficult time”. During that time, Sofia slept apart from her partner because of fear of possible contamination of herself and the baby, and she expressed the thought “I was totally alone”. The baby was born at 39 weeks of gestation and did not have any medical problems. After childbirth, Sofia mentioned that her partner was afraid of caring for the baby in the first months postpartum (e.g., holding the baby, giving a bath, and feeding the baby) because he was afraid to unintentionally hurt the baby. According to her, this reinforced her feelings of loneliness. Additionally, she mentioned a decrease in marital satisfaction and intimacy. A few months later, Sofia was temporarily separated from her partner and stayed at her parents’ house due to her partner’s lack of comprehension of her difficulties and support in household tasks. The patient referred to the postpartum period as a painful period, reporting hemorrhoid-related problems during the first 3 months after childbirth and feeling pain up to 6 months postpartum. In addition, Sofia described the return to work as a stressful situation. Sofia mentioned having practical support from her mother and mother-in-law when she needed (e.g., to take care of the baby and to cook meals). The current depressive symptoms started, according to the patient, 4 months after childbirth. Sofia mentioned that she had started psychological treatment a few months earlier than the present treatment but dropped out for financial reasons. The patient was not taking any antidepressant medication, had no history of drugs and alcohol use and had no history of depression in her family.

Assessment

Before the beginning of the treatment, a clinical interview was conducted by telephone to assess the presence of a major depressive episode through an adapted version of the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013; First et al., 2017). Sofia also completed a set of self-report questionnaires, which included the following:

Edinburgh Postnatal Depression Scale (EPDS; Portuguese version [PV]: Areias et al., 1996). The EPDS is a 10-item instrument (e.g., “I have been able to laugh and see the funny side of things”) that assesses the presence of PPD symptoms, with a 4-point Likert answer scale ranging from 0 to 3. The total score can range between 0 and 30, and higher scores are indicative of more severe depressive symptoms. A score of 10 or higher suggests the presence of clinically relevant depressive symptoms.

Hospital Anxiety and Depression Scale - Anxiety subscale (HADS-A; PV: Pais-Ribeiro et al., 2007). The HADS-A evaluates anxiety symptoms and is composed of seven items (e.g., “Worrying thoughts go through my mind”) answered on a 4-point Likert scale ranging from 0 to 3. The total score for this subscale can range between 0 and 21, and higher scores indicate higher levels of anxiety symptoms. A score of 11 or higher suggests the presence of clinically relevant anxiety symptoms.

Investment Model Scale - Satisfaction subscale (IMS-S; PV: Rodrigues & Lopes, 2013). The IMS-S assesses marital satisfaction through five items (e.g., “My relationship is close to ideal”) rated on a 9-point scale ranging from 0 (*do not agree at all*) to 8 (*completely agree*). Higher scores are indicative of higher satisfaction with the relationship.

Perceived Maternal Parenting Self-Efficacy questionnaire (PMP S-E; Barnes and Adamson-Macedo, 2007). The PMPS-E assesses maternal self-efficacy using 20 items (e.g., “I can read my baby’s cues”) answered on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The total score can range between 20 and 80, with higher scores indicating higher perceived maternal self-efficacy.

Self-Compassion Scale - Short Form (SCS-SF; PV: Castilho et al., 2015). The SCS-SF evaluates self-compassion and comprises 12 items (e.g., “I’m disapproving and judgmental about my own flaws and inadequacies”) answered on a 5-point response scale ranging from 1 (*almost never*) to 5 (*almost always*). The total score can range between 12 and 60, with higher scores revealing higher levels of self-compassion.

Acceptance and Action Questionnaire-II (AAQ-II; PV: Pinto-Gouveia et al., 2012). The AAQ-II is a 7-item instrument (e.g., “I’m afraid of my feelings”) that assesses psychological flexibility. Items are answered on a 7-point Likert scale ranging from 1 (*never true*) to 7 (*always true*). The total score can range between 7 and 49, with higher scores suggesting lower psychological flexibility and higher experiential avoidance.

Mood ratings to assess depressed mood were conducted at the beginning of each session with the psychologist through questions developed by the research team (“How do you feel today? How is your mood on a scale of 0 to 10?”), using an 11-point Likert scale ranging from 0 (*absence of depressed symptoms*) to 10 (*maximum of depressed symptoms*).

Data concerning usage information (number of logins, average time spent at each login, average number of days between logins, number of completed exercises) were obtained from the website’s system to assess patient compliance and adherence to the online program.

Case Conceptualization

Sofia experienced the transition to motherhood as a very difficult time, with perceived losses in several areas, including her social relationships (social isolation, lack of practical support), her marital relationship (decrease in couple’s intimacy, lack of support, difficulties in communication) and personal domains (diminished sense of competence and self-efficacy). Sofia’s previous history of depression, medical complications in the postpartum period, her baby’s difficult temperament and lack of partner’s support are usually reported in the literature as risk factors for PPD (Hutchens & Kearney, 2020). In addition to the context of the COVID-19 pandemic and experiencing the postpartum period with high stress, these factors may have contributed to Sofia’s increased vulnerability to develop depressive symptoms. These events may have contributed to activating dysfunctional cognitions, such as “I am not able to do anything”, “I am not doing enough” and “Nobody understands me” and to internalizing beliefs such as “I am alone” and “I am not a good mother”. These dysfunctional thoughts and beliefs could have contributed to the maintenance of depressive symptoms and were reinforced by her emotional and behavioral reactions. For instance, Sofia reported that she could not do the household chores and the thought “I can’t do anything”, while feeling overwhelmed and guilty, reinforced the behavioral reaction of not performing the tasks.

In line with this, blended treatment was planned to provide Sofia with strategies to deal with motherhood expectations, to understand the function of emotions, to identify negative thoughts and to learn how to cope with them in a more adaptative way, to engage in value-based actions, to develop communication skills and to ask for support, to increase the quality of the couple’s relationship and to create a relapse prevention plan.

Course of Treatment and Assessment of Progress

Therapist

The therapist who conducted the intervention was a licensed psychologist with a master's degree in clinical psychology and was trained in CBT. During the application of the intervention, the psychologist followed a detailed therapist manual and was supervised in biweekly sessions by an experienced postdoctoral-level psychologist.

Course of Treatment

Sofia received 13 sessions of the blended intervention (7 sessions delivered by the psychologist and 6 sessions delivered through the online program) and one follow-up session. The intervention was conducted from April to July 2021.

Session one

The first session aimed to establish the therapeutic relationship with Sofia and to conduct a brief cognitive-behavioral clinical evaluation and a collaborative conceptualization of the patient's difficulties. The influence of vulnerability factors and stress situations she experienced over the past months on the development of depressive symptoms, as well as the role of negative thoughts and their relationship to emotions and behaviors, was explained. Sofia recognized a pattern of negative thoughts associated with her feelings of guilt, inability to do household tasks, exhaustion and tiredness, and described this mutual influence as a *"snowball that keeps increasing."* Afterward, Sofia defined her therapeutic goals for the treatment in several areas, namely, the individual domain (e.g., *"to be more flexible with my expectations for myself"*), household-related tasks (e.g., *"to be able to do the house tasks and cook meals"*), her marital relationship (e.g., *"going out as a couple once a month"*), her interpersonal relationships (e.g., *"to have lunch with my friends once a month"*), the professional domain (e.g., *"get a full-time job"*) and engagement in pleasurable activities (e.g., *"to read a romance book for 15 minutes a day"*). In the final part of the session, Sofia was presented with an overview of the blended intervention and to the online program, including the next week's module.

Session 2 (online)

The first module elucidated about changes due to motherhood and family reorganization, role idealization and unrealistic expectations toward motherhood, and normalized Sofia's experience during this period. Then, psychoeducation about PPD was provided, including its prevalence, symptoms, risk factors, associated myths and possible

consequences if untreated, followed by psychoeducation about emotions—the diversity of emotional responses, the possible discrepancy between expected emotions and emotions actually felt during the postpartum period, the promotion of their nonjudgmental evaluation, and the links between thoughts, emotions, and behaviors.

Session 3

Concerning her experience with the first module, Sofia mentioned that it was useful “*to view little by little*” to provide an opportunity to think and reflect about the contents. It was evident that Sofia was motivated to change by her reports that “*I want to be well, and for that I have to do my part.*” In addition, Sofia reported an improvement in her mood and that during that last week, she was able to cook meals.

The therapist promoted reflection on motherhood changes, social expectations and their impacts on depressive symptomatology. Sofia believed in some myths about PPD that were presented in the module (e.g., “*Only weak or bad mothers have postpartum depression*”) and realized that her expectations about motherhood were not realistic. The distinctiveness of each maternity experience was discussed, and Sofia said “*I understand that but it is very difficult to accept, particularly in my environment, where there are some babies now, and other people are constantly comparing them; it is very frustrating.*” and “*I feel that my role as a mother is at stake.*” Sofia recognized the negative impact of her expectations about motherhood, both external and internal, associated with her perfectionism and self-criticism traits. She referred to the following example of her internal dialogue: “*My mother keeps saying that she had three children and that she was able to do everything at home, and I only have one baby and I can’t do anything.*” The social pressure to be a “*perfect mother*” and the stigma associated with revealing emotional difficulties during the postpartum period were discussed to promote its normalization and acceptance.

Regarding the topic of emotions, the therapist normalized the diversity of emotions and the discrepancy between what Sofia expected and what she actually felt during the postpartum period. Sofia mentioned that she did not expect to feel alone and without support from her partner, with the thought “*My life has changed and his did not.*” Psychoeducation about the adaptative function of emotions was discussed to promote their acceptance and noncritical evaluation. Then, the cognitive–behavioral model was revised, and Sofia was asked to identify a recent situation and links between her thoughts, emotions and behaviors. This exercise also allowed the promotion of cognitive flexibility by asking her to think of possible alternative

interpretations for the situation. The patient was asked to keep performing this thought record through the exercise that would be proposed in the next module.

Session 4 (online)

The second module was focused on psychoeducation about thoughts (their automatic nature, the distinction between useful and negative thoughts) and normalizing negative automatic thoughts in the postpartum period. An exercise was proposed to identify negative thoughts and their link to emotions and behaviors. Psychoeducation about the poor effectiveness of thought suppression and cognitive fusion was provided, and more adaptative strategies to deal with negative thoughts were presented—cognitive defusion, acceptance and non-evaluation of thoughts, and thought questioning. The final theme focused on self-criticism and promoted self-compassion as a helpful strategy to deal with private negative and judgmental evaluations.

Session 5

Sofia started by reflecting on the strategies learned in the previous module: *“the most important strategy was the way I could deal with the negative thoughts”*; *“when I was overthinking about something, I asked myself ‘Is this thought useful?’ and it helped me to break that chain of thoughts”* and *“it has had an impact on my emotions; they are not as strong as before”*. The therapist reviewed the thought record exercise that Sofia completed, normalized the existence of negative thoughts during the postpartum period and promoted a reflection on alternative interpretations to increase cognitive flexibility. Then, the ineffectiveness of thought suppression and cognitive fusion (i.e., belief in the thoughts) was discussed, with Sofia mentioning *“I can’t control my thoughts, but I can question them”*. Afterward, the therapist reviewed and practiced the adaptative strategies to deal with the negative thoughts with the patient—acceptance and cognitive defusion, thought questioning, and self-compassion.

Session 6 (online)

The third module was divided into two different sessions. The first session was dedicated to defining, identifying and clarifying parenthood values and to promoting behavioral activation through value-based actions. An exercise was proposed, and Sofia was directed to reflect on the impact of performing the value-based activities and behaviors on her mood.

Session 7

Sofia mentioned feeling better, with more energy and a better mood. During the last week, she had been practicing thought questioning and revealed increased cognitive flexibility when interpreting her daily situations. In addition, the patient wrote a self-compassionate letter for herself to read when she was facing more difficult moments: *“Sofia, I know it has been hard and that you feel unsupported and misunderstood. Be patient and time will help to clarify things. Try to take things slowly without putting too much pressure on yourself. The most important thing is that you and your daughter are well. You have been demanding a lot from yourself, but you have also been giving a lot. Take time for yourself now, to recover and to calmly go back to the battle. You will be happy.”* In this session, Sofia said that it was difficult to identify her values by saying *“I know what my values as a mother are, but I am not just a ‘mother’. I am also a woman, a wife...”*. The therapist helped Sofia reflecting on her personal values—parenthood-related values (e.g., *“to be a present mother”*) and individual values (e.g., *“to be more connected with myself”*)—and how to manage the perception of conflict between values. Then, the importance of doing committed value-based actions was discussed: the impact of not doing value-based actions on depressed mood and strategies to increase and engage in those pleasant and value-based activities (e.g., goal definition, time management, and cognitive defusion to deal with negative thoughts or emotions of guilt).

Session 8 (online)

The second part of the third module aimed to identify Sofia’s social support needs and sources of support among her network and to reduce social isolation. Psychoeducation about assertive communication was given as a helpful communication skill to ask for support and to deal with other people’s comments, and assertive communication techniques were provided.

Session 9

The importance of social support in the postpartum period was reviewed, and Sofia highlighted the importance of the module’s exercise aimed at identifying her needs and sources of support (*“I was sad when realized that he [my partner] was not a source of support; it hurts me to know that I cannot count on him”*). The therapist and Sofia collaboratively discussed possible solutions to include her partner in practical and emotional support. Then, the importance of assertive communication when asking for support was explained (e.g., using specific requests, showing appreciation, and body posture).

The topic of communication and how to deal with difficult situations was introduced (e.g., dealing with other people's opinions). The patient reported some changes in her behavior in how she faced these situations by using the strategies for being assertive (*"I adopted the 'broken record' technique. I assumed my position and I said 'no'; people kept insisting and saying the same thing, and I kept answering 'no, thanks' or 'no, it is not necessary.'"*) and by acting in accordance with her values (*"I do what I think is best and what makes sense for me"*). The communication styles (passive, aggressive, and assertive) were briefly described in collaboration with the patient. In this context, Sofia revealed some difficulties in communicating with her partner (*"I try to communicate, but it is very difficult; sometimes he does not answer, or I talk and he just nods his head"*). A role-play exercise was proposed to practice in-session the learned communication skills in a situation of asking her partner for support.

Session 10 (online)

Sofia completed the fourth module about the couple's relationship, which included three main themes: the changes in the couple's relationship during the postpartum period and how to promote and increase affection and intimacy; the possible sources of conflict and the promotion of negotiation, assertive communication and problem-solving skills within the relationship; and sharing parenthood values and the normalization and acceptance of differences.

Session 11

Concerning the experience with the module about the couple's relationship, Sofia considered that this was the most difficult topic for her and reported difficulty in viewing this module with her partner (*"I tried to share the module with him [my partner], but he did not want to participate"*). The main changes felt by Sofia in her marital relationship during the postpartum period were the presence of distinct expectations about the postpartum period (*"He [my partner] thought it was going to be like before"*), the rise of communication difficulties and the lack of sexual desire. The therapist normalized these changes and encouraged the patient to find other pleasurable activities for the couple and daily gestures of affection. In this context, Sofia felt that her partner did not perform these gestures toward her (*"I got tired of unilateralism and stopped doing it because I also want to receive."*) and that he did not understand her tiredness (*"To him, I am not tired because I have a lot of free time"*) and lack of sexual desire (*"He thinks I am not trying hard enough. However, I actually do not feel like it, but he does not understand."*). Sofia also revealed that it was difficult to overcome the existing communication challenges due to feelings that her partner was not available to change (*"I feel ignored"; "His lack of communication is very difficult to deal with."*) and because they had very different perceptions

of reality (*“His perception is totally different from mine: of the daily routine, how to care for a baby, he does not realize how much work and how exhausting it is.”*). Assertive communication tips were reviewed to promote conflict resolution and to encourage Sofia to share her feelings with her partner, and an active listening exercise was proposed for the couple. In addition, cognitive flexibility was promoted concerning the different perceptions mentioned by Sofia. For instance, the thought *“My life has changed and his did not”* was discussed by examining the evidence that supported and refuted it. The therapist also reviewed the strategies for negotiation and conflict management within the relationship, as presented in the module.

Session 12 (online)

The final module aimed to promote reflection on the learned skills and changes obtained by Sofia during the intervention, as well as to develop a relapse prevention plan, by identifying alert signs and future difficulties and how to use the learned strategies to deal with them. By the end of the module, Sofia was invited to write a testimony of her experience with the intervention: *“With this program, I reflected on the changes after the birth of my daughter and learned to accept and recognize them as normal”*.

Session 13

Sofia started by sharing her reflection about the relationship with her partner over the last few days, mentioning that she needed to accept the things she could not control, such as her partner’s work schedule and his little availability to be with the baby, and revealed some improvements in their communication and in the support provided by him.

In this last session of the intervention, the therapist reinforced the patient’s therapeutic progress, and Sofia recognized her changes and the importance of the learned strategies (*“the management of expectations, the awareness that what I think is not always true, that all emotions are good to help us understand what is good and bad. Now, when I’m feeling down, I question my thoughts a lot to stop that chain of thoughts”*). The patient also described to being able to concentrate, to engage in pleasurable activities, such as reading, and to better manage her daily routine. Then, the therapist and the patient collaboratively reviewed the learned skills and the relapse prevention plan developed by Sofia in the online module. The patient identified the increase of a work schedule, her daughter getting sick and getting pregnant again as alert situations that could contribute to increase depressive symptoms, and she recognized that *“activating my support network, talking to my partner, to better organize the routine”*, dealing with negative thoughts and conducting value-based actions would be helpful strategies. Then, the objectives defined in the first sessions were revisited, and Sofia realized she had achieved

most of them, which reinforced her therapeutic progress. She also defined objectives for the future (e.g., “to practice physical exercise, to dedicate more to self-care”). At the end of the session, Sofia was praised for her motivation and dedication to treatment and was encouraged to keep practicing the learned skills to maintain the achieved gains.

Assessment of Progress

The reliable change index (RCI) was calculated to examine the changes obtained by Sofia in the self-report measures. The RCI is obtained by dividing the difference between post- and pre-treatment by the measurement error of the instrument (Jacobson & Truax, 1991; Tingey et al., 1996) using the following formula: $RCI = \frac{(post-) - (pre-treatment)}{\sqrt{2(SD\sqrt{1-\alpha})^2}}$. Normative data and

Cronbach’s alpha values for the SCS-SF and PMP S-E were obtained from the corresponding Portuguese validation studies. To calculate the RCI scores for the EDPS, HADS-A and AAQ-II, data were obtained from the sample of the study by Fonseca et al. (2018a). The normative data and Cronbach’s alpha values for the IMS-S were obtained from Rodrigues et al. (2016). A RCI score greater than ± 1.96 ($p < .05$) is indicative of a reliable change (Jacobson & Truax, 1991; Tingey et al., 1996), and a score higher than ± 1.28 also demonstrates a significant change, with a 90% confidence level (Wise, 2004).

Table 2 presents the patient’s pre- and post-intervention assessments, as well as the RCI scores for each measure. After the intervention, the patient reported a significant decrease in the levels of depressive (RCI = -3.96) and anxiety symptoms (RCI = -1.51), which were both under the cutoff scores established in the Portuguese validation studies. Post-intervention, Sofia also presented a higher perception of maternal self-efficacy (RCI = 2.68), as well as higher psychological flexibility and lower experiential avoidance (RCI = -2.14) and higher self-compassion levels (RCI = 1.77). Unexpectedly, marital satisfaction decreased by the end of the intervention (RCI = -1.71).

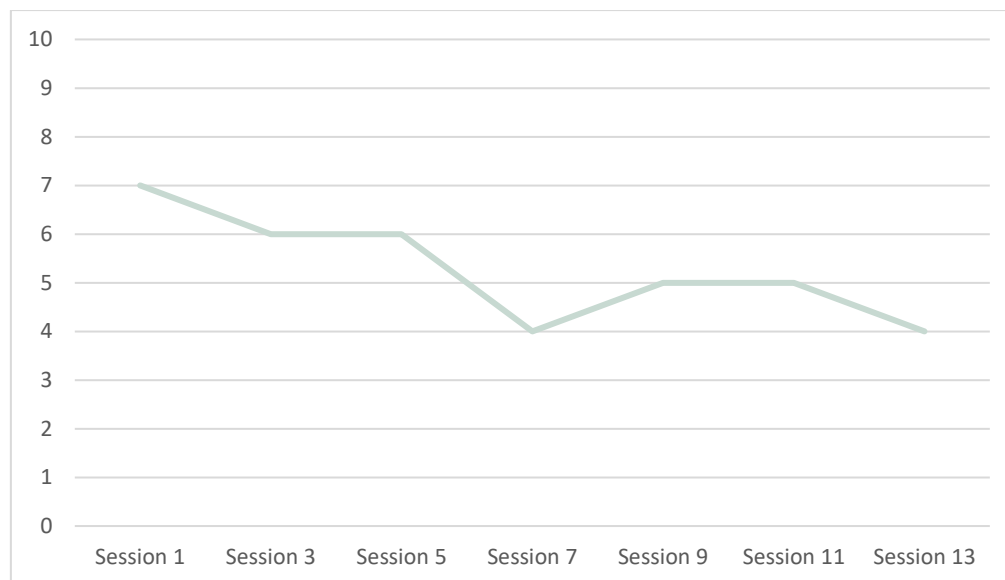
In **Figure 1**, a graphic with the mood ratings throughout the sessions is represented. A decrease in self-reported depressed mood was observed, which ranged from 7 (Session 1) to 4 (Session 13) out of a maximum of 10.

Table 2*Patient's pre- and postintervention assessments*

	T0 (pre-intervention)	T1 (post-intervention)	RCI
EPDS	19	8	-3.96**
HADS-A	11	7	-1.51*
IMS-S	2.4	1.2	-1.71*
PMP S-E	59	72	2.68**
SCS-SF	20	35	1.77*
AAQ-II	36	27	-2.14**

Note. EPDS = Edinburgh Postnatal Depression Scale; HADS-A = Hospital Anxiety and Depression Scale - Anxiety subscale; IMS-S = Investment Model Scale - Satisfaction subscale; PMP S-E = Perceived Maternal Parenting Self-Efficacy; SCS-SF = Self-Compassion Scale - Short Form; AAQ-II = Acceptance and Action Questionnaire-II; RCI = Reliable Change Index

*RCI > ± 1.28; **RCI > ± 1.96.

Figure 1*Depressed mood reporting throughout the sessions*

Note. 0 = no depressed mood; 10 = maximum depressed mood.

Data concerning usage information revealed a total of 30 logins (average time at each login of 12 minutes) on the website during the intervention period of 13 weeks, with an average of 4 days between logins, and all 13 exercises proposed in the online program were completed. Patient feedback regarding the treatment was very positive, and Sofia recognized beneficial changes (*“it allowed me to gain awareness of my difficulties,” “my problems did not disappear, my way of dealing with them is different now, so I believe I am better”*).

Complicating Factors

The main complicating factors of Sofia’s progress were the decreased marital satisfaction, the lack of support from her partner and their communication difficulties. In fact, poor marital relationships and low social support are considered important factors in both the development and maintenance of depressive symptoms during the postpartum period by increasing the stress associated with motherhood changes (Hutchens & Kearney, 2020; Wenzel & Kleiman, 2015). Given that this was a structured intervention, including the partner in some sessions was not considered. In Sofia’s case, future sessions with her partner could be particularly beneficial to clarify expectations about their roles, their relationship and parenthood, to promote communication skills and to practice problem-solving strategies to increase partner support.

Access and Barriers to Care

There were no evident barriers to care given the online nature of this intervention. Sofia had an internet connection at home and accessed the online modules of the program through her smartphone and computer. Additionally, Sofia was offered the possibility to reschedule any session with the therapist when necessary, and she requested to reschedule one session because her daughter was sick.

Follow-up

A follow-up session was provided 1 month after the end of the intervention. Sofia reported feeling *“more emotionally stable”* and being able to be less reactive in certain situations (e.g., stressful situations). Sofia still reported sleep deprivation but faced it with increased

flexibility (*"I know this is a transition period"*), and also mentioned difficulties managing and sharing household tasks with her partner. In this context, Sofia did not describe any changes and mentioned that her partner still did not understand her point of view regarding the baby's care and her feelings of tiredness. Despite that, Sofia changed the way she deals with this situation (*"Even recognizing this as a difficulty, I think I am dealing better with it. I can see a difference. Now, when I am upset, I will talk to him [my partner] about how I feel; it is better to find a solution."*) and how she deals with her negative thoughts (*"I was able to change my way of thinking and to perceive things differently"*). Sofia also described a situation in which her partner acted against the value-based action defined by the couple concerning the baby's feeding, and Sofia was encouraged to keep using the assertive communication style. The patient felt closer to her partner, having created more opportunities to be together and to promote their intimacy. Given the difficulties experienced in the couple's relationship, the patient was recommended couple's therapy. Sofia said that she already thought about that option when she was separated from the partner and she agreed that it could be important for them. Regarding the objectives defined in the last session, Sofia has been increasing physical exercise (e.g., walking) and mentioned that she would like to practice meditation and to learn English.

Treatment Implications of the case

This clinical case is part of a feasibility study assessing the acceptability of Be a Mom Coping with Depression, and to our knowledge, this is the first blended CBT intervention developed for the treatment of PPD. In this case study, the intervention was effective in reducing anxiety and depressive symptoms. It also seemed to contribute to increasing maternal self-efficacy and to developing psychological competences of psychological flexibility and self-compassion. These findings are quite promising, reflecting the effectiveness of CBT in treating depressive symptoms in the postpartum period (Ammerman et al., 2007; Crespo-Delgado et al., 2020; Nillni et al., 2018), including third-wave CBT strategies. Research interest in ACT and self-compassion therapies applied to the perinatal period has increased in the last years and revealed positive results in this population (e.g., Waters et al., 2020), which reinforces their inclusion in therapeutic protocols for PPD treatment.

This case study indicated that a blended intervention for PPD presents strengths for women during the postpartum period. Sofia perceived the blended intervention for PPD as positive and useful, highlighting time savings in transportation, decreased costs, the possibility to review content in the online program and to progress on her own time, and to better explore

online exercises with the psychologist in-session. In fact, a blended treatment format has the benefit of providing patients with psychoeducation through an online program and therapeutic strategies to practice, allowing for better preparation for the session with a therapist, which in turn contributes to increased treatment intensity (Schuster et al., 2018; Titzler et al., 2018). This is in line with our previous research indicating that postpartum women presenting depressive symptoms would be available to receive blended psychological treatment and that this format would be useful (Branquinho et al., 2021a). Therefore, a blended treatment format can contribute to increase postpartum women's access to effective treatment for PPD by overcoming some help-seeking barriers they often report (Button et al., 2017) and to improve their motivation, self-management and active roles in the treatment (Schuster et al., 2018).

Moreover, this case study also provides insight into therapeutic alliance and adherence to treatment. Throughout the sessions, Sofia described an adequate therapeutic relationship, considering that the online format of the sessions with the psychologist (through video calls) did not compromise it and she engaged positively in both the online and therapist sessions. This can have important implications that are particularly relevant during a pandemic or emergency context. As opposed to what was expected to be a disadvantage of a blended treatment (Branquinho et al., 2021a), the fear of having a "weaker" therapeutic relationship or lack of motivation were not reported by Sofia or observed by the therapist. In addition, using video calls for "face-to-face" sessions may become even more advantageous for women during the postpartum period, since it can reduce stigma associated with seeking professional help during this period or the possibility for the mother to be with her baby during the session. In line with this, clinical guidelines for interventions delivered through information and communication technologies, including interventions through video calls, have been developed for professional practice (e.g., Carvalho et al., 2019) and address specific aspects that need to be followed (e.g., guarantee of confidentiality and obtaining informed consent).

Despite the encouraging results that were found, the conclusions drawn from this clinical case study may not be applicable to all patients receiving blended interventions. The results from the feasibility study will be important to understand the acceptability and preliminary efficacy (not controlled) among a larger sample of women with PPD. Additionally, this case was selected given Sofia's motivation and adherence to treatment, which allowed us to describe the intervention in detail.

Recommendations to Clinicians and Students

Some implications for clinical practice can be drawn from this study. First, we highlight some specificities that should be included in CBT interventions for PPD. As previously exposed, it is particularly important to address motherhood-specific beliefs, discuss expectations and cultural concepts, promote social support, and address couple's relationships (Crespo-Delgado et al., 2020; O'Mahen et al., 2012). Moreover, we reflected on the potential benefit of including the partner in the intervention, for instance, by assisting in the module about the couple's relationship or by participating in this session with the psychologist. Previous literature on partner-inclusive interventions indicated that sessions including the partner aim to provide psychoeducation about PPD and to provide strategies such as communication skills, managing household tasks and giving emotional and instrumental support (Alves et al., 2018), which in Sofia's case, and for other women experiencing marital conflict and dissatisfaction, would be of great relevance.

Second, blended psychological interventions are potentially helpful not only for women experiencing PPD but also for individuals with other mental health problems. In fact, blended interventions are progressively receiving attention from researchers worldwide, with increasing preference for this treatment format among clinicians (Phillips et al., 2021). Recent studies with psychologists revealed a moderate to high acceptance toward blended treatment (Baumeister et al., 2020) and a higher acceptability toward blended interventions when compared to only online or web-based interventions (Mendes-Santos et al., 2020). In fact, previous studies revealed that clinicians recognized several advantages of blended therapy, such as time savings, the possibility of attending more patients by reducing the number of sessions and the gap between sessions that exist in healthcare systems, and customizing sessions as a function of patients' needs (Schuster et al., 2018; Titzler et al., 2018). Therefore, blended interventions are also beneficial to clinicians, and more research is warranted to expand the use of this innovative treatment format. Further studies will be conducted by the research team to assess the clinical efficacy of the intervention within a clinical trial. If proven effective and cost-effective, *Be a Mom Coping with Depression* can gain acceptance among several stakeholders, such as postpartum women, therapists, and healthcare services.

References

- Alves, S., Martins, A., Fonseca, A., Canavarro, M. C., & Pereira, M. (2018). Preventing and treating women's postpartum depression: A qualitative systematic review on partner-inclusive interventions. *Journal of Child and Family Studies*, 27(1), 1–25. <https://doi.org/10.1007/s10826-017-0889-z>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. American Psychiatric Association.
- Ammerman, R. T., Bodley, A. L., Putnam, F. W., Lopez, W. L., Holleb, L. J., Stevens, J., & Van Ginkel, J. B. (2007). In-home cognitive behavior therapy for a depressed mother in a home visitation program. *Clinical Case Studies*, 6(2), 161–180. <https://doi.org/10.1177/1534650106286533>
- Areias, M. E. G., Kumar, R., Barros, H., & Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth. *The British Journal of Psychiatry*, 169(1), 30–35. <https://doi.org/10.1192/bjp.169.1.30>
- Barnes, C. R., & Adamson-Macedo, E. N. (2007). Perceived maternal parenting self-efficacy (PMP S-E) tool: Development and validation with mothers of hospitalized preterm neonates. *Journal of Advanced Nursing*, 60(5), 550–560. <https://doi.org/10.1111/j.1365-2648.2007.04445.x>
- Batt, M. M., Duffy, K. A., Novick, A. M., Metcalf, C. A., & Epperson, C. N. (2020). Is postpartum depression different from depression occurring outside of the perinatal period? A review of the evidence. *Focus*, 18(2), 106–119. <https://dx.doi.org/0.1176/appi.focus.20190045>
- Baumeister, H., Terhorst, Y., Grassle, C., Freudenstein, M., Nübling, R., & Ebert, D. D. (2020). Impact of an "acceptance facilitating intervention on psychotherapists' acceptance of blended therapy. *PloS One*, 15(8), Article e0236995. <https://doi.org/10.1371/journal.pone.0236995>
- Beck, J. S (1995). *Cognitive therapy: Basics & beyond*. Guilford Press.
- Bonacquisti, A., Cohen, M. J., & Schiller, C. E. (2017). Acceptance and commitment therapy for perinatal mood and anxiety disorders: Development of an inpatient group intervention. *Archives of Women's Mental Health*, 20(5), 645–654. <https://doi.org/10.1007/s00737-017-0735-8>

- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2020). A blended cognitive–behavioral intervention for the treatment of postpartum depression: Study protocol for a randomized controlled trial. *International Journal of Environmental Research and Public Health*, *17*(22), 8631. <https://doi.org/10.3390/ijerph17228631>
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2021a). A blended psychological intervention for postpartum depression: Acceptability and preferences in women presenting depressive symptoms. *Journal of Reproductive and Infant Psychology*, 1–15. Advance online publication. <https://doi.org/10.1080/02646838.2021.1969350>
- Branquinho, M., de la Fe Rodriguez-Muñoz, M., Maia, B. R., Marques, M., Matos, M., Osma, J., Moreno-Peral, P., Conejo-Cerón, S., Fonseca, A., & Voursora, E. (2021b). Effectiveness of psychological interventions in the treatment of perinatal depression: A systematic review of systematic reviews and meta-analyses. *Journal of Affective Disorders*, *291*, 294–306. <https://doi.org/10.1016/j.jad.2021.05.010>
- Button, S., Thornton, A., Lee, S., Shakespeare, J., & Ayers, S. (2017). Seeking help for perinatal psychological distress: A meta-synthesis of women’s experiences. *British Journal of General Practice*, *67*(663), Article e692–e699. <https://doi.org/10.3399/bjgp17X692549>
- Carvalho, R., Fonseca, A., Dores, A., Santos, C. M., Batista, J., Salgado, J., & Sousa, M. (2019). *Linhas de Orientação para a Prestação de Serviços de Psicologia Mediados por Tecnologias da Informação e da Comunicação (TIC)*. Ordem dos Psicólogos Portugueses, Linhas de Orientação para a Prática Profissional. Porto.
- Castilho, P., Pinto-Gouveia, J., & Duarte, J. (2015). Evaluating the multifactor structure of the long and short versions of the Self-Compassion Scale in a clinical Sample. *Journal of Clinical Psychology*, *71*(9), 856–870. <https://doi.org/10.1002/jclp.22187>
- Crespo-Delgado, E., Martinez-Borba, V., & Osma, J. (2020). The unified protocol for transdiagnostic treatment of perinatal depression: A case study. *Clinical Case Studies*, *19*(6), 491–508. <https://doi.org/10.1177/1534650120951266>
- Ebert, D. D., Van Daele, T., Nordgreen, T., Karekla, M., Compare, A., Zarbo, C., Brugnera, A., Øverland, S., Trebbi, G., Jensen, K. L., Kaehlke, F., Baumeister, H., & Taylor, J. (2018). Internet and mobile-based psychological interventions: Applications, efficacy and potential for improving mental health. A report of the EFPA E-Health taskforce. *European Psychologist*, *23*(2), 167–187. <https://doi.org/10.1027/1016-9040/a000318>

- Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research*, 19(9), Article e306. <https://doi.org/10.2196/jmir.6588>
- Field, T. (2010). Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behavior and Development*, 33(1), 1–6. <https://doi.org/10.1016/j.infbeh.2009.10.005>
- Finlayson, K., Crossland, N., Bonet, M., & Downe, S. (2020). What matters to women in the postnatal period: A meta-synthesis of qualitative studies. *PLoS One*, 15(4), Article e0231415. <https://doi.org/10.1371/journal.pone.0231415>
- First, M. B., Williams, J. B., Karg, R. S., & Spitzer, R. L. (2017). *User's guide for the SCID-5-CV structured clinical interview for DSM-5® disorders: Clinical version*. American Psychiatric Publishing, Inc.
- Fonseca, A., Alves, S., Monteiro, F., Gorayeb, R., & Canavarro, M. C. (2020a). Be a mom, a web-based intervention to prevent postpartum depression: Results from a pilot randomized controlled trial. *Behavior Therapy*, 51(4), 616–633. <https://doi.org/10.1016/j.beth.2019.09.007>
- Fonseca, A., Branquinho, M., & Canavarro, M. C. (2020b). Application of the cognitive-behavior therapy principles in the development of e-mental health tools: The case of be a mom, a web-based psychological intervention to prevent postpartum depression. *Psychologica*, 63(2), 119–137. https://doi.org/10.14195/1647-8606_63-2_6
- Fonseca, A., Gorayeb, R., & Canavarro, M. C. (2015). Women's help-seeking behaviours for depressive symptoms during the perinatal period: Socio-demographic and clinical correlates and perceived barriers to seeking professional help. *Midwifery*, 31(12), 1177–1185. <https://doi.org/10.1016/j.midw.2015.09.002>
- Fonseca, A., Monteiro, F., & Canavarro, M. C. (2018a). Dysfunctional beliefs towards motherhood and postpartum depressive and anxiety symptoms: Uncovering the role of experiential avoidance. *Journal of Clinical Psychology*, 74(12), 2134–2144. <https://doi.org/10.1002/jclp.22649>
- Fonseca, A., Pereira, M., Araujo-Pedrosa, A., Gorayeb, R., Ramos, M. M., & Canavarro, M. C. (2018b). Be a mom: Formative evaluation of a web-based psychological intervention to

- prevent postpartum depression. *Cognitive and Behavioral Practice*, 25(4), 473–495. <https://doi.org/10.1016/j.cbpra.2018.02.002>
- Gelaye, B., Rondon, M. B., Araya, R., & Williams, M. A. (2016). Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. *The Lancet Psychiatry*, 3(10), 973–982. [https://dx.doi.org/10.1016%2FS2215-0366\(16\)30284-X](https://dx.doi.org/10.1016%2FS2215-0366(16)30284-X)
- Goodman, J. H. (2009). Women's attitudes, preferences, and perceived barriers to treatment for perinatal depression. *Birth*, 36(1), 60–69. <https://doi.org/10.1111/j.1523-536X.2008.00296.x>
- Hutchens, B. F., & Kearney, J. (2020). Risk factors for postpartum depression: An umbrella review. *Journal of Midwifery & Women's Health*, 65(1), 96–108. <https://doi.org/10.1111/jmwh.13067>
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12–19. <https://doi.org/10.1037//0022-006x.59.1.12>
- Lal, S., & Adair, C. E. (2014). E-mental health: A rapid review of the literature. *Psychiatric Services*, 65(1), 24–32. <https://doi.org/10.1176/appi.ps.201300009>
- Mendes-Santos, C., Weiderpass, E., Santana, R., & Andersson, G. (2020). Portuguese psychologists' attitudes toward internet interventions: Exploratory cross-sectional study. *JMIR Mental Health*, 7(4), Article e16817. <https://doi.org/10.2196/16817>
- Nillni, Y. I., Mehralizade, A., Mayer, L., & Milanovic, S. (2018). Treatment of depression, anxiety, and trauma-related disorders during the perinatal period: A systematic review. *Clinical Psychology Review*, 66, 136–148. <https://doi.org/10.1016/j.cpr.2018.06.004>
- O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: Current status and future directions. *Annual Review of Clinical Psychology*, 9, 379–407. <https://doi.org/10.1146/annurev-clinpsy-050212-185612>
- O'Mahen, H., Fedock, G., Henshaw, E., Himle, J. A., Forman, J., & Flynn, H. A. (2012). Modifying CBT for perinatal depression: What do women want?: A qualitative study. *Cognitive and Behavioral Practice*, 19(2), 359–371. <https://doi.org/10.1016/j.cbpra.2011.05.005>

- Pais-Ribeiro, J., Silva, I., Ferreira, T., Martins, A., Meneses, R., & Baltar, M. (2007). Validation study of a Portuguese version of the hospital anxiety and depression scale. *Psychology, Health & Medicine, 12*(2), 225–237. <https://doi.org/10.1080/13548500500524088>
- Phillips, E. A., Himmler, S. F., & Schreyogg, J. (2021). Preferences for e-mental health interventions in Germany: A discrete choice experiment. *Value in Health, 24*(3), 421–430. <https://doi.org/10.1016/j.jval.2020.09.018>
- Pinto-Gouveia, J., Gregório, S., Dinis, A., & Xavier, A. (2012). Experiential avoidance in clinical and non-clinical samples: AAQ-II Portuguese version. *International Journal of Psychological Therapy, 12*(2), 139–156.
- Rodrigues, D., & Lopes, D. (2013). The investment model Scale (IMS): Further studies on construct validation and development of a shorter version (IMS-S). *The Journal of General Psychology, 140*(1), 16–28. <https://doi.org/10.1080/00221309.2012.710276>
- Rodrigues, D., Lopes, D., & Pereira, M. (2016). We agree and now everything goes my way”: Consensual sexual nonmonogamy, extradyadic sex, and relationship satisfaction. *Cyberpsychology, Behavior, and Social Networking, 19*(6), 373–379. <https://doi.org/10.1089/cyber.2016.0114>
- Schuster, R., Pokorny, R., Berger, T., Topooco, N., & Laireiter, A. R. (2018). The advantages and disadvantages of online and blended therapy: Survey study amongst licensed psychotherapists in Austria. *Journal of Medical Internet Research, 20*(12), Article e11007. <https://doi.org/10.2196/11007>
- Switalska, J., & Bielawska-Batorowicz, E. (2020). The effect of maternal depression on infant attachment: A systematic review. *International Journal of Environmental Research and Public Health, 17*(8), 2675. <https://doi.org/10.3390/ijerph17082675>
- Tingey, R., Lambert, M., Burlingame, G., & Hansen, N. (1996). Assessing clinical significance: Proposed extensions to method. *Psychotherapy Research, 6*(2), 109–123. <https://doi.org/10.1080/10503309612331331638>
- Titzler, I., Saruhanjan, K., Berking, M., Riper, H., & Ebert, D. D. (2018). Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists’ perspective. *Internet Interventions, 12*, 150–164. <https://doi.org/10.1016/j.invent.2018.01.002>

- Waters, C. S., Annear, B., Flockhart, G., Jones, I., Simmonds, J. R., Smith, S., Traylor, C., & Williams, J. F. (2020). Acceptance and Commitment Therapy for perinatal mood and anxiety disorders: A feasibility and proof of concept study. *British Journal of Clinical Psychology, 59*(4), 461–479. <https://doi.org/10.1111/bjc.12261>
- Wenzel, A., & Kleiman, K. (2015). *Cognitive behavioral therapy for perinatal distress*. Routledge.
- Wise, E. A. (2004). Methods for analyzing psychotherapy outcomes: A review of clinical significance, reliable change, and recommendations for future directions. *Journal of Personality Assessment, 82*(1), 50–59. https://doi.org/10.1207/s15327752jpa8201_10
- Woolhouse, H., Gartland, D., Perlen, S., Donath, S., & Brown, S. J. (2014). Physical health after childbirth and maternal depression in the first 12 months post partum: Results of an Australian nulliparous pregnancy cohort study. *Midwifery, 30*(3), 378–384. <http://dx.doi.org/10.1016/j.midw.2013.03.006>
- Yan, H., Ding, Y., & Guo, W. (2020). Mental health of pregnant and postpartum women during the coronavirus disease 2019 pandemic: A systematic review and meta-analysis. *Frontiers in Psychology, 11*, 3324. <https://doi.org/10.3389/fpsyg.2020.617001>

Empirical study IV

Be a Mom Coping with Depression: A feasibility study of a blended cognitive-behavioral intervention for postpartum depression

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2023

International Journal of Cognitive Therapy, 16, 618–645.

<https://doi.org/10.1007/s41811-023-00182-0>

Be a Mom Coping with Depression: A feasibility study of a blended cognitive-behavioral intervention for postpartum depression

Abstract

A blended cognitive-behavioral intervention for postpartum depression (Be a Mom Coping with Depression) was developed, consisting of the combination of seven face-to-face sessions (delivered through videocall) with six online sessions in a web-based program. This study aimed to assess the intervention's feasibility, acceptability, and preliminary effects on depressive symptoms. A single-arm pre- and post-test study was conducted, and adult Portuguese women in the postpartum period (up to 12 months) with a clinical diagnosis of a major depressive episode were eligible to participate ($n = 9$). Participants completed self-report measures and were interviewed after completing the intervention. Eight participants completed the blended intervention. The recruitment rate was low, but the adherence to treatment was high. Participants reported several advantages of this intervention and high levels of satisfaction. The blended intervention was found to be feasible and acceptable, and a reduction on depressive symptoms was observed in our sample. These results support the conduction of a randomized controlled trial to assess the efficacy of this blended intervention and provided important information to proceed with the necessary modifications.

Keywords: Acceptability, Be a Mom Coping with Depression, Blended intervention, Feasibility, Postpartum depression

Introduction

The postpartum period, defined as the time after childbirth and extending for the following 12 months (Batt et al., 2020), represents a time of increased risk for mental health problems due to the demanding changes and challenges that women face (Finlayson et al., 2020). Postpartum depression (PPD) is one of the most prevalent psychiatric disorders during this period worldwide (Gelaye et al., 2016). In Portugal, it affects approximately 13% of postpartum women (Maia et al., 2011). The literature has consistently demonstrated the negative effects that PPD can have for a mother and baby as well as for the family system if it is not properly treated (Slomian et al., 2019). In addition, the recent COVID-19 pandemic has contributed to an increased prevalence of PPD (about 22%; Yan et al., 2020), as well as a higher risk of developing this mental health problem (Hutchens & Kearney, 2020).

This is particularly concerning given that few women seek professional help for their depressive symptoms during the postpartum period (Fonseca et al., 2015). Women report several practical barriers (e.g., reduced time, childcare or job limitations, transportation issues) that prevents them to attend appointments with a mental health professional (Daehn et al., 2022), as well as a difficulty to access healthcare, associated with high costs of treatment, limited availability of professionals and long waiting time (Bina, 2020). In addition, attitudinal factors (e.g., stigma and shame associated with PPD, perceptions about psychological treatment) also act as barriers to seek treatment for PPD (Bina, 2020).

E-mental health tools (i.e., the use of digital technology applied to mental health field; Riper et al., 2010) can play an important role in overcoming these treatment barriers, given their potential to reduce costs, increase flexibility and improve accessibility (Lal & Adair, 2014). Several web-based interventions for PPD treatment have been developed (e.g., O'Mahen et al., 2013; Loughnan et al., 2019) and proved to be effective in reducing depressive symptoms (Ashford et al., 2016; Mu et al., 2021). However, web-based self-led interventions have strong limitations related with low engagement and high attrition rates (due to the absence of therapist support during the intervention; Andersson & Titov, 2014; Nair et al., 2018). Also, they do not allow to address specific problems and can limit the inclusion of more vulnerable groups (e.g., low literacy women; Andersson & Titov, 2014), and therefore could be insufficient to increase treatment rates among this population.

Blended interventions

In the past decade, there has been increased interest in developing blended interventions, a new format of treatment delivery that combines face-to-face psychotherapy with e-health tools (e.g., web-based interventions) into one intervention protocol (Erbe et al., 2017). Including these tools in a blended treatment, with face-to-face and online elements being provided within the same period in an integrated and sequential format (Erbe et al., 2017), can be advantageous in many ways. First, it can improve treatment flexibility and accessibility (Kloek et al., 2020; Schuster et al., 2018b). Second, blended interventions can contribute to the development of self-management skills (Kloek et al., 2020). Given that online tools can make contents and materials available anywhere at any time, it contributes to better preparation for sessions with the therapist (Mol et al., 2020; Urech et al., 2018). For instance, elements of psychotherapy such as psychoeducation and exercises can be delivered through the web-based tool, providing the patients with the opportunity to learn and practice before the sessions (Ebert et al., 2018). Additionally, the disadvantages that are usually reported when using web-based tools alone (e.g., high dropout rates) can be mitigated in blended interventions because therapists are available to provide individual support, manage possible crises and therefore increasing motivation and engagement (Urech et al., 2018; Wentzel et al., 2016). In fact, a systematic review on blended interventions for the treatment of mental health problems revealed lower attrition rates and saving therapists' time associated to blended interventions (Erbe et al., 2017).

Blended interventions for psychological problems are, then, the combination of the "best of both worlds" (Wentzel et al., 2016, p. 2), allowing to optimize and intensify treatment by replacing some face-to-face sessions or complementing them with modules through a web-based program (Erbe et al., 2017). In fact, Mendes-Santos et al. (2020) reported that about two-thirds of a sample of Portuguese psychologists demonstrated a preference for blended interventions when compared to only web-based interventions, and that most professionals who were already using digital tools viewed them as a complement to and not a substitute for face-to-face psychotherapy. In addition, positive attitudes regarding blended interventions have been reported by patients and clinicians (van der Vaart et al., 2014). Studies indicated that participants presenting depressive symptoms who received a blended treatment demonstrated satisfaction (Høifødt et al., 2013; Kooistra et al., 2016), as did the therapists providing blended treatment (Mol et al., 2020). A systematic review about blended interventions for the treatment of depression, anxiety or substance abuse was conducted (Erbe et al., 2017), and the results indicated that most blended interventions were based on cognitive-behavioral therapy (CBT)

and many interventions lasted between 8 and 12 weeks. There is also evidence of the effectiveness of blended interventions in reducing symptoms of depression (Høifødt et al., 2013; Kooistra et al., 2019) and anxiety (Witlox et al., 2021) in the general population.

This evidence is encouraging to develop a blended intervention for the treatment of PPD, since it could help women overcome some treatment barriers often reported. A recent study in Portugal revealed that postpartum women presenting depressive symptoms agreed that a blended intervention would be helpful and that they would be available to receive this treatment (Branquinho et al., 2021). However, to the best of our knowledge, there has been no blended intervention specifically established for PPD treatment.

In line with this, a blended CBT intervention for PPD — Be a Mom Coping with Depression — has been conceived in the Portuguese context (Branquinho et al., 2020), combining face-to-face sessions with a psychologist and a web-based program. The web-based program was previously created as a self-guided tool for the prevention of PPD among Portuguese women presenting a high risk for PPD (Fonseca et al., 2018b). The results of a randomized controlled trial (RCT) indicated that this tool was effective in reducing depressive symptoms among these women, and therefore, it was included in this blended intervention (Carona et al., 2023). Be a Mom Coping with Depression follows CBT principles (e.g., problem-oriented, educative, structured and time-limited), and includes third-wave CBT contributions such as elements of self-compassion and acceptance and commitment therapy (Fonseca et al., 2020). The CBT therapeutic components included in this intervention consist of psychoeducation, strategies to deal with negative thoughts, valued-based behavioral activation, and relapse prevention. This intervention also includes strategies to activate social support networks, develop communication and problem-solving skills and improve couples' relationships.

The importance of feasibility studies

Feasibility studies aim to test innovative interventions and are focused on the process of development and implementation, as well as the participants' response to the treatment (Gadke et al., 2021; Orsmond & Cohn, 2015). The results can then provide important information to prepare and support the further conduction of an RCT with a large sample to test the efficacy of newly developed interventions (Orsmond & Cohn, 2015). According to several authors, feasibility includes dimensions as the recruitment capability, procedures, fidelity of implementation, and potential effectiveness (Gadke et al., 2021; Orsmond & Cohn, 2015). Acceptability, which is the extent to which an intervention is considered to be appropriate by the target population (including intervention contents, characteristics, perceived effectiveness and costs; Sekhon et

al., 2017), usability and satisfaction should also be assessed since they are important indicators of participants' experiences (Newton et al., 2021).

Some research has been conducted on this topic for the development and evaluation of blended interventions (Fitzpatrick et al., 2018; Kooistra et al., 2016; Wilhelmsen et al., 2013). For instance, a feasibility study assessed a blended CBT intervention for depression in terms of its usefulness, system usage and participants' evaluations of the treatment format (Schuster et al., 2018a). Participants obtained improvements in the reported symptoms and demonstrated satisfaction with treatment and computer elements. Another feasibility study conducted by Wilhelmsen et al. (2013) included a qualitative evaluation of participants' motivation to engage in a blended CBT-based treatment for depression and the results generated important implications for further implementation of the intervention. Qualitative data are also of particularly valuable in a feasibility study since they offer relevant information about the participants' perceptions about the intervention's strengths and weaknesses, and how it can be improved (O'Cathain et al., 2015). Then, both quantitative and qualitative information are of great relevance in a feasibility study.

Objectives

This feasibility study aimed to evaluate the Be a Mom Coping with Depression intervention in terms of its 1) feasibility (recruitment, dropout rates, patterns of usage and therapist fidelity); 2) acceptability (participants' opinions about the contents, structure, accessibility, advantages and disadvantages of the intervention, perceived effectiveness), usability and satisfaction; and 3) potential in reducing depressive symptoms.

Method

Study design

A single-arm pre- and post-test study was conducted between March 2021 and January 2022 to assess the feasibility, acceptability and preliminary effects on depressive symptoms of the blended intervention in a sample of Portuguese women. This study was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra, and was registered on ClinicalTrials.gov (NCT04441879). The ethical standards and procedures for research with human beings were followed (e.g., Helsinki Declaration – World Medical

Association, 2013). This study was reported according to the extension of the CONSORT 2010 statement for randomized pilot and feasibility trials (Eldridge et al., 2016).

Participants and Procedures

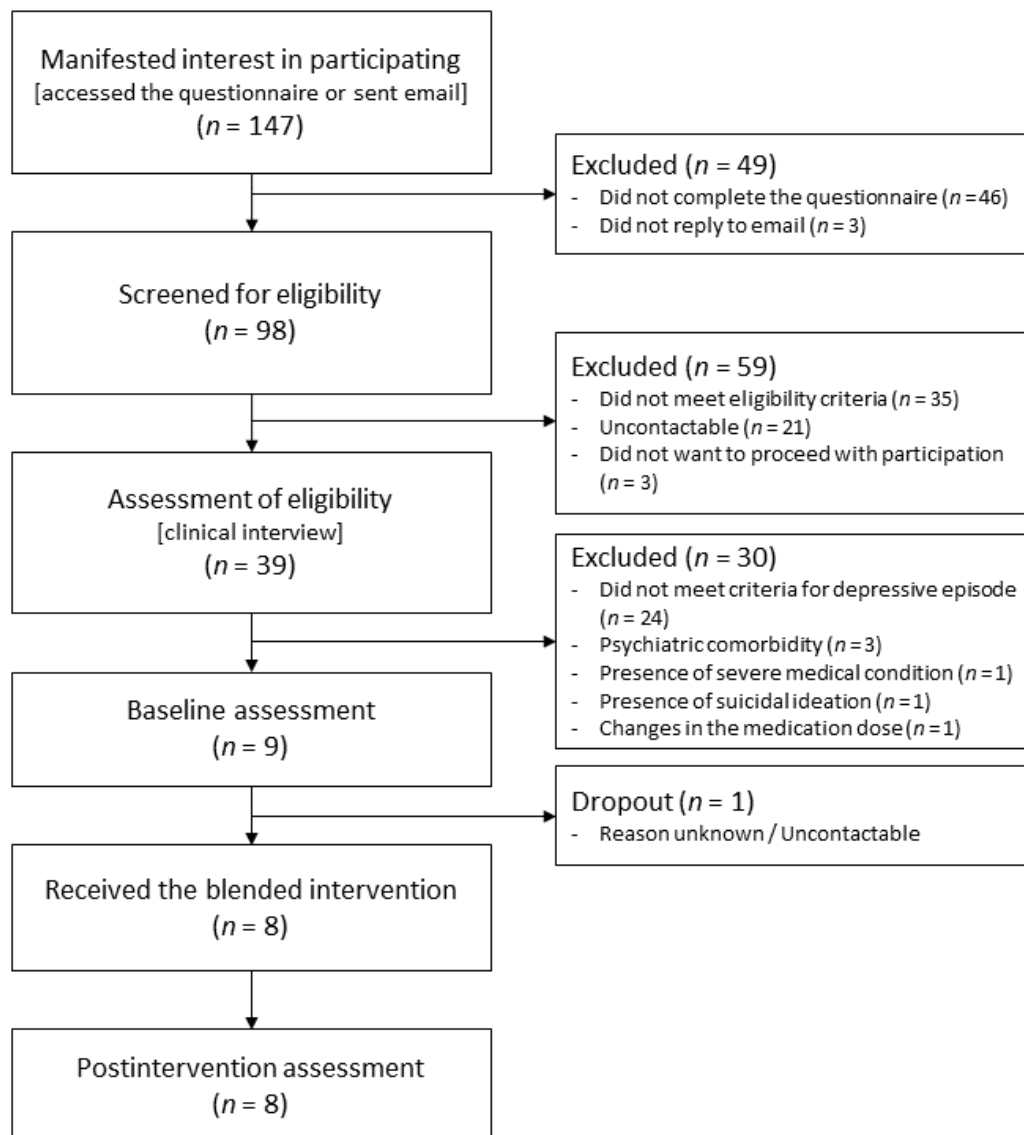
The inclusion criteria to participate in the study were (1) women in the postpartum period (up to 12 months after childbirth); (2) women aged 18 years or older; (3) women who were Portuguese; (4) women with a diagnosis of a major depressive episode according to the Diagnostic and Statistical Manual of Mental Disorders – fifth edition (DSM-5; American Psychiatric Association, 2013); (5) women with the necessary technological means (a computer or smartphone with internet access); and (6) women who were able to write and read Portuguese. Women were excluded if they had a psychiatric comorbidity requiring primary treatment, severe suicidal ideation, a serious medical condition (the mother or the baby – self-reported) or were receiving current psychological or pharmacological treatment for depression (medication was allowed only if it had been stabilized for three months prior to study onset – self-reported). After the study started, two changes were made to the eligibility criteria. First, residence in Portugal was no longer an inclusion criterion, given that the intervention was delivered online. Second, taking medication for the treatment of depressive symptoms was allowed because women currently receiving this treatment could also benefit from a psychological treatment if the medication dose was stabilized, so its effects should not have confounded the intervention effects.

Women were recruited through online platforms, including social media (Facebook and Instagram) and maternity forums. The main researcher created Facebook and Instagram pages for the dissemination of the research project. Paid and unpaid boosting campaigns on social media were performed to target women between 18 and 45 years of age with interest in maternity topics. These advertisements included information about the study goals and procedures, including the guarantee of confidentiality and anonymity, the possibility to withdraw at any time and that participation was free of costs, and were followed by a weblink to a screening questionnaire. After accessing the weblink, participants were asked to provide their informed consent to participate in the study and were given access to the questionnaire, which included questions about sociodemographic information, the Edinburgh Postnatal Depression Scale (EPDS; Areias et al., 1996) and other eligibility criteria questions (e.g., having internet access). Women were also asked to provide their contact information (e-mail and telephone number) to be further contacted by the research team.

Women with a positive screen for the presence of PPD symptoms (indicated by an EPDS score > 9; Areias et al., 1996) who fulfilled the eligibility criteria were contacted by the main researcher to schedule an interview to assess the presence of a major depressive episode. The researcher (clinical psychologist) conducted a clinical interview based on the Structured Clinical Interview for the DSM-5 (SCID-5; First et al., 2017) by telephone. Women with a diagnosis of a major depressive episode were included in the study. The participants who did not meet all the inclusion criteria were informed about the end of their participation, and the researcher discussed and proposed other treatment possibilities. Before the beginning of the intervention, the participants were asked to complete a set of self-report questionnaires (baseline assessment) that was accessed through a weblink sent by email. After the end of the intervention, the participants were asked to complete a postintervention protocol. All questionnaires (screening, pre- and postintervention) were hosted on LimeSurvey®. **Figure 1** presents the flowchart of the study.

Figure 1

Flowchart of the participants' inclusion in the study



Be a Mom Coping with Depression

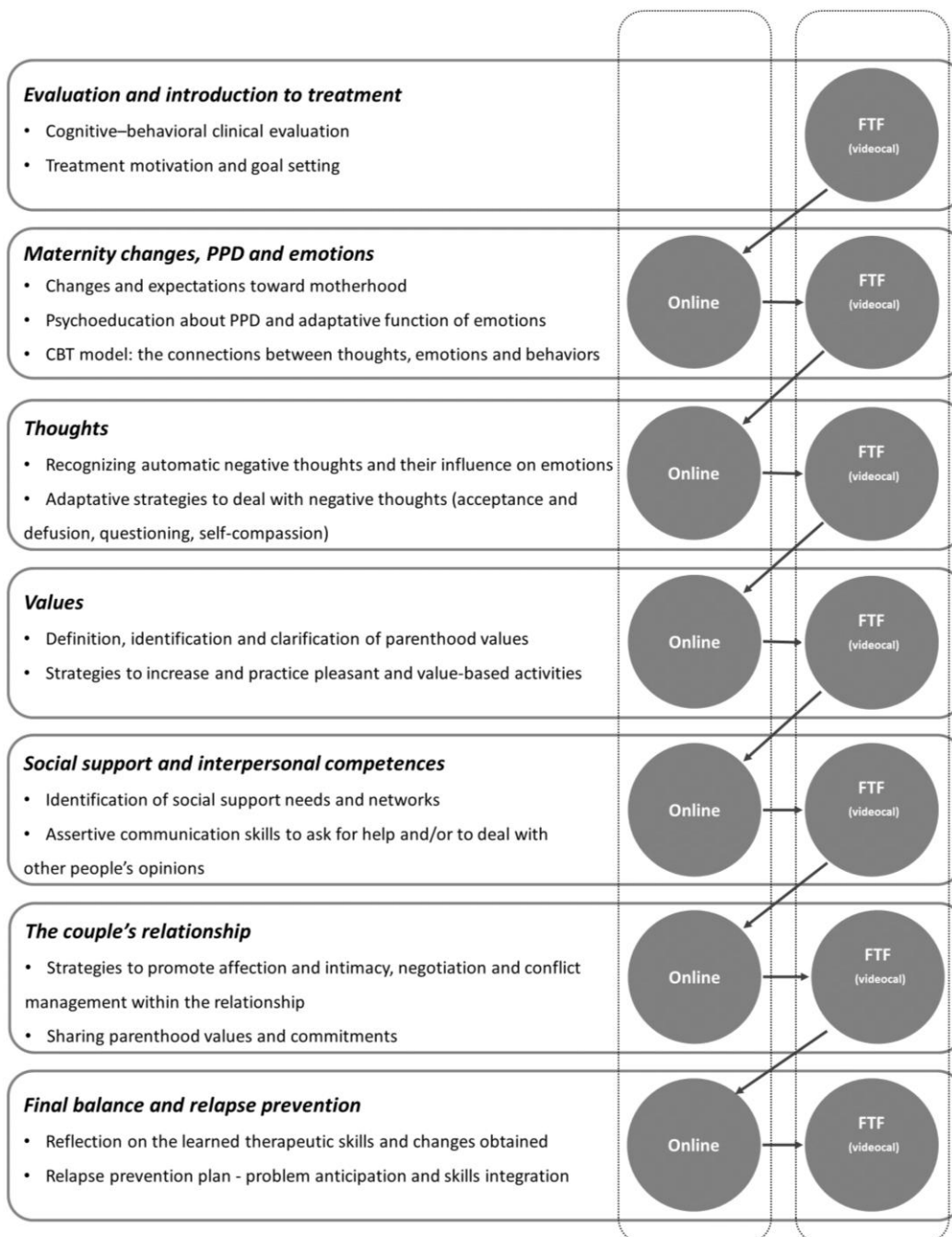
The development of the blended treatment protocol included, in the first phase, a literature search that was conducted on existing blended interventions for depression (e.g., Kooistra et al., 2016; Schuster et al., 2018a), as well as on evidence-based CBT interventions for PPD, delivered both face-to-face (e.g., Wenzel & Kleiman, 2015) and online (e.g., O'Mahen et al., 2013). Content and structural aspects were identified (e.g., duration of the intervention, the number of sessions), and the results of this review informed the development of the general structure for the blended intervention protocol. Afterward, modifications to the original web-

based program were conducted to address some specificities of PPD and a detailed therapist manual for face-to-face sessions was developed. Connection between the online modules and face-to-face sessions was an important aspect that was considered when developing the therapist manual to ensure that the treatment was perceived as “one”. At the same time, a cross-sectional study was also conducted with the target population (Portuguese postpartum women presenting depressive symptoms) to gather information on their preferences for this type of intervention (Branquinho et al., 2021) and the results also informed the development of the blended treatment protocol. The final version of the protocol was reviewed and approved by a group of researchers with clinical expertise in the area of PPD.

The general structure of the Be a Mom Coping with Depression is presented in **Figure 2**. The intervention duration is 13 weeks, and it is composed of seven sessions with a psychologist and six sessions in the online program, which are alternated weekly. The intervention was conducted by a licensed psychologist who followed a detailed therapist manual. The sessions with the psychologist were observed by a psychologist in training. Biweekly supervision sessions were provided by an experienced postdoctoral-level psychologist.

Figure 2

General structure of the *Be a Mom Coping with Depression* intervention



Note. CBT = cognitive-behavioral therapy; FTF (videocal) = face-to-face sessions with the psychologist (delivered through videocal); PPD = postpartum depression.

Due to the COVID-19 pandemic, several restrictions were imposed on face-to-face activities. Therefore, *Be a Mom Coping with Depression* was adapted to be delivered totally online, with face-to-face sessions with a therapist being replaced by videocall sessions, using videoconference tools (e.g., Zoom). Each session with the psychologist was expected to last approximately 60 minutes and started with mood check and discussion of the women's symptoms. Then, the therapist reviewed the women's experiences with the online program and each module's content — the therapist discussed the homework assignments, practiced the therapeutic strategies in-session, provided feedback, and clarified any doubts. At the end of the session, the next online module theme and objectives were presented. A detailed description of each session's content and its illustration through a case study are presented elsewhere (Branquinho et al., 2022). The interval between sessions with the psychologist was allowed to vary somewhat to provide flexibility in meeting each patient's individual needs.

The online sessions were self-guided and delivered through a web-based program (<https://beamomcopingwithdepression.pt/>). Participants received an invitation by email to register in the program after the first session with the psychologist. After registering, participants accessed the web-based program using an email and a password created by them. The web-based program was organized into modules addressing several thematic contents (e.g., understanding postpartum depression, maternity changes, emotions). Each online module (with an approximate duration of 30 min) was completed after a session with the psychologist, according to the instructions given. The module opened with an introduction to the session's goals and content, followed by specific information and strategies, which were presented in different formats (e.g., text, video, audio), and ended with a reminder of the session with the psychologist, indicating that the participant had finished that week's module. Participants could pause the session at any time and reopen the last page visited during subsequent access to the program. The web-based program also included a section with additional reading documents that were available after completing each module. An asynchronous communication channel with the therapist was available through the program, and two automatic email reminders (3 and 10 days after the participant's last access) and a phone call with the psychologist were delivered to participants between sessions to encourage their engagement. The email reminders informed that there was an incomplete module and motivated participants to access it. In the phone calls, women were asked to identify the key messages of the module, and if she did not access it, the therapist would encourage her to complete it in the next days.

Measures

Sociodemographic and clinical information. The women's sociodemographic (age, marital status, professional status, educational level, place of residence, number of children) and clinical (history of psychiatric/psychological problems and history of psychiatric/psychological treatment) information was collected through a self-report questionnaire. Infant-related information (age, sex, gestational weeks at birth) was also obtained.

Feasibility. The feasibility of the implementation of the intervention was evaluated through recruitment rates, participants' treatment adherence, participants' patterns of usage and therapist fidelity. Completion of the intervention was considered when participants had attended all sessions with the psychologist and completed a minimum of 75% of the online modules. Information regarding the number of sessions, the average duration (minutes) and the total duration of treatment (in weeks) was obtained from the therapist's records. Website usage data were obtained from the website concerning the number of completed modules, the number of logins, the average time spent at each login (minutes) and the number of interactive exercises completed in each module. To assess therapist fidelity, the therapist completed a checklist at the end of each session to confirm that the topics of the session were covered. It was composed of 18 items related to the first part of the session (e.g., "To assess patient humor"), the session goals (e.g., "To review the exercises completed by the patient in the online module"), the final part of the session (e.g., "To remind the patient of their homework") and transversal competences (e.g., "To demonstrate verbal empathy") that were answered with yes, no or not applicable.

Acceptability, usability and satisfaction. A semistructured interview guide with open-ended questions was developed by the research team (cf. Appendix A) to collect qualitative data on participants' acceptability, usability and satisfaction with the intervention. Interviews were conducted to explore the participants' expectations for the treatment, opinions about the contents and structure (including the frequency and number of sessions), perceived advantages and disadvantages of the treatment format, opinions about the web-based program (language, usability, design, exercises) and sessions with the psychologist (relevance, language used and therapeutic relationship). Participants were also asked to reflect on any difficulties they experienced during the intervention and to provide suggestions for improvement. Participants who completed the blended intervention were invited for an individual interview, and the researcher explained its nature and purpose — to gather participants' perceptions of the intervention to help improve it for future implementation. Permission to participate and record

the interview (after explaining its purpose) were obtained before its start by asking for the women's verbal consent. The interviews were conducted by the first author about one week after the end of the intervention through videoconference. The interviews were videorecorded and had an average duration of approximately 50 minutes (range from 40 to 61 minutes).

Depressive symptoms. The Portuguese version of the Edinburgh Postnatal Depression Scale (EPDS; Areias et al., 1996) was used to assess depressive symptoms. The EPDS is a 10-item instrument (e.g., "I have felt sad or miserable") with a 4-point Likert answer scale ranging from 0 to 3. Higher scores are indicative of more severe depressive symptoms. Portuguese validation studies of the EPDS (Figueiredo, 1997) showed good levels of internal consistency (Cronbach's alpha = 0.85).

Statistical analysis

Quantitative analyses were conducted using the Statistical Package for the Social Sciences (IBM SPSS, version 25.0; IBM SPSS, Chicago, IL). Descriptive statistics were calculated to describe the sociodemographic and clinical characteristics of the sample, recruitment data and retention data, to assess patterns of usage and therapist fidelity and to compute the mean scores of depressive symptoms. To assess the clinical changes in depressive symptoms obtained by the participants, reliable change index (RCI) scores were calculated by dividing the difference between post- and pretreatment by the measurement error of the instrument (Jacobson & Truax, 1991; Tingey et al., 1996). An RCI score higher than ± 1.96 ($p < .05$) is indicative of a reliable change (Jacobson & Truax, 1991; Tingey et al., 1996), and a score higher than ± 1.28 reveals a significant change, with a 90% confidence level (Wise, 2004). To calculate the RCI scores for the EDPS, data was obtained from the sample of the study by Fonseca et al. (2018a).

Qualitative data analysis

Data were transcribed verbatim in the participants' original language (Portuguese). A thematic analysis was conducted, following a data-driven approach and the procedures recommended by Braun and Clarke (2006). MAXQDA software was used to support data analysis. First, the data were read and reread by the first author for a general understanding and familiarization with the data, and initial ideas for coding were noted. Then, relevant codes to address the research questions were generated and grouped by similar meanings. The codes were sorted into potential themes and reviewed and named accordingly. Examples of relevant quotations have been translated into English.

Results

Sociodemographic characteristics of the sample

The sample consisted of 9 women in the postpartum period, with a mean age of 35.00 years ($SD = 2.91$; range from 31 to 40 years), and all of them were married/cohabiting ($n = 9$, 100.0%). Most women were currently employed ($n = 7$, 77.8%), had completed higher education ($n = 9$, 100.0%), and lived in an urban area ($n = 7$, 77.8%). This was the first child for 77.8% ($n = 7$) of the women. Most of the infants were female ($n = 6$, 66.7%), and the average age of the infants was 6.33 months ($SD = 4.03$; range from 1 to 12 months). Approximately 77.8% of the women ($n = 7$) reported a prior history of psychiatric or psychological problems (e.g., depression, anxiety) and previous psychiatric or psychological treatment ($n = 7$).

Feasibility

A total of 147 potential participants demonstrated their interest in the study. Approximately 93.9% ($n = 138$) of the potential participants were excluded for several reasons (e.g., did not answer, did not meet the eligibility criteria; cf. **Figure 1**). A total of 9 women (6.1%) were eligible to participate and were enrolled in the study. Recruitment ended by achieving an approximated number of the initial estimated sample for the purpose of this study. Of the eligible participants, 8 (88.9%) completed the intervention and the baseline and postintervention assessments.

Of the participants who initiated the blended intervention, eight attended all seven sessions with the psychologist. The participant who dropped out only attended the first session. She registered in the web-based program and accessed the first eight pages of Module 1, and the reason for dropout is unknown. Considering the participants who completed the intervention, the average duration of the sessions with the psychologist was 90.1 minutes ($SD = 10.0$; range = 62–124 minutes). Concerning web-based program usage, 87.5% ($n = 7$) of the women completed the 6 online sessions. Only one participant completed 3 out of the 6 online sessions. The average number of logins was 12.5 ($SD = 7.18$, range = 4–30 logins). Participants spent, on average, 19.6 minutes ($SD = 9.15$, range = 10–38 minutes) at each login. All participants ($n = 8$, 100%) completed the interactive exercises in Module 1 and Module 2. Seven participants (87.5%) finished the exercises in Module 3, with one participant completing only one exercise. The exercises in Module 4 were completed by 6 participants (75%) and the exercise in Module 5 was completed by 3 participants (37.5%). Three participants did not listen to either of the two

audio exercises proposed, and five participants listened to them only once. The average duration of treatment was 13.5 weeks ($SD = 1.2$).

Therapist adherence to the therapist manual was 95%, according to the therapist checklist completed at the end of each session. A main difficulty was addressing all contents present in the therapist manual in the expected time. The main topic that was not covered due to time constraints was a review of the exercises that the participants performed in the online modules (in 17.9% of the sessions). Each session was planned to last for approximately one hour, which was not accomplished since the average duration was 30 minutes longer. The sessions with the psychologist with higher average durations (in minutes) were session 13 ($M = 107.5$, $SD = 19.0$), session 1 ($M = 94.4$, $SD = 10.7$) and session 3 ($M = 93.1$, $SD = 14.0$).

Qualitative data

All eight participants who received the intervention were interviewed. The findings from the qualitative data analysis are discussed below, and a summary of the results is presented in **Table 1** with the identified themes and subthemes and participants' representative quotes.

Table 1

Main themes, subthemes, and representative quotes from participants’ interviews

Themes and subthemes	Representative quotes
Acceptability	
Structure	<p>“What we were working on the modules, we worked on the next session, and there was always this connection.” (P3)</p> <p>“I liked the fact that it was biweekly, I think it gives time to think and to use the strategies.” (P5)</p>
Duration	<p>“I think it was the necessary number of sessions, because we also had the website plan.” (P8)</p> <p>“The duration was good, they were not too long or too short. (...) although there were some sessions that were quite long, I think there was one or two that lasted two hours.” (P6)</p>
Contents and Exercises	<p>“I thought all contents were interesting and relevant.” (P3)</p> <p>“I think the themes are appropriate for what a person usually goes through during this period.” (P5)</p>
Additional readings	<p>“Then we had the reading guides, they are also important.” (P4)</p>
Attractive features	<p>“Addressing postpartum depression and being a research project, and honestly, also having no associated costs.” (P1)</p> <p>“I found the fact that it was something so specific for mothers in the postpartum period interesting.” (P3)</p>
Usability of the web-based program	
Design	<p>“The program was interactive, appealing” (P1)</p> <p>“It was very nice, it looked very professional but also accessible.” (P6)</p>
Language	<p>“I think it was clear; it was’ very clear, direct, and easy to understand. It did not have very complex concepts or complex terms (...).” (P7)</p>
Equipment used	<p>“On the computer. Yes, everything was fine, there were no problems or configuration errors, in that aspect it worked very well.” (P3)</p>
Navigation	<p>“Easy to use from the sign in to viewing the modules, the navigation, I found it easy.” (P6)</p>
Length of the modules	<p>“The modules were not very long, they were not extensive. The fact that they were short is good, there was not a lot of text.” (P6)</p>
Reminders	<p>“Sometimes I forgot to see the module, so I think it makes perfect sense. I do not think they were intrusive or whatever, I think they were useful for us to remember.” (P3)</p>

Effectiveness

Utility	"I would describe it as a useful and important program (...) Essentially it would be a useful and important thing to help women dealing with this phase." (P3)
Perceived impact	"It has come to an end, and I feel much more stable." (P2) "I think I rediscovered myself. I learned to like my daughter, I learned to enjoy this role, I learned to enjoy life again." (P8)
Importance of the online modules	"It just did not work as well as it could have when I did not see the modules; I did not do the homework and the referral that could have been given in the consultations was slightly more limited." (P1)
Learned strategies and therapeutic gains	"I think the strategies I learned to deal with thoughts and emotions and to have more adequate communication." (P1) "To gain an awareness of certain aspects that I did not have, such as managing expectations, the importance of emotions and how emotions affect thoughts, that was truly important." (P2) "The question of values is very important; it is a topic that is fundamental." (P3)
Intention to practice	"I think there are exercises that I have to repeat with some regularity." (P1)
Generalization of gains	"Strategies were useful not only for the postpartum period but that will stay for the rest of my life." (P3) "It was very useful at this phase, but it also has a lot of utility and applicability in several other situations and that can be useful to me." (P7)
The role of normalization	"The fact that this is common to other people; other people also experience the same thing." (P2)

Advantages

Advantages associated with the web-based program	"It was a way for me to think about things, and then in the next week we had the session and we reflected on the same theme." (P2) "At any time, if we were not well prepared or if we had any doubts, we could consult the previous modules." (P4)
Advantages associated with the sessions with the psychologist	"We explored the topics better, always according to my case, according to my situation and reality." (P2) "I had some difficulty in interpreting what I was supposed to do in some exercises on the website, but I clarified that with you in the sessions." (P7)
Advantages associated with the sessions through videocall	"For instance, the fact that it was online, I could drop the baby at the daycare which is 5 minutes from home, and I'm here in a moment; the session ended at 10 am and at 10:02 am I was working." (P3) "(...) having weekly sessions with a baby is very difficult and, in this way, it became more accessible, and in that the website helped a lot." (P5)

“(…) in the videocall, since the other person was not present, maybe it was easier (…) not being ashamed (…). I think that for me, I felt freer to talk and especially about a topic that was so ugly in my head, which was not being happy to have my daughter, not loving my daughter. Maybe by being away from you it was a little easier to say it.” (P8)

Disadvantages and difficulties

Standardized program

“The order in which the modules are presented – the fact that it is fixed and that it is always in that same order. For me, for example, the part of communication and the marital relationship would make more sense at the beginning.” (P2)

“Sometimes I had difficulty fitting the modules with what I was feeling at the time, the question of its structure.” (P3)

Structured sessions with psychologist

“I had the idea that the sessions would be for talking and it did not happen so much in the way of talking freely about things.” (P1)

Need for commitment

“Sometimes the fact of being online can also create some neglect, we do not have that commitment as we do face-to-face.” (P2)

“It requires some commitment from us. (…) The disadvantage is that, in my case, for example, I ended up delaying it. When we have to complete the module online, there is no scheduled time for it, it is the advantage and disadvantage.” (P3)

Completing the exercises

“Sometimes responding to exercises, it was not very easy to complete them. Not because they were complicated, it was because I did not know what to answer.” (P2)

Difficulties associated with the online communication

“Maybe some people need to be in face-to-face contact with each other.” (P4)

“Well, if a person does not have an internet connection, it is slightly difficult, or if the connection is bad or if she doesn’t know how to handle this [technology].” (P5)

Therapeutic relationship

Communication and language

“I think the language was very accessible; there was never a moment when I could not understand what you were saying to me.” (P8)

Empathic and nonjudgmental relationship

“I think we established a relationship of openness and trust and I feel free to talk to you and share things with you.” (P3)

Availability and flexibility

“I scheduled and rescheduled the appointments a few times and that caused me a lot of stress, and you always made me feel comfortable with that.” (P7)

Motivating and encouraging change

“You were always reinforcing ‘You are doing a good job, it is going well, it was a great evolution’. For me it was really important.” (P8)

Individual characteristics

Motivation to participate	<p>“I think it was very good for me to be able to identify if I really had a problem or if it was just a temporary mood.” (P7)</p> <p>“I just needed help, I just wanted help.” (P8)</p>
Previous experience with psychotherapy	<p>“For those who are more familiar with psychotherapy, it was very different from the usual.” (P1)</p>
Motivation and commitment	<p>“It is really a matter of a person being available to be in front of the computer and saying 'this morning is really for this'. (...) We also need to have a little determination.” (P4)</p> <p>“I often felt like giving up because it is easier (...). I think the ability to continue was the most difficult.” (P8)</p>
Availability	<p>“The main issue was to continue to follow the program, at a certain point; I think it was when I started working. It became more difficult to dedicate the time to read the contents.” (P1)</p>
Emotional expression	<p>“Maybe sometimes understanding what I was feeling and expressing it was the biggest difficulty.” (P6)</p>
Preferences	<p>“Being face-to-face or online, for me it is even better to be like this [online]; it is a lot easier.” (P4)</p>
Stigma and professional help-seeking	<p>“(…) because unfortunately we still have a bit of this stigma, don't we? To go to the psychologist, to enter the office and to speak” (P8)</p>

Satisfaction

Satisfaction with the intervention	<p>“I loved it, I think it is super young, it is fresh.” (P8)</p>
Intention to use the web-based program again	<p>“I will certainly not lose the password for this website because I want to go back there many times.” (P7)</p>
Intention to recommend the intervention	<p>“I would recommend it. It has the additional readings, it has the complement of the online sessions, we have the human part of the sessions. I think I would simply recommend it.” (P6)</p>

(1) Acceptability. Most participants considered *Be a Mom Coping with Depression* to be a well-structured intervention that is adequate for the difficulties presented during the postpartum period. All participants said that there was a good connection between the web-based program and the sessions with the psychologist. The biweekly frequency of the sessions with the psychologist was considered adequate by all participants. Most women thought that the number of sessions was adequate, although two participants (P1 and P6) said that it was too little.

The contents and exercises were described as useful and important to deal with the difficulties experienced. Some participants (P4, P5 and P6) referred to the additional readings as an important complement to the information presented on the modules. The participants reported some features that were attractive to them when enrolling in this intervention, namely, being part of a research project associated with a university, and the intervention being specifically designed for the postpartum period and having no associated costs.

(2) Usability of the web-based program. The design of the web-based program was described as attractive, interactive, accessible, funny and professional. One participant (P5) considered the design to be childish. All participants, except for one (P5), found the language clear, simple, direct and accessible. Most participants used the web-based program on their smartphones, and some used the computer. Two women reported some technical issues with some exercises or difficulties when visualizing the webpages on a smartphone. According to all participants, the navigation was easy, intuitive and accessible. Concerning the extension of the online modules, two participants (P1 and P6) said that the modules were short and easy to complete, and one participant (P4) reported that the first two modules were extensive. Most participants reported the usefulness of the reminders both in engaging with the web-based program and in remembering the upcoming session with the psychologist, and they considered they had an adequate frequency.

(3) Effectiveness. The intervention was generally perceived as useful, important, positive and beneficial. Two participants (P1 and P6) also described the effect of completing the online modules — when not completing the modules, the participants described the negative effect it had on their next session, as well as the positive effect they felt when viewing the modules. All eight participants were able to identify strategies that they considered helpful and to recognize therapeutic gains that they obtained with this intervention. Learning how to deal with negative thoughts and emotions in a more adaptive way and increasing cognitive flexibility were the most common skills reported by the mothers, which included strategies of thought questioning, remembering positive experiences, thought defusion and self-compassion. They also described

having learned to understand their emotional difficulties, to deal with unrealistic expectations toward motherhood, to adopt more assertive communication, to increase social support, to set goals and to identify their values and act in accordance with them. The normalization of difficulties experienced during the postpartum period was an important component of the intervention that was highlighted by five participants.

(4) Advantages. Concerning the web-based program, the possibility to reflect previously to the session and to prepare for the next session with the psychologist was described. In fact, some participants reported that it was important to them to have time to think about the topics discussed both in the online modules and the sessions with the psychologist. The flexibility to complete the online modules at any time and any place, according to their availability, as well as the possibility to review the contents and to have the information aggregated in the same place was described by the participants as beneficial. Other participants said that having the exercises and information presented in the web-based program was helpful to understand the concepts and strategies. The sessions with the psychologist, according to the participants, allowed them to reinforce information and practice the learned strategies, to adapt the strategies to their individual needs, to explore personal issues and to clarify any doubts. Some participants also said that this blended intervention contributed to the reduction of costs, reduction of travel (or no need to travel) and better time management. One participant (P5) said that the web-based program would have also contributed to these advantages even if the sessions with the psychologist were delivered face-to-face. Concerning the videocall format of the sessions, the participants said that it allowed for a better logistic organization related to their childcare or work and that it was easy to access the intervention (accessibility). Some women mentioned other advantages related to the reduction of stigma and disclosure of feelings.

(5) Disadvantages and difficulties. Four participants (P1, P2, P3, P4) said that the intervention was highly structured and identified the standardized order of the online modules as a disadvantage. They reported that some of the topics could have been addressed earlier, according to their individual situation, and that sometimes they were not able to relate to certain themes. However, two other participants (P4 and P8) presented a different opinion and considered that the order of how the themes were presented made sense and was useful. Two participants (P1 and P3) felt that the sessions with the psychologist were too structured and focused on the themes that were the predefined for the sessions. Most participants recognized that engaging in the online session required commitment, and some participants reported feeling less commitment toward the web-based program compared to the sessions with the psychologist. Difficulty in understanding and completing the exercises of the web-based program

was reported by three participants (P2, P4 and P7). Another participant (P6) said that it was difficult for her to use the strategies and practice the exercises when she was facing difficulties. Some participants reported possible disadvantages associated with communication through videocalls, namely, the possibility of affecting the establishment of the therapeutic relationship, the possibility of affecting the intervention's credibility and a possible lack of privacy. Despite reporting these disadvantages, they said that these were not problems they experienced.

(6) Therapeutic relationship. Most participants considered that there was good communication with the psychologist and considered the language that was used to be accessible, clear, adequate and simple. The participants reported feeling that the psychologist listened to them and showed interest in their difficulties, and empathy was a common characteristic in the participants' descriptions. Some participants (P2, P6 and P8) also reported that the psychologist guided them toward a certain result by promoting the use of certain strategies, reinforcing their achievements and motivating them to change.

(7) Individual characteristics. Some individual characteristics that can play an important role when engaging in the blended intervention were identified. Five women described the need for help as an important factor for participating in the intervention. The need to recognize their difficulties and deal with their depressive symptoms was reported by two other mothers (P1 and P7). Some participants (P1, P2 and P5) reported previous experience with psychotherapy and compared the blended intervention to their previous experiences. It was mentioned that this intervention required commitment and motivation, and three participants reported difficulty in managing their time availability. A common obstacle mentioned by half of the sample was the difficulty in emotional expression, i.e., to recognize and describe their thoughts and feelings during the sessions with the psychologist. Most women (six participants) demonstrated a preference for the videocall format. The stigma associated with psychological treatment or antidepressant medication use was described in the participants' reports (P4, P7 and P8), as well as the difficulty in asking for professional help (P3).

(8) Satisfaction. Generally, the participants expressed feeling satisfied with their experience receiving the blended intervention or reported the intention to use the web-based program again in the future. All eight participants said they would recommend the intervention to a friend experiencing emotional difficulties during the postpartum period.

The participants made some suggestions for improvement of the blended intervention. Considering the standardized order of the online modules, participants P2, P3 and P5 suggested

that the course of treatment could be flexible and adapted to each participant according to their individual needs. Participants P1 and P3 suggested, respectively, increasing the number of sessions and having some sessions with the psychologist to talk about other themes in a less structured way. Two other mothers (P2 and P8) considered that it would be useful to have a support group or chat with other women with PPD within the web-based program and to have videos with real clinical patients sharing their experiences.

Depressive symptoms

The pre- and postintervention assessments are displayed in **Table 2**. In general, the levels of depressive symptoms decreased among the participants. Specifically, a significant improvement in depressive symptoms was found in 4 out of the 8 participants, as informed by the RCI.

Table 2

Participants' pre- and post-intervention assessments

	EPDS scores		RCI
	Pre	Post	
P1	23	8	-5.40
P2	19	8	-3.96
P3	17	14	-1.08
P4	19	18	-0.36
P5	18	8	-3.60
P6	17	22	1.80
P7	14	14	0
P8	20	7	-4.68
<i>M (SD)</i>	18.4 (2.62)	12.4 (5.55)	-

Note. EPDS = Edinburgh Postnatal Depression Scale; Pre = Pre-intervention scores; Post = Post-intervention scores; RCI = Reliable Change Index scores

Discussion

This study presents the first known blended CBT intervention for PPD delivered to Portuguese mothers and our findings support the feasibility and acceptability of Be a Mom

Coping with Depression. This study also provided evidence to proceed with the conduction of a larger study to assess the efficacy of this new intervention and provided relevant information to perform the necessary changes.

In this study, the recruitment of participants was challenging, with only 6.1% of women being eligible. A considerable number of mothers who were screened for eligibility were uncontactable or did not want to proceed with their participation. We can hypothesize that the purpose of the study was not clear in the dissemination or that these mothers did not recognize their depressive symptoms and/or the need for psychological treatment. Knowledge-related barriers such as not knowing the effective treatment options or normalizing depressive symptoms (Daehn et al., 2022) could have prevented women to engage in the next phases of recruitment. Efforts to increase and clarify the dissemination of the study will be conducted in future RCT trial. Moreover, since a larger sample will be needed to assess the intervention's efficacy, the eligibility criteria will be changed for the further conduction of an RCT. In this study, a considerable number of participants did not meet the criteria for a major depressive episode according to the DSM-5, despite presenting depressive symptoms and emotional difficulties. Therefore, postpartum women presenting at least 4 symptoms for the clinical diagnosis of a major depressive episode according to the DSM-5 (and at least one of the symptoms should be either depressed mood or decreased interest or pleasure; American Psychiatric Association, 2013) will be eligible, as previously proposed by other authors (e.g., Topooco et al., 2019). This modification may increase the number of participants accessing and receiving the blended intervention, since we believe that these mothers can also benefit from this intervention.

Despite the difficulty to recruit participants, a low dropout rate was observed. In fact, only one participant did not complete the intervention. Other studies assessing the feasibility or effectiveness of blended interventions for depression have reported no dropouts (Nakao et al., 2018; Schuster et al., 2018a) or dropout rates ranging from 13% (Kemmeren et al., 2019) to 40% (Høifødt et al., 2013). It also seems that the dropout rates are similar when comparing blended CBT interventions to the traditional CBT (Mol et al., 2020). On the other hand, only web-based interventions for PPD revealed higher attrition rates that can range from than 60 to 86% (Branquinho et al., 2021; Mu et al., 2021), revealing that retention rates are higher when there is therapist support available in the intervention (Urech et al., 2018; Wentzel et al., 2016). The participants' engagement in sessions with the psychologist and online sessions was also high. However, some participants did not complete all the exercises proposed in the web-based program. The qualitative findings showed that women in our sample reported not understanding some online exercises and found it more difficult to engage with the modules. In fact, other

studies reported higher adherence to the face-to-face sessions when compared to the online components (Høifødt et al., 2013; Schuster et al., 2019) and one study reported a decrease of engagement with the module throughout treatment (Schuster et al., 2018a). These difficulties can be addressed by the psychologist in-session by explaining the exercises that will be found in the upcoming module and the importance of completing them to obtain clinical improvements. Moreover, strategies to increase the participants' involvement with the online sessions were implemented (e.g., email reminders, phone calls) and were considered acceptable and adequate by the sample. Other strategies to increase engagement with the web-based program (e.g., sending reminder messages; establishing a schedule to complete the online sessions) can be further included (Ebert et al., 2018).

Adherence to the therapist manual was high, although the expected time for the sessions with the psychologist was not accomplished. In fact, some sessions included several topics to be addressed, which may have contributed to their increased duration. This supports the need to review the therapist manual and the contents addressed in each session for the conduction of an RCT to mitigate the time constraints observed in this feasibility study. This seems to be a concern among therapists who have doubts if a blended format contributes to decrease treatment duration or if it is more time-consuming than face-to-face CBT (Cerga-Pashoja et al., 2020; Mol et al., 2020; Schuster et al., 2019). For instance, it may require time for the therapist to learn how to use the web-based program and to effectively deliver this new treatment format (Mol et al., 2020). On the other hand, there is some evidence that blended treatments could also reduce therapists' time by 50 to 86% without compromising efficacy (Ebert et al., 2018) and that, when comparing to standard CBT, blended CBT can decrease the number of face-to-face sessions with the therapist (Kooistra et al., 2019), but more research is warranted.

In terms of acceptability, usability and satisfaction, the results seem promising. Be a Mom Coping with Depression was found to be an acceptable and useful intervention for PPD and the participants presented a general positive opinion about the intervention's structure, duration, contents and relevance. Some technical issues were identified when viewing the online sessions on a smartphone, which will be adjusted. Overall, the participants were satisfied with this blended intervention. Consistent with prior studies (Branquinho et al., 2021; Schuster et al., 2018b; Urech et al., 2018; Wentzel et al., 2016), the participants reported several advantages of this blended intervention for PPD, including the possibility to address individual questions, to clarify doubts and to have personal guidance. Previous studies also described the potential of blended interventions for increasing patient involvement and motivation when compared to web-based interventions without therapist support (Titzler et al., 2018). In fact, in this study,

some participants said that the therapist was able to motivate and encourage them in practicing therapeutic strategies. Similarly, in Wilhelmsen et al. (2013), some participants receiving a blended intervention for depression mentioned that the face-to-face sessions were important to motivate them and that this was a necessary component to engage in the treatment, which highlights the importance of human support and therapeutic relationship in a blended intervention (Ebert et al., 2018; Wilhelmsen et al., 2013).

The sessions with the psychologist were delivered through videocalls, which revealed to be a more accessible and feasible delivery format for our sample, given the benefits reported by them (e.g., better time management, fewer logistical difficulties related to their baby). Then, it is possible that this blended intervention can be a more accessible treatment option that meets women's needs and preferences. These advantages seem to be more even relevant during the COVID-19 pandemic given the restrictions that were imposed during the study onset (e.g., quarantine measures, unavailability of services; Motrico et al., 2020). A blended intervention may also contribute to reducing the stigma associated with PPD treatment, which usually hinders postpartum women's help-seeking (Bina, 2020). Incorporating a web-based program in a treatment for PPD can have an important role in the normalization of patients' difficulties because they may recognize that the contents were developed for many people who experience the same condition (Wilhelmsen et al., 2013). In this study, some participants said that it was easier to share their emotional difficulties by videocall because they felt less shame. In fact, "using technologies may reduce the impact of shame on treatment utilization" (Ebert et al., 2018, p. 169). Concerning the therapeutic relationship, Vernmark et al. (2019) found that the therapist alliance was scored as high by patients in a blended treatment for depression and that those ratings were comparable to those of face-to-face interventions. Similarly, the participants in our sample considered having established a good therapeutic relationship and reported a concern associated with the videocall format and not the blended format itself. The participants made some considerations about patient-therapist communication, such as the possible lack of privacy or credibility, which have also been described in the literature (Mohr et al., 2013). These concerns can be discussed with patients in the first session, reinforcing that it has been shown that the therapeutic relationship can be equally strong in a therapy that is delivered through videocall (Simpson & Reid, 2014) and developing possible solutions to decrease the impact of other barriers (e.g., to address the concern about the lack of privacy, finding a quiet space). Given the inherent challenges to the postpartum period and that the participants demonstrated a preference for the videocall format, we decided to maintain the sessions with the psychologist in this format in the upcoming RCT.

Despite the perceived advantages of this blended intervention, some participants found it highly structured and suggested that it could be more flexible. In some studies (e.g., Kemmeren et al., 2019; Titzler et al., 2019), the blended interventions were tailored over the treatment course, giving the possibility to choose the order of modules according to a patient's preference or a clinician's evaluation. However, this possibility may add more heterogeneity to an efficacy study and heterogeneity between participants. In the study conducted by Kemmeren et al. (2019), the option to customize treatment contributed to a larger variability in patterns of usage. On the other hand, most blended interventions follow a structured protocol and all participants have the same order of online and face-to-face sessions (e.g., Kooistra et al., 2019; Nakao et al., 2018; Schuster et al., 2018a). For these reasons, our intervention was developed to be provided in a standardized order based on prior literature and evidence of interventions conducted in different formats (blended, online or in person). Therefore, we will opt to maintain the standardized order in the implementation of the RCT, explaining the relevance of addressing the contents from an individual level (sessions 1 to 7) to interpersonal contexts (sessions 8 to 11) to women. However, we recognize the relevance of delivering a tailored and patient-centered treatment, which could be further studied after assessing the potential efficacy of this blended intervention in its current format.

Although no conclusions can be drawn on the efficacy of the intervention based on this study, the results are promising for the potential benefits in reducing depressive symptoms, which is consistent with the results reported in other studies of blended interventions for depression (Høifødt et al., 2013; Kooistra et al., 2019). Participants in our sample also reported, by the end of the intervention, that they acquired several skills and obtained therapeutic changes. It is interesting that patients receiving blended treatment seem to attribute therapeutic gains to themselves in a higher level than in standard treatment (Mol et al., 2020). In our sample, participants reported that they were more prepared for the sessions with the psychologist after completing the online sessions and recognized the negative effects when they did not do it. So, the online sessions may increase the patients' self-management and perception of active role in treatment and in their progress (Schuster et al., 2017), which could be further explored in future studies.

Limitations and strengths

This study has some limitations that need to be considered, including the small sample size, and therefore our findings cannot be generalized to the general population. Since this was a feasibility study with a single-arm design and no control group, it did not allow us to evaluate

the clinical efficacy of the blended intervention, which will be further evaluated in the RCT. No follow-up assessments were conducted, so it was not possible to draw conclusions on the long-term maintenance of the intervention's effects. The recruitment through online platforms produced a self-selected and possibly biased sample, because women could have higher technology literacy and be more willing to receive this type of intervention. The qualitative outcomes (the participants' answers to interview questions) could have been influenced by the presence of the interviewer, who was the psychologist conducting the blended intervention, and then producing a social desirability bias. Moreover, the interviewer's own beliefs towards the intervention may influence the interpretation of results, and the timing of the interview (only one week after the end of the intervention). Finally, variables related to the COVID-19 pandemic (e.g., infection with COVID-19) were not assessed and could have been important to characterize our sample.

Despite these limitations, the present study has several strengths. It collected both quantitative and qualitative evidence, which is in accordance with recent recommendations of including qualitative methods in feasibility studies to assess acceptability and discuss barriers and facilitators to treatment (Gadke et al., 2021; Sekhon et al., 2017). Second, the development of this blended intervention involved the target population at different stages (development, evaluation) and using different methods (e.g., questionnaires, interviews) following a patient-centered approach, which is an established practice in the development of e-health interventions (Kip et al., 2022). Finally, this study adds important contributions to the current state-of-art on blended interventions for mental health problems, as it adds new evidence that this format can also be feasible and applicable to PPD treatment. By providing an alternative format to the existing treatment options, this blended intervention can potentially increase postpartum women's access to effective mental health care. The results of this study also inform the further improvement of the Be a Mom Coping with Depression intervention and supports the conduction of an RCT considering the issues previously discussed.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. American Psychiatric Association.
- Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry, 13*(1), 4–11. <https://doi.org/10.1002/wps.20083>
- Areias, M. E. G., Kumar, R., Barros, H., & Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth. *The British Journal of Psychiatry, 169*(1), 30–35. <https://doi.org/10.1192/bjp.169.1.30>
- Ashford, M. T., Olander, E. K., & Ayers, S. (2016). Computer-or web-based interventions for perinatal mental health: A systematic review. *Journal of Affective Disorders, 197*, 134–146. <https://doi.org/10.1016/j.jad.2016.02.057>
- Batt, M. M., Dufy, K. A., Novick, A. M., Metcalf, C. A., & Epperson, C. N. (2020). Is postpartum depression different from depression occurring outside of the perinatal period? A review of the evidence. *Focus, 18*(2), 106–119. <https://doi.org/10.1176/appi.focus.20190045>
- Bina, R. (2020). Predictors of postpartum depression service use: A theory-informed, integrative systematic review. *Women and Birth, 33*(1), e24–e32. <https://doi.org/10.1016/j.wombi.2019.01.006>
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2020). A blended cognitive–behavioral intervention for the treatment of postpartum depression: Study protocol for a randomized controlled trial. *International Journal of Environmental Research and Public Health, 17*(22), 8631. https://doi.org/10.3390/ijerp_h17228631
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2021). A blended psychological intervention for postpartum depression: Acceptability and preferences in women presenting depressive symptoms. *Journal of Reproductive and Infant Psychology, 1*–15. <https://doi.org/10.1080/02646838.2021.1969350>
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2022). A blended cognitive–behavioral intervention for the treatment of postpartum depression: A case study. *Clinical Case Studies, 1*–19. <https://doi.org/10.1177/15346501221082616>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>

- Carona, C., Pereira, M., Araújo-Pedrosa, A., Canavarro, M. C., & Fonseca, A. (2023). The efficacy of Be a Mom, a web-based intervention to prevent postpartum depression: Examining mechanisms of change in a randomized controlled trial. *JMIR Mental Health*, *10*(1), e39253. <https://doi.org/10.2196/39253>
- Cerga-Pashoja, A., Doukani, A., Gega, L., Walke, J., & Araya, R. (2020). Added value or added burden? A qualitative investigation of blending internet self-help with face-to-face cognitive behaviour therapy for depression. *Psychotherapy Research*, *30*(8), 998–1010. <https://doi.org/10.1080/10503307.2020.1720932>
- Daehn, D., Rudolf, S., Pawils, S., & Renneberg, B. (2022). Perinatal mental health literacy: Knowledge, attitudes, and help-seeking among perinatal women and the public – A systematic review. *BMC Pregnancy and Childbirth*, *22*(1), 1–22. <https://doi.org/10.1186/s12884-022-04865-y>
- Ebert, D. D., Van Daele, T., Nordgreen, T., Karekla, M., Compare, A., Zarbo, C., Brugnera, A., Øverland, S., Trebbi, G., Jensen, K. L., Kaelhke, F., & Baumeister, H. (2018). Internet-and mobile-based psychological interventions: Applications, efficacy, and potential for improving mental health. *European Psychologist*, *23*(2), 167–187. <https://doi.org/10.1027/1016-9040/a000318>
- Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: Extension to randomised pilot and feasibility trials. *BMJ*, *355*. <https://doi.org/10.1136/bmj.i5239>
- Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research*, *19*(9), e306. <https://doi.org/10.2196/jmir.6588>
- Figueiredo, B. (1997). *Postpartum depression, mother-infant interaction and child development*. Unpublished Doctoral Dissertation, Universidade do Minho.
- Finlayson, K., Crossland, N., Bonet, M., & Downe, S. (2020). What matters to women in the postnatal period: A meta-synthesis of qualitative studies. *PLoS One*, *15*(4), e0231415. <https://doi.org/10.1371/journal.pone.0231415>
- First, M. B., Williams, J. B., Karg, R. S., & Spitzer, R. L. (2017). *User's guide for the SCID-5-CV Structured Clinical Interview for DSM-5® disorders: Clinical version*. American Psychiatric Publishing, Inc.

- Fitzpatrick, M., Nedeljkovic, M., Abbott, J. A., Kyrios, M., & Moulding, R. (2018). “Blended” therapy: The development and pilot evaluation of an internet-facilitated cognitive behavioral intervention to supplement face-to-face therapy for hoarding disorder. *Internet Interventions*, 12, 16–25. <https://doi.org/10.1016/j.invent.2018.02.006>
- Fonseca, A., Branquinho, M., & Canavarro, M. C. (2020). Application of the cognitive-behavior therapy principles in the development of e-mental health tools: The case of Be a Mom, a web-based psychological intervention to prevent postpartum depression. *Psychologica*, 63(2), 119–137. https://doi.org/10.14195/1647-8606_63-2_6
- Fonseca, A., Gorayeb, R., & Canavarro, M. C. (2015). Women’s help-seeking behaviours for depressive symptoms during the perinatal period: Socio-demographic and clinical correlates and perceived barriers to seeking professional help. *Midwifery*, 31(12), 1177–1185. <https://doi.org/10.1016/j.midw.2015.09.002>
- Fonseca, A., Monteiro, F., & Canavarro, M. C. (2018). Dysfunctional beliefs towards motherhood and postpartum depressive and anxiety symptoms: Uncovering the role of experiential avoidance. *Journal of Clinical Psychology*, 74(12), 2134–2144. <https://doi.org/10.1002/jclp.22649>
- Fonseca, A., Pereira, M., Araújo-Pedrosa, A., Gorayeb, R., Ramos, M. M., & Canavarro, M. C. (2018). Be a Mom: Formative evaluation of a web-based psychological intervention to prevent postpartum depression. *Cognitive and Behavioral Practice*, 25(4), 473–495. <https://doi.org/10.1016/j.cbpra.2018.02.002>
- Gadke, D. L., Kratochwill, T. R., & Gettinger, M. (2021). Incorporating feasibility protocols in intervention research. *Journal of School Psychology*, 84, 1–18. <https://doi.org/10.1016/j.jsp.2020.11.004>
- Gelaye, B., Rondon, M. B., Araya, R., & Williams, M. A. (2016). Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. *The Lancet Psychiatry*, 3(10), 973–982. [https://doi.org/10.1016/s2215-0366\(16\)30284-x](https://doi.org/10.1016/s2215-0366(16)30284-x)
- Høifødt, R. S., Lillevoll, K. R., Griffiths, K. M., Wilsgaard, T., Eisemann, M., & Kolstrup, N. (2013). The clinical effectiveness of web-based cognitive behavioral therapy with face-to-face therapist support for depressed primary care patients: Randomized controlled trial. *Journal of Medical Internet Research*, 15(8), e153. <https://doi.org/10.2196/jmir.2714>

- Hutchens, B. F., & Kearney, J. (2020). Risk factors for postpartum depression: An umbrella review. *Journal of Midwifery & Women's Health*, 65(1), 96–108. <https://doi.org/10.1111/jmwh.13067>
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to denning meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12–19.
- Kemmeren, L. L., van Schaik, A., Smit, J. H., Ruwaard, J., Rocha, A., Henriques, M., Ebert, D. D., Titzler, I., Hazo, J., Dorsey, M., Zukowska, K., & Riper, H. (2019). Unraveling the black box: Exploring usage patterns of a blended treatment for depression in a multicenter study. *JMIR Mental Health*, 6(7), e12707. <https://doi.org/10.2196/12707>
- Kip, H., Keizer, J., da Silva, M. C., Beerlage-de Jong, N., Köhle, N., & Kelders, S. M. (2022). Methods for human-centered eHealth development: Narrative scoping review. *Journal of Medical Internet Research*, 24(1), e31858. <https://doi.org/10.2196/31858>
- Kloek, C. J., Janssen, J., & Veenhof, C. (2020). Development of a checklist to assist physiotherapists in determination of patients' suitability for a blended treatment. *Telemedicine and e-Health*, 26(8), 1051–1065. <https://doi.org/10.1089/tmj.2019.0143>
- Kooistra, L. C., Ruwaard, J., Wiersma, J. E., Van Oppen, P., van der Vaart, R., van Gemert-Pijnen, J. E., & Riper, H. (2016). Development and initial evaluation of blended cognitive behavioural treatment for major depression in routine specialized mental health care. *Internet Interventions*, 4, 61–71. <https://doi.org/10.1016/j.invent.2016.01.003>
- Kooistra, L. C., Wiersma, J. E., Ruwaard, J., Neijenhuijs, K., Lokkerbol, J., van Oppen, P., Smit, F., & Riper, H. (2019). Cost and effectiveness of blended versus standard cognitive behavioral therapy for outpatients with depression in routine specialized mental health care: Pilot randomized controlled trial. *Journal of Medical Internet Research*, 21(10), e14261. <https://doi.org/10.2196/14261>
- Lal, S., & Adair, C. E. (2014). E-mental health: A rapid review of the literature. *Psychiatric Services*, 65(1), 24–32. <https://doi.org/10.1176/appi.ps.201300009>
- Loughnan, S. A., Butler, C., Sie, A. A., Grierson, A. B., Chen, A. Z., Hobbs, M. J., Joubert, A. E., Haskelberg, H., Mahoney, A., Holt, C., Gemmill, A. W., Milgrom, J., Austin, M.-P., Andrews, G., & Newby, J. M. (2019). A randomised controlled trial of 'MUMentum postnatal': Internet-delivered cognitive behavioural therapy for anxiety and depression in postpartum

women. *Behaviour Research and Therapy*, 116, 94–103.
<https://doi.org/10.1016/j.brat.2019.03.001>

Maia, B. R., Marques, M., Bos, S., Pereira, A. T., Soares, M. J., Valente, J., Macedo, A., & Azevedo, M. H. (2011). Epidemiology of perinatal depression in Portugal: Categorical and dimensional approach. *Acta Medica Portuguesa*, 24, 443–448.

Mendes-Santos, C., Weiderpass, E., Santana, R., & Andersson, G. (2020). Portuguese psychologists' attitudes toward Internet interventions: Exploratory cross-sectional study. *JMIR Mental Health*, 7(4), e16817. <https://doi.org/10.2196/16817>

Mohr, D. C., Burns, M. N., Schueller, S. M., Clarke, G., & Klinkman, M. (2013). Behavioral intervention technologies: Evidence review and recommendations for future research in mental health. *General Hospital Psychiatry*, 35(4), 332–338.
<https://doi.org/10.1016/j.genhosppsych.2013.03.008>

Mol, M., van Genugten, C., Dozeman, E., van Schaik, D. J., Draisma, S., Riper, H., & Smit, J. H. (2020). Why uptake of blended internet-based interventions for depression is challenging: A qualitative study on therapists' perspectives. *Journal of Clinical Medicine*, 9(1), 91.
<https://doi.org/10.3390/jcm9010091>

Motrico, E., Mateus, V., Bina, R., Felice, E., Bramante, A., Kalcev, G., Mauri, M., Martins, S., & Mesquita, A. (2020). Good practices in perinatal mental health during the COVID-19 pandemic: A report from task-force RISEUP-PPD COVID-19. *Clínica y Salud*, 31(3), 155–160.
<https://doi.org/10.5093/clysa 2020a26>

Mu, T. Y., Li, Y. H., Xu, R. X., Chen, J., Wang, Y. Y., & Shen, C. Z. (2021). Internet-based interventions for postpartum depression: A systematic review and meta-analysis. *Nursing Open*, 8(3), 1125–1134. <https://doi.org/10.1002/nop2.724>

Nair, U., Armfeld, N. R., Chatfeld, M. D., & Edirippulige, S. (2018). The effectiveness of telemedicine interventions to address maternal depression: A systematic review and meta-analysis. *Journal of Telemedicine and Telecare*, 24(10), 639–650.
<https://doi.org/10.1177/1357633X18794332>

Nakao, S., Nakagawa, A., Oguchi, Y., Mitsuda, D., Kato, N., Nakagawa, Y., Tamura, N., Kudo, Y., Abe, T., Hiyama, M., Iwashita, S., Ono, Y., Mimura, M., & Mimura, M. (2018). Web-based cognitive behavioral therapy blended with face-to-face sessions for major depression:

- Randomized controlled trial. *Journal of Medical Internet Research*, 20(9), e10743. <https://doi.org/10.2196/10743>
- Newton, A. S., March, S., Gehring, N. D., Rowe, A. K., & Radomski, A. D. (2021). Establishing a working definition of user experience for eHealth interventions of self-reported user experience measures with eHealth researchers and adolescents: Scoping review. *Journal of Medical Internet Research*, 23(12), e25012. <https://doi.org/10.2196/25012>
- O’Cathain, A., Hoddinott, P., Lewin, S., Thomas, K. J., Young, B., Adamson, J., Jansen, Y., Mills, N., Moore, G., & Donovan, J. L. (2015). Maximising the impact of qualitative research in feasibility studies for randomised controlled trials: Guidance for researchers. *Pilot and Feasibility Studies*, 1(1), 1–13. <https://doi.org/10.1186/s40814-015-0026-y>
- O’Mahen, H. A., Woodford, J., McGinley, J., Warren, F. C., Richards, D. A., Lynch, T. R., & Taylor, R. S. (2013). Internet-based behavioral activation—Treatment for postnatal depression (Netmums): A randomized controlled trial. *Journal of Affective Disorders*, 150(3), 814–822. <https://doi.org/10.1016/j.jad.2013.03.005>
- Orsmond, G. I., & Cohn, E. S. (2015). The distinctive features of a feasibility study: Objectives and guiding questions. *OTJR: Occupation, Participation and Health*, 35(3), 169–177. <https://doi.org/10.1177/1539449215578649>
- Riper, H., Andersson, G., Christensen, H., Cuijpers, P., Lange, A., & Eysenbach, G. (2010). Theme issue on e-mental health: A growing field in internet research. *Journal of Medical Internet Research*, 12(5), e74. <https://doi.org/10.2196/jmir.1713>
- Schuster, R., Leitner, I., Carlbring, P., & Laireiter, A. R. (2017). Exploring blended group interventions for depression: Randomised controlled feasibility study of a blended computer-and multimedia-supported psychoeducational group intervention for adults with depressive symptoms. *Internet Interventions*, 8, 63–71. <https://doi.org/10.1016/j.invent.2017.04.001>
- Schuster, R., Fichtenbauer, I., Sparr, V. M., Berger, T., & Laireiter, A. R. (2018a). Feasibility of a blended group treatment (bGT) for major depression: Uncontrolled interventional study in a university setting. *BMJ Open*, 8(3), e018412. <https://doi.org/10.1136/bmjopen-2017-018412>

- Schuster, R., Pokorny, R., Berger, T., Topooco, N., & Laireiter, A. R. (2018b). The advantages and disadvantages of online and blended therapy: Survey study amongst licensed psychotherapists in Austria. *Journal of Medical Internet Research*, *20*(12), e11007.
- Schuster, R., Kalthof, I., Walther, A., Köhldorfer, L., Partinger, E., Berger, T., & Laireiter, A. R. (2019). Effects, adherence, and therapists' perceptions of web-and mobile-supported group therapy for depression: Mixed-methods study. *Journal of Medical Internet Research*, *21*(5), e11860. <https://doi.org/10.2196/11860>
- Sekhon, M., Cartwright, M., & Francis, J. J. (2017). Acceptability of healthcare interventions: An overview of reviews and development of a theoretical framework. *BMC Health Services Research*, *17*(1), 1–13. <https://doi.org/10.1186/s12913-017-2031-8>
- Simpson, S. G., & Reid, C. L. (2014). Therapeutic alliance in videoconferencing psychotherapy: A review. *Australian Journal of Rural Health*, *22*(6), 280–299. <https://doi.org/10.1111/ajr.12149>
- Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health*, *15*. <https://doi.org/10.1177/1745506519844044>
- Tingey, R., Lambert, M., Burlingame, G., & Hansen, N. (1996). Assessing clinical significance: Proposed extensions to method. *Psychotherapy Research*, *6*(2), 109–123. <https://doi.org/10.1080/10503309612331331638>
- Titzler, I., Saruhanjan, K., Berking, M., Riper, H., & Ebert, D. D. (2018). Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists' perspective. *Internet Interventions*, *12*, 150–164. <https://doi.org/10.1016/j.invent.2018.01.002>
- Titzler, I., Egle, V., Berking, M., Gumbmann, C., & Ebert, D. D. (2022). Blended psychotherapy: Treatment concept and case report for the integration of internet-and mobile-based interventions into brief psychotherapy of depressive disorders. *Verhaltenstherapie*, *32*, 230–244. <https://doi.org/10.1159/000503408>
- Topooco, N., Byléhn, S., Nysäter, E. D., Holmlund, J., Lindegaard, J., Johansson, S., Åberg, L., Nordgren, L. B., Maria Zetterqvist, M., & Andersson, G. (2019). Evaluating the efficacy of internet-delivered cognitive behavioral therapy blended with synchronous chat sessions

- to treat adolescent depression: Randomized controlled trial. *Journal of Medical Internet Research*, 21(11), e13393. <https://doi.org/10.2196/13393>
- Urech, A., Krieger, T., Möseneder, L., Biaggi, A., Vincent, A., Poppe, C., Meyer, B., Riper, H., & Berger, T. (2018). A patient post hoc perspective on advantages and disadvantages of blended cognitive behaviour therapy for depression: A qualitative content analysis. *Psychotherapy Research*, 29(8), 986–998. <https://doi.org/10.1080/10503307.2018.1430910>
- Van der Vaart, R., Witting, M., Riper, H., Kooistra, L., Bohlmeijer, E. T., & van Gemert-Pijnen, L. J. (2014). Blending online therapy into regular face-to-face therapy for depression: Content, ratio and preconditions according to patients and therapists using a Delphi study. *BMC Psychiatry*, 14(1), 1–10. <https://doi.org/10.1186/s12888-014-0355-z>
- Vernmark, K., Hesser, H., Topooco, N., Berger, T., Riper, H., Luuk, L., Backlund, L., Carlbring, P., & Andersson, G. (2019). Working alliance as a predictor of change in depression during blended cognitive behaviour therapy. *Cognitive Behaviour Therapy*, 48(4), 285–299. <https://doi.org/10.1080/16506073.2018.1533577>
- Wentzel, J., van der Vaart, R., Bohlmeijer, E. T., & van Gemert-Pijnen, J. E. (2016). Mixing online and face-to-face therapy: How to benefit from blended care in mental health care. *JMIR Mental Health*, 3(1), e9. <https://doi.org/10.2196/mental.4534>
- Wenzel, A., & Kleiman, K. (2015). *Cognitive behavioral therapy for perinatal distress*. Routledge.
- Wilhelmsen, M., Lillevoll, K., Risør, M. B., Høifødt, R., Johansen, M. L., Eisemann, M., & Kolstrup, N. (2013). Motivation to persist with internet-based cognitive behavioural treatment using blended care: A qualitative study. *BMC Psychiatry*, 13(1), 1–9. <https://doi.org/10.1186/1471-244X-13-296>
- Wise, E. A. (2004). Methods for analyzing psychotherapy outcomes: A review of clinical significance, reliable change, and recommendations for future directions. *Journal of Personality Assessment*, 82(1), 50–59. https://doi.org/10.1207/s15327752jpa8201_10
- Witlox, M., Garnefski, N., Kraaij, V., de Waal, M. W., Smit, F., Bohlmeijer, E., & Spinhoven, P. (2021). Blended acceptance and commitment therapy versus face-to-face cognitive behavioral therapy for older adults with anxiety symptoms in primary care: Pragmatic single-blind cluster randomized trial. *Journal of Medical Internet Research*, 23(3), e24366. <https://doi.org/10.2196/24366>

- World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA*, *310*, 2191–2194. <https://doi.org/10.1001/jama.2013.281053>
- Yan, H., Ding, Y., & Guo, W. (2020). Mental health of pregnant and postpartum women during the coronavirus disease 2019 pandemic: A systematic review and meta-analysis. *Frontiers in Psychology*, *11*, 3324. <https://doi.org/10.3389/fpsyg.2020.617001>

Supplementary Information

Appendix A. Semi-structured interview (Translated from Portuguese)

1. Introduction

The purpose of this interview is to discuss the most useful and least useful aspects of this intervention and to get feedback from the participants for possible improvements. There are no right or wrong answers, it is important that you give honest answers, even if you didn't appreciate something during the intervention. Your feedback will help us improve the program for future applications. We would like to get your permission to record this session.

Before we start the interview, do you have any questions?

2. General feedback

- What did get your attention, in particular?
- What expectations did you have before starting?
- What is your general opinion about the contents covered, in terms of pertinence, relevance and usefulness? Do you feel that the contents covered in this intervention were useful to you? How?
- Regarding the intervention structure, what do you think about the total number of sessions? What about the time interval between sessions?
- Do you consider that the contents of the sessions with the psychologist and the online modules were well integrated?
- What did you think about this modality, that combines sessions with the psychologist and online sessions? What are the advantages and disadvantages of this format for you?
- Would you prefer face-to-face sessions with the psychologist, or in this online format, via videocall? What advantages and disadvantages do you recognize for each option?

3. Web-based program related aspects

- How do you evaluate the language used on the online platform?

- To what extent did the contents of the online program influence your well-being and usual functioning? Did you feel that they were useful?
- What is your opinion about the exercises presented in the online modules?
- What is your opinion about the usefulness of these exercises for you?
- Do you intend to continue practicing these exercises in the future?
- What is your opinion about the website design?
- Where did you view the online modules? Through which device (mobile phone, tablet, computer)?
- Did you find the program easy or difficult to use?
- What is your opinion on the frequency you received reminders to view the modules?

4. Aspects related to the sessions with the psychologist

- How do you evaluate the information given by the psychologist, during the sessions? [Do you consider it useful and pertinent?]
- What is your opinion about the language used by the psychologist [Do you consider it clear and accessible?]
- What is your opinion about the exercises practiced and learned in the sessions with the psychologist?
- Do you intend to continue practicing these exercises in your daily life in the future?
- How do you evaluate the interest and understanding shown by the psychologist about your concerns and difficulties?

5. Conclusion

- What were the main difficulties you experienced in this intervention?
- What did you find most useful? What did you find least useful?
- What aspects do you consider that could be improved in this intervention?
- How would you briefly describe this intervention, in one sentence, to a friend who might be experiencing postpartum depression?
- Is there any other aspect you would like to mention?

Empirical study V

Blended CBT intervention vs. a guided web-based intervention for
postpartum depression: Results from a pilot randomized controlled trial

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2024

Manuscript submitted, under review

Blended CBT intervention vs. a guided web-based intervention for postpartum depression: Results from a pilot randomized controlled trial

Abstract

Objectives: This pilot randomized controlled trial evaluated the acceptability and preliminary effectiveness of a blended CBT intervention (intervention group) compared to a guided web-based intervention (active control group) for the treatment of postpartum depression. **Methods:** Adult Portuguese women in the postpartum period (up to 12 months) presenting clinically relevant depressive symptoms were considered eligible. Participants were randomly assigned to the intervention group (n=17) or the control group (n=17) and completed self-report questionnaires at baseline, post-intervention and at 3-month follow-up. **Results:** In both arms, dropout rates were low, and participants considered the treatment acceptable and useful. Mixed ANOVAs revealed a significant reduction in depressive symptoms and improvements in secondary outcomes (anxiety, negative thoughts, self-efficacy, emotion regulation, self-compassion and psychological flexibility) from baseline to post-intervention in both groups. No time x group interactions were found. A significant clinical change in depressive symptoms was observed in more than 80% of the participants in both groups. Significant associations were observed among therapeutic alliance and depressive symptoms. **Conclusion:** The results of our study support the acceptability, usability and preliminary effects on postpartum depression of both interventions and highlight the important role of therapist support in both blended and guided web-based interventions.

Keywords: Postpartum depression; blended intervention; guided web-based intervention; pilot randomized controlled trial; acceptability; preliminary effectiveness

Introduction

The use of digital technology to address mental health problems has been increasing, as has the development of new delivery formats to increase access to psychological interventions (Fairburn & Patel, 2017). Blended treatment is a recent popular approach that combines face-to-face with web-based interventions (Erbe et al., 2017). It could be more a more efficient option (Fairburn & Patel, 2017), as patients can independently access the web-based component at their own pace, which, in turn, increases self-management and preparation for face-to-face sessions (Rasing, 2021; Titzler et al., 2018). On the other hand, blended interventions are also more efficient for therapists since it decreases the time spent with each patient by providing some content (e.g., psychoeducation) or exercises through web-based programs, thus reducing the number of face-to-face sessions (Schuster et al., 2018; Titzler et al., 2018).

In addition, therapist support, which is typically low or nonexistent in web-based interventions alone (self-guided or unguided), has an important role in blended interventions. Despite the growing evidence of their effectiveness in different mental health conditions, web-based interventions usually have low adherence and high dropout rates, with many patients initiating but not completing the treatment (Andersson & Titov, 2014). When there is some form of clinician or practical support, the attrition rates in therapist-guided web-based interventions seem to decrease (Andersson & Titov, 2014). Then, the presence of a clinician in a blended intervention allows patients to be motivated throughout treatment and to adapt the contents of the web-based program to the individual needs, contributing to reduced dropout rates (Rasing, 2021; Wentzel et al., 2016).

Blended interventions have been tested for patients with depressive (e.g., Kooistra et al., 2019), anxiety (e.g., Romijn et al., 2021) and addictive disorders (e.g., Kay-Lambkin et al., 2011). Particularly for depression, some blended interventions have been developed, such as the blended version of the MoodGYM program (Høifødt et al., 2013). This blended intervention is based on cognitive behavioral therapy (CBT) and is composed of 5 modules provided in a web-based program and 8 face-to-face weekly sessions with a therapist (Høifødt et al., 2015). A randomized controlled trial (RCT) was conducted in Norway comparing this blended treatment with a waiting list control condition and the results revealed a significant decrease in depressive and anxiety symptoms, as well as a positive effect on satisfaction with life (Høifødt et al., 2013). Another study compared a blended CBT intervention with standard face-to-face CBT for depressive symptoms and found that the clinical effectiveness was similar in both groups and

that treatment duration was lower in the blended CBT intervention group than in the standard CBT group (Kooistra et al., 2019).

Overall, research has demonstrated that blended treatment formats for depression are feasible and acceptable (Schuster et al., 2018), that patients and therapists perceive several advantages (Erbe et al., 2017; van der Vaart et al., 2014) and that they are effective in reducing depressive symptoms (Kooistra et al., 2019; Mathiasen et al., 2022). However, most trials evaluated the effectiveness of blended interventions compared to face-to-face interventions (including treatment as usual) or waiting list controls (Erbe et al., 2017), but few studies have compared blended treatment to web-based interventions. Sethi et al. (2010), for instance, conducted a study comparing four conditions, namely, a guided web-based CBT program, face-to-face CBT, a blended CBT intervention, and a control condition (without treatment), for the treatment of anxiety and depressive symptoms in adolescents. The results showed that the participants who received the blended intervention had significant decreases in anxiety and depressive symptoms compared to the group of participants who received the guided web-based intervention (Sethi et al., 2010). The field of blended interventions is still under development, and more research is needed to evaluate the effectiveness of this treatment format by comparing it with different control conditions (Erbe et al., 2017) as well as to expand its utilization to other populations.

A blended intervention for postpartum depression

Postpartum depression (PPD) is a prevalent mental health problem occurring up to the first year after childbirth that can have serious consequences for the mother, the baby and the family (Slomian et al., 2019). Clinical guidelines suggest that psychological interventions should be offered before pharmacological treatment for women with mild to moderate depressive symptoms (BC Reproductive Mental Health Program, & Williams, 2014), and CBT is among the most used and effective psychological intervention for PPD (Branquinho et al., 2021). However, professional help-seeking rates for depressive symptoms among postpartum women are quite low (14% in Fonseca et al., 2015). Knowledge (e.g., not knowing what PPD is and what the effective treatments are), attitudinal (e.g., stigma and shame associated with mental illness), and practical barriers (e.g., time constraints, logistics related to transportation and childcare, elevated costs, long waiting lists) usually prevent women from engaging in treatment during the postpartum period (Daehn et al., 2022). Thus, it is important to develop alternative formats of intervention that could overcome these barriers. In particular, blended interventions could

present many benefits, but to date, there is no national or international study assessing the effectiveness of such interventions specifically developed for PPD.

A blended intervention named Be a Mom Coping with Depression was developed within the Portuguese context for the treatment of PPD by combining sessions with a psychologist and a web-based program (Branquinho et al., 2023). The intervention follows the CBT principles and includes content based on acceptance- and compassion-focused approaches. Be a Mom Coping with Depression incorporates psychoeducation about PPD and emotional experiences, strategies to deal with negative thoughts and motherhood-related beliefs, and value-based behavioral activation. It also aims to promote the activation of social support networks and the development of communication skills and provides strategies to improve couples' relationship and develop relapse prevention plans. A detailed description of the treatment protocol was published elsewhere (Branquinho et al., 2022). A feasibility study was previously conducted with a small sample of Portuguese women with PPD (Branquinho et al., 2023), and participants found this blended intervention to be acceptable, useful and advantageous, but further research is needed to assess its clinical effectiveness. A pilot trial, usually described as a study conducted on a smaller scale prior to a large RCT, is the first step to evaluate the potential effectiveness of an intervention by focusing on the outcomes (Eldridge et al., 2016).

Objectives

This pilot study aimed to evaluate the acceptability and preliminary effectiveness of the Be a Mom Coping with Depression blended intervention compared to a therapist-guided web-based intervention (from now on identified as guided web-based). In particular, this study aimed to assess 1) the acceptability, adherence and pattern of usage of both intervention arms (blended and guided web-based interventions); 2) the preliminary effectiveness of the intervention considering the decrease in or absence of clinically significant depressive symptoms (primary outcome) at post-intervention and the 3-month follow-up period; and 3) post-intervention improvements in secondary outcomes. It was hypothesized that the blended intervention would have higher levels of acceptability and lead to a greater reduction in depressive symptoms compared to the guided web-based intervention, as well as larger improvements in secondary outcomes.

Methods

Study design

The present study was a two-arm (blended vs. guided web-based intervention), open-label, pilot RCT. The study was conducted in accordance with the Declaration of Helsinki, it was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra, and it was registered on ClinicalTrials.gov (NCT04441879). The CONSORT recommendations, namely, the extensions of the CONSORT 2010 checklist for pilot trials (Eldridge et al., 2016), CONSORT-EHEALTH (Eysenbach & Consort-EHEALTH Group, 2011) and CONSORT-SPI 2018 Extension (Montgomery et al., 2018), were used for reporting this study.

Participants and Recruitment Procedures

The eligibility criteria were as follows: (a) being aged 18 years or older; (b) being female; (c) being Portuguese; (d) having a baby aged up to 12 months; (e) presenting at least four symptoms of a major depressive episode according to the DSM-5, with one being depressed mood (dysphoria) or loss of pleasure or interest (anhedonia); (f) having internet and computer access; and (g) being able to write in and read Portuguese. Participants were excluded if they had a current diagnosis of a severe psychiatric disorder (e.g., psychotic disorders), presented with suicidal ideation (active or passive) or were currently on psychological or pharmacological treatment for depression (medication was allowed only if it had been stabilized for 3 months prior to study onset) or if they or their baby had a serious health condition (self-reported).

Participant recruitment occurred between April 2022 and April 2023. The study was disseminated through online advertisements on social media and on websites focusing on maternity themes. The advertisements contained information about the study and a weblink to a screening questionnaire. The first page of the questionnaire presented more detailed information on the study goals and procedures, the voluntary and free-of-cost nature of participation, the participants' right to withdraw at any time and considerations regarding anonymity and confidentiality. Additionally, no compensation was offered to the participants. Participants were asked to provide their informed consent to participate in the study and then had access to the set of questions to determine their eligibility, which included the Edinburgh Postnatal Depression Scale (EPDS; Areias et al., 1996). Participants were also asked to provide their contact information (e-mail and telephone number).

The participants who met the eligibility criteria, including a positive screen for PPD symptoms indicated by a score > 9 on the EPDS (Areias et al., 1996), were contacted to be

interviewed by telephone. The main researcher (clinical psychologist) conducted an adapted version of the Structured Clinical Interview for the DSM-5 (SCID-5; First et al., 2017) to assess the presence of clinically significant depressive symptoms (at least four symptoms of a major depressive episode). Women who did not meet the eligibility criteria were informed of the reason they could not participate in this study and were recommended to pursue other treatment options, if needed. Participants included in the study were asked to complete a set of questionnaires at baseline (T1), post-intervention (T2) and follow-up (T3) through a weblink sent by email. Questionnaires were hosted on a secure server (LimeSurvey®). There were no changes to the procedures or intervention protocol during the study.

Since this was a pilot study, a sample size calculation was not performed. A sample of approximately 30 to 40 participants for randomization was estimated, considering sample sizes from other pilot studies evaluating blended interventions (e.g., Nakao et al., 2018; Schuster et al., 2017) and other authors' recommendations for estimating the sample size in a pilot trial (i.e., a total sample size ranging from 20 to 40 participants to be randomized; Whitehead et al., 2016).

Randomization

After completing the baseline assessment, participants were randomly assigned (parallel assignment; allocation ratio of 1:1) to either the intervention group (blended intervention) or to the active control group (guided web-based intervention). Randomization was performed using a computerized random number generator (<https://www.randomizer.org/>). The main researcher was responsible for the enrollment and assignment of the participants to the study groups, according to a randomization sequence list that was generated prior to study onset (in April 2022). After randomization, participants were sent an e-mail with information about their assigned group. Given the nature of the interventions, neither the participants nor the therapist could be blinded to the treatment allocation.

Interventions

Participants were randomized to receive one of two interventions: a blended intervention (Be a Mom Coping with Depression - combination of sessions with a psychologist and sessions in a web-based program) or a guided web-based intervention (sessions in a web-based program, with therapist support through phone calls). Both treatments were delivered according to a treatment manual, designed specifically for the study to provide a structured approach for the therapist to follow. All participants began the treatment with one session with the psychologist, delivered through video call, which aimed to understand the participants'

difficulties and to introduce the treatment and the online program. After this session, participants received an invitation by email to register in the web-based program.

Participants in both intervention arms had access to the same web-based program, which was previously developed in 2018 for the prevention of PPD (Fonseca, Pereira, et al., 2018). The web-based program, originally created as a self-guided tool (without therapist support), was found to be effective in reducing depressive and anxiety symptoms in women at high risk for PPD (Carona et al., 2023), demonstrating promising potential for use in women with PPD. The program was adapted and organized into six sessions (see Appendix A for screenshots from the program). Each session took approximately 30 to 45 minutes to complete, and participants could pause and resume the session at any time. Two email reminders (3 and 10 days after the participant's last access) were delivered automatically to the participants to encourage engagement and completion of the modules.

Despite the similarities, the two interventions differed in the degree to which contents/strategies were addressed with the therapist (exploring the contents in more detail, guided practice of strategies, opportunity to address other difficulties) and the time and format of contact with the therapist (see Appendix B for more details).

Blended intervention. Participants in the intervention arm had access to the blended intervention. The sessions with the psychologist were provided on a biweekly basis, and between each session with the psychologist, participants were instructed to complete an online session in the web-based program. Sessions with the psychologist occurred through video call, using secure videoconference tools (Zoom or Skype), and each session was expected to last approximately 60 minutes. Sessions with the psychologist started with a mood check and reviewing the participant's experience with the previous module. Then, the module's contents were further explored and adapted to each participant's needs, and the strategies learned were practiced in-session. The session ended by asking the participant to summarize the most important aspects and by presenting the themes of the next online session. A more detailed description of the blended treatment protocol can be found elsewhere (Branquinho et al., 2022).

Guided web-based intervention. Participants in the control group had access to the guided web-based intervention. It consisted of the visualization of the modules of the web-based program and included phone calls with the therapist after each online session. Participants were instructed to complete an online session every two weeks, and in between sessions, they received a previously scheduled phone call. At the beginning of each phone call, the therapist assessed the participant's mood (using the EPDS) and asked the participant to summarize the

contents from the previous online session. The therapist then reviewed the main strategies and exercises addressed in the web-based program and clarified any doubts. At the end, the participant's progress was reinforced, and the next module's theme was presented. The duration of each phone call should range from 20 to 30 minutes. The therapist did not use any other CBT techniques that were not included in the manual.

Therapist. Sessions (intervention group) and phone calls (control group) were delivered by the main researcher, a clinical psychologist trained in CBT, who was supervised by a senior psychologist. It was not possible to have more therapists conducting the interventions due to limited resources. Additionally, the therapist was not blind to participants' treatment allocation due to the nature of the interventions. Throughout the intervention, the therapist could access the back-office system of the web-based program and check on the participants' progress in the modules. The sessions with the psychologist and the phone calls were aimed to be provided biweekly, but some flexibility to reschedule was allowed when requested by the mothers. The therapist completed a checklist at the end of each session (blended intervention) or phone call (guided web-based intervention) to ensure adherence to the treatment manual.

Safety measures. Symptom severity and risk of suicide were monitored in both arms. In the intervention group, the therapist assessed the participant's mood at the beginning of each session by verbally asking the patient about their depressive symptoms. If a risk of self-harm was identified, the therapist would immediately assess the risk of suicide and provide referral to other specialized mental health services. In the control group, at the beginning of each phone call, the therapist assessed the participant's depressive symptom severity using the EPDS. If a score higher than 2 was determined for item 10 ("The thought of harming myself has occurred to me"), indicating severe suicidal ideation, the therapist would immediately assess the risk of suicide and provide referral to other specialized mental health services. Also, if a participant received a total score higher than 20 on the EPDS in two consecutive assessments, the therapist evaluated symptom deterioration and the need for referral for other treatment. A follow-up session was provided one month after the end of the treatment to both intervention arms to evaluate the participant's mood, current difficulties, and how they had been using the therapeutic strategies. Participants considered in need of continuing treatment were assisted in the process of referral to other mental health services after the end of their participation in the study.

Outcomes

Sociodemographic and clinical information. Sociodemographic (e.g., age, marital status, educational level), clinical (e.g., history of psychological problems) and infant-related information (e.g., age, sex) were collected at baseline through a self-report questionnaire developed by the research team.

Adherence, usage and acceptability. The number, duration and frequency of sessions and phone calls were obtained from therapist records. Data regarding the number of completed modules, number of logins, average time between logins (in days), average time spent at each login (in minutes) and number of completed exercises were obtained from the website system. Acceptability was assessed at post-intervention through specific questions developed by the researchers (e.g., “I found the modules easy to use”) and participants in both conditions were asked to rate the items on a four-point scale ranging from 1 (Totally disagree) to 4 (Totally agree). This questionnaire included 16 items, and two additional items were presented to the participants who received the blended intervention (“I think that the sessions with the psychologist and the modules of the web-based program were well integrated and connected” and “I was satisfied with the psychologist's understanding and interest in my difficulties”).

Primary outcome. Depressive symptoms were assessed using the EPDS (Areias et al., 1996). The EPDS comprises 10 items answered with an individualized four-point answer scale ranging from 0 to 3. Higher scores are indicative of more severe depressive symptoms, and a score of 10 or higher suggests the presence of clinically relevant symptomatology. In this study, the Cronbach's alpha values were .57 (T1), .89 (T2) and .94 at the 3-month follow-up.

Secondary outcomes. The Anxiety Subscale of the Hospital Anxiety and Depression Scale (HADS-A; Pais-Ribeiro et al., 2007) was used to evaluate anxiety symptoms. The HADS-A is composed of seven items answered on a four-point scale ranging from 0 to 3. Higher scores indicate more anxiety symptomatology. In this study, the Cronbach's alpha values were .54 (T1) and .84 (T2). The Postnatal Negative Thoughts Questionnaire (PNTQ; Rodrigues et al., 2017) was used to assess the frequency of negative thoughts. This instrument is composed of 17 items rated on a four-point scale ranging from 0 (never) to 3 (almost always). Higher scores are indicative of a higher frequency of postpartum negative thoughts. In the present study, the Cronbach's alpha values were .78 (T1) and .85 (T2). The Perceived Maternal Parenting Self-Efficacy scale (PMPS-E; Monteiro et al., 2022) was used to evaluate the perception of maternal self-efficacy. This measure includes 20 items answered on a four-point scale ranging from 1

(strongly disagree) to 4 (strongly agree). Higher scores are indicative of higher levels of perceived self-efficacy. The Cronbach's alphas ranged from .91 (T1) to .94 (T2).

The Difficulties in Emotion Regulation Scale - Short Form (DERS-SF; Moreira et al., 2022) was used to assess emotion regulation difficulties. The DERS-SF is an 18-item scale answered on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). The total score is computed by summing all items, and it can range between 18 and 90. Higher scores suggest more difficulties in emotion regulation. The Cronbach's alpha values were .74 (T1) and .92 (T2). The Self-Compassion Scale - Short Form (SCS-SF; Castilho et al., 2015) was used to evaluate self-compassion. The SCS-SF comprises 12 items answered on a 5-point response scale ranging from 1 (almost never) to 5 (almost always). The total score ranges between 12 and 60, with higher scores revealing higher levels of self-compassion. In this study, the Cronbach's alpha values were .88 (T1) and .90 (T2). The Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT; Trindade et al., 2021) was used to evaluate psychological flexibility. This instrument has 18 items that are answered on a 7-point response scale ranging from 0 (strongly disagree) to 6 (strongly agree). The total score ranges between 0 and 108, and higher scores are indicative of higher psychological flexibility. In this study, the Cronbach's alphas were .76 (T1) and .85 (T2).

Therapeutic alliance. The Working Alliance Inventory – Short Revised (WAI-SR; Ramos, 2008) was used to assess therapeutic alliance at post-intervention. This scale is composed of 12 items answered on a 5-point Likert scale ranging from 1 (rarely) to 5 (always). The total score ranges between 12 and 60, and higher scores indicate better therapeutic alliance. The Cronbach's alpha was .93 (T2) in this study.

Data Analyses

Data analyses were conducted using the Statistical Package for the Social Sciences (IBM SPSS, version 27.0). Cronbach's alphas were calculated to analyze the internal consistency of the measures, and values $>.60$ were considered acceptable (Maroco & T. Garcia-Marques, 2006). Descriptive statistics were computed for sample characterization, and comparison tests (t-test and chi-squared test) were performed to compare the intervention and control groups in terms of background characteristics. Descriptive statistics were computed for dropout rates, intervention adherence, usage and acceptability. Dropouts were defined as participants who did not complete the postintervention assessment (i.e., not completing at least the primary and secondary outcome measures). Completers were defined as participants who completed at least 75% of the intervention. Comparison analyses were performed to compare outcome scores at

baseline and to examine differences in acceptability and therapeutic alliance between the groups. Spearman and Pearson correlations were calculated to examine associations between depressive symptoms and therapeutic alliance. The magnitude of the effect of these associations was classified as small ($r \geq 0.10$), medium ($r \geq 0.30$) or large ($r \geq 0.50$) (Cohen, 1988).

Preliminary treatment effects from baseline to post-intervention on primary and secondary outcomes were tested with mixed ANOVAs (2x2), considering within-group (time), between-group (group) and interaction effects (time x group). Assumptions were previously checked (normality, homogeneity of variances, sphericity), and effect sizes were estimated through partial eta-square (small: $\eta^2 p \geq .01$; medium: $\eta^2 p \geq .06$, and large: $\eta^2 p \geq .14$; Tabachnick & Fidell, 2013). Participants who did not complete the post-intervention or follow-up assessments (dropouts) were not included in this analysis. Given that the number of participants who completed the follow-up assessment was lower, additional ANOVAs were performed to explore effects only on the primary outcome across the three moments of assessment and on the variables that showed significant ($p < 0.05$) or marginally significant effects ($p < 0.10$) in the previous analysis.

The Reliable Change Index (RCI) was calculated to examine participants' clinical changes in depressive symptoms from baseline to post-intervention. An RCI score higher than -1.96 ($p < 0.05$) suggests that the change is clinically significant (Tingey et al., 1996). Normative data were obtained from the study by Fonseca et al. (2018). Based on the RCI scores, participants were categorized in accordance with their pattern of change from T1 to T2: (1) improvement; (2) no change; and (3) deterioration. Chi-square statistics with Fisher's exact tests were performed to examine differences as a function of group (intervention vs. control group).

Results

Participants

A flow diagram of the participants throughout the study is presented in **Figure 1**. Of the 338 participants enrolled in the study, 208 were excluded. A total of 130 participants agreed to be assessed for the presence of clinically significant depressive symptoms, and a total of 34 women met the eligibility criteria. They completed the baseline assessment and were then randomized and allocated to the intervention group ($n = 17$) or to the control group ($n = 17$).

Figure 1

Flowchart of the participants in the study

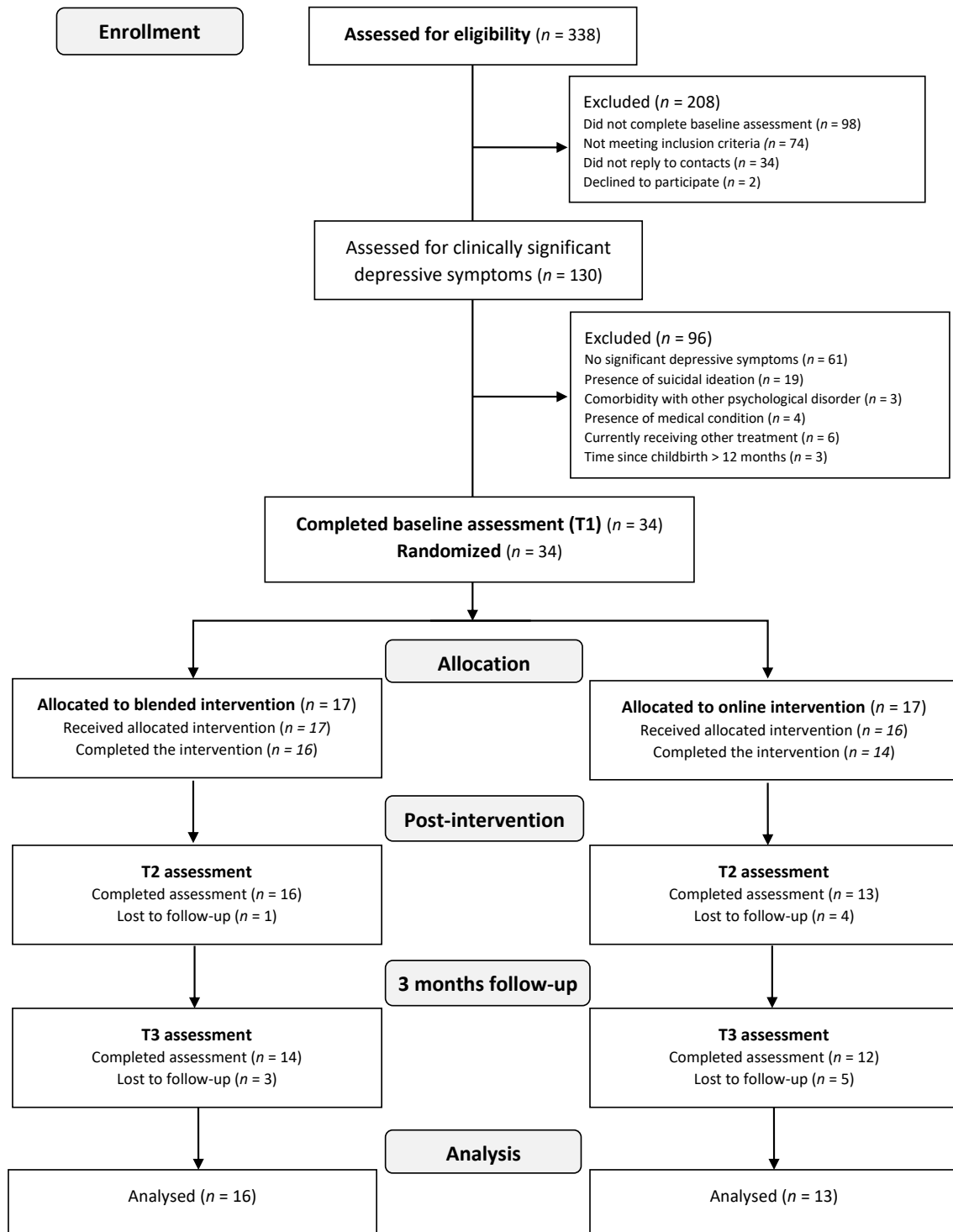


Table 1 presents the participants' sociodemographic and clinical characteristics at baseline. No baseline differences were found between the groups. During the intervention time, one of the participants allocated to the control group changed her marital status to divorced, and two participants (one from each intervention arm) initiated antidepressant medication after the 7th week of the intervention and therefore were not excluded from the analyses. Of the 34 participants randomized, 29 completed the post-intervention assessment (overall retention rate: 85.3%). A higher loss to follow-up rate was observed in the control arm ($n = 4$, 23.5%) than in the intervention arm ($n = 1$, 5.9%).

Table 1

Participants' sociodemographic and clinical characteristics at baseline

	Intervention Group ($n = 17$)	Control Group ($n = 17$)	t / χ^2
Sociodemographic information			
<i>Age (in years), M (SD)</i>	30.9 (2.30)	33.3 (5.38)	-1.66
<i>Marital status, n (%)</i>			1.03
Married/co-habiting	17 (100)	16 (94.1)	
In a relationship (without living together)	0	1 (5.9)	
<i>Number of children, n (%)</i>			1.13
Primiparous	16 (94.1)	14 (82.4)	
<i>Educational level, n (%)</i>			1.13
Basic or secondary education	3 (17.6)	1 (5.9)	
Higher education	14 (82.4)	16 (94.1)	
<i>Employment status, n (%)</i>			0
Employed	15 (88.2)	15 (88.2)	
Unemployed	2 (11.8)	2 (11.8)	
<i>Household monthly income, n (%)</i>			3.33
1000€ - 2000€	7 (41.2)	6 (35.3)	
2000€ - 3500€	9 (52.9)	7 (41.2)	
More than 3500€	1 (5.9)	1 (5.9)	
I do not know/I do not want to answer	0	3 (17.6)	
<i>Residence, n (%)</i>			0.18
Urban	14 (82.4)	13 (76.5)	
Rural	3 (17.6)	5 (23.5)	

Clinical information

<i>Psychopathology history, n (%)</i>			0.50
Yes	7 (41.2)	9 (52.9)	
No	9 (52.9)	7 (41.2)	
I do not know/I do not want to answer	1 (5.9)	1 (5.9)	
<i>Previous psychological/psychiatric treatment, n (%)</i>			0.49
Yes	9 (52.9)	11 (64.7)	
<i>Planned pregnancy, n (%)</i>			0.0
Yes	13 (76.5)	13 (76.5)	
<i>Pregnancy or birth complications, n (%)</i>			1.94
Yes	5 (29.4)	9 (52.9)	
<i>Birth delivery, n (%)</i>			0.13
Vaginal delivery	11 (64.7)	10 (58.8)	
Cesarean birth	6 (35.3)	7 (41.2)	
Infant's characteristics			
<i>Infant's sex, n (%)</i>			1.89
Male	6 (35.3)	10 (58.8)	
Female	11 (64.7)	7 (41.2)	
<i>Infant's age (in months), M (SD)</i>	4.9 (3.2)	6.0 (3.6)	-0.91
<i>Infant's gestational weeks at birth, M (SD)</i>	39.6 (1.2)	39.1 (1.3)	1.01

Note. * $p < 0.05$.

Adherence, usage and acceptability

Of the 17 participants allocated to the blended intervention, 94.1% ($n = 16$) completed the intervention (completers), while 5.9% ($n = 1$) discontinued the intervention (noncompleters). A total of 14 participants from the intervention arm (82.4%) had 7 sessions with the psychologist (range: 4–7) and 15 women (88.2%) completed all 6 online sessions (range: 2–6). The mean duration of the sessions with the psychologist was 70.7 minutes ($SD = 8.9$, range: 47–120) and the treatment duration ranged from 8 to 16 weeks ($M = 12.7$; $SD = 1.7$), including completers and noncompleters.

In the control group, 82.4% (14 out of 17) of the women completed the guided web-based intervention (completers). A total of 11 women (68.8%) attended all phone calls with the psychologist (range: 0–6) and 13 (81.3%) completed the 6 online sessions (range: 0–6). The average phone call duration was 35.1 minutes ($SD = 8.5$, range: 20–62) and the mean intervention duration was 10.8 weeks ($SD = 3.5$, range: 0–13), including completers and noncompleters. **Table 2** presents the pattern of usage of the web-based program in both condition arms. Twenty-two follow-up sessions were provided (with an average duration of 48.1 minutes, $SD = 15.1$).

Table 2

Usage of web-based program

	Intervention Group ($n = 17$)	Control Group ($n = 16$)		
	Mean (SD), Range	Mean (SD), Range	t	p
Number of logins	10.5 (4.8), 1 – 19	12.4 (11.0) 1 – 45	-0.63	0.531
Time between logins (in days)	7.5 (2.1), 4 – 11	7.9 (4.7), 2 – 16	-0.27	0.787
Time spent at each login (in minutes)	15.3 (5.2), 8 – 28	16.9 (10.8), 8 – 50	-0.56	0.578
Number of completed exercises	12.1 (1.5), 7 – 13	10.8 (3.0), 2 – 13	1.59	0.409

A total of 28 participants answered the questionnaire assessing the acceptability of the intervention (intervention group: $n = 15$; control group: $n = 13$) and their responses are represented in **Figure 2**. Comparison analysis between the groups revealed that a higher number of participants in the blended intervention ($n = 15$, 100%) considered that the intervention improved their relationship with their baby when compared to the guided web-based intervention ($n = 10$, 76.9%; $\chi^2 = 3.88$, $p = 0.049$). It was also observed that few women in both groups considered that the intervention received was not worth it (control group: $n = 3$, 23.1% vs. intervention group: $n = 1$, 6.7%) and more women in the intervention group considered that the blended treatment was demanding (intervention group: $n = 9$, 60% vs. control group: $n = 6$, 46.2%); however, these differences were not statistically significant.

Preliminary Evidence of Effectiveness: Comparison with the Control Group

Comparison analysis (t tests) did not reveal any differences in the outcome scores at baseline between the intervention arms. The ANOVA results revealed significant and large effects for time but no interaction between time and group for all variables (primary and secondary outcomes). The means, standard deviations, and time, group and time x group interaction effects are presented in **Table 3**.

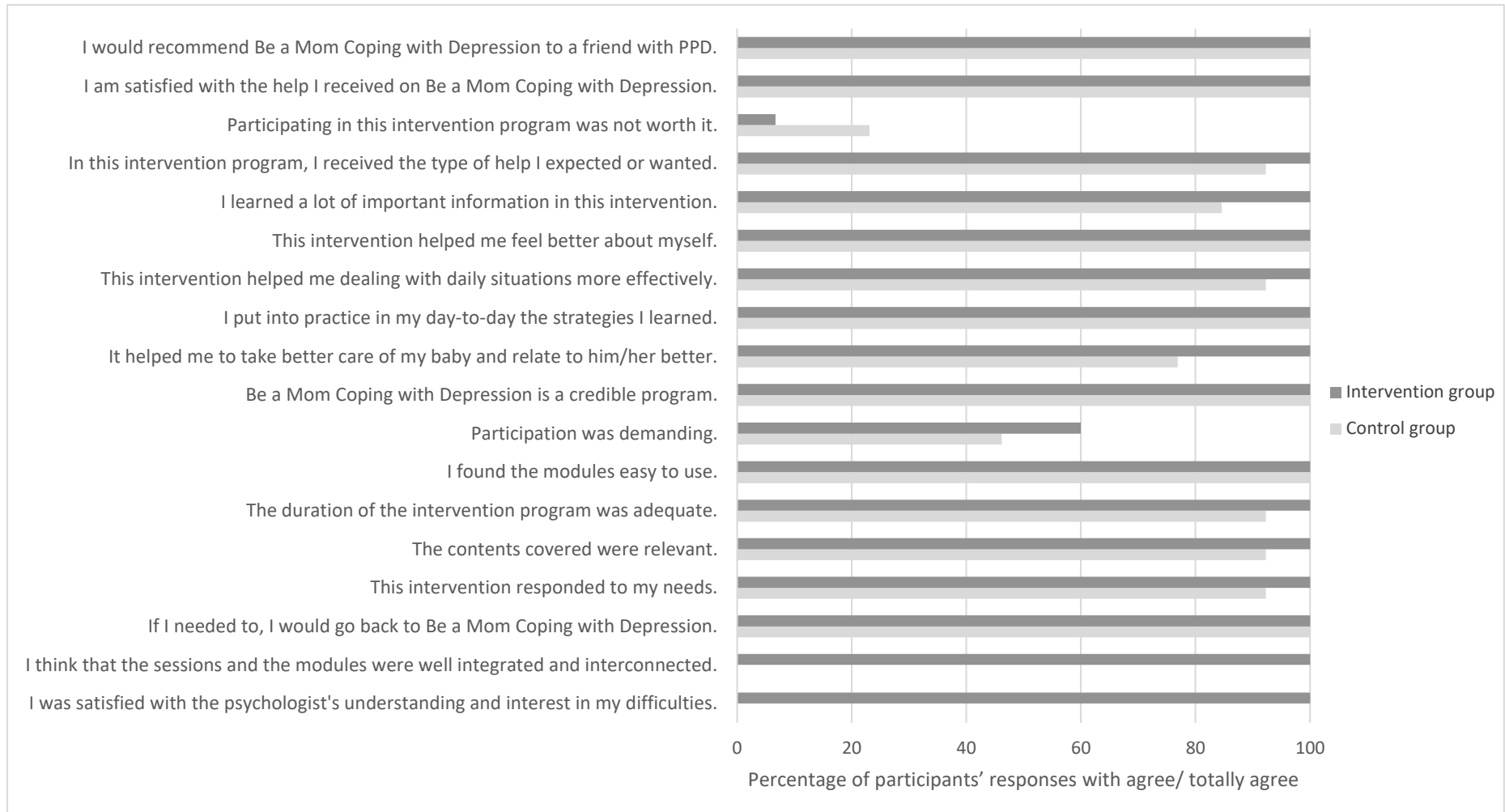
Figure 2.*Participant's acceptability of both intervention arms*

Table 3

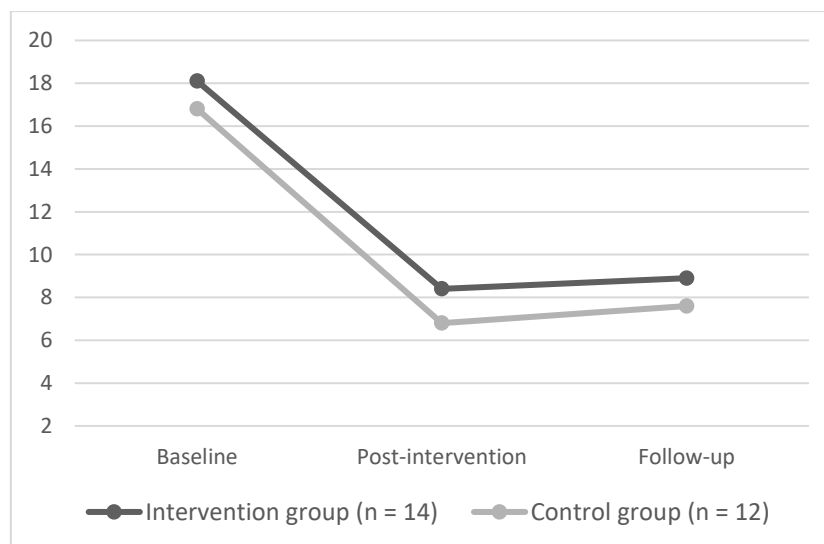
Means, standard deviation, and mixed ANOVA with time, group and time x group effects

Measures	Baseline (T1)		Post-intervention (T2)		Time	Group	Time x Group
	Intervention group M (SD)	Control Group M (SD)	Intervention group M (SD)	Control Group M (SD)			
EPDS	18.19 (2.86)	16.69 (2.39)	9.19 (3.97)	6.54 (4.86)	$F = 112.12, p < .001, \eta^2 p = 0.806$	$F = 4.220, p = 0.050, \eta^2 p = 0.135$	$F = 0.407, p = 0.529, \eta^2 p = 0.015$
HADS-A	11.88 (3.46)	11.85 (1.77)	7.06 (4.06)	6.46 (3.07)	$F = 39.061, p < .001, \eta^2 p = 0.591$	$F = 0.120, p = 0.732, \eta^2 p = 0.004$	$F = 0.123, p = 0.729, \eta^2 p = 0.005$
PNTQ	19.69 (6.00)	17.31 (5.71)	10.06 (6.14)	9.08 (4.55)	$F = 50.940, p < .001, \eta^2 p = 0.654$	$F = 0.964, p = 0.335, \eta^2 p = 0.034$	$F = 0.311, p = 0.582, \eta^2 p = 0.011$
PMPS-E	65.81 (6.89)	65.92 (7.86)	72.19 (6.67)	74.92 (6.32)	$F = 41.400, p < .001, \eta^2 p = 0.605$	$F = 0.383, p = 0.541, \eta^2 p = 0.014$	$F = 1.207, p = 0.282, \eta^2 p = 0.043$
DERS-SF	58.93 (8.76)	55.15 (8.35)	47.00 (12.78)	39.23 (12.75)	$F = 23.302, p < .001, \eta^2 p = 0.473$	$F = 3.855, p = 0.060, \eta^2 p = 0.129$	$F = 0.478, p = 0.495, \eta^2 p = 0.018$
SCS-SF	26.20 (4.72)	25.77 (8.72)	37.27 (8.98)	36.38 (6.55)	$F = 39.666, p < .001, \eta^2 p = 0.604$	$F = 0.087, p = 0.771, \eta^2 p = 0.003$	$F = 0.017, p = 0.897, \eta^2 p = 0.001$
CompACT	42.80 (9.65)	44.23 (11.35)	56.53 (16.22)	56.85 (9.66)	$F = 17.402, p < .001, \eta^2 p = 0.401$	$F = 0.068, p = 0.796, \eta^2 p = 0.003$	$F = 0.031, p = 0.861, \eta^2 p = .001$

Regarding the primary outcome, a marginally significant group effect ($p < 0.10$) was found for depressive symptoms from baseline to post-intervention. Women in the guided web-based intervention group reported lower levels of depressive symptoms than women in the blended intervention group. According to the RCI values, clinical improvement in depressive symptoms from T1 to T2 was observed in 81.3% ($n = 13$) of participants in the intervention group and in 84.6% ($n = 11$) of participants in the control group. There was no change in 3 participants (18.8%) in the blended intervention group and in 2 participants (15.4%) in the guided web-based intervention group. The participants' clinical changes did not differ across conditions ($\chi^2 = 0.057$, $p = 1.000$, Cramer's $V = 0.044$). Additional exploratory analysis evaluating the effect of time (from baseline to follow-up) on depressive symptoms revealed that the group effect was no longer significant when considering the follow-up period (see **Figure 3**). The results revealed significant main effects for time ($F = 52.733$, $p < .001$, $\eta^2 p = .821$) and no significant main effects for group ($F = .973$, $p = .334$, $\eta^2 p = .039$) or time x group interactions ($F = .040$, $p = .961$, $\eta^2 p = .003$).

Figure 3

Mean scores on the EPDS across the three assessment points



For the secondary outcomes, time effects were also significant from T1 to T2 (**Table 3**). A marginally significant group effect ($p < 0.10$) was found for emotion regulation. Difficulties in emotion regulation were higher in the intervention group than in the control group, although this difference was marginally significant ($p < 0.10$). An additional ANOVA to explore the effect

of time (from baseline to follow-up) on DERS-SF scores showed that neither the time \times group effect ($F = .495, p = .617, \eta^2 p = .047$), nor the group effect ($F = 1.096, p = .307, \eta^2 p = .050$) were significant, and the time effect was significant ($F = 12.595, p < .001, \eta^2 p = .557$).

Therapeutic alliance

Therapeutic alliance was rated higher in the blended intervention group (mean rank = 16.97) than in the guided web-based intervention group (mean rank = 11.65) and this difference was marginally significant ($U = 60.50, p = 0.086$). In addition, the therapeutic relationship was significantly associated with depressive symptoms at post-intervention, in both the intervention ($\rho = -0.526, p = 0.044$) and control groups ($\rho = -0.922, p < 0.001$), with a more positive therapeutic alliance being associated with lower levels of symptoms after treatment.

Discussion

The aim of the present study was to evaluate Be a Mom Coping with Depression, the first known blended CBT intervention for the treatment of PPD, compared to a guided web-based intervention in terms of acceptability and preliminary evidence of effectiveness. Overall, the results of our study suggest that both interventions were considered acceptable by postpartum women and led to reductions in depressive symptoms, as well as improvements in other outcomes. Moreover, our findings emphasize the value of including therapist support, either by face-to-face sessions or through short phone calls, in new formats of interventions for PPD integrating digital tools.

In this study, the dropout rate was lower in the blended intervention group than in the guided web-based intervention group. In fact, attrition rates in web-based interventions for perinatal mental problems can be quite elevated (up to 60%; Ashford et al., 2016), whereas lower dropout rates have been reported in blended interventions for depression (e.g., 0% in Nakao et al., 2018; 13% in Kemmeren et al., 2019). In terms of usage of the web-based program, there were no significant differences between the two groups. However, more women in the intervention group than the control group attended all sessions and completed all modules. In fact, women who previously participated in the feasibility study evaluating Be a Mom Coping with Depression reported feeling more committed to engage in the sessions with the psychologist than to the web-based program (Branquinho et al., 2023). Then, our study supports the evidence that the presence of a therapist can increase treatment adherence and reduce dropout (Andersson & Titov, 2014).

Overall, participants in both intervention arms considered that the treatment received was useful, acceptable and satisfactory. Participants' perceptions of the usefulness of both interventions (the blended and guided web-based interventions) seemed to be in accordance with the findings related to preliminary effectiveness, since women reported feeling better about themselves and being able to deal effectively with daily situations. The results demonstrated that some women in both treatment arms considered the intervention to be demanding, and a higher percentage of participants in the intervention group agreed with this when compared to those in the control group. This could be explained by the perception that attending the sessions with the psychologist was more time-consuming. Additionally, a deeper discussion of the contents and practice of strategies could be perceived as requiring more attention and effort. Accordingly, more participants in the blended intervention group than the guided web-based intervention group considered that they had learned important information and that participation was worth it.

Our findings showed that participants reported significant reductions in depressive symptoms at post-intervention, although there was no difference between the blended and guided web-based intervention groups. High rates of clinical improvement (> 80%) were found in both intervention arms, and the reductions in depressive symptoms were sustained at the 3-month follow-up. In addition, time effects were also significant for the secondary outcomes, revealing that both interventions produced clinical improvements. Although these findings were not expected according to our research hypothesis that the blended intervention would be superior to the guided web-based intervention in terms of preliminary effectiveness, these results are quite informative and relevant for psychological interventions for PPD. This is the first study assessing the preliminary effects of a CBT intervention combining face-to-face sessions with a web-based program for PPD and most of the women in our sample showed clinical improvement. Other blended interventions for depression used the RCI to assess clinical changes in the participants and reported improvement rates ranging from 40.5% to 63% (Kemmeren et al., 2023; Rasing et al., 2021; Schuster et al., 2019). This evidence provides encouraging data on the effectiveness of *Be a Mom Coping with Depression*, although this conclusion cannot be drawn from this pilot study given its limited power to detect differences. On the other hand, our results are in accordance with the literature demonstrating that web-based interventions are also effective for the treatment of PPD (Ashford et al., 2016), highlighting the important role of therapist guidance in this type of intervention.

Concerning the EPDS scores, participants in the control group reported lower levels of depressive symptoms than those in the intervention group. However, this group effect was not

significant considering the follow-up period. As previously mentioned, women allocated to the guided web-based intervention group were periodically assessed for depressive symptom severity using the EPDS during phone calls. It is possible that this contributed to increasing participants' familiarity with the items and influenced their responses on the post-intervention assessment (Høifødt et al., 2013). A similar procedure was adopted to evaluate depressive symptoms and participant safety in other RCTs using a self-report questionnaire (Milgrom et al., 2021; Topooco et al., 2018). However, it was applied to participants in all treatment conditions, and in our study, the EPDS was only applied to the participants receiving the guided web-based intervention, which represents a limitation that could have influenced participants' responses and help explain the results found.

In this study, participants in both the blended and guided web-based intervention groups reported a decrease in anxiety levels and in the frequency of negative thoughts, as well as an increased perception of maternal self-efficacy. Thus, the strategies and contents included in the intervention can target not only depressive symptoms but also other outcomes (e.g., self-criticism and negative thoughts) that are relevant for the maintenance of PPD (Pedro et al., 2019). The inclusion of third-wave CBT elements may have contributed to the improvements observed, as revealed by the levels of self-compassion, psychological flexibility and emotion regulation at post-intervention. Although there are still few CBT interventions for the treatment of PPD focused on third-wave approaches (Rodriguez-Muñoz et al., 2023), the promotion of these psychological competences seems to be relevant during the postpartum period. It is common for postpartum women to evaluate themselves and their experiences as a function of unrealistic expectations and standards imposed by society and to experience feelings of shame and guilt (Law et al., 2021). Throughout the interventions, the women were encouraged to accept their emotional experiences with a nonjudgmental and kind attitude, to deal with their emotions in a more adaptative way, to face their difficulties as part of their human nature and to engage in value-based behaviors. Since it could not be evaluated in this study, future research should explore whether these psychological processes (self-compassion, psychological flexibility and emotion regulation) are responsible for changes in women receiving this blended intervention for PPD, as suggested by other authors (Fonseca et al., 2019).

Participants' positive ratings of the therapeutic alliance in *Be a Mom Coping with Depression* were comparable to those reported in other studies evaluating blended interventions for depression (Topooco et al., 2018; Vernmark et al., 2019). In this study, participants who received the blended intervention reported the therapeutic alliance as being more positive than the participants who received the guided web-based intervention. In fact,

women in the blended intervention group had more contact with the therapist, both in terms of time (up to one hour per session) and the number of sessions attended. In addition, it has been stated that the lower face-to-face contact in guided web-based interventions can somehow hinder the establishment of a therapeutic alliance (Berger, 2017). Moreover, our results demonstrated that a more positive therapeutic alliance was associated with lower levels of depressive symptoms at the end of the intervention for both treatment conditions. This finding is consistent with the literature (Berger, 2017; Vernmark et al., 2019) and reinforces the relevance of therapist support when integrating e-health tools in interventions for PPD. In a study evaluating a blended treatment for depression, the participants who reported higher rates of therapeutic alliance also shared more of their digital homework assignments with their therapist, reflecting higher engagement with treatment (Aerts & van Dam, 2018). We can assume that therapeutic alliance is therefore a key element to promote engagement with and commitment to the treatment, as well as to prevent dropout.

Implications for practice

Over the last few years, research has shown that blended treatment is a feasible, acceptable and effective treatment option for depressive symptoms (e.g., Kooistra et al., 2019; Schuster et al., 2018). Our study adds new evidence to the literature by demonstrating that a blended intervention can also be applied to PPD by addressing the specific needs of postpartum women and considering the barriers they usually face in seeking help. In this study, a blended intervention was compared to a guided web-based intervention. A possible explanation for the results not sustaining our research hypotheses regarding the preliminary effectiveness is that the two interventions may not be sufficiently different to produce variance between the groups. A study conducted by Rasing et al. (2021) compared a blended CBT intervention with face-to-face CBT for depression in adolescents. The authors hypothesized that the similarity of content and techniques of both treatment protocols as well as the presence of clinical guidance in both formats did not produce differences in the outcomes (Rasing et al., 2021). Similarly, in our study, all participants accessed the same web-based program and received therapeutic support, although in different formats and with different levels of intensity. It can be assumed that the use of the web-based program, together with therapeutic support, can be effective enough to develop and practice therapeutic strategies to treat PPD, but more research is needed.

Then, the integration of the web-based program in a stepped-care model in health care for women with PPD could be an efficient choice. For instance, it has been suggested that the web-based program could be provided as a first approach for postpartum women while on a

waiting list for face-to-face sessions (Milgrom et al., 2021). This could be particularly relevant in the Portuguese context, with long waiting lists to access psychological care. However, it has been found that Portuguese psychologists have higher acceptance of blended interventions when compared to standalone web-based interventions (Mendes-Santos et al., 2020). Therefore, it may be more acceptable to implement a web-based program in a healthcare system in a blended format. In addition, although the participants in both treatment arms showed improvement in our study, the results indicated that the blended intervention may present more advantages over the guided web-based intervention, including lower dropout rates, higher engagement, more positive perceptions of usefulness and therapeutic gains, and better therapeutic alliance.

Limitations and strengths

The present study has some limitations, and therefore, the results should be interpreted with caution. First, the small sample size and its self-selected nature limit the generalizability of the results and the robustness of the statistical power. Also, the women in our sample were married, and most were employed and highly educated, which may not be representative of the Portuguese population. Second, the use of only self-report measures could compromise the validity of the results, as well as the low Cronbach's alpha values found for the EPDS and HADS-A at the baseline assessment. Third, the study was only disseminated through online media, and further studies should include recruitment in healthcare centers or hospital units to increase women's access to the intervention. Fourth, given the nature of the interventions, the participants could not be blinded to their treatment allocation, and both intervention arms (the blended and guided web-based interventions) were delivered by the same therapist (first author), introducing a risk of bias. Future trials should be conducted to assess the clinical effectiveness in larger and more representative samples and with more therapists providing the interventions. Fifth, the participants in the control group were frequently assessed for depressive symptoms using the EDPS, whereas participants in the intervention group only responded to the questionnaire at baseline and post-intervention, which may have influenced the effects produced in the control group. This has also been reported in other studies (e.g., Høifødt et al., 2013). Moreover, participants who initiated antidepressant medication were included in the analyses since the blended or guided web-based interventions were halfway completed, but it cannot be ruled out that their changes may have been attributed to the medication. The reasons for study dropout were unknown, and it would be important to understand that whether it was explained by any intervention characteristics (e.g., demandingness) or individual factors (e.g., lack of time).

Despite these limitations, this study has several strengths and provides insights for future research, namely, the completion of a full-powered RCT to examine the effectiveness of the blended intervention. To our knowledge, this study provided the first comparison of a blended intervention with a guided web-based intervention for PPD. To be included in the trial, participants were assessed for depressive symptoms with both a self-report measure (EPDS) and a clinical interview by a psychologist. The fact that this pilot study included an active control treatment represents a strength, since several blended interventions were compared to no treatment conditions (Erbe et al., 2017). It would be interesting to conduct a future RCT comparing blended treatment with face-to-face interventions for PPD. Further research on blended interventions targeted at postpartum women is still warranted to understand whether the blended format is more suitable as a function of some characteristics (e.g., severity of symptoms, infant age). Finally, it would also be relevant to examine the cost-effectiveness of Be a Mom Coping with Depression by including the costs of the maintenance of the web-based program and costs associated with delivering the intervention.

References

- Aerts, J. E., & van Dam, A. (2018). Blended e-Health in cognitive behavioural therapy: Usage intensity, attitude and therapeutic alliance in clinical practice. *Psychology, 9*(10), 2422. <https://doi.org/10.4236/psych.2018.910139>
- Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry, 13*(1), 4–11. <https://doi.org/10.1002/wps.20083>
- Areias, M. E. G., Kumar, R., Barros, H., & Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth. *The British Journal of Psychiatry, 169*(1), 30-35. <https://dx.doi.org/10.1192/bjp.169.1.30>
- Ashford, M. T., Olander, E. K., & Ayers, S. (2016). Computer-or web-based interventions for perinatal mental health: A systematic review. *Journal of Affective Disorders, 197*, 134–146. <https://doi.org/10.1016/j.jad.2016.02.057>
- BC Reproductive Mental Health Program, & Williams, J. (2014). *Best practice guidelines for mental health disorders in the perinatal period*. BC Reproductive Mental Health Program.
- Berger, T. (2017). The therapeutic alliance in internet interventions: A narrative review and suggestions for future research. *Psychotherapy Research, 27*(5), 511-524. <https://doi.org/10.1080/10503307.2015.1119908>
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2022). A blended cognitive–behavioral intervention for the treatment of postpartum depression: A case study. *Clinical Case Studies, 21*(5), 1-19. <https://doi.org/10.1177/15346501221082616>
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2023). Be a Mom Coping with Depression: A feasibility study of a blended cognitive-behavioral intervention for postpartum depression. *International Journal of Cognitive Therapy*. <https://doi.org/10.1007/s41811-023-00182-0>
- Branquinho, M., de la Fe Rodriguez-Muñoz, M., Maia, B. R., Marques, M., Matos, M., Osma, J., Moreno-Peral, P., Conejo-Cerón, S., Fonseca, A., & Voursora, E. (2021). Effectiveness of psychological interventions in the treatment of perinatal depression: A systematic review of systematic reviews and meta-analyses. *Journal of Affective Disorders, 291*, 294–306. <https://doi.org/10.1016/j.jad.2021.05.010>
- Castilho, P., Pinto-Gouveia, J., & Duarte, J. (2015). Evaluating the multifactor structure of the long and short versions of the Self-Compassion Scale in a clinical Sample. *Journal of Clinical Psychology, 71*(9), 856–870. <https://doi.org/10.1002/jclp.22187>

- Daehn, D., Rudolf, S., Pawils, S., & Renneberg, B. (2022). Perinatal mental health literacy: Knowledge, attitudes, and help-seeking among perinatal women and the public – a systematic review. *BMC Pregnancy and Childbirth*, 22(1), 1-22. <https://doi.org/10.1186/s12884-022-04865-y>
- Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: Extension to randomised pilot and feasibility trials. *BMJ*, 355. <http://dx.doi.org/10.1136/bmj>
- Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research*, 19(9), e306. <https://doi.org/10.2196/jmir.6588>
- Eysenbach, G., & Consort-EHEALTH Group. (2011). CONSORT-EHEALTH: Improving and standardizing evaluation reports of Web-based and mobile health interventions. *Journal of Medical Internet Research*, 13(4), e126. <https://doi.org/10.2196/jmir.1923>
- Fairburn, C. G., & Patel, V. (2017). The impact of digital technology on psychological treatments and their dissemination. *Behaviour Research and Therapy*, 88, 19-25. <https://doi.org/10.1016/j.brat.2016.08.012>
- First, M. B., Williams, J. B., Karg, R. S., & Spitzer, R. L. (2017). *User's guide for the SCID-5-CV Structured Clinical Interview for DSM-5® disorders: Clinical version*. American Psychiatric Publishing, Inc.
- Fonseca, A., Gorayeb, R., & Canavarro, M. C. (2015). Women's help-seeking behaviours for depressive symptoms during the perinatal period: Socio-demographic and clinical correlates and perceived barriers to seeking professional help. *Midwifery*, 31(12), 1177-1185. <https://doi.org/10.1016/j.midw.2015.09.002>
- Fonseca, A., Monteiro, F., & Canavarro, M. C. (2018). Dysfunctional beliefs towards motherhood and postpartum depressive and anxiety symptoms: Uncovering the role of experiential avoidance. *Journal of Clinical Psychology*, 74(12), 2134–2144. <https://doi.org/10.1002/iclp.22649>
- Fonseca, A., Monteiro, F., Alves, S., Gorayeb, R., & Canavarro, M. C. (2019). Be a Mom, a web-based intervention to prevent postpartum depression: The enhancement of self-regulatory skills and its association with postpartum depressive symptoms. *Frontiers in Psychology*, 10, 265. <https://doi.org/10.3389/fpsyg.2019.00264>
- Fonseca, A., Pereira, M., Araujo-Pedrosa, A., Gorayeb, R., Ramos, M. M., & Canavarro, M. C. (2018). Be a mom: Formative evaluation of a web-based psychological intervention to prevent postpartum depression. *Cognitive and Behavioral Practice*, 25(4), 473-495. <https://doi.org/10.1016/j.cbpra.2018.02.002>

- Høifødt, R. S., Lillevoll, K. R., Griffiths, K. M., Wilsgaard, T., Eisemann, M., & Kolstrup, N. (2013). The clinical effectiveness of web-based cognitive behavioral therapy with face-to-face therapist support for depressed primary care patients: Randomized controlled trial. *Journal of Medical Internet Research*, *15*(8), e153. <https://doi.org/10.2196/jmir.2714>
- Høifødt, R. S., Mittner, M., Lillevoll, K., Katla, S. K., Kolstrup, N., Eisemann, M., Friberg, O., & Waterloo, K. (2015). Predictors of response to web-based cognitive behavioral therapy with high-intensity face-to-face therapist guidance for depression: A Bayesian analysis. *Journal of Medical Internet Research*, *17*(9), e197. <https://doi.org/10.2196/jmir.4351>
- Kay-Lambkin, F. J., Baker, A. L., Kelly, B., & Lewin, T. J. (2011). Clinician-assisted computerised versus therapist-delivered treatment for depressive and addictive disorders: A randomised controlled trial. *Medical Journal of Australia*, *195*, S44-S50. <https://doi.org/10.5694/j.1326-5377.2011.tb03265.x>
- Kemmeren, L. L., van Schaik, A., Draisma, S., Kleiboer, A., Riper, H., & Smit, J. H. (2023). Effectiveness of blended cognitive behavioral therapy versus treatment as usual for depression in routine specialized mental healthcare: E-COMPARED trial in the Netherlands. *Cognitive Therapy and Research*, *47*(3), 386-398. <https://doi.org/10.1007/s10608-023-10363-y>
- Kemmeren, L. L., van Schaik, A., Smit, J. H., Ruwaard, J., Rocha, A., Henriques, M., Ebert, D. D., Titzler, I., Hazo, J., Dorsey, M., Zukowska, K., & Riper, H. (2019). Unraveling the black box: Exploring usage patterns of a blended treatment for depression in a multicenter study. *JMIR Mental Health*, *6*(7), e12707. <https://doi.org/10.2196/12707>
- Kooistra, L. C., Wiersma, J. E., Ruwaard, J., Neijenhuijs, K., Lokkerbol, J., van Oppen, P., Smit, F., & Riper, H. (2019). Cost and effectiveness of blended versus standard cognitive behavioral therapy for outpatients with depression in routine specialized mental health care: Pilot randomized controlled trial. *Journal of Medical Internet Research*, *21*(10), e14261. <https://doi.org/10.2196/14261>
- Law, N. K., Hall, P. L., & Cheshire, A. (2021). Common negative thoughts in early motherhood and their relationship to guilt, shame and depression. *Journal of Child and Family Studies*, *30*(8), 1831-1845. <https://doi.org/10.1007/s10826-021-01968-6>
- Maroco, J., & Garcia-Marques, T. (2006). Qual a fiabilidade do alfa de Cronbach? Questões antigas e soluções modernas?. *Laboratório de Psicologia*, *4*(1), 65-90. <https://doi.org/10.14417/lp.763>
- Mathiasen, K., Andersen, T. E., Lichtenstein, M. B., Ehlers, L. H., Riper, H., Kleiboer, A., & Roessler, K. K. (2022). The clinical effectiveness of blended cognitive behavioral therapy compared with face-to-face cognitive behavioral therapy for adult depression: Randomized

- controlled noninferiority trial. *Journal of Medical Internet Research*, 24(9), e36577. <https://doi.org/10.2196/36577>
- Mendes-Santos, C., Weiderpass, E., Santana, R., & Andersson, G. (2020). Portuguese psychologists' attitudes toward Internet interventions: Exploratory cross-sectional study. *JMIR Mental Health*, 7(4), e16817. <https://doi.org/10.2196/16817>
- Milgrom, J., Danaher, B. G., Seeley, J. R., Holt, C. J., Holt, C., Ericksen, J., Tyler, M. S., Gau, J. M., & Gemmill, A. W. (2021). Internet and face-to-face cognitive behavioral therapy for postnatal depression compared with treatment as usual: Randomized controlled trial of MumMoodBooster. *Journal of Medical Internet Research*, 23(12), e17185. <https://doi.org/10.2196/17185>
- Monteiro, F., Fonseca, A., Pereira, M., & Canavarro, M. C. (2022). Perceived maternal parenting self-efficacy scale: Factor structure and psychometric properties among Portuguese postpartum women. *Midwifery*, 105, 103240. <https://doi.org/10.1016/j.midw.2021.103240>
- Montgomery, P., Grant, S., Mayo-Wilson, E., Macdonald, G., Michie, S., Hopewell, S., & Moher, D. (2018). Reporting randomised trials of social and psychological interventions: The CONSORT-SPI 2018 Extension. *Trials*, 19(1), 407. <https://doi.org/10.1186/s13063-018-2733-1>
- Moreira, H., Gouveia, M.J. & Canavarro, M.C. (2022). A bifactor analysis of the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF) in a sample of adolescents and adults. *Current Psychology*, 41, 757–782. <https://doi.org/10.1007/s12144-019-00602-5>
- Nakao, S., Nakagawa, A., Oguchi, Y., Mitsuda, D., Kato, N., Nakagawa, Y., Tamura, N., Kudo, Y., Abe, T., Hiyama, M., Iwashita, S., Ono, Y., Mimura, M., & Mimura, M. (2018). Web-based cognitive behavioral therapy blended with face-to-face sessions for major depression: Randomized controlled trial. *Journal of Medical Internet Research*, 20(9), e10743. <https://doi.org/10.2196/10743>
- Pais-Ribeiro, J., Silva, I., Ferreira, T., Martins, A., Meneses, R., & Baltar, M. (2007). Validation study of a Portuguese version of the Hospital Anxiety and Depression Scale. *Psychology, Health & Medicine*, 12(2), 225-237. <https://doi.org/10.1080/13548500500524088>
- Pedro, L., Branquinho, M., Canavarro, M. C., & Fonseca, A. (2019). Self-criticism, negative automatic thoughts and postpartum depressive symptoms: The buffering effect of self-compassion. *Journal of Reproductive and Infant Psychology*, 37(5), 539-553. <https://doi.org/10.1080/02646838.2019.1597969>

- Ramos, M. A. F. (2008). *Análise das Características Psicométricas da Versão Portuguesa do Working Alliance Inventory - Short Revised*. [Doctoral dissertation, Universidade Do Minho]
- Rasing, S. P. (2021). Blended treatment for depressive disorders in youth: A narrative review. *International Journal of Cognitive Therapy, 14*(1), 47-58. <https://doi.org/10.1007/s41811-020-00088-1>
- Rasing, S. P., Stikkelbroek, Y. A., Den Hollander, W., Okorn, A., & Bodden, D. H. (2021). Long term outcomes of blended CBT compared to face-to-face CBT and treatment as usual for adolescents with depressive disorders: Analyses at 12 months post-treatment. *Social Sciences, 10*(10), 373. <https://doi.org/10.3390/socsci10100373>
- Rodrigues, S., Costa, A. C., Canavarro, M. C. C., & Fonseca, A. (2017). Adaptação da Escala de Pensamentos Automáticos Negativos Pós-Parto para a população portuguesa: Estudos psicométricos. *Análise Psicológica, 35*(3), 395-407. <https://doi.org/10.14417/ap.1334>
- Rodriguez-Muñoz, M. F., Radoš, S. N., Uka, A., Marques, M., Maia, B. R., Matos, M., Branquinho, M., Aydin, R., Mahmoodi, V., Chrzan-Dętkoś, M., Walczak-Kozłowska, T., & Liakea, I. (2023). Effectiveness of the third wave cognitive behavior therapy for peripartum depression treatment – a systematic review. *Midwifery, 127*, 103865. <https://doi.org/10.1016/j.midw.2023.103865>
- Romijn, G., Provoost, S., Batelaan, N., Koning, J., van Balkom, A., & Riper, H. (2021). Does it blend? Exploring therapist fidelity in blended CBT for anxiety disorders. *Internet Interventions, 25*, 100418. <https://doi.org/10.1016/j.invent.2021.100418>
- Schuster, R., Fichtenbauer, I., Sparr, V. M., Berger, T., & Laireiter, A. R. (2018). Feasibility of a blended group treatment (bGT) for major depression: Uncontrolled interventional study in a university setting. *BMJ Open, 8*(3), e018412. <https://dx.doi.org/10.1136/bmjopen-2017-018412>
- Schuster, R., Kalthoff, I., Walther, A., Köhldorfer, L., Partinger, E., Berger, T., & Laireiter, A. R. (2019). Effects, adherence, and therapists' perceptions of web-and mobile-supported group therapy for depression: Mixed-methods study. *Journal of Medical Internet Research, 21*(5), e11860. <http://dx.doi.org/10.2196/11860>
- Schuster, R., Leitner, I., Carlbring, P., & Laireiter, A. R. (2017). Exploring blended group interventions for depression: Randomised controlled feasibility study of a blended computer-and multimedia-supported psychoeducational group intervention for adults with depressive symptoms. *Internet Interventions, 8*, 63–71. <https://doi.org/10.1016/j.invent.2017.04.001>

- Sethi, S., Campbell, A. J., & Ellis, L. A. (2010). The use of computerized self-help packages to treat adolescent depression and anxiety. *Journal of Technology in Human Services, 28*(3), 144-160. <https://doi.org/10.1080/15228835.2010.508317>
- Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health, 15*. <https://doi.org/10.1177/1745506519844044>
- Tabachnick, B., & Fidell, L. (2013). *Using multivariate statistics*. Pearson.
- Tingey, R., Lambert, M., Burlingame, G., & Hansen, N. (1996). Assessing clinical significance: Proposed extensions to method. *Psychotherapy Research, 6*(2), 109–123. <https://doi.org/10.1080/10503309612331331638>
- Titzler, I., Saruhanjan, K., Berking, M., Riper, H., & Ebert, D. D. (2018). Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists' perspective. *Internet Interventions, 12*, 150–164. <https://doi.org/10.1016/j.invent.2018.01.002>
- Topooco, N., Berg, M., Johansson, S., Liljethörn, L., Radvogin, E., Vlaescu, G., Nordgren, L. B., Zetterqvist, M., & Andersson, G. (2018). Chat-and internet-based cognitive-behavioural therapy in treatment of adolescent depression: Randomised controlled trial. *BJPsych Open, 4*(4), 199-207. <https://doi.org/10.1192/bjo.2018.18>
- Trindade, I. A., Ferreira, N. B., Mendes, A. L., Ferreira, C., Dawson, D., & Golijani-Moghaddam, N. (2021). Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT): Measure refinement and study of measurement invariance across Portuguese and UK samples. *Journal of Contextual Behavioral Science, 21*, 30-36. <https://doi.org/10.1016/j.jcbs.2021.05.002>
- Van der Vaart, R., Witting, M., Riper, H., Kooistra, L., Bohlmeijer, E. T., & van Gemert-Pijnen, L. J. (2014). Blending online therapy into regular face-to-face therapy for depression: Content, ratio and preconditions according to patients and therapists using a Delphi study. *BMC Psychiatry, 14*(1), 1–10. <https://doi.org/10.1186/s12888-014-0355-z>
- Vernmark, K., Hesser, H., Topooco, N., Berger, T., Riper, H., Luuk, L., Backlund, L., Carlbring, P., & Andersson, G. (2019). Working alliance as a predictor of change in depression during blended cognitive behaviour therapy. *Cognitive Behaviour Therapy, 48*(4), 285–299. <https://doi.org/10.1080/16506073.2018.1533577>
- Wentzel, J., van der Vaart, R., Bohlmeijer, E. T., & van Gemert-Pijnen, J. E. (2016). Mixing online and face-to-face therapy: How to benefit from blended care in mental health care. *JMIR Mental Health, 3*(1), e9. <https://doi.org/10.2196/mental.4534>

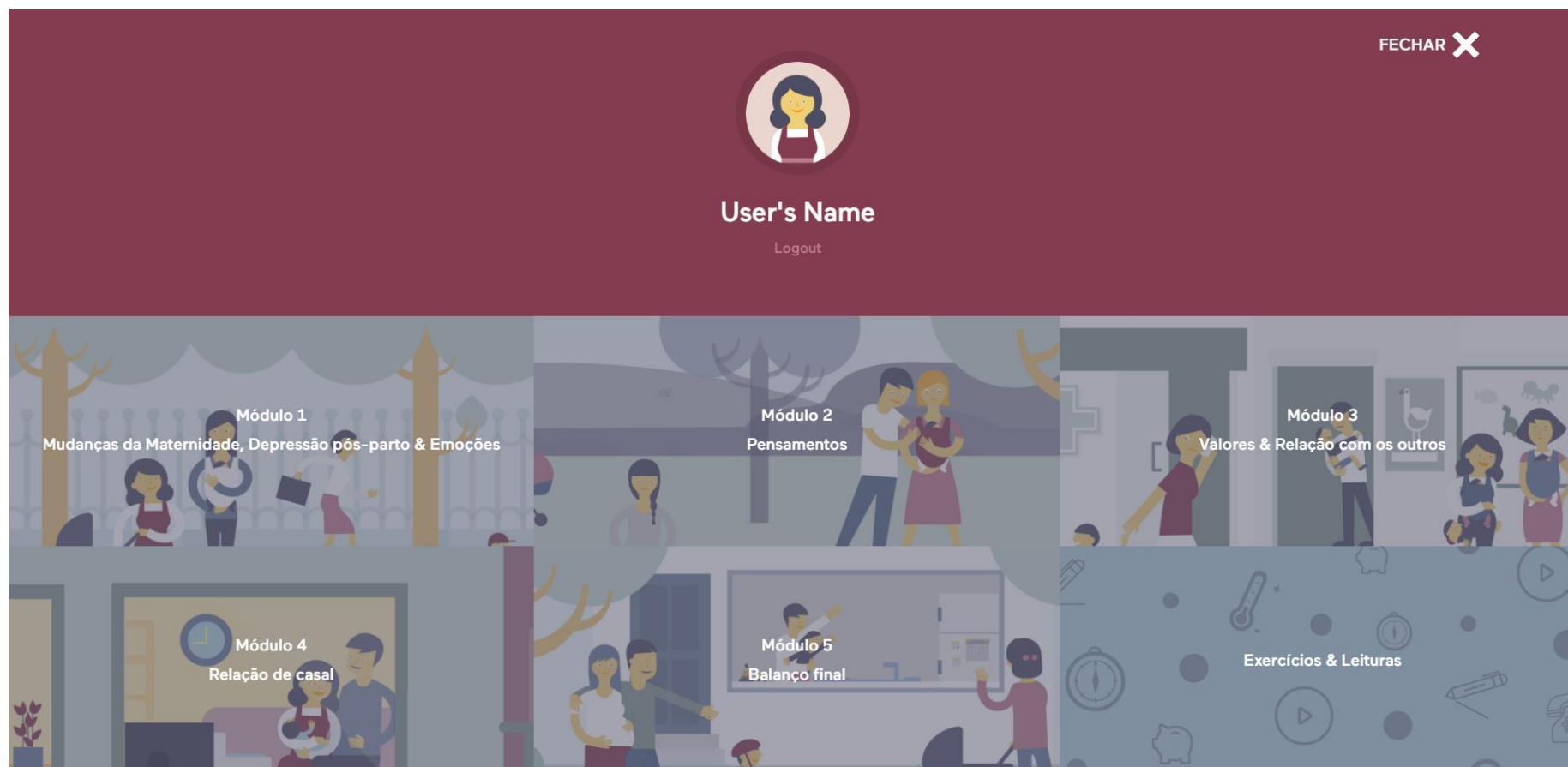
Whitehead, A. L., Julious, S. A., Cooper, C. L., & Campbell, M. J. (2016). Estimating the sample size for a pilot randomised trial to minimise the overall trial sample size for the external pilot and main trial for a continuous outcome variable. *Statistical Methods in Medical Research*, 25(3), 1057-1073. <https://doi.org/10.1177/0962280215588241>

Supplementary material

Table 1

General structure of blended (intervention arm) and guided web-based interventions (control arm)

Session 1 - Evaluation and introduction to treatment		
Web-based program	Sessions with the therapist (blended intervention)	Phone calls with the therapist (guided web-based intervention)
(1) Maternity changes, PPD and emotions	Expectations toward motherhood; Emotions and their adaptative function; The CBT model and introduction to cognitive flexibility.	The impact of expectations toward motherhood; Recognizing emotions; Review of the CBT model.
(2) Thoughts	Recognizing negative thoughts; Practice of strategies (acceptance and defusion, thoughts questioning and self-compassion).	Recognizing negative thoughts; Review of strategies (thoughts questioning, acceptance and self-compassion).
(3) Values	Identification of values; Importance of committed value-based actions; Strategies to increase and practice pleasant and value-based activities.	Recognizing values; Encouraging valued-based behaviors.
(4) Social support and interpersonal skills	Importance of social support and identification of difficulties; Communication styles; Practice of assertive communication skills.	Review of social network identification; Recognizing difficulties; Review of assertive communication skills.
(5) The couple's relationship	Strategies to promote affection and intimacy; Assertive communication; Promotion of cognitive flexibility; Problem-solving strategies.	Encouraging communication and problem-solving strategies.
(6) Final balance and relapse prevention	Reflection on the learned strategies and changes obtained; Relapse prevention plan; Evaluation of treatment progress.	Identifying positive gains; Review of relapse prevention plan.

Appendix A. User interfaces of the web-based program

User's main menu.




Controlar os pensamentos

3 minutos

Se se sentir culpabilizada por ter pensamentos negativos nesta fase da vida, é possível que **tente controlá-los**.

Mas será que conseguimos mesmo controlar os nossos pensamentos?


Ouçã o seguinte exercício:

 Supressão do pensamento
00:36

Play button



Examples of an audio exercise and a written exercise.

 Pense numa **situação** das últimas semanas em que se **sentiu mais triste, irritada ou ansiosa** e preencha os diferentes campos do quadro que se segue.

Situação	Onde estava? Quem estava consigo? O que estava a fazer?
Emoções	Ansiedade, tristeza, raiva, frustração, desespero,...?
Pensamentos	O que lhe passou pela cabeça na altura? que tipo de pensamentos teve? Como se viu a si própria na altura? Como pensa que os outros a viram? O que é essa situação significou para si na altura?
Comportamentos	Como reagiu à situação? O que fez? O que deixou de fazer?

Chapter IV | General Discussion

This final chapter aims to summarize and conjointly discuss the main results of the current research project. The findings from the five empirical studies that compose this research work were previously discussed in-depth, and therefore a comprehensive and integrative discussion of the results is presented in this section. Next, a reflection on the strengths and limitations of this research project is provided, as well as on the implications for future research, clinical practice, and health policy.

1. Summary of the main findings

In the **first phase**, this research project aimed to understand postpartum women's emotional experience related to depressive symptomatology and attitudinal factors towards blended interventions. Accordingly, two empirical studies were conducted with the following specific objectives: (1) to explore the heterogeneity of PPD characteristics among women presenting depressive symptoms (Empirical study I) and (2) to understand acceptability and preferences concerning blended psychological interventions among postpartum women presenting clinically relevant depressive symptoms (Empirical study II). The main findings are thereafter summarized:

EMPIRICAL STUDY I

- The CFA confirmed the three-factor structure of the Portuguese version of the EPDS (depression, anxiety, and anhedonia).
- The three dimensions of the EPDS were associated with having low self-esteem and depression during pregnancy. We also highlight the correlations between low levels of social support and increased marital dissatisfaction and higher levels of depression and anhedonia.
- Three profiles of women presenting PPD symptoms were identified based on the severity of the symptoms of depression, anhedonia, and anxiety, as measured with the EPDS. The profiles were named as mild anxious-depressive symptoms, moderate anxious-depressive symptoms, and severe PPD symptoms.
- The most frequent profile in our sample (68%) was the group of women presenting mild anxious-depressive symptoms, characterized by clinically significant PPD symptoms (EPDS > 9) but considered to have low severity. The least frequent profile (3.5%) was the group of

women with severe PPD symptoms, characterized by higher levels of depression and anxiety, and moderate levels of anhedonia.

- Women in the moderate anxious-depressive symptoms profile had lower education and lower income than those women in the mild anxious-depressive symptoms profile. Additionally, a higher proportion of women in the group with moderate anxious-depressive symptoms presented more risk factors than those in the mild anxious-depressive symptoms group.
- Women in the severe PPD symptoms profile presented low self-esteem and prenatal depression more frequently than those in the other two profiles.

EMPIRICAL STUDY II

- The majority of women with clinically relevant depressive symptoms agreed that a blended psychological intervention for the treatment of PPD would be useful (89.8%) and would be available to receive this intervention (91.5%). Approximately half of the participants indicated that a blended intervention would be their preferred option.
- Women reported a significantly higher number of advantages than disadvantages of a blended intervention for PPD. The main perceived advantages were flexibility (68.5%), autonomy (65.1%) and cost savings (45.5%). The most frequently reported disadvantages were concerns about the therapeutic relationship (58.3%), lack of motivation (33.2%) and data protection issues (26.8%).
- Women who were married or in a relationship, employed, with younger babies and with less severe depressive symptoms had a significantly higher likelihood of perceiving a blended intervention for PPD as being useful.
- A higher educational level was the only factor associated with an increased likelihood of being available to use a blended psychological intervention for PPD.
- Regarding women's preferences for blended interventions for PPD, most agreed that contents and strategies should be equally addressed in both face-to-face and online sessions. Concerning the proportion of sessions, approximately one-third of women preferred a 75% face-to-face/25% online proportion, while 28% would prefer an equal proportion of sessions (50% online and 50% face-to-face). Most women indicated a preference for face-to-face sessions lasting between 45 and 60 minutes and online sessions lasting between 30 and 45 minutes.

The general objective of the **second research phase** was to develop and evaluate a blended intervention for the treatment of PPD – the Be a Mom Coping with Depression intervention. Three empirical studies were conducted that aimed (1) to explore the application of the intervention through a case study report (Empirical study III), (2) to assess the intervention's feasibility and acceptability (Empirical study IV), and (3) to investigate the acceptability and preliminary effectiveness of the blended intervention for PPD in a pilot randomized controlled trial (Empirical study V). The most relevant findings are summarized below:

EMPIRICAL STUDY III

- Sofia (pseudonym) received a blended CBT treatment for PPD – Be a Mom Coping with Depression – composed of 7 sessions delivered by the psychologist and 6 sessions delivered through the web-based program. One follow-up session was provided 1 month after the end of the intervention.
- Following the intervention, the participant reported a significant decrease in the levels of depressive and anxiety symptoms, which were both under the cutoff scores established in the Portuguese validation studies. Sofia presented an increased perception of maternal self-efficacy, higher levels of self-compassion, and reduced experiential avoidance at the post-intervention assessment.
- Sofia perceived the blended intervention as positive and useful. Regarding the perceived advantages of the blended format, she highlighted time and costs savings, the possibility to review content in the online program and progress at her own pace, and the opportunity to explore online exercises with the psychologist in-session.

EMPIRICAL STUDY IV

- Adherence to treatment was high, with 89% of women completing the treatment ($n = 8$).
- Concerning usage data, 87.5% of women completed the 6 online sessions, with an average of 13 logins. The average duration of the sessions with the psychologist was 90 minutes.
- Overall, most women considered Be a Mom Coping with Depression a well-structured, useful, and adequate intervention for PPD. The duration and structure were considered adequate. The web-based program was described as attractive, interactive, easy to use and accessible.

- Three types of advantages were identified, namely, advantages associated with the web-based program (e.g., to prepare for the next session with the psychologist, flexibility, the possibility to review contents), advantages associated with the sessions with the psychologist (e.g., to reinforce information, to practice the learned strategies and to adapt them to their individual needs, to clarify doubts) and advantages associated with the video call format of the sessions (e.g., better logistic and time management, easy access, reduction of stigma).
- Disadvantages and difficulties experienced by women were mainly related to the standardized and structured format of the intervention, as well as the need for commitment and completion of the exercises in the web-based program.
- The therapeutic relationship was described as positive, empathic, encouraging and nonjudgmental.
- Some individual characteristics that can play an important role when engaging in the blended intervention were identified: motivation to participate, having previous experience with psychotherapy, level of commitment, availability of time, ability of emotional expression, preferences regarding face-to-face or video call, and stigma about professional help-seeking.
- Women were satisfied with their experience and would recommend the blended intervention.
- A reduction in depressive symptom levels was observed in the sample.

EMPIRICAL STUDY V

- A higher dropout rate (23.5%) was observed in the control arm (therapist guided web-based intervention) compared to the intervention arm (blended intervention; 5.9%).
- In the intervention arm, the mean duration of the sessions with the psychologist was 71 minutes, and the average treatment duration was 13 weeks. In the control group, the average phone call duration was 35 minutes, and the average total duration of the intervention was 11 weeks.
- Regarding acceptability, all women in both intervention arms were satisfied with the intervention received, reported feeling better about themselves, found the web-based program easy to use, would use the intervention again if needed, and would recommend it to a friend with PPD. Most of the participants also considered the intervention's duration

adequate, perceived the content as relevant and felt that the intervention addressed their needs.

- At post-intervention, significant reductions in depressive symptoms and improvements in secondary outcomes (anxiety, negative thoughts, self-efficacy, emotion regulation, self-compassion and psychological flexibility) were observed in participants from both intervention and control groups. There were no significant time x group interaction effects.
- A significant clinical change in depressive symptoms was observed in over 80% of participants in both groups (81.3% of women in the intervention group and 84.6% of women in the control group), from baseline to post-intervention.
- The therapeutic alliance was stronger in the intervention group than in the control group. The therapeutic alliance was significantly and negatively associated with depressive symptoms at post-intervention, in both intervention and control groups, i.e., a more positive therapeutic alliance was associated with lower symptom levels after the intervention.

2. General discussion of the main findings

In this section, the discussion of the main findings is presented, focusing both on the diversity of postpartum women's emotional experience related to depressive symptomatology and on the development and evaluation of Be a Mom Coping with Depression. This last topic will be discussed in two parts: first, addressing the development process and the evaluation of women's attitudes towards blended treatment for PPD; and the second part will focus on the results demonstrating that Be a Mom Coping with Depression is a feasible, acceptable, and potentially effective intervention for PPD.

2.1. Diversity of postpartum women's emotional experience

The birth of a baby is a major life transition, which is experienced uniquely by each woman. Although culturally perceived as a life event characterized only by positive emotions, not every mother undergoes such an experience (Moustafa et al., 2020), and about 17% of postpartum women develop PPD (Wang et al., 2021). It has been stated that PPD differs from an episode of major depression given the timing of its occurrence, its risk factors and clinical

specificities (Batt et al., 2020; Kettunen et al., 2014). Our work adds an important contribution to the literature regarding the heterogeneity of symptoms in this clinical condition.

The findings support the existence of three dimensions among PPD symptoms – depression, anhedonia and anxiety – and the identification of distinct profiles of women with PPD symptoms based on the severity of these symptoms. These results are in line with earlier research (e.g., Putnam et al., 2017; Sun et al., 2019) and suggest, firstly, that the multidimensional structure of the EPDS is consistent across several cultural contexts (e.g., Europe, Asia, Latin America) (Flom et al., 2018; Kubota et al., 2014; Petrozzi & Gagliardi, 2013). Secondly, although the coexistence of depression, anxiety, and anhedonia within PPD has been little explored in the literature, evidence is increasing (Coates et al., 2017; Waqas & Rahman, 2021), particularly regarding the high comorbidity between depressive and anxiety symptoms in PPD (Batt et al., 2020, Radoš et al., 2018). And thirdly, PPD should be understood as a heterogeneous clinical condition that can manifest with distinct subtypes of symptoms, presented with different intensities, which can have implications in its clinical management.

Moreover, this study provided evidence that different sociodemographic variables and risk factors were associated with distinct subtypes of PPD symptoms and profiles of symptoms. In terms of sociodemographic characteristics, we highlight that lower educational levels and lower household income are distinctive features across profiles, which may be expected to be associated with more severe PPD symptoms. A possible explanation for this finding is that women with lower education and lower incomes may face more difficulties in managing the different roles (e.g., professional) and may possess fewer resources to adapt to the changes inherent to the transition to motherhood (e.g., financial struggles; lower social support). In fact, Reck et al. (2008) have reported that mothers with lower educational levels presented a higher risk of developing depressive symptoms.

Among the factors that increase the likelihood of developing PPD, low self-esteem and previous episodes of depression (during pregnancy or before pregnancy) were found to be particularly relevant since they were associated with the three dimensions of PPD symptoms – depression, anxiety and anhedonia. Additionally, women in the severe PPD symptoms profile presented more frequently low self-esteem and prenatal depression compared to women in the other two profiles. These two risk factors are recognized as two of the most common risk factors for PPD, together with low social support and marital dissatisfaction (Hutchens & Kearney, 2020), which were also associated with higher levels of depression and anhedonia. These results were in accordance with previous studies (Falah-Hassani et al., 2016; McVey & Tuohy, 2007), but

further evidence is needed to determine if and how the specific risk factors for PPD can distinctly predict the subtypes of PPD symptoms.

The relevance of identifying the risk factors for the development of PPD is highlighted, as these factors seem to hold the potential to estimate the severity of women's PPD symptoms. Indeed, our findings revealed that women with severe PPD symptoms presented significantly more risk factors compared to those with mild anxious-depressive symptoms in our sample. Similarly, the profile of moderate anxious-depressive symptoms was associated with more risk factors than the profile of mild anxious-depressive symptoms. Therefore, the presence of risk factors for PPD can not only help in detecting the likelihood of a woman developing PPD (Alves et al., 2019) but also assist in estimating the severity of symptoms, providing valuable insights for further prognosis and treatment course.

This study marked the onset of our research project, providing an initial exploration that deepened the understanding of the target population to be engaged in subsequent studies, and it has contributed to the ongoing efforts of researchers and clinicians to advance the understanding and treatment of PPD.

2.2. Development and evaluation of Be a Mom Coping with Depression

2.2.1. Attitudes towards blended treatment for PPD

To ensure a systematic and successful uptake of new psychological interventions, particularly those incorporating e-health tools, the development process should consider the evaluation of key stakeholders' preferences and opinions, including the target population (Kip et al., 2022; Mohr et al., 2017). Therefore, exploring women's attitudes towards blended treatment for PPD was of great relevance to optimize the development and feasibility of the blended intervention (Be a Mom Coping with Depression).

Our research revealed an overall positive acceptability of a blended treatment for PPD, thereby encouraging further development and evaluation of this intervention. Consistent with the findings reported in other studies (Kooistra et al., 2016; van der Vaart et al., 2014), most women included in Empirical study II perceived a blended intervention for PPD as a useful format, with several advantages, and demonstrated being available to receive this type of treatment.

One of the objectives of developing a blended intervention for PPD is to increase professional help-seeking rates, by providing a more accessible treatment option for women. It is noteworthy that postpartum women who are employed and have younger babies may encounter more practical barriers when attending psychological treatment. So, the fact that these women had a higher likelihood of perceiving a blended intervention for PPD as useful can be an indicator that this blended format would, indeed, be more accessible. In fact, the main advantages reported by participants were flexibility, autonomy, and cost savings, which are important for increasing access to treatment, especially during a period when mothers encounter several practical barriers to seeking professional help (e.g., limitations associated with childcare, transportation or treatment costs, reduced time; Daehn et al. 2022).

Another important contribution to the literature is that our results demonstrated that married women or women in a relationship were more likely to consider a blended intervention for PPD as useful. This is in accordance with the results of a study conducted by Høifødt et al. (2015), and this finding may suggest two hypotheses. First, supportive partners can play a significant role in recommending and encouraging women to seek professional help for their postpartum depressive symptoms (Luís et al., 2019). Consequently, they can also encourage women to adhere to treatment for PPD, including new digital formats. Second, women may find a blended intervention useful for the possibility to share and discuss the contents of the web-based program with their partners. In fact, 26% of the participants identified this as an advantage. If a blended intervention is more frequently attended by women in a relationship, it becomes important for this intervention to include content that address common difficulties experienced within the couple (e.g., lack of support or communication difficulties).

It was also found that women with more severe depressive symptoms would more likely perceive the blended intervention for PPD as not useful. Women experiencing severe PPD symptoms may feel more isolated and less motivated to use the online component of the blended intervention and may prefer face-to-face treatment to discuss their difficulties and to feel more supported. In fact, it was previously mentioned that a blended treatment format could be more appropriate for patients presenting mild to moderate symptoms of depression and not recommended for severe symptoms (Topooco et al., 2017). This finding is relevant for addressing questions regarding the suitability of a blended intervention for all postpartum women, suggesting that it is not a 'one-size-fits-all' treatment format. This underscores the need for future research to identify women's characteristics, such as the severity of PPD symptoms, that may be more suitable for a blended treatment format.

Regarding the factors that influenced the availability for use, the results revealed that a higher educational level was associated with an increased likelihood of being available to use a blended psychological intervention for PPD. Furthermore, another study found that more participants with higher levels of education completed a blended intervention for depression, compared to participants with lower levels of education (Kemmeren et al., 2019). Thus, education may play a relevant role in the adherence to blended treatment. It is possible that women with higher education levels also present greater mental health literacy, and therefore recognize the importance of seeking professional help for depressive symptoms (Branquinho et al., 2019), as well as higher levels of e-health literacy. This, in turn, may contribute to increased confidence and comfort when engaging with the web-based program.

Regarding women's preferences, the results were considered in the development of Be a Mom Coping with Depression. In specific, in the final intervention protocol, the proportion of sessions is approximately 55% of sessions with the psychologist and 45% of online sessions in the web-based program, and duration is up to 60 minutes and 30 minutes, respectively.

2.2.2. Be a Mom Coping with Depression – a feasible, acceptable and potentially effective intervention for PPD

Be a Mom Coping with Depression is a blended intervention for the treatment of PPD, combining sessions with a psychologist and a web-based program. It is grounded in CBT principles for PPD treatment and includes elements of acceptance- and compassion-based approaches. The development of Be a Mom Coping with Depression included diverse phases of evaluation (Orsmond & Cohn, 2015). Empirical studies III and IV revealed that the blended intervention was feasible and acceptable to the target population. The findings were also informative about the necessary adjustments to proceed with a larger trial, as recommended in the literature (Gadke et al., 2021). Empirical study V answered the questions about the promising evidence of effectiveness and focused on the outcomes, as well as on the acceptability of the intervention (Eldridge et al., 2016; Orsmond & Cohn, 2015). Overall, the results of Empirical studies III, IV and V supported the feasibility, acceptability, and potential effectiveness of Be a Mom Coping with Depression.

The results concerning adherence to treatment were positive indicators of the feasibility of the blended intervention for PPD. In both feasibility and pilot RCT studies (Empirical studies IV and V), high treatment completion rates were observed (89% and 94%, respectively). Despite the reduced sample sizes, these rates are comparable to those found in other studies evaluating

blended interventions for depression, which reported low or no dropout rates (Nakao et al., 2018; Schuster et al., 2018a, Kemmeren et al., 2019). Regarding data on program usage and sessions' attendance, participants' engagement was also generally high. These findings represent a large advantage of blended interventions over web-based interventions for PPD. In fact, literature on web-based interventions for PPD treatment revealed high attrition and low completion rates (Lee et al., 2016; Nair et al., 2018). Additionally, studies have showed that engagement and completion rates increase when therapist support was provided (Baumeister et al., 2014), which is a benefit of blended treatment formats.

In terms of acceptability, most women in both Empirical studies IV and V perceived *Be a Mom Coping with Depression* as a useful intervention, with an adequate duration and ease of use. Several advantages of the blended intervention for PPD were identified, including improved flexibility and accessibility, reduced stigma, access to content between sessions, the opportunity to clarify doubts in-session and the adaptability of strategies to individual needs. These results are in line with previous research on the topic (Urech et al., 2018; Wentzel et al., 2016) and align with the results found in Empirical study II. Indeed, postpartum women would expect to experience these benefits if they participated in a blended intervention for PPD. In addition, the case study description (Empirical study III) allowed to reflect on the importance of using the web-based program integrated into the blended intervention. According to the mother, the web-based program was important to prepare for the sessions with the psychologist, to practice therapeutic strategies between sessions and to progress at her own pace, according to her availability, thus reinforcing the acceptability of this treatment format for PPD. Regarding satisfaction with the treatment, all women who received and completed the blended intervention (Empirical studies IV and V) reported being satisfied and would recommend it to a friend with PPD.

A blended intervention appears to be an attractive and engaging treatment for postpartum women with depressive symptoms. In fact, it has been suggested that blended interventions could potentially increase patient's motivation, self-management, and active role in the treatment (Schuster et al., 2018b; Titzler et al., 2018). In this context, motivation and need for commitment were identified as individual characteristics associated with the use of blended treatment formats. In Empirical study IV, women reported that the blended intervention required commitment and motivation. Specifically, some felt less committed to using the web-based program compared to attending the sessions with the psychologist. In the case study report (Empirical study III), the patient highlighted the importance of her motivation to actively engage in the web-based program and to complete the modules for her therapeutic progress.

Congruently, research has showed that patients who received a blended intervention for depression stated that the face-to-face sessions were important to increase their motivation and considered it a necessary component to engage in the treatment (Wilhelmsen et al., 2013). Hence, these findings highlight the importance of human support and the therapeutic relationship in a blended intervention (Ebert et al., 2018; Wilhelmsen et al., 2013).

In line with this, the therapeutic alliance assumes a valuable role in the blended intervention for PPD. The literature has documented a shared concern among patients and therapists regarding the establishment of an adequate therapeutic relationship in such interventions (Mol et al., 2020; van der Vaart et al., 2014). Indeed, in Empirical study II, a considerable portion of women (58%) agreed that potential constraints on the therapeutic relationship would be a disadvantage of a blended intervention for PPD. Nevertheless, our results did not confirm this expectation and they revealed instead that a positive therapeutic alliance was established. In Empirical study III, the therapeutic relationship was considered to be adequate, with the mother reporting that the video call format of sessions with the therapist did not compromise it. Similarly, in Empirical study IV, the therapeutic relationship was described as positive, empathic, encouraging and nonjudgmental. Some participants acknowledged some potential disadvantages associated with communication via video call but reported not experiencing any problems. The concerns expressed by women in our empirical studies appear to be associated with the video call format rather than the blended format itself. Despite this, literature indicates that the therapeutic relationship can be equally strong in therapy delivered through video call (Simpson & Reid, 2014) and that this is a feasible format that closely replicates face-to-face therapy (Berger, 2017).

Findings from Empirical study V also revealed positive levels of therapeutic alliance in the blended intervention. Research has demonstrated that the therapeutic relationship in blended treatments for depression was equivalent to that reported in face-to-face interventions (Vernmark et al., 2019). Thus, the reduced number of sessions with a therapist in a blended treatment format compared to a standard face-to-face intervention does not seem to affect the establishment of a therapeutic alliance, contrary to expectations (Mol et al., 2020). Additionally, we found that levels of therapeutic alliance were higher in the blended intervention compared to those reported by participants who received the guided web-based intervention, revealing the importance of the face-to-face component, even when provided through video call format. In fact, the establishment of a therapeutic alliance in guided web-based interventions can be hindered due to lower (or sometimes nonexistent) face-to-face contact (Berger, 2017; Roman et al., 2020). Congruently, a study comparing face-to-face CBT to an internet based-intervention,

with the option of contacting a therapist through online messaging, found that it took more time to build a positive therapeutic alliance in the group receiving the web-based intervention compared to those in the face-to-face intervention (Jasper et al., 2014). Therefore, although web-based interventions adopt characteristics of understanding, validation, and empathy that resemble a therapeutic relationship, face-to-face contact remains relevant and is indeed preferred by postpartum women to personalize treatment and reduce feelings of loneliness (Berger, 2017; Pugh et al., 2015).

In sum, it seems that the therapeutic relationship plays a crucial role in motivating women to adhere to the blended intervention for PPD. One study evaluating a blended treatment for depression described that participants who reported higher rates of therapeutic alliance shared more of their digital homework assignments with the therapist, reflecting higher engagement with treatment (Aerts & van Dam, 2018). This, in turn, can explain the association found between the therapeutic relationship and the treatment outcomes. Our results demonstrated that a more positive therapeutic alliance was associated with lower levels of depressive symptoms at the end of the blended intervention. This finding was consistent with the literature (Berger, 2017; Vernmark et al., 2019) and reinforces the relevance of therapist support when integrating e-health tools in interventions for PPD, as it can foster engagement and commitment to treatment.

Finally, the results of this research work provided preliminary evidence on the effectiveness of Be a Mom Coping with Depression in reducing depressive symptoms, although there are some limitations in the interpretation of the findings. In Empirical study IV, there was an overall decrease in the levels of depressive symptoms among women, although a clinically significant improvement was observed only in half of the sample, as informed by the RCI. In Empirical study V, there were notable rates of clinical improvement, according to the RCI, with 81.3% of women experiencing significant changes. The levels of depressive symptoms significantly reduced at post-intervention and were sustained at the 3-month follow-up. Although there were no significant differences between the experimental group (blended intervention) and the active control group (guided web-based intervention) in this study, these results were informative and relevant for research and clinical practice.

First, the findings of the empirical studies support the potential preliminary effectiveness of Be a Mom Coping with Depression for the treatment of PPD, although this conclusion cannot be withdrawn given the limited statistical power. There is growing interest in blended treatments for diverse mental health problems, but most research focuses on evaluating blended

interventions for depression and anxiety (Erbe et al., 2017; Ebert et al., 2018). Our results make a significant contribution to the literature by demonstrating that a blended treatment format can be useful to this population – postpartum women with depressive symptoms, who often encounter several barriers when seeking professional help and accessing adequate treatment. Second, it is known that CBT can be applied in a variety of formats (e.g., face-to-face, group, self-guided; Andersson et al., 2016) and our findings provided additional evidence that CBT can be delivered through a blended treatment format. Third, *Be a Mom Coping with Depression* can contribute to improve other outcomes relevant to the maintenance of PPD and to promote important psychological skills. In addition to reducing depressive symptoms, women who received the blended treatment reported decreased levels of anxiety and negative thoughts, as well as an increased perception of maternal self-efficacy, in Empirical study V. Additionally, the qualitative results of Empirical study IV showed that mothers perceived they gained several therapeutic skills and highlighted increased psychological flexibility, thought questioning, thought defusion, emotion regulation strategies, and self-compassion.

The integration of third-wave elements in the blended CBT treatment for PPD appears to be quite relevant. It is well-established that expectations about motherhood and dysfunctional beliefs are relevant cognitive processes that contribute to the occurrence and maintenance of PPD (Fonseca et al., 2020; Fonseca, 2023). In turn, women with PPD often use maladaptive emotion regulation strategies to cope with their internal experiences (e.g., suppression of thoughts and emotions, self-blame or self-criticism; Fonseca, 2023). Indeed, they tend to evaluate themselves and their experiences based on unrealistic expectations and standards imposed by society, leading to negative thoughts and feelings of shame, guilt or loneliness (Cree, 2010; Law et al., 2021). Throughout *Be a Mom Coping with Depression*, CBT strategies focused on increasing cognitive flexibility, fostering acceptance and cultivating self-compassion. Women were encouraged to deal with their thoughts and emotions in more adaptive ways and to accept their emotional experiences with a nonjudgmental and caring attitude. Additionally, they were prompted to face their difficulties inherent aspects of human nature and to recognize that difficulties during the postpartum period are common to all women. The inclusion of an interpersonal component was also relevant in this blended intervention. Strategies such as the promotion of assertive communication skills, problem solving and values-oriented behaviors were important to mitigate the impact of the lack of social support and marital dissatisfaction (Fonseca, 2023). Thus, it seems of extreme value to combine third-wave elements in CBT treatment for PPD, enabling a more process-focused approach that is responsive to women's needs (Hayes & Hofmann, 2021).

One additional commentary should be made regarding the comparison of the blended intervention for PPD with a guided web-based intervention, as both treatment arms showed improvements in the outcomes. One hypothesis is that the two interventions were not sufficiently different to produce variance between the groups, since participants accessed the same web-based program and received therapeutic support, although in different levels of intensity. Comparable results have been previously reported in a study comparing a blended CBT intervention with face-to-face CBT for depression in adolescents and it was hypothesized that the similarity of content and techniques of both treatment protocols, coupled with clinical guidance in both formats, may have contributed to the absence of differences in the outcomes (Rasing et al., 2021). Thus, it is possible that the use of the web-based program, together with therapeutic support, may be effective enough to develop and practice therapeutic strategies to treat PPD, but further research is needed.

Both intervention formats compared in Empirical study V can then be relevant for the treatment of PPD and each may present advantages for different women, but it remains to be explored what works better for whom. The evidence on the moderators of treatment effects in web-based interventions for depression is heterogeneous (Schröder et al., 2016) and scarce regarding e-health interventions for PPD (Milgrom et al., 2021). However, some hypothesis can arise from the preliminary evidence from our research and the literature.

Regarding the sociodemographic characteristics of postpartum women, Carona et al. (2023b) found that higher income levels were associated to greater reduction in anxiety symptoms in the Be a Mom program, the unguided version of the web-based intervention aiming to prevent PPD. Furthermore, literature has shown that higher education levels were indicators of positive outcomes in web-based interventions for depression, and that patients with lower education levels tended to dropout more often from unguided web-based interventions (Schröder et al., 2016). Thus, we can hypothesize that women with lower education levels and lower income, who possibly have lower access to information and e-health literacy levels, would need more support from a therapist throughout treatment, and therefore would benefit more from the blended intervention compared to the guided web-based intervention.

In light of the discussion of the findings above, the blended treatment format for PPD may be more appropriate for women who may not feel as motivated or committed to treatment. Conversely, the guided web-based intervention may be more suitable for women who are highly motivated for treatment and would not require the face-to-face component to remain engaged

with the intervention. In fact, the effectiveness of web-based interventions can be higher for participants with higher outcome expectations (Ebert et al., 2013).

Additionally, it is important to consider potential barriers to accessing or implementing each format of intervention. For instance, women with scheduling difficulties may prefer a web-based intervention, such as those with more children, younger babies or employment constraints, who may find it particularly challenging to dedicate time to sessions with a psychologist in a blended intervention. On the other hand, being unemployed or part-time employed can contribute to have more time to engage in the blended intervention (Mathiasen et al., 2022). In terms of implementation, the blended or guided web-based formats can be applicable to different healthcare contexts depending on the resources available. For instance, a web-based format may be more appropriate and sustainable for health service contexts with low human resources or without the possibility to provide sessions with psychologists (Milgrom et al., 2021).

Another important factor to consider when comparing a blended treatment with other formats using e-health is related to health professionals' preferences. Davies et al. (2020) conducted a review about the implementation of web-based interventions in routine mental healthcare and found that health professionals preferred the inclusion of some face-to-face contact given its role in establishing a therapeutic relationship and to continuously monitoring patients' progress. It is also noteworthy that many women will likely not access web-based intervention for PPD without support from a health professional (Davies et al., 2020).

Overall, assessing the available resources in healthcare, considering the different needs and characteristics of women, and taking into account the health professionals' preferences to implementation are important steps in determining the most appropriate format for delivering treatment for PPD.

3. Strengths and limitations

A major strength of this research project is its innovative character, both nationally and internationally. Up to date, and to our knowledge, this was the first research project that contributed: (1) to explore the factor structure of the EPDS, in the Portuguese context, and to identify profiles of women with PPD symptoms, (2) to explore the acceptability and preferences of Portuguese postpartum women presenting clinically relevant depressive symptoms about blended treatment formats targeting PPD; and (3) to develop a blended CBT intervention for the treatment of PPD and to test its feasibility and preliminary effectiveness.

In fact, to our knowledge, *Be a Mom Coping with Depression* was the first blended CBT intervention specifically designed for the treatment of PPD. The development of this intervention followed a user-centered approach, involving the target population (women in the postpartum period with clinically relevant depressive symptoms) throughout the process of its development and evaluation. The intervention protocol was informed both by a literature review about blended treatments and evidence-based CBT interventions for PPD, and by the results of a cross-sectional study with the target population (Empirical study II). Then, a feasibility study and a pilot RCT were conducted to evaluate the blended intervention in terms of feasibility, acceptability and preliminary effectiveness (Empirical studies IV and V).

The research objectives and hypothesis were defined based on previous evidence and existing literature. Additionally, the methodological and statistical choices used in this research work contributed to its strength. First, the inclusion of both quantitative and qualitative methods in assessing the blended intervention's feasibility and acceptability (Empirical study IV) is a recommended choice when evaluating new psychological interventions and should be highlighted. Second, the acceptability and preliminary effectiveness were explored in a pilot RCT with three assessment moments. Despite being considered a study conducted on a smaller scale than an RCT, the pilot study (Empirical study V) followed the same rigorous procedures (e.g., randomization, comparison to an active control group) and recommendations (e.g., CONSORT statement) as an RCT. It should also be noted that the empirical studies included instruments with good psychometric characteristics that were validated for the Portuguese population. The variety of instruments applied allowed to cover a wide range of variables that were relevant for understanding the emotional experience of postpartum women, including individual, parental, and relationship outcomes, as well as psychological processes and intervention-related variables.

The statistical techniques employed in this research work reinforce its strength. In particular, we highlight: 1) the use of the a confirmatory-factor approach in exploring the factor structure of the EPDS, which confirmed the three-factor structure of the EPDS in a sample of Portuguese women; 2) the use of latent profile analysis to determine and characterize profiles of PPD symptoms, which allowed to determine the existence of three profiles of women with distinct characteristics; 3) the calculation of the RCI to measure individual clinical change; and 4) the use of mixed ANOVAs to examine the preliminary effectiveness of Be a Mom Coping with Depression on primary and secondary outcomes.

These theoretical, methodological and statistical strengths reinforce the validity, relevance, and innovation of the results of this research project. Despite that, some limitations should also be acknowledged and taken into consideration in the interpretation of the findings.

First, the recruitment method used in the empirical studies (online recruitment) may have contributed to creating a selection bias. The samples comprised self-selected individuals, and then women included in the studies could have been more interested in the research topics, could be more available to receive psychological interventions or to use e-health tools, and could possess higher levels of mental health literacy. In addition, a consistent sociodemographic description across samples can be observed, with most women being married or in a relationship, employed, and highly educated. Despite adhering to recommendations for conducting feasibility and pilot studies, the small sample sizes in Empirical studies IV and V also contributed to limited representativeness. Therefore, the findings of this research work cannot be generalized to all Portuguese women in the postpartum period.

Second, the cross-sectional design of Empirical studies I and II did not allow to establish causal relationships between the variables. Moreover, the use of self-report measures presented limitations associated with social desirability, response fatigue, or loss of interest, which could have influenced the validity of the findings. Regarding the qualitative outcomes (Empirical study IV), the presence of the interviewer, who was also the psychologist conducting the blended intervention, may have introduced a desirability bias.

Third, the following limitations should be considered regarding the conduction of the pilot RCT (Empirical study V). Due to human resources limitations, the same individual (main researcher) was responsible for the enrolment, allocation and delivery of treatment (both intervention and control arms). To reduce therapist bias, Therapist Manuals were followed for each intervention arm. Moreover, given the nature of the interventions, participants were not blind to treatment allocation, which could have influenced their expectations about treatment

and improvement. The reasons for study dropout were unknown, since women who did not complete either the blended intervention or the guided web-based intervention did not reply to the contact attempts. It would be important to understand if dropouts were explained by intervention characteristics (e.g., demandingness) or individual factors (e.g., lack of time). Finally, due to time restrictions associated with the project duration, it was not feasible to include a longer follow-up assessment to evaluate if improvements would be maintained over a long period of time.

4. Implications and final considerations

4.1. Implications for future research

The current research work added important evidence to the literature and offers new directions for further research. Some gaps and research questions were identified that need to be answered in the future, considering simultaneously the limitations of this work.

First, the next logical step in the evaluation of the blended intervention for PPD – Be a Mom Coping with Depression – would be conducting an RCT to gather the highest level of evidence on its clinical effectiveness (Gadke et al., 2021). A future RCT should include a larger number of participants with more diverse sociodemographic characteristics, to ensure a more representative sample of Portuguese women with PPD symptoms, and should include other recruitment methods, such as recruitment in healthcare centers or hospital units.

The pilot RCT described in this research work faced human resources limitations, and thus a full powered RCT should include additional therapists delivering the blended intervention and different researchers responsible for enrolment and treatment allocation. The therapists should receive training on the application of the blended intervention and be supervised by senior psychologists, to ensure treatment fidelity and adherence to the treatment manual. It is also important to include longer follow-up assessments to evaluate if improvements would be maintained over time. Our results also revealed the need to explore characteristics associated with dropouts in further research to understand if attrition is associated with intervention or individual characteristics. Another relevant topic for research is to examine the process of change in women receiving this blended intervention for PPD in further trials through mediational analyses, by exploring if changes in psychological processes that are expected to be promoted through the intervention (e.g., self-compassion, psychological flexibility and emotion regulation) mediate improvements in depressive symptoms.

From a healthcare perspective, the perception of different mental healthcare stakeholders regarding the acceptability and implementation of a blended intervention for PPD in mental health services, including barriers and facilitators, should be further explored. Additionally, integrating e-health tools into health professionals' practice aims to increase efficiency instead of increasing workload (Mohr et al., 2017). Therefore, an RCT should assess variables such as the duration of treatment and therapist's time dedicated to each patient, as

well as costs associated to treatment, to provide evidence on the efficiency and cost-effectiveness of the blended intervention for PPD in a real-world setting.

Further research on blended treatment for PPD is still warranted to understand for whom the blended format is more suitable. The results of this research work have provided initial evidence on this topic, and it is now proposed that a blended intervention format may be more suitable for women with moderate symptoms of PPD. Moreover, our study has contributed to understanding women's preferences, but further investigation is needed to determine if individual characteristics (e.g., literacy levels, education) can determine the suitability for and effectiveness of this treatment format.

The question "What works for whom?" can also be raised by the findings from Empirical study V, regarding the type and intensity of therapist support. Both the experimental and control arms included therapist support, in addition to the web-based program. The blended intervention comprised one-hour structured sessions with a therapist delivered via video call, while the guided web-based intervention included short semi-structured phone calls with a therapist. Both interventions produced improvements, confirming that the optimal level of contact with the therapist (regarding frequency and content) as well as the mode of delivery (by telephone, email or face-to-face) in e-health interventions remain unclear in the literature (Ebert et al., 2018; Mohr et al., 2017). Blended interventions for PPD is a field to be explored, and knowledge on who may benefit more from this format and how it works better can inform the implementation in a real-world setting and improve treatment access.

Thus, we propose a future RCT with three arms, comparing the blended intervention for PPD with a lower intensity guided web-based intervention and a face-to-face CBT. Given the similarities described between the guided web-based intervention and the blended intervention in Empirical study V, we suggest a less intensive format for the control group. In this format, women would access the web-based program at their own pace, and contact with the therapist would be less frequent or of shorter duration, only to motivate women and clarify doubts, rather than being structured and related to the content of the modules.

It would also be relevant to compare Be a Mom Coping with Depression with face-to-face CBT to assess differences in clinical improvements and determine whether the blended intervention is more cost-effective compared to traditional formats. Face-to-face CBT and TAU provided in healthcare centers are the most common options for control groups when evaluating blended interventions for depression in RCTs. Therefore, including these comparators could contribute to producing results more comparable to other studies in the literature.

4.2. Implications for clinical practice and health policy

Considering the results of the present research work, as well as the literature review and clinical experience of the research team with postpartum women, some implications and considerations are drawn for clinical practice and to improve (mental) health policies targeting the perinatal period.

The first implication of this research work is related to the heterogeneity of PPD symptoms and the need to effectively detect this prevalent and persistent mental health problem. As it is known, screening for PPD symptoms is recommended by several clinical guidelines (e.g., Austin & Marcé Society Position Statement Advisory Committee, 2014; Bina et al., 2023) and the World Health Organization recommends routinely screening all postpartum women using validated tools, such as the EPDS (WHO, 2022). In fact, this is the standard and most widely used screening tool for PPD symptoms (Bina et al., 2023) and our research work made important contributions to screening practices using this instrument.

In Portugal, there is a lack of systematic screening procedures for PPD, which underscores the urgent need for the establishment of assessment procedures and training of healthcare providers. It is necessary to provide health professionals, particularly those who interact frequently with postpartum women (e.g., obstetrician/gynecologists, nurses, pediatricians), with the knowledge and tools to identify and address PPD effectively (Gjerdingen et al., 2008). Our findings suggest that it is possible to detect three subtypes of PPD symptoms using the EPDS. Therefore, in addition to considering the cutoff in the total score, analyzing the scores of the EPDS factors allows to gain insight about specific symptomatology of depression, anxiety and anhedonia experienced by mothers (Tuohy & McVey, 2008). This knowledge enables healthcare professionals to provide more tailored and adequate referral or treatment to postpartum women. In this context, Waqas and Rahman (2021) found that a CBT-based program was effective in different phenotypes of depressive symptoms among pregnant women, and they stated that it is necessary to adapt interventions according to the mother's symptom profile. Thus, understanding PPD as a heterogeneous condition contributes to a more personalized approach to screening and further treatment planning.

Another important implication resulting from this research project is related to the integration of blended treatment for PPD into perinatal mental healthcare. Considering the high prevalence of PPD, the challenges faced by postpartum women in accessing professional help, and the limited resources in the Portuguese healthcare system, the integration of new treatment formats that are both effective and efficient is paramount. This research work allowed to reflect

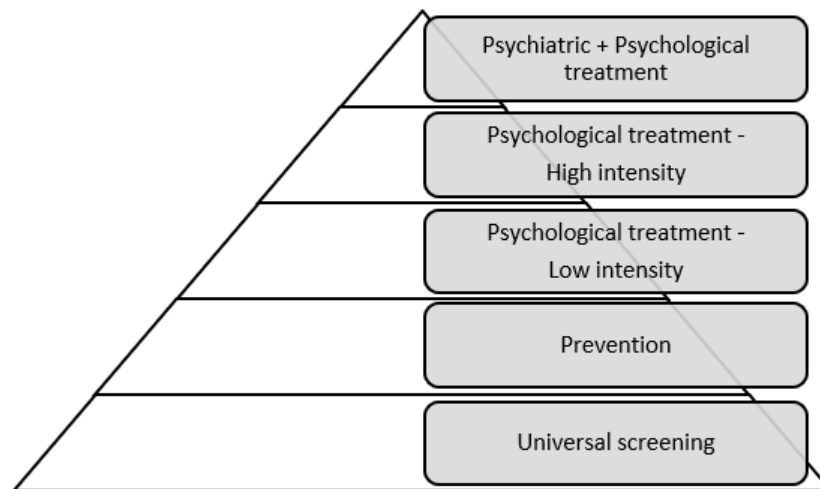
on the integration of e-health tools in perinatal mental healthcare and, in fact, blended treatment can be viewed as an initial step in integrating technology into clinical practice in a structured and supported way (Andersson et al., 2016; Topooco, 2018).

Furthermore, and in line with this perspective, both the guided web-based intervention for PPD tested in Empirical study V and the blended intervention for PPD can be viewed as complementary in a continuum of treatment options, varying in the level of support provided and treatment intensity. Despite the differences previously explored, both interventions produced improvements and have the potential to benefit diverse women with varying needs. Accordingly, integrating e-health interventions in a stepped-care model for PPD management could be particularly relevant (Gjerdingen et al., 2008; Schmidt-Hantke & Jacobi, 2023).

Stepped-care models of healthcare delivery aim to improve overall treatment efficiency by achieving greater benefit from the available resources. They are based on the principle of providing increased treatment intensity based on symptom severity, and on the collaborative principle of benefiting both the patient and healthcare provider (Bower & Gilbody, 2005; Gjerdingen et al., 2008). In the context of psychological treatment, a hierarchy of interventions with different intensity levels can be provided in a stepped-care model: self-help (without therapist support), guided self-help (with therapist support) and individual therapy. According to this model, the more intensive treatments are usually provided for patients who are not expected to get improvements from the first-line treatment options (Bower & Gilbody, 2005).

As mentioned by Gjerdingen et al. (2008), an integrated- and stepped-care model for the management of PPD in healthcare services must include screening and diagnosis, followed by the options of active treatment. Thus, the findings of this research work are aligned with a stepped-care model proposed in Figure 5 (based on DiSanza, et al., 2020; Gjerdingen et al., 2008).

Figure 5. Proposal of a stepped-care model for PPD management



At the base of the pyramid, universal screening using the EPDS should be conducted for all postpartum women, as previously mentioned. In particular, the identification of different subtypes and profiles of PPD symptoms could facilitate individualized treatment referral to the upper levels. In the next level, programs focused on the prevention of mental health problems could be made available to postpartum women if they do not screen positive for PPD. In the Portuguese context, the original version of the web-based program (Be a Mom) included in the blended intervention for PPD was developed as a totally self-guided tool for preventing PPD. Currently, a pilot implementation study of this program is being tested within the Portuguese National Health Service, with the potential to be integrated into a stepped-care model.

Stepped-care models assume that the higher levels of the pyramid correspond to patients with increased symptom severity and greater barriers to treatment access, such as lower support levels and lower income. Accordingly, different treatment intensities and formats should be available (Bower & Gilbody, 2005; DiSanza, et al., 2020). Based on clinical guidelines recommendations, psychological interventions are encouraged as the initial treatment for mild to moderate forms of PPD, with a combination of pharmacotherapy and psychotherapy being advised for severe PPD symptoms (Guille et al., 2013; Molenaar et al., 2018). Additionally, different options can be provided to address the diverse needs of patients. For example, the guided web-based intervention (web-based program with therapist support through brief phone calls) could target women with clinically relevant symptoms of PPD but considered to have low severity, offering a less intensive intervention than the blended treatment for PPD, which may

be suitable for those women higher up the treatment pyramid. For women with more severe symptoms, interventions conducted entirely face-to-face may be more appropriate.

This stepped-care model aligns with the findings from this research project. In Empirical Study I, women with mild anxious-depressive symptoms were identified as the most common profile of PPD symptoms. The integration of e-health interventions in a stepped-care model has the potential to extend support to a large number of women, which is particularly relevant in healthcare settings with limited human resources. The results of the empirical studies also highlighted that postpartum women with lower levels of education usually present more severe depressive symptoms and that these women may not consider the blended intervention as a treatment option. Aligned with the principles of stepped-care, these women could be directed to the upper levels of the pyramid, since it can be expected that they would not benefit from lower intensity interventions. Furthermore, it is important to increase education campaigns targeting women with lower educational levels not only to increase awareness about PPD symptoms and to promote help-seeking but also to increase knowledge about the effective treatment options.

In the context of integrating a blended intervention for PPD in perinatal mental health care, some barriers may emerge. Among these, there is the lack of guidance for professionals regarding the operationalization and implementation of blended treatments (Fairburn & Patel, 2017). To effectively integrate this blended intervention for PPD into the healthcare system, it is essential to establish guidelines outlining how and when to apply this format, as well as to provide specific education and training for health professionals (Davies et al., 2020; Kenter et al., 2015). These guidelines would not only ensure consistency and quality in the delivery of blended treatment but also equip healthcare professionals with the necessary skills and knowledge to effectively use and integrate e-health tools in their clinical practice for PPD management.

Several studies are being conducted to evaluate the implementation of blended treatment in real-world settings. Although there are specific challenges associated, such as introducing variability associated with providers and system factors, the evaluation of blended interventions in real-life conditions can enhance the generalizability of findings due to the more representative samples of participants (Kemmeren et al., 2023). For instance, in Spain, a blended treatment for emotional disorders will be tested in public mental health centers of the National Health System (Osma et al., 2021). Similarly, in the United States of America, a study evaluated a blended CBT treatment for depression and anxiety, but the access to the intervention was provided at no cost by employer companies (Lungu et al., 2020). In the Netherlands, Kemmeren

et al. (2023) evaluated a blended CBT intervention for depression within specialized routine mental healthcare. This study was part of a larger project named E-COMPARED conducted across nine European countries (European Comparative Effectiveness Research on Internet-based Depression Treatment, 2017). The overall goal of the E-COMPARED project was to assess the efficacy and cost-effectiveness of blended treatment for depression, as well as to provide mental health professionals with recommendations about this treatment approach. These recommendations included employing blended CBT as an additional treatment option provided in routine mental health care, as well as raising awareness about the potential of e-health and blended interventions for mental health (European Comparative Effectiveness Research on Internet-based Depression Treatment, 2017).

Thus, this increasing evidence is encouraging for the application of blended treatment to mental health problems such as PPD. By emphasizing the importance of screening, adopting an integrated and stepped-care approach for PPD management, and creating guidelines for the implementation of blended treatment, our research project can contribute to inform policy-making decisions to help healthcare systems better address the complex needs of women experiencing PPD and ensure access to effective treatment.

References

- Aerts, J. E., & van Dam, A. (2018). Blended e-Health in cognitive behavioural therapy: Usage intensity, attitude and therapeutic alliance in clinical practice. *Psychology*, 9(10), 2422. <https://doi.org/10.4236/psych.2018.910139>
- Alves, S., Fonseca, A., Canavarro, M. C., & Pereira, M. (2018). Preliminary psychometric testing of the Postpartum Depression Predictors Inventory-Revised (PDPI-R) in Portuguese women. *Maternal and Child Health Journal*, 22(4), 571-578. <https://doi.org/10.1007/s10995-017-2426-5>
- Alves, S., Fonseca, A., Canavarro, M. C., & Pereira, M. (2019). Predictive validity of the Postpartum Depression Predictors Inventory-Revised (PDPI-R): A longitudinal study with Portuguese women. *Midwifery*, 69, 113–120. <https://doi.org/10.1016/j.midw.2018.11.006>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental disorders: DSM-5*. American Psychiatric Association.
- American Psychiatric Association. (2022). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision*. American Psychiatric Association.
- American Psychological Association. (2017). *Ethical principles of psychologists and code of conduct* (2002, amended effective June 1, 2010, and January 1, 2017). <http://www.apa.org/ethics/code/principles.pdf>
- Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry*, 13(1), 4-11. <https://doi.org/10.1002/wps.20083>
- Andersson, G., Carlbring, P., & Lindefors, N. (2016). History and current status of ICBT. In N. Lindefors & G. Andersson (Eds.), *Guided internet-based treatments in psychiatry* (pp. 1-16). Springer International Publishing. <https://doi.org/10.1007/978-3-319-06083-5>
- Areias, M. E., Kumar, R., Barros, H., & Figueiredo, E. (1996). Comparative incidence of depression in women and men, during pregnancy and after childbirth. Validation of the Edinburgh Postnatal Depression Scale in Portuguese mothers. *British Journal of Psychiatry*, 169(1), 30-35. <https://doi.org/10.1192/bjp.169.1.30>

- Ashford, M. T., Olander, E. K., & Ayers, S. (2016). Computer-or web-based interventions for perinatal mental health: A systematic review. *Journal of Affective Disorders, 197*, 134–146. <https://doi.org/10.1016/j.jad.2016.02.057>
- Austin, M. P., & Marcé Society Position Statement Advisory Committee. (2014). Marcé International Society position statement on psychosocial assessment and depression screening in perinatal women. *Best Practice & Research Clinical Obstetrics & Gynaecology, 28*(1), 179-187. <https://doi.org/10.1016/j.bpobgyn.2013.08.016>
- Austin, M. P., Hight, N., & Guidelines Expert Advisory Committee (2011). *Clinical practice guidelines for depression and related disorders – anxiety, bipolar disorder and puerperal psychosis – in the perinatal period. A guideline for primary care health professionals*. Beyondblue: The national depression initiative.
- Ayala, G. X., & Elder, J. P. (2011). Qualitative methods to ensure acceptability of behavioral and social interventions to the target population. *Journal of Public Health Dentistry, 71*, S69-S79. <https://doi.org/10.1111/j.1752-7325.2011.00241.x>
- Barak, A., Klein, B., & Proudfoot, J. G. (2009). Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine, 38*(1), 4–17. <https://doi.org/10.1007/s12160-009-9130-7>
- Barnes, C. R., & Adamson-Macedo, E. N. (2007). Perceived Maternal Parenting Self-Efficacy (PMP S-E) tool: Development and validation with mothers of hospitalized preterm neonates. *Journal of Advanced Nursing, 60*(5), 550-560. <https://doi.org/10.1111/j.1365-2648.2007.04445.x>
- Barnes, D. L. (2006). Postpartum depression: Its impact on couples and marital satisfaction. *Journal of Systemic Therapies, 25*(3), 25-42. <https://doi.org/10.1521/jsyt.2006.25.3.25>
- Batt, M. M., Duffy, K. A., Novick, A. M., Metcalf, C. A., & Epperson, C. N. (2020). Is postpartum depression different from depression occurring outside of the perinatal period? A review of the evidence. *Focus, 18*(2), 106–119. <https://doi.org/10.1176/appi.focus.20190045>
- Bauer, A., Knapp, M., & Parsonage, M. (2016). Lifetime costs of perinatal anxiety and depression. *Journal of Affective Disorders, 192*, 83-90. <https://doi.org/10.1016/j.jad.2015.12.005>
- Baumeister, H., Reichler, L., Munzinger, M., & Lin, J. (2014). The impact of guidance on Internet-based mental health interventions—A systematic review. *Internet Interventions, 1*(4), 205-215. <https://doi.org/10.1016/j.invent.2014.08.003>

- BC Reproductive Mental Health Program, & Williams, J. (2014). *Best practice guidelines for mental health disorders in the perinatal period*. BC Reproductive Mental Health Program.
- Beck, C. T. (2002). Revision of the postpartum depression predictors inventory. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 31(4), 394-402. <https://doi.org/10.1111/j.1552-6909.2002.tb00061.x>
- Beck, J. S (1995). *Cognitive therapy: Basics & beyond*. Guilford Press.
- Begg, C., Cho, M., Eastwood, S., Horton, R., Moher, D., Olkin, I., Pitkin, R., Rennie, D., Schulz, K. F., Simel, D., & Stroup, D. F. (1996). Improving the quality of reporting of randomized controlled trials: The CONSORT statement. *JAMA*, 276(8), 637-639. <https://doi.org/10.1001/jama.1996.03540080059030>
- Berger, T. (2017). The therapeutic alliance in internet interventions: A narrative review and suggestions for future research. *Psychotherapy Research*, 27(5), 511-524. <https://doi.org/10.1080/10503307.2015.1119908>
- Bina, R. (2020). Predictors of postpartum depression service use: A theory-informed, integrative systematic review. *Women and Birth*, 33(1), e24–e32. <https://doi.org/10.1016/j.wombi.2019.01.006>
- Bina, R., Ganho-Ávila, A., Kittel-Schneider, S., Lambregtse-van den Berg, M., Lega, I., Lupattelli, A., Moura-Ramos, M., Nakić-Radoš, S., Rodriguez-Muñoz, M. F., Sheaf, G., A. Skalkidou, Uka, A., Uusitalo, S., & Van den Abeele, L. (2023). *Evidence-Based Guidelines for Prevention, Screening and Treatment of Peripartum Depression*. COST Action Research Innovation and Sustainable Pan-European Network in Peripartum Depression Disorder.
- Bonacquisti, A., Cohen, M. J., & Schiller, C. E. (2017). Acceptance and commitment therapy for perinatal mood and anxiety disorders: Development of an inpatient group intervention. *Archives of Women's Mental Health*, 20, 645-654. <https://doi.org/10.1007/s00737-017-0735-8>
- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, 42(4), 676-688. <https://doi.org/10.1016/j.beth.2011.03.007>

- Bower, P., & Gilbody, S. (2005). Stepped care in psychological therapies: Access, effectiveness and efficiency: Narrative literature review. *The British Journal of Psychiatry*, *186*(1), 11-17. <https://doi.org/10.1192/bjp.186.1.11>
- Branquinho, M., Canavarro, M. C., & Fonseca, A. (2019). Knowledge and attitudes about postpartum depression in the Portuguese general population. *Midwifery*, *77*, 86-94. <https://doi.org/10.1016/j.midw.2019.06.016>
- Branquinho, M., de la Fe Rodriguez-Muñoz, M., Maia, B. R., Marques, M., Matos, M., Osma, J., Moreno-Peral, P., Conejo-Cerón, S., Fonseca, A., & Vousoura, E. (2021). Effectiveness of psychological interventions in the treatment of perinatal depression: A systematic review of systematic reviews and meta-analyses. *Journal of Affective Disorders*, *291*, 294–306. <https://doi.org/10.1016/j.jad.2021.05.010>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. Guilford publications.
- Bur, O. T., Bielinski, L. L., Krauss, S., Häfliger, A., Guggisberg, J., Krieger, T., & Berger, T. (2022). Working alliance and adherence mediate the effect of guidance in a web-based program for participants with mild to moderate depressive symptoms: A secondary mediation analysis. *Internet Interventions*, *30*, 100593. <https://doi.org/10.1016/j.invent.2022.100593>
- Button, S., Thornton, A., Lee, S., Shakespeare, J., & Ayers, S. (2017). Seeking help for perinatal psychological distress: A meta-synthesis of women's experiences. *British Journal of General Practice*, *67*(663), e692-e699. <https://doi.org/10.3399/bjgp17X692549>
- Caldwell, J., Meredith, P., Whittingham, K., & Ziviani, J. (2021). Shame and guilt in the postnatal period: A systematic review. *Journal of Reproductive and Infant Psychology*, *39*(1), 67-85. <https://doi.org/10.1080/02646838.2020.1754372>
- Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., & Hedman-Lagerlöf, E. (2018). Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: An updated systematic review and meta-analysis. *Cognitive Behaviour Therapy*, *47*(1), 1-18. <https://doi.org/10.1080/16506073.2017.1401115>
- Carona, C., Pereira, M., Araújo-Pedrosa, A., Canavarro, M. C., & Fonseca, A. (2023a). The efficacy of Be a Mom, a web-based intervention to prevent postpartum depression: Examining

- mechanisms of change in a randomized controlled trial. *JMIR Mental Health*, 10(1), e39253. <https://doi.org/10.2196/39253>
- Carona, C., Pereira, M., Araújo-Pedrosa, A., Monteiro, F., Canavarro, M. C., & Fonseca, A. (2023b). For whom and for how long does the “Be a Mom” intervention work? A secondary analysis of data from a randomized controlled trial exploring the mid-term efficacy and moderators of treatment response. *Behavior Therapy*. <https://doi.org/10.1016/j.beth.2023.11.001>
- Castilho, P., Pinto-Gouveia, J., & Duarte, J. (2015). Evaluating the multifactor structure of the long and short versions of the Self-Compassion Scale in a clinical Sample. *Journal of Clinical Psychology*, 71(9), 856–870. <https://doi.org/10.1002/jclp.22187>
- Chiu, Y. H. M., Sheffield, P. E., Hsu, H. H. L., Goldstein, J., Curtin, P. C., & Wright, R. J. (2017). Subconstructs of the Edinburgh Postnatal Depression Scale in a multi-ethnic inner-city population in the US. *Archives of Women's Mental Health*, 20(6), 803–810. <https://doi.org/10.1007/s00737-017-0765-2>
- Christensen, H., & Hickie, I. B. (2010). Using e-health applications to deliver new mental health services. *Medical Journal of Australia*, 192(11), S53-S56.
- Coates, R., Ayers, S., & de Visser, R. (2017). Factor structure of the Edinburgh Postnatal Depression Scale in a population- based sample. *Psychological Assessment*, 29(8), 1016–1027. <https://doi.org/10.1037/pas0000397>
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Routledge
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150, 782-786. <https://doi.org/10.1192/bjp.150.6.782>
- Cree, M. (2010). Compassion Focused Therapy with perinatal and mother-infant distress. *International Journal of Cognitive Therapy*, 3(2), 159-171. <https://doi.org/10.1521/ijct.2010.3.2.159>
- da Fonseca, M. H., Kovalski, F., Picinin, C. T., Pedroso, B., & Rubbo, P. (2021). E-health practices and technologies: A systematic review from 2014 to 2019. *Healthcare*, 9, 1192. <https://doi.org/10.3390/healthcare9091192>
- Daehn, D., Rudolf, S., Pawils, S., & Renneberg, B. (2022). Perinatal mental health literacy: Knowledge, attitudes, and help-seeking among perinatal women and the public – a

- systematic review. *BMC Pregnancy and Childbirth*, 22(1), 1-22. <https://doi.org/10.1186/s12884-022-04865-y>
- Danaher, B. G., Milgrom, J., Seeley, J. R., Stuart, S., Schembri, C., Tyler, M. S., Ericksen, J., Lester, W., Gemmill, A., Kosty, D.B., & Lewinsohn, P. (2013). MomMoodBooster web-based intervention for postpartum depression: Feasibility trial results. *Journal of Medical Internet Research*, 15(11), e242. <https://doi.org/10.2196/jmir.2876>
- Davies, F., Shepherd, H. L., Beatty, L., Clark, B., Butow, P., & Shaw, J. (2020). Implementing web-based therapy in routine mental health care: Systematic review of health professionals' perspectives. *Journal of Medical Internet Research*, 22(7), e17362. <https://doi.org/10.2196/17362>
- Dennis, C. L., & Chung-Lee, L. (2006). Postpartum depression help-seeking barriers and maternal treatment preferences: A qualitative systematic review. *Birth*, 33(4), 323-331. <https://doi.org/10.1111/j.1523-536X.2006.00130.x>
- Di Florio, A., & Meltzer-Brody, S. (2015). Is postpartum depression a distinct disorder?. *Current Psychiatry Reports*, 17, 1-6. <https://doi.org/10.1007/s11920-015-0617-6>
- DiSanza, C. B., Geller, P. A., Bonacquisti, A., Posmontier, B., Horowitz, J. A., & Chiarello, L. A. (2020). A stepped care model of patient navigation to enhance engagement with perinatal mental health care. *Health Equity*, 4(1), 484-488. <https://doi.org/10.1089/heq.2020.0077>
- Dunford, E., & Granger, C. (2017). Maternal guilt and shame: Relationship to postnatal depression and attitudes towards help-seeking. *Journal of Child and Family Studies*, 26(6), 1692-1701. <https://doi.org/10.1007/s10826-017-0690-z>
- Ebert, D. D., Van Daele, T., Nordgreen, T., Karekla, M., Compare, A., Zarbo, C., Brugnera, A., Øverland, S., Trebbi, G., Jensen, K. L., Kahlke, F., & Baumeister, H. (2018). Internet-and mobile-based psychological interventions: Applications, efficacy, and potential for improving mental health. *European Psychologist*, 23(2), 167-187. <https://doi.org/10.1027/1016-9040/a000318>
- Eldridge, S. M., Chan, C. L., Campbell, M. J., Bond, C. M., Hopewell, S., Thabane, L., & Lancaster, G. A. (2016). CONSORT 2010 statement: Extension to randomised pilot and feasibility trials. *BMJ*, 355. <https://doi.org/10.1136/bmj.i5239>
- Emmanuel, E., & St John, W. (2010). Maternal distress: A concept analysis. *Journal of Advanced Nursing*, 66(9), 2104-2115. <https://doi.org/10.1111/j.1365-2648.2010>

- Epperson, C. N., Huang, M. Y., Cook, K., Gupta, D., Chawla, A., Greenberg, P. E., & Eldar-Lissai, A. (2020). Healthcare resource utilization and costs associated with postpartum depression among commercially insured households. *Current Medical Research and Opinion*, *36*(10), 1707-1716. <https://doi.org/10.1080/03007995.2020.1799772>
- Erbe, D., Eichert, H. C., Riper, H., & Ebert, D. D. (2017). Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *Journal of Medical Internet Research*, *19*(9), e306. <https://doi.org/10.2196/jmir.6>
- European Comparative Effectiveness Research on Internet-based Depression Treatment (2017). *Final Report Summary*. <https://cordis.europa.eu/docs/results/603/603098/final1-e-compared-final-report-publishable-summary.pdf>
- Evagorou, O., Arvaniti, A., & Samakouri, M. (2016). Cross-cultural approach of postpartum depression: Manifestation, practices applied, risk factors and therapeutic interventions. *Psychiatric Quarterly*, *87*(1), 129–154. <https://doi.org/10.1007/s11126-015-9367-1>
- Eysenbach, G. (2001). What is e-health?. *Journal of Medical Internet Research*, *3*(2), e20. <https://doi.org/10.2196/jmir.3.2.e20>
- Eysenbach, G., & Consort-EHEALTH Group. (2011). CONSORT-EHEALTH: Improving and standardizing evaluation reports of web-based and mobile health interventions. *Journal of Medical Internet Research*, *13*(4), e126. <https://doi.org/10.2196/jmir.1923>
- Fairburn, C. G., & Patel, V. (2017). The impact of digital technology on psychological treatments and their dissemination. *Behaviour Research and Therapy*, *88*, 19-25. <https://doi.org/10.1016/j.brat.2016.08.012>
- Falah-Hassani, K., Shiri, R., & Dennis, C. L. (2016). Prevalence and risk factors for comorbid postpartum depressive symptomatology and anxiety. *Journal of Affective Disorders*, *198*, 142–147. <https://doi.org/10.1016/j.jad.2016.03.010>
- Ferguson, S. L., G. Moore, E. W., & Hull, D. M. (2020). Finding latent groups in observed data: A primer on latent profile analysis in Mplus for applied researchers. *International Journal of Behavioral Development*, *44*(5), 458–468. <https://doi.org/10.1177/0165025419881721>
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). Sage.
- Field, T. (2010). Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behavior and Development*, *33*, 1–6. <https://doi.org/10.1016/j.infbeh.2009.10.005>

- Finlayson, K., Crossland, N., Bonet, M., & Downe, S. (2020). What matters to women in the postnatal period: A meta-synthesis of qualitative studies. *PLoS One*, *15*(4), e0231415. <https://doi.org/10.1371/journal.pone.0231415>
- Flom, J. D., Chiu, Y. H. M., Tamayo-Ortiz, M., Schnaas, L., Curtin, P. C., Wright, R. J., Téllez-Rojo, M. M., & Rosa, M. J. (2018). Subconstructs of the Edinburgh Postpartum Depression Scale in a postpartum sample in Mexico City. *Journal of Affective Disorders*, *238*, 142–146. <https://doi.org/10.1016/j.jad.2018.05.049>
- Fonseca, A. (2023). Postnatal depression: Cognitive-behavioral conceptualization and prevention and treatment approaches. In C. Martin, V. Preedy, & V. Patel (Eds.), *Handbook of lifespan cognitive-behavioral therapy* (pp. 53-64). Academic Press: Elsevier. <https://doi.org/10.1016/B978-0-323-85757-4.00006-7>
- Fonseca, A., & Canavarro, M. C. (2021). Towards a model of professional help-seeking for women's perinatal mood and anxiety disorders: The application of the information-processing model of help-seeking decisions. *Journal of Affective Disorders*, *282*, 686–688. <https://doi.org/10.1016/j.jad.2020.12.191>
- Fonseca, A., Alves, S., Monteiro, F., Gorayeb, R., & Canavarro, M. C. (2020). Be a Mom, a web-based intervention to prevent postpartum depression: Results from a pilot randomized controlled trial. *Behavior Therapy*, *51*(4), 616-633. <https://doi.org/10.1016/j.beth.2019.09.007>
- Fonseca, A., Branquinho, M., Monteiro, F., Araújo-Pedrosa, A., Bjørndal, L., & Lupattelli, A. (2023). Treatment options and their uptake among women with symptoms of perinatal depression: Exploratory study in Norway and Portugal. *BJPsych Open*, *9*(3), E77. <https://doi.org/10.1192/bjo.2023.56>
- Fonseca, A., Gorayeb, R., & Canavarro, M. C. (2015). Women's help-seeking behaviours for depressive symptoms during the perinatal period: Socio-demographic and clinical correlates and perceived barriers to seeking professional help. *Midwifery*, *31*(12), 1177-1185. <https://doi.org/10.1016/j.midw.2015.09.002>
- Fonseca, A., Gorayeb, R., & Canavarro, M. C. (2016). Women's use of online resources and acceptance of e-mental health tools during the perinatal period. *International Journal of Medical Informatics*, *94*, 228-236. <https://doi.org/10.1016/j.ijmedinf.2016.07.016>

- Fonseca, A., Monteiro, F., & Canavarro, M. C. (2018a). Dysfunctional beliefs towards motherhood and postpartum depressive and anxiety symptoms: Uncovering the role of experiential avoidance. *Journal of Clinical Psychology, 74*(12), 2134–2144. <https://doi.org/10.1002/iclp.22649>
- Fonseca, A., Monteiro, F., Alves, S., Gorayeb, R., & Canavarro, M. C. (2019). Be a mom, a web-based intervention to prevent postpartum depression: The enhancement of self-regulatory skills and its association with postpartum depressive symptoms. *Frontiers in Psychology, 10*, 265. <https://doi.org/10.3389/fpsyg.2019.00265>
- Fonseca, A., Pereira, M., Araújo-Pedrosa, A., Gorayeb, R., Ramos, M. M., & Canavarro, M. C. (2018b). Be a Mom: Formative evaluation of a web-based psychological intervention to prevent postpartum depression. *Cognitive and Behavioral Practice, 25*(4), 473–495. <https://doi.org/10.1016/j.cbpra.2018.02.002>
- Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). The development and validation of the Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT). *Journal of Contextual Behavioral Science, 5*(3), 134–145. <https://doi.org/10.1016/j.jcbs.2016.05.003>
- Gadke, D. L., Kratochwill, T. R., & Gettinger, M. (2021). Incorporating feasibility protocols in intervention research. *Journal of School Psychology, 84*, 1–18. <https://doi.org/10.1016/j.jsp.2020.11.004>
- Gelaye, B., Rondon, M. B., Araya, R., & Williams, M. A. (2016). Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. *The Lancet Psychiatry, 3*(10), 973–982. [https://doi.org/10.1016/S2215-0366\(16\)30284-X](https://doi.org/10.1016/S2215-0366(16)30284-X)
- Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology, 53*(1), 6–41. <https://doi.org/10.1111/bjc.12043>
- Gjerdingen, D., Katon, W., & Rich, D. E. (2008). Stepped care treatment of postpartum depression: A primary care-based management model. *Women's Health Issues, 18*(1), 44–52. <https://doi.org/10.1016/j.whi.2007.09.001>
- Goodman, J. H. (2004). Paternal postpartum depression, its relationship to maternal postpartum depression, and implications for family health. *Journal of Advanced Nursing, 45*(1), 26–35. <https://doi.org/10.1046/j.1365-2648.2003.02857.x>

- Goodman, J. H. (2009). Women's attitudes, preferences, and perceived barriers to treatment for perinatal depression. *Birth, 36*(1), 60-69. <https://doi.org/10.1111/j.1523-536X.2008.00296.x>
- Grissette, B. G., Spratling, R., & Aycock, D. M. (2018). Barriers to help-seeking behavior among women with postpartum depression. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 47*(6), 812-819. <https://doi.org/10.1016/j.jogn.2018.09.006>
- Guille, C., Newman, R., Fryml, L. D., Lifton, C. K., & Epperson, C. N. (2013). Management of postpartum depression. *Journal of Midwifery & Women's Health, 58*(6), 643-653. <https://doi.org/10.1111/jmwh.12104>
- Hall, P. L., & Papageorgiou, C. (2005). Negative thoughts after childbirth: Development and preliminary validation of a self-report scale. *Depression and Anxiety, 22*(3), 121-129. <https://doi.org/10.1002/da.20119>
- Hatcher, R. L., & Gillaspay, J. A. (2006). Development and validation of a revised short version of the Working Alliance Inventory. *Psychotherapy Research, 16*(1), 12-25. <https://doi.org/10.1080/10503300500352500>
- Hayes, S. C., & Hofmann, S. G. (2021). "Third-wave" cognitive and behavioral therapies and the emergence of a process-based approach to intervention in psychiatry. *World Psychiatry, 20*(3), 363-375. <https://doi.org/10.1002/wps.20884>
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44*(1), 1-25. <https://doi.org/10.1016/j.brat.2005.06.006>
- Hayes, S. C., Villatte, M., Levin, M., & Hildebrandt, M. (2011). Open, aware, and active: Contextual approaches as an emerging trend in the behavioral and cognitive therapies. *Annual Review of Clinical Psychology, 7*, 141-168. <https://doi.org/10.1146/annurev-clinpsy-032210-104449>
- Høifødt, R. S., Lillevoll, K. R., Griffiths, K. M., Wilsgaard, T., Eisemann, M., & Kolstrup, N. (2013). The clinical effectiveness of web-based cognitive behavioral therapy with face-to-face therapist support for depressed primary care patients: Randomized controlled trial. *Journal of Medical Internet Research, 15*(8), e153. <https://doi.org/10.2196/jmir.2714>
- Høifødt, R. S., Mittner, M., Lillevoll, K., Katla, S. K., Kolstrup, N., Eisemann, M., Friberg, O., & Waterloo, K. (2015). Predictors of response to web-based cognitive behavioral therapy

- with high-intensity face-to-face therapist guidance for depression: A Bayesian analysis. *Journal of Medical Internet Research*, 17(9), e197. <https://doi.org/10.2196/jmir.4351>
- Howard, L. M., & Khalifeh, H. (2020). Perinatal mental health: A review of progress and challenges. *World Psychiatry*, 19(3), 313-327. <https://doi.org/10.1002/wps.20769>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55. <https://doi.org/10.1080/10705519909540118>
- Huang, L., Zhao, Y., Qiang, C., & Fan, B. (2018). Is cognitive behavioral therapy a better choice for women with postnatal depression? A systematic review and meta-analysis. *PLoS One*, 13(10), e0205243. <https://doi.org/10.1371/journal>
- Hutchens, B. F., & Kearney, J. (2020). Risk factors for postpartum depression: An umbrella review. *Journal of Midwifery & Women's Health*, 65(1), 96–108. <https://doi.org/10.1111/jmwh.13067>
- Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to denning meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12–19.
- Jasper, K., Weise, C., Conrad, I., Andersson, G., Hiller, W., & Kleinstäuber, M. (2014). The working alliance in a randomized controlled trial comparing Internet-based self-help and face-to-face cognitive behavior therapy for chronic tinnitus. *Internet interventions*, 1(2), 49-57. <https://doi.org/10.1016/j.invent.2014.04.002>
- Kanotra, S., D'Angelo, D., Phares, T. M., Morrow, B., Barfield, W. D., & Lansky, A. (2007). Challenges faced by new mothers in the early postpartum period: an analysis of comment data from the 2000 Pregnancy Risk Assessment Monitoring System (PRAMS) survey. *Maternal and Child Health Journal*, 11, 549-558. <https://doi.org/10.1007/s10995-007-0206-3>
- Kaufman, E. A., Xia, M., Fosco, G., Yaptangco, M., Skidmore, C. R., & Crowell, S. E. (2016). The Difficulties in Emotion Regulation Scale Short Form (DERS-SF): Validation and replication in adolescent and adult samples. *Journal of Psychopathology and Behavioral Assessment*, 38(3), 443-455. <https://doi.org/10.1007/s10862-015-9529-3>

- Kazantzis, N., & Dobson, K. S. (2022). Therapeutic relationships in cognitive behavioral therapy: Theory and recent research. *Psychotherapy Research*, 32(8), 969-971. <https://doi.org/10.1080/10503307.2022.2124047>
- Kelman, A. R., Evare, B. S., Barrera, A. Z., Muñoz, R. F., & Gilbert, P. (2018). A proof-of-concept pilot randomized comparative trial of brief Internet-based compassionate mind training and cognitive-behavioral therapy for perinatal and intending to become pregnant women. *Clinical Psychology & Psychotherapy*, 25(4), 608-619. <https://doi.org/10.1002/cpp.2185>
- Kemmeren, L. L., van Schaik, A., Draisma, S., Kleiboer, A., Riper, H., & Smit, J. H. (2023). Effectiveness of blended cognitive behavioral therapy versus treatment as usual for depression in routine specialized mental healthcare: E-COMPARED trial in the Netherlands. *Cognitive Therapy and Research*, 47(3), 386-398. <https://doi.org/10.1007/s10608-023-10363-y>
- Kemmeren, L. L., van Schaik, A., Smit, J. H., Ruwaard, J., Rocha, A., Henriques, M., Zukowska, K., Hazo, J.-B., Dorsey, M., Zukowska, K., Riper, H., & Ebert, D. D. (2019). Unraveling the black box: Exploring usage patterns of a blended treatment for depression in a multicenter study. *JMIR Mental Health*, 6(7), e12707. <https://doi.org/https://doi.org/10.2196/12707>
- Kemmeren, L. L., Van Schaik, D. J. F., Riper, H., Kleiboer, A. M., Bosmans, J. E., & Smit, J. H. (2016). Effectiveness of blended depression treatment for adults in specialised mental healthcare: Study protocol for a randomised controlled trial. *BMC Psychiatry*, 16(113), 1-14. <https://doi.org/10.1186/s12888-016-0818-5>
- Kenter, R. M., van de Ven, P. M., Cuijpers, P., Koole, G., Niamat, S., Gerrits, R. S., Willems, M., & van Straten, A. (2015). Costs and effects of Internet cognitive behavioral treatment blended with face-to-face treatment: Results from a naturalistic study. *Internet Interventions*, 2(1), 77-83. <https://doi.org/10.1016/j.invent.2015.01.001>
- Kettunen, P., Koistinen, E., & Hintikka, J. (2014). Is postpartum depression a homogenous disorder: Time of onset, severity, symptoms and hopelessness in relation to the course of depression. *BMC Pregnancy and Childbirth*, 14(1), 1-9. <https://doi.org/10.1186/s12884-014-0402-2>
- Kip, H., Keizer, J., da Silva, M. C., Beerlage-de Jong, N., Köhle, N., & Kelders, S. M. (2022). Methods for human-centered eHealth development: Narrative scoping review. *Journal of Medical Internet Research*, 24(1), e31858. <https://doi.org/10.2196/31858>

- Kleiboer, A., Smit, J., Bosmans, J., Ruwaard, J., Andersson, G., Topooco, N., Berger, T., Krieger, T., Botella, C., Baños, R., Chevreur, K., Araya, R., Cerga-Pashoja, A., Cieślak, R., Rogala, A., Vis, C., Draisma, S., van Schaik, A., Kemmeren, L., ... Riper, H. (2016). European COMPARative Effectiveness research on blended Depression treatment versus treatment-as-usual (E-COMPARED): Study protocol for a randomized controlled, non-inferiority trial in eight European countries. *Trials*, *17*(1), 1-10. <https://doi.org/10.1186/s13063-016-1511-1>
- Kloek, C. J., Janssen, J., & Veenhof, C. (2020). Development of a checklist to assist physiotherapists in determination of patients' suitability for a blended treatment. *Telemedicine and e-Health*, *26*(8), 1051–1065. <https://doi.org/10.1089/tmj.2019.0143>
- Kloek, C., Bossen, D., De Bakker, D. H., Veenhof, C., & Dekker, J. (2017). Blended interventions to change behavior in patients with chronic somatic disorders: Systematic review. *Journal of Medical Internet Research*, *19*(12), e418. <https://doi.org/10.2196/jmir.8108>
- Kooistra, L. C., Ruwaard, J., Wiersma, J. E., Van Oppen, P., van der Vaart, R., van Gemert-Pijnen, J. E., & Riper, H. (2016). Development and initial evaluation of blended cognitive behavioural treatment for major depression in routine specialized mental health care. *Internet Interventions*, *4*, 61–71. <https://doi.org/10.1016/j.invent.2016.01.003>
- Kooistra, L. C., Wiersma, J. E., Ruwaard, J., Neijenhuijs, K., Lokkerbol, J., van Oppen, P., Smit, F., & Riper, H. (2019). Cost and effectiveness of blended versus standard cognitive behavioral therapy for outpatients with depression in routine specialized mental health care: Pilot randomized controlled trial. *Journal of Medical Internet Research*, *21*(10), e14261. <https://doi.org/10.2196/14261>
- Kubota, C., Okada, T., Aleksic, B., Nakamura, Y., Kunimoto, S., Morikawa, M., Shiino, T., Tamaji, A., Ohoka, H., Banno, N., Morita, T., Murase, S., Goto, S., Kanai, A., Masuda, T., Ando, M., & Ozaki, N. (2014). Factor structure of the Japanese version of the Edinburgh Postnatal Depression Scale in the postpartum period. *PLoS One*, *9*(8), e103941. <https://doi.org/10.1371/journal.pone.0103941>
- Lal, S., & Adair, C. E. (2014). E-mental health: A rapid review of the literature. *Psychiatric Services*, *65*(1), 24–32. <https://doi.org/10.1176/appi.ps.201300009>
- Law, N. K., Hall, P. L., & Cheshire, A. (2021). Common negative thoughts in early motherhood and their relationship to guilt, shame and depression. *Journal of Child and Family Studies*, *30*(8), 1831-1845. <https://doi.org/10.1007/s10826-021-01968-6>

- Lee, E. W., Denison, F. C., Hor, K., & Reynolds, R. M. (2016). Web-based interventions for prevention and treatment of perinatal mood disorders: A systematic review. *BMC Pregnancy and Childbirth*, *16*(38), 1-8. <https://doi.org/10.1186/s12884-016-0831-1>
- Luís, C., Canavarró, M. C., & Fonseca, A. (2019). Men's intentions to recommend professional help-seeking to their partners in the postpartum period: The direct and indirect effects of gender-role conflict. *International Journal of Environmental Research and Public Health*, *16*(20), 4002. <https://doi.org/10.3390/ijerph16204002>
- Lungu, A., Jun, J. J., Azarmanesh, O., Leykin, Y., & Chen, C. E. J. (2020). Blended care-cognitive behavioral therapy for depression and anxiety in real-world settings: Pragmatic retrospective study. *Journal of Medical Internet Research*, *22*(7), e18723. <https://doi.org/10.2196/18723>
- Maia, B. R., Marques, M., Bos, S., Pereira, A. T., Soares, M. J., Valente, J., Macedo, A., & Azevedo, M. H. (2011). Epidemiology of perinatal depression in Portugal: Categorical and dimensional approach. *Acta Medica Portuguesa*, *24*, 443–448.
- Maloni, J. A., Przeworski, A., & Damato, E. G. (2013). Web recruitment and internet use and preferences reported by women with postpartum depression after pregnancy complications. *Archives of Psychiatric Nursing*, *27*(2), 90–95. <https://doi.org/10.1016/j.apnu.2012.12.001>
- Maroco, J., & Garcia-Marques, T. (2006). Qual a fiabilidade do alfa de Cronbach? Questões antigas e soluções modernas?. *Laboratório de psicologia*, *4*(1), 65-90. <https://doi.org/10.14417/lp.763>
- Mathiasen, K., Andersen, T. E., Lichtenstein, M. B., Ehlers, L. H., Riper, H., Kleiboer, A., & Roessler, K. K. (2022). The clinical effectiveness of blended cognitive behavioral therapy compared with face-to-face cognitive behavioral therapy for adult depression: Randomized controlled noninferiority trial. *Journal of Medical Internet Research*, *24*(9), e36577. <https://doi.org/10.2196/36577>
- McVey, C., & Tuohy, A. (2007). Differential effects of marital relationship and social support on three subscales identified within the Edinburgh Postnatal Depression Scale. *Journal of Reproductive and Infant Psychology*, *25*(3), 203–209. <https://doi.org/10.1080/02646830701467256>

- Meltzer-Brody, S., & Rubinow, D. (2021). An overview of perinatal mood and anxiety disorders: Epidemiology and etiology. In E. Cox (Ed.), *Women's Mood Disorders: A Clinician's Guide to Perinatal Psychiatry* (pp. 5-16). Springer. https://doi.org/10.1007/978-3-030-71497-0_2
- Mendes-Santos, C., Weiderpass, E., Santana, R., & Andersson, G. (2020). Portuguese psychologists' attitudes toward Internet interventions: Exploratory cross-sectional study. *JMIR Mental Health*, 7(4), e16817. <https://doi.org/10.2196/16817>
- Meyer, B., Pilkonis, P. A., Krupnick, J. L., Egan, M. K., Simmens, S. J., & Sotsky, S. M. (2002). Treatment expectancies, patient alliance and outcome: Further analyses from the National Institute of Mental Health Treatment of Depression Collaborative Research Program. *Journal of Consulting and Clinical Psychology*, 70(4), 1051. <https://doi.org/10.1037/0022-006X.70.4.1051>
- Milgrom, J., Danaher, B. G., Gemmill, A. W., Holt, C., Holt, C. J., Seeley, J. R., Tyler, M. S., Ross, J., & Ericksen, J. (2016). Internet cognitive behavioral therapy for women with postnatal depression: A randomized controlled trial of MumMoodBooster. *Journal of Medical Internet Research*, 18(3), e4993. <https://doi.org/10.2196/jmir.4993>
- Milgrom, J., Danaher, B. G., Seeley, J. R., Holt, C. J., Holt, C., Ericksen, J., Tyler, M. S., Gau, J. M., & Gemmill, A. W. (2021). Internet and face-to-face cognitive behavioral therapy for postnatal depression compared with treatment as usual: Randomized controlled trial of MumMoodBooster. *Journal of Medical Internet Research*, 23(12), e17185. <https://doi.org/10.2196/17185>
- Mohr, D. C., Burns, M. N., Schueller, S. M., Clarke, G., & Klinkman, M. (2013). Behavioral intervention technologies: Evidence review and recommendations for future research in mental health. *General Hospital Psychiatry*, 35(4), 332-338. <https://doi.org/10.1016/j.genhosppsych.2013.03.008>
- Mohr, D. C., Spring, B., Freedland, K. E., Beckner, V., Arean, P., Hollon, S. D., Ockene, J., & Kaplan, R. (2009). The selection and design of control conditions for randomized controlled trials of psychological interventions. *Psychotherapy and Psychosomatics*, 78(5), 275-284. <https://doi.org/10.1159/000228248>
- Mohr, D. C., Weingardt, K. R., Reddy, M., & Schueller, S. M. (2017). Three problems with current digital mental health research... and three things we can do about them. *Psychiatric Services*, 68(5), 427-429. <https://doi.org/10.1176/appi.ps.201600541>

- Mol, M., van Genugten, C., Dozeman, E., van Schaik, D. J., Draisma, S., Riper, H., & Smit, J. H. (2020). Why uptake of blended internet-based interventions for depression is challenging: A qualitative study on therapists' perspectives. *Journal of Clinical Medicine*, *9*(1), 91. <https://doi.org/10.3390/jcm9010091>
- Molenaar, N. M., Kamperman, A. M., Boyce, P., & Bergink, V. (2018). Guidelines on treatment of perinatal depression with antidepressants: An international review. *Australian & New Zealand Journal of Psychiatry*, *52*(4), 320-327. <https://doi.org/10.1177/0004867418762057>
- Monteiro, F., Fonseca, A., Pereira, M., & Canavarro, M. C. (2022). Perceived maternal parenting self-efficacy scale: Factor structure and psychometric properties among Portuguese postpartum women. *Midwifery*, *105*, 103240. <https://doi.org/10.1016/j.midw.2021.103240>
- Montgomery, P., Grant, S., Mayo-Wilson, E., Macdonald, G., Michie, S., Hopewell, S., & Moher, D. (2018). Reporting randomised trials of social and psychological interventions: The CONSORT-SPI 2018 Extension. *Trials*, *19*(407) 1-14. <https://doi.org/10.1186/s13063-018-2733-1>
- Moreira, H., Gouveia, M.J. & Canavarro, M.C. (2022). A bifactor analysis of the Difficulties in Emotion Regulation Scale - Short Form (DERS-SF) in a sample of adolescents and adults. *Current Psychology*, *41*, 757–782. <https://doi.org/10.1007/s12144-019-00602-5>
- Moreno-Agostino, D., Wu, Y. T., Daskalopoulou, C., Hasan, M. T., Huisman, M., & Prina, M. (2021). Global trends in the prevalence and incidence of depression: A systematic review and meta-analysis. *Journal of Affective Disorders*, *281*, 235-243. <https://doi.org/10.1016/j.jad.2020.12.035>
- Motrico, E., Moreno-Peral, P., Uriko, K., Hancheva, C., Brekalo, M., Ajaz, E., Apter, G., Bramante, A., Conejo-Cerón, S., Christoforou, A., Dikmen-Yildiz, P., Evagorou, O., Fonseca, A., Lupattelli, A., Radoš, S. N., al Maach, N. Rodriguez-Muñoz, M. F., Žutić, M., & Lambregtse-van den Berg, M. P. (2022). Clinical practice guidelines with recommendations for peripartum depression: A European systematic review. *Acta Psychiatrica Scandinavica*, *146*(4), 325-339. <https://doi.org/10.1111/acps.13478>
- Moustafa, A. A., Crouse, J. J., Herzallah, M. M., Salama, M., Mohamed, W., Misiak, B., Frydecka, D., Al-Dosari, N. F., Megreya, A. M., & Mattock, K. (2020). Depression following major life

- transitions in women: A review and theory. *Psychological Reports*, 123(5), 1501-1517. <https://doi.org/10.1177/0033294119872209>
- Mu, T. Y., Li, Y. H., Xu, R. X., Chen, J., Wang, Y. Y., & Shen, C. Z. (2021). Internet-based interventions for postpartum depression: A systematic review and meta-analysis. *Nursing Open*, 8(3), 1125–1134. <https://doi.org/10.1002/nop2.724>
- Nair, U., Armfeld, N. R., Chatfeld, M. D., & Edirippulige, S. (2018). The effectiveness of telemedicine interventions to address maternal depression: A systematic review and meta-analysis. *Journal of Telemedicine and Telecare*, 24(10), 639–650. <https://doi.org/10.1177/1357633X18794332>
- Nakao, S., Nakagawa, A., Oguchi, Y., Mitsuda, D., Kato, N., Nakagawa, Y., Tamura, N., Kudo, Y., Abe, T., Hiyama, M., Iwashita, S., Ono, Y., Mimura, M., & Mimura, M. (2018). Web-based cognitive behavioral therapy blended with face-to-face sessions for major depression: Randomized controlled trial. *Journal of Medical Internet Research*, 20(9), e10743. <https://doi.org/10.2196/10743>
- Neff, K. D. (2003). Self-Compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2(2), 85-101. <https://doi.org/10.1080/15298860309032>
- Neff, K., & Germer, C. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*, 69(1), 28-44. <https://doi.org/10.1002/iclp.21923>
- Newton, A. S., March, S., Gehring, N. D., Rowe, A. K., & Radomski, A. D. (2021). Establishing a working definition of user experience for eHealth interventions of self-reported user experience measures with eHealth researchers and adolescents: Scoping review. *Journal of Medical Internet Research*, 23(12), e25012. <https://doi.org/10.2196/25012>
- Nillni, Y. I., Mehralizade, A., Mayer, L., & Milanovic, S. (2018). Treatment of depression, anxiety, and trauma-related disorders during the perinatal period: A systematic review. *Clinical Psychology Review*, 66, 136-148. <https://doi.org/10.1016/j.cpr.2018.06.004>
- Norman, C. D., & Skinner, H. A. (2006). eHEALS: the eHealth literacy scale. *Journal of Medical Internet Research*, 8(4), e507. <https://doi.org/10.2196/jmir.8.4.e27>
- Novick, A. M., Kwitowski, M., Dempsey, J., Cooke, D. L., & Dempsey, A. G. (2022). Technology-based approaches for supporting perinatal mental health. *Current Psychiatry Reports*, 24(9), 419-429. <https://doi.org/10.1007/s11920-022-01349-w>

- O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: A synthesis of recommendations. *Academic medicine*, 89(9), 1245-1251. <https://doi.org/10.1097/ACM.0000000000000388>
- O'Cathain, A., Hoddinott, P., Lewin, S., Thomas, K. J., Young, B., Adamson, J., Jansen, Y., Mills, N., Moore, G., & Donovan, J. L. (2015). Maximising the impact of qualitative research in feasibility studies for randomised controlled trials: Guidance for researchers. *Pilot and Feasibility Studies*, 1(1), 1–13. <https://doi.org/10.1186/s40814-015-0026-y>
- O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: Current status and future directions. *Annual Review of Clinical Psychology*, 9, 379–407. <https://doi.org/10.1146/annurev-clinpsy-050212-185612>
- O'Hara, M. W., & Wisner, K. L. (2014). Perinatal mental illness: definition, description and aetiology. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 28(1), 3-12. <https://doi.org/10.1016/j.bpobgyn.2013.09.002>
- O'Mahen, H. A., Richards, D. A., Woodford, J., Wilkinson, E., McGinley, J., Taylor, R. S., & Warren, F. C. (2014). Netmums: A phase II randomized controlled trial of a guided Internet behavioural activation treatment for postpartum depression. *Psychological Medicine*, 44(8), 1675-1689. <https://doi.org/10.1017/S0033291713002092>
- O'Mahen, H. A., Woodford, J., McGinley, J., Warren, F. C., Richards, D. A., Lynch, T. R., & Taylor, R. S. (2013). Internet-based behavioral activation—Treatment for postnatal depression (Netmums): A randomized controlled trial. *Journal of Affective Disorders*, 150(3), 814–822. <https://doi.org/10.1016/j.jad.2013.03.005>
- O'Mahen, H., Fedock, G., Henshaw, E., Himle, J. A., Forman, J., & Flynn, H. A. (2012). Modifying CBT for perinatal depression: What do women want?: A qualitative study. *Cognitive and Behavioral Practice*, 19(2), 359–371. <https://doi.org/10.1016/j.cbpra.2011.05.005>
- Order of Portuguese Psychologists (2021). Código Deontológico [Ethic Code]. https://www.ordemospsicologos.pt/ficheiros/documentos/regulamento_ao_637_2021.pdf
- Orsmond, G. I., & Cohn, E. S. (2015). The distinctive features of a feasibility study: Objectives and guiding questions. *OTJR: Occupation, Participation and Health*, 35(3), 169-177. <https://doi.org/10.1177/1539449215578649>

- Orsolini, L., Valchera, A., Vecchiotti, R., Tomasetti, C., Iasevoli, F., Fornaro, M., De Berardis, D., Perna, G., Pompili, M., & Bellantuono, C. (2016). Suicide during perinatal period: Epidemiology, risk factors, and clinical correlates. *Frontiers in Psychiatry, 7*, 138. <https://doi.org/10.3389/fpsyt.2016.00138>
- Osma, J., Martínez-García, L., Peris-Baquero, Ó., Navarro-Haro, M. V., González-Pérez, A., & Suso-Ribera, C. (2021). Implementation, efficacy and cost effectiveness of the unified protocol in a blended format for the transdiagnostic treatment of emotional disorders: A study protocol for a multicentre, randomised, superiority controlled trial in the Spanish National Health System. *BMJ Open, 11*(12), e054286. <https://doi.org/10.1136/bmjopen-2021-054286>
- Pais-Ribeiro, J., Silva, I., Ferreira, T., Martins, A., Meneses, R., & Baltar, M. (2007). Validation study of a Portuguese version of the Hospital Anxiety and Depression Scale. *Psychology, Health & Medicine, 12*(2), 225-235. <https://doi.org/10.1080/13548500500524088>
- Pedro, L., Branquinho, M., Canavarro, M. C., & Fonseca, A. (2019). Self-criticism, negative automatic thoughts and postpartum depressive symptoms: The buffering effect of self-compassion. *Journal of Reproductive and Infant Psychology, 37*(5), 539-553. <https://doi.org/10.1080/02646838.2019.1597969>
- Petrou, S., Cooper, P., Murray, L., & Davidson, L. L. (2002). Economic costs of post-natal depression in a high-risk British cohort. *The British Journal of Psychiatry, 181*(6), 505-512. <https://doi.org/10.1192/bjp.181.6.505>
- Petrozzi, A., & Gagliardi, L. (2013). Anxious and depressive components of Edinburgh Postnatal Depression Scale in maternal postpartum psychological problems. *Journal of Perinatal Medicine, 41*(4), 343-348. <https://doi.org/10.1515/jpm-2012-0258>
- Pettman, D., O'Mahen, H., Blomberg, O., Svanberg, A. S., von Essen, L., & Woodford, J. (2023). Effectiveness of cognitive behavioural therapy-based interventions for maternal perinatal depression: A systematic review and meta-analysis. *BMC Psychiatry, 23*(1), 1-25. <https://doi.org/10.1186/s12888-023-04547-9>
- Pihlaja, S., Stenberg, J. H., Joutsenniemi, K., Mehik, H., Ritola, V., & Joffe, G. (2018). Therapeutic alliance in guided internet therapy programs for depression and anxiety disorders—a systematic review. *Internet Interventions, 11*, 1-10. <https://doi.org/10.1016/j.invent.2017.11.005>

- Pinto-Gouveia, J., Gregório, S., Dinis, A., & Xavier, A. (2012). Experiential avoidance in clinical and non-clinical samples: AAQ-II Portuguese version. *International Journal of Psychology & Psychological Therapy*, 12(2), 139–156.
- Putnam, K. T., Wilcox, M., Robertson-Blackmore, E., Sharkey, K., Bergink, V., Munk-Olsen, T., Deligiannidis, K. M., Payne, J., Altemus, M., Newport, J., Apter, G., Devouche, E., Viktorin, A., Magnusson, P., Penninx, B., Buist, A., Bilszta, J., O'Hara, M., Stuart, S., ... Postpartum depression: Action Towards Causes and Treatment (PACT), C. (2017). Clinical phenotypes of perinatal depression and time of symptom onset: Analysis of data from an international consortium. *The Lancet Psychiatry*, 4(6), 477–485. [https://doi.org/10.1016/S2215-0366\(17\)30136-0](https://doi.org/10.1016/S2215-0366(17)30136-0)
- Radley, A., & Chamberlain, K. (2012). The study of the case: Conceptualising case study research. *Journal of Community & Applied Social Psychology*, 22(5), 390-399. <https://doi.org/10.1002/casp.1106>
- Radoš, S. N., Tadinac, M., & Herman, R. (2018). Anxiety during pregnancy and postpartum: course, predictors and comorbidity with postpartum depression. *Acta Clinica Croatica*, 57(1), 39. <https://doi.org/10.20471%2Facc.2018.57.01.05>
- Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy*, 18(3), 250-255. <https://doi.org/10.1002/cpp.702>
- Rai, A., Chen, L., Pye, J., & Baird, A. (2013). Understanding determinants of consumer mobile health usage intentions, assimilation, and channel preferences. *Journal of Medical Internet Research*, 15(8), e149. <https://doi.org/10.2196/jmir.2635>
- Ramos, M. A. F. (2008). *Análise das Características Psicométricas da Versão Portuguesa do Working Alliance Inventory - Short Revised*. (Doctoral dissertation, Universidade Do Minho).
- Rasing, S. P. (2021). Blended treatment for depressive disorders in youth: A narrative review. *International Journal of Cognitive Therapy*, 14(1), 47-58. <https://doi.org/10.1007/s41811-020-00088-1>
- Rasing, S. P., Stikkelbroek, Y. A., & Boddien, D. H. (2020). Is digital treatment the Holy Grail? Literature review on computerized and blended treatment for depressive disorders in

- youth. *International Journal of Environmental Research and Public Health*, 17(1), 153. <https://doi.org/10.3390/ijerph17010153>
- Rasing, S. P., Stikkelbroek, Y. A., Den Hollander, W., Okorn, A., & Bodden, D. H. (2021). Long term outcomes of blended CBT compared to face-to-face CBT and treatment as usual for adolescents with depressive disorders: Analyses at 12 months post-treatment. *Social Sciences*, 10(10), 373. <https://doi.org/10.3390/socsci10100373>
- Reck, C., Struben, K., Backenstrass, M., Stefenelli, U., Reinig, K., Fuchs, T., Sohn, C., & Mundt, C. (2008). Prevalence, onset and comorbidity of postpartum anxiety and depressive disorders. *Acta Psychiatrica Scandinavica*, 118(6), 459–468. <https://doi.org/10.1111/j.1600-0447.2008.01264.x>
- Riper, H., Andersson, G., Christensen, H., Cuijpers, P., Lange, A., & Eysenbach, G. (2010). Theme issue on e-mental health: A growing field in internet research. *Journal of Medical Internet Research*, 12(5), e1713. <https://doi.org/10.2196/jmir.1713>
- Rison, R. A., Shepphird, J. K., & Kidd, M. R. (2017). How to choose the best journal for your case report. *Journal of Medical Case Reports*, 11, 1-9. <https://doi.org/10.1186/s13256-017-1351-y>
- Robertson, E., Celasun, N., and Stewart, D.E. (2003). Risk factors for postpartum depression. In D.E., Stewart, E., Robertson, C.-L., Dennis, S.L., Grace, & T. Wallington (Eds.), *Postpartum depression: Literature review of risk factors and interventions*. (pp.9-70). University Health Network Women’s Health Program.
- Rodrigues, D., & Lopes, D. (2013). The Investment Model Scale (IMS): Further studies on construct validation and development of a shorter version (IMS-S). *Journal of General Psychology*, 140(1), 16-28. <https://doi.org/10.1080/00221309.2012.710276>
- Rodrigues, S., Costa, A. C., Canavarro, M. C. C., & Fonseca, A. (2017). Adaptação da Escala de Pensamentos Automáticos Negativos Pós-Parto para a população portuguesa: Estudos psicométricos. *Análise Psicológica*, 35(3), 395-407. <https://doi.org/10.14417/ap.1334>
- Rodriguez-Muñoz, M. F., Radoš, S. N., Uka, A., Marques, M., Maia, B. R., Matos, M., Branquinho, M., Aydın, R., Mahmoodi, V., Chrzan-Dętkoś, M., Walczak-Kozłowska, T., & Liakea, I. (2023). Effectiveness of the third wave cognitive behavior therapy for peripartum depression treatment – a systematic review. *Midwifery*, 127, 103865. <https://doi.org/10.1016/j.midw.2023.103865>

- Roman, M., Constantin, T., & Bostan, C. M. (2020). The efficiency of online cognitive-behavioral therapy for postpartum depressive symptomatology: A systematic review and meta-analysis. *Women & Health, 60*(1), 99-112. <https://doi.org/10.1080/03630242.2019.1610824>
- Rusbult, C. E., Martz, J. M., & Agnew, C. R. (1998). The Investment Model Scale: Measuring commitment level, satisfaction level, quality of alternatives, and investment size. *Personal Relationships, 5*(4), 357-387. <https://doi.org/10.1111/j.1475-6811.1998.tb00177.x>
- Sander, L., Rausch, L., & Baumeister, H. (2016). Effectiveness of internet-based interventions for the prevention of mental disorders: A systematic review and meta-analysis. *JMIR Mental Health, 3*(3), e6061. <https://doi.org/10.2196/mental.6061>
- Schmidt-Hantke, J., & Jacobi, C. (2023). Investigating perspectives on e-health interventions to enhance maternal mental well-being: Results of a stakeholder interview. *PLOS Digital Health, 2*(8), e0000326. <https://doi.org/10.1371/journal.pdig.0000326>
- Schröder, J., Berger, T., Westermann, S., Klein, J. P., & Moritz, S. (2016). Internet interventions for depression: New developments. *Dialogues in Clinical Neuroscience, 18*(2), 203-212. <https://doi.org/10.31887/DCNS.2016.18.2/jschroeder>
- Schulz, K. F., Altman, D. G., Moher, D., & Group, C. (2010). CONSORT 2010 statement: Updated guidelines for reporting parallel group randomised trials. *BMJ, 340*, c332. <https://doi.org/10.1136/bmj.c332>
- Schuster, R., Fichtenbauer, I., Sparr, V. M., Berger, T., & Laireiter, A. R. (2018a). Feasibility of a blended group treatment (bGT) for major depression: Uncontrolled interventional study in a university setting. *BMJ Open, 8*(3), e018412. <https://doi.org/10.1136/bmjopen-2017-018412>
- Schuster, R., Pokorny, R., Berger, T., Topooco, N., & Laireiter, A. R. (2018b). The advantages and disadvantages of online and blended therapy: Survey study amongst licensed psychotherapists in Austria. *Journal of Medical Internet Research, 20*(12), e11007. <https://doi.org/10.2196/11007>
- Sekhon, M., Cartwright, M., & Francis, J. J. (2017). Acceptability of healthcare interventions: An overview of reviews and development of a theoretical framework. *BMC Health Services Research, 17*(1), 1-13. <https://doi.org/10.1186/s12913-017-2031-8>

- Sethi, S., Campbell, A. J., & Ellis, L. A. (2010). The use of computerized self-help packages to treat adolescent depression and anxiety. *Journal of Technology in Human Services, 28*(3), 144-160. <https://doi.org/10.1080/15228835.2010.508317>
- Shaw, T., McGregor, D., Brunner, M., Keep, M., Janssen, A., & Barnet, S. (2017). What is eHealth (6)? Development of a conceptual model for eHealth: Qualitative study with key informants. *Journal of Medical Internet Research, 19*(10), e324. <https://doi.org/10.2196/jmir.8106>
- Shorey, S., Chee, C. Y. I., Ng, E. D., Chan, Y. H., San Tam, W. W., & Chong, Y. S. (2018). Prevalence and incidence of postpartum depression among healthy mothers: A systematic review and meta-analysis. *Journal of Psychiatric Research, 104*, 235–248. <https://doi.org/10.1016/j.jpsychires.2018.08.001>
- Simpson, S. G., & Reid, C. L. (2014). Therapeutic alliance in videoconferencing psychotherapy: A review. *Australian Journal of Rural Health, 22*(6), 280–299. <https://doi.org/10.1111/ajr.12149>
- Śliwerski, A., Kossakowska, K., Jarecka, K., Świtalska, J., & Bielawska-Batorowicz, E. (2020). The effect of maternal depression on infant attachment: A systematic review. *International Journal of Environmental Research and Public Health, 17*(8), 2675. <https://doi.org/10.3390/ijerph17082675>
- Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health, 15*, 1-55. <https://doi.org/10.1177/1745506519844044>
- Smoktunowicz, E., Barak, A., Andersson, G., Banos, R. M., Berger, T., Botella, C., Dear, B. F., Donker, T., Ebert, D. D., Hadjistavropoulos, H., Hodgins, D. C., Kaldov, V., Mohr, D. C., Nordgreen, T., Powers, M. B., Riper, H., Ritterband, L. M., Rozental, A., Schueller, S. M., Titov, N., Weise, C., & Carlbring, P. (2020). Consensus statement on the problem of terminology in psychological interventions using the internet or digital components. *Internet Interventions, 21*, 100331. <https://doi.org/https://doi.org/10.1016/j.invent.2020.100331>
- Sockol, L. E. (2015). A systematic review of the efficacy of cognitive behavioral therapy for treating and preventing perinatal depression. *Journal of Affective Disorders, 177*, 7-21. <https://doi.org/10.1016/j.jad.2015.01.052>

- Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: a review and “how to” guide of its application within vocational behavior research. *Journal of Vocational Behavior, 120*, 103445. <https://doi.org/10.1016/j.jvb.2020.103445>
- Stamou, G., García-Palacios, A., & Botella, C. (2018). Cognitive-Behavioural therapy and interpersonal psychotherapy for the treatment of post-natal depression: A narrative review. *BMC Psychology, 6*, 1-25. <https://doi.org/10.1186/s40359-018-0240-5>
- Steel, Z., Marnane, C., Iranpour, C., Chey, T., Jackson, J. W., Patel, V., & Silove, D. (2014). The global prevalence of common mental disorders: A systematic review and meta-analysis 1980–2013. *International Journal of Epidemiology, 43*(2), 476-493. <https://doi.org/10.1093/ije/dyu038>
- Sun, J. W., Cao, D. F., Li, J. H., Zhang, X., Wang, Y., Bai, H. Y., Lin, P. Z., Zhang, H. H., & Cao, F. L. (2019). Profiles and characteristics of clinical subtypes of perinatal depressive symptoms: A latent class analysis. *Journal of Advanced Nursing, 75*(11), 2753–2765. <https://doi.org/10.1111/jan.14136>
- Tabachnick, B., & Fidell, L. (2013). *Using multivariate statistics*. Pearson.
- Taylor, C. B., Graham, A. K., Flatt, R. E., Waldherr, K., & Fitzsimmons-Craft, E. E. (2021). Current state of scientific evidence on Internet-based interventions for the treatment of depression, anxiety, eating disorders and substance abuse: An overview of systematic reviews and meta-analyses. *European Journal of Public Health, 31*, i3-i10. <https://doi.org/10.1093/eurpub/ckz208>
- Tingey, R., Lambert, M., Burlingame, G., & Hansen, N. (1996). Assessing clinical significance: Proposed extensions to method. *Psychotherapy Research, 6*(2), 109–123. <https://doi.org/10.1080/10503309612331331638>
- Titzler, I., Saruhanjan, K., Berking, M., Riper, H., & Ebert, D. D. (2018). Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists’ perspective. *Internet Interventions, 12*, 150–164. <https://doi.org/10.1016/j.invent.2018.01.002>
- Tomás, C., Queirós, P., & Ferreira, T. (2014). Análise das propriedades psicométricas da versão portuguesa de um instrumento de avaliação de e-literacia em Saúde. *Revista De Enfermagem Referência, 4*(2), 19–28. <https://doi.org/10.12707/RIV14004>

- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349-357. <https://doi.org/10.1093/intqhc/mzm042>
- Topooco, N. (2018). *Blended cognitive behavior therapy: Efficacy and acceptability for treating depression in the adult and adolescent population* (Doctoral dissertation, Linköping University Electronic Press).
- Topooco, N., Riper, H., Araya, R., Berking, M., Brunn, M., Chevreur, K., Cieslak, R., Ebert, D. D., Etchmendy, E., Herrero, R., Kleiboer, A., Krieger, T., García-Palacios, A., Cerga-Pashoja, A., Smoktunowicz, E., Urech, A., Vis, C., Andersson, G., & E-COMPARED consortium (2017). Attitudes towards digital treatment for depression: A European stakeholder survey. *Internet Interventions*, *8*, 1–9. <https://doi.org/10.1016/j.invent.2017.01.001>
- Trindade, I. A., Ferreira, N. B., Mendes, A. L., Ferreira, C., Dawson, D., & Golijani-Moghaddam, N. (2021). Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT): Measure refinement and study of measurement invariance across Portuguese and UK samples. *Journal of Contextual Behavioral Science*, *21*, 30-36. <https://doi.org/10.1016/j.jcbs.2021.05.002>
- Tripepi, G., Chesnaye, N. C., Dekker, F. W., Zoccali, C., & Jager, K. J. (2020). Intention to treat and per protocol analysis in clinical trials. *Nephrology*, *25*(7), 513-517. <https://doi.org/10.1111/nep.13709>
- Tuohy, A., & McVey, C. (2008). Subscales measuring symptoms of non-specific depression, anhedonia, and anxiety in the Edinburgh Postnatal Depression Scale. *British Journal of Clinical Psychology*, *47*(2), 153–169. <https://doi.org/10.1348/014466507X238608>
- Urech, A., Krieger, T., Möseneder, L., Biaggi, A., Vincent, A., Poppe, C., Meyer, B., Riper, H., & Berger, T. (2018). A patient post hoc perspective on advantages and disadvantages of blended cognitive behaviour therapy for depression: A qualitative content analysis. *Psychotherapy Research*, *29*(8), 986–998. <https://doi.org/10.1080/10503307.2018.1430910>
- van der Vaart, R., Witting, M., Riper, H., Kooistra, L., Bohlmeijer, E. T., & van Gemert-Pijnen, L. J. (2014). Blending online therapy into regular face-to-face therapy for depression: Content, ratio and preconditions according to patients and therapists using a Delphi study. *BMC Psychiatry*, *14*(1), 1–10. <https://doi.org/10.1186/s12888-014-0355-z>

- van Gemert-Pijnen, J. E., Nijland, N., van Limburg, M., Ossebaard, H. C., Kelders, S. M., Eysenbach, G., & Seydel, E. R. (2011). A holistic framework to improve the uptake and impact of eHealth technologies. *Journal of Medical Internet Research*, *13*(4), e1672. <https://doi.org/10.2196/jmir.1672>
- Vernmark, K., Hesser, H., Topooco, N., Berger, T., Riper, H., Luuk, L., Backlund, L., Carlbring, P., & Andersson, G. (2019). Working alliance as a predictor of change in depression during blended cognitive behaviour therapy. *Cognitive Behaviour Therapy*, *48*(4), 285–299. <https://doi.org/10.1080/16506073.2018.1533577>
- Vesga-Lopez, O., Blanco, C., Keyes, K., Olfson, M., Grant, B. F., & Hasin, D. S. (2008). Psychiatric disorders in pregnant and postpartum women in the United States. *Archives of General Psychiatry*, *65*(7), 805-815. <https://doi.org/10.1001/archpsyc.65.7.805>
- Virués-Ortega, J., & Moreno-Rodríguez, R. (2008). Guidelines for clinical case reports in behavioral clinical psychology. *International Journal of Clinical and Health Psychology*, *8*(3), 765-777.
- Wang, Z., Liu, J., Shuai, H., Cai, Z., Fu, X., Liu, Y., Xiao, X., Zhang, W., Krabbendam, E., Liu, S., Liu, Z., Li Z., & Yang, B. X. (2021). Mapping global prevalence of depression among postpartum women. *Translational Psychiatry*, *11*(1), 543. <https://doi.org/10.1038/s41398-021-01663-6>
- Waqas, A., & Rahman, A. (2021). Does one treatment fit all? Effectiveness of a multicomponent cognitive behavioral therapy program in data-driven subtypes of perinatal depression. *Frontiers in Psychiatry*, *12*, 736790. <https://doi.org/10.3389/fpsyt.2021.736790>
- Waqas, A., Zafar, S. W., Akhtar, P., Naveed, S., & Rahman, A. (2023). Optimizing cognitive and behavioral approaches for perinatal depression: A systematic review and meta-regression analysis. *Cambridge Prisms: Global Mental Health*, *10*, e22. <https://doi.org/10.1017/gmh.2023.8>
- Waters, C. S., Annear, B., Flockhart, G., Jones, I., Simmonds, J. R., Smith, S., Traylor, C., & Williams, J. F. (2020). Acceptance and Commitment Therapy for perinatal mood and anxiety disorders: A feasibility and proof of concept study. *British Journal of Clinical Psychology*, *59*(4), 461–479. <https://doi.org/10.1111/bjc.12261>

- Wehmann, E., Köhnen, M., Härter, M., & Liebherz, S. (2020). Therapeutic alliance in technology-based interventions for the treatment of depression: Systematic review. *Journal of Medical Internet Research*, 22(6), e17195. <https://doi.org/10.2196/17195>
- Wentzel, J., van der Vaart, R., Bohlmeijer, E. T., & van Gemert-Pijnen, J. E. (2016). Mixing online and face-to-face therapy: How to benefit from blended care in mental health care. *JMIR Mental Health*, 3(1), e9. <https://doi.org/10.2196/mental.4534>
- Wenzel, A., & Kleiman, K. (2015). *Cognitive behavioral therapy for perinatal distress*. Routledge.
- Wilhelmsen, M., Lillevoll, K., Risør, M. B., Høifødt, R., Johansen, M. L., Kolstrup, N., Kolstrup, N., & Kolstrup, N. (2013). Motivation to persist with internet-based cognitive behavioural treatment using blended care: A qualitative study. *BMC Psychiatry*, 13(1), 296. <https://doi.org/https://doi.org/10.1186/1471-244X-13-296>
- Woolhouse, H., Gartland, D., Perlen, S., Donath, S., & Brown, S. J. (2014). Physical health after childbirth and maternal depression in the first 12 months post partum: Results of an Australian nulliparous pregnancy cohort study. *Midwifery*, 30(3), 378–384. <http://dx.doi.org/10.1016/j.midw.2013.03.006>
- World Health Organization. (2022). *WHO recommendations on maternal and newborn care for a positive postnatal experience*. World Health Organization.
- World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA*, 310, 2191–2194. <https://doi.org/10.1001/jama.2013.281053>
- Xavier, S., Monteiro, F., Canavarro, M. C., & Fonseca, A. (2022). Be a Mom: Patterns of program usage and acceptability among women with low-risk and high-risk for postpartum depression. *Frontiers in Global Women's Health*, 3, 841427. <https://doi.org/10.3389/fgwh.2022.841427>
- Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-370. <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>

Appendix

Appendix I

Overview of the Therapist Manual – Be a Mom Coping with Depression

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2022



*Be a Mom Coping with Depression: Uma intervenção psicológica
combinada para o tratamento da depressão pós-parto*

Manual do Terapeuta

Mariana Branquinho

Maria Cristina Canavarro

Ana Fonseca

Visão geral do programa Be a Mom Coping with Depression

Sessões	Tipo	Conteúdos	Fichas para a doente
Sessão 1 Avaliação e Introdução ao Tratamento	Sessão com o psicólogo	<ul style="list-style-type: none"> • Avaliação Clínica Cognitivo-Comportamental; • Modelo idiossincrático da doente; • Motivação para o tratamento e definição de objetivos terapêuticos. 	<ol style="list-style-type: none"> 1. A minha linha de vida 2. Os meus objetivos 3. Calendarização do tratamento
Sessão 2 Mudanças da Maternidade, Depressão pós-parto e Emoções	Sessão online	<ul style="list-style-type: none"> • As mudanças da maternidade; • A depressão pós-parto; • A diversidade de respostas emocionais no pós-parto. 	
Sessão 3 Modelo da Terapia Cognitivo- Comportamental	Sessão com o psicólogo	<ul style="list-style-type: none"> • As expectativas associadas à maternidade; • As emoções e a sua função adaptativa; • Ligação entre pensamentos, emoções e comportamentos; • Introdução à flexibilidade cognitiva. 	<ol style="list-style-type: none"> 4. O que influencia as emoções?
Sessão 4 Pensamentos	Sessão online	<ul style="list-style-type: none"> • Os pensamentos úteis e os pensamentos negativos; • Estratégias para lidar com pensamentos; • O autocrítico e a autocompaixão. 	
Sessão 5 Pensamentos	Sessão com o psicólogo	<ul style="list-style-type: none"> • Reconhecimento dos pensamentos automáticos negativos; • Estratégias adaptativas para lidar com os pensamentos (notar, aceitar e distanciar-se dos pensamentos; questionar os pensamentos; voz compassiva). 	
Sessão 6 Valores	Sessão online	<ul style="list-style-type: none"> • Definição e identificação dos valores pessoais; • Definir objetivos e atividades de acordo com os valores. 	
Sessão 7 Valores	Sessão com o psicólogo	<ul style="list-style-type: none"> • Importância de realizar ações valorizadas e comprometidas; • Estratégias para colocar em prática ações valorizadas e comprometidas. 	

Sessão 8 Relação com os outros	Sessão online	<ul style="list-style-type: none"> • Identificação de necessidades e fontes de apoio; • A comunicação assertiva; • Estratégias úteis para pedir ajuda. 	
Sessão 9 Apoio Social e Competências Interpessoais	Sessão com o psicólogo	<ul style="list-style-type: none"> • A importância do apoio social no período pós-parto e identificação de situações de maior dificuldade; • Estilos de comunicação (passividade, agressividade e assertividade); • Estratégias de comunicação assertiva. 	
Sessão 10 Relação de Casal	Sessão online	<ul style="list-style-type: none"> • As mudanças no casal e as principais dificuldades sentidas; • Possíveis fontes de conflitos e a negociação; • A partilha de valores na parentalidade. 	
Sessão 11 Relação de Casal	Sessão com o psicólogo	<ul style="list-style-type: none"> • Estratégias para promover o afeto e a intimidade no casal; • Estratégias de comunicação; • Estratégias de flexibilização cognitiva; • Estratégias de resolução de problemas e negociação de conflitos no casal. 	
Sessão 12 Balanço Final	Sessão online	<ul style="list-style-type: none"> • Reflexão sobre as mudanças obtidas; • Antecipação de situações de alerta e integração de competências. 	5. Os meus ganhos e as minhas forças
Sessão 13 Balanço Final e Prevenção de Recaída	Sessão com o psicólogo	<ul style="list-style-type: none"> • Revisão das aprendizagens terapêuticas; • O plano de prevenção de recaída; • Reflexão acerca das competências e ganhos obtidos. 	6. O que foi mais importante para mim 7. A minha evolução

SESSÃO 1 – Avaliação e Introdução ao Tratamento

OBJETIVOS:

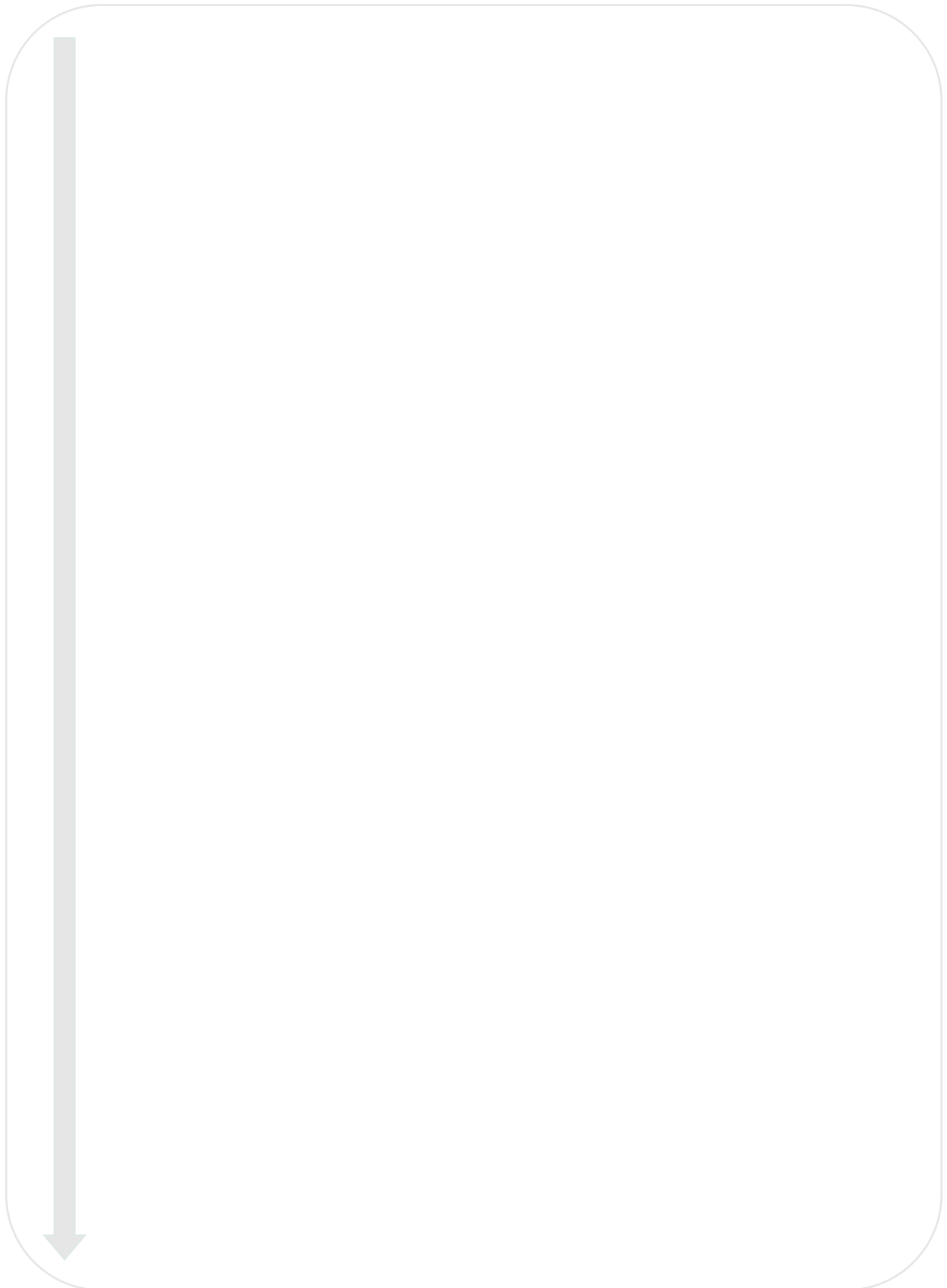
1. Proceder a uma avaliação clínica cognitivo-comportamental, com vista à análise funcional das dificuldades da doente e construção do modelo idiossincrático;
2. Dar o racional à doente sobre o desenvolvimento das suas dificuldades e normalizar a sua experiência emocional;
3. Motivar para o tratamento e definir objetivos terapêuticos;
4. Explicar o funcionamento e estrutura da intervenção.

ESTRUTURA:

Conteúdos	Duração
Apresentar os objetivos da sessão	5 min
Avaliação clínica cognitivo-comportamental	20 a 30 min
Racional sobre o modelo idiossincrático	10 a 15 min
Definição de objetivos terapêuticos + Motivação para o tratamento	15 min
Explicar o funcionamento da intervenção	10 min
Identificar obstáculos e dificuldades	5 min
Finalizar sessão	5 min

EXERCÍCIOS:

- Ficha 1. “A minha linha de vida”
- Ficha 2. “Os meus objetivos”
- Ficha 3. “Calendarização do tratamento”

Ficha 1. "A minha linha de vida"

Ficha 2. “Os meus objetivos”

O que gostaria que mudasse		Objetivos <ul style="list-style-type: none"> • Específico- <i>O quê? Quando? Como?</i> • Mensurável- <i>Como vou avaliar o meu progresso?</i> • Realista- <i>É alcançável?</i> • Relevante- <i>É importante para mim?</i>
Relação comigo própria (como penso ou me sinto)		
O meu papel como mãe / Relação com o meu bebé		
Relação conjugal		
Relações interpessoais		
Vida profissional		
Outros		

Ficha 3. Calendarização da intervenção

SEMANA	SESSÃO	NATUREZA	DATA
1	Introdução ao tratamento	Sessão com o psicólogo	___/___/____, às ___:___h
2	Mudanças da Maternidade, Depressão pós-parto & Emoções (<i>módulo 1</i>)	Sessão online	
3	Mudanças da Maternidade & Emoções	Sessão com o psicólogo	___/___/____, às ___:___h
4	Pensamentos (<i>módulo 2</i>)	Sessão online	
5	Pensamentos	Sessão com o psicólogo	___/___/____, às ___:___h
6	Valores (<i>módulo 3 - parte 1</i>)	Sessão online	
7	Valores	Sessão com o psicólogo	___/___/____, às ___:___h
8	Relação com os outros (<i>módulo 3 - parte 2</i>)	Sessão online	
9	Relação com os outros	Sessão com o psicólogo	___/___/____, às ___:___h
10	Relação de casal (<i>módulo 4</i>)	Sessão online	
11	Relação de casal	Sessão com o psicólogo	___/___/____, às ___:___h
12	Balanço final (<i>módulo 5</i>)	Sessão online	
13	Balanço final	Sessão com o psicólogo	___/___/____, às ___:___h

SESSÃO 2 (online) – Mudanças da Maternidade, Depressão pós-parto & Emoções

Esta sessão corresponde ao **Módulo 1** do programa online.

OBJETIVOS:

1. Abordar as mudanças da maternidade, os mitos das "Mães Perfeitas" e o seu impacto no estado emocional;
2. Psicoeducar sobre a depressão pós-parto (sintomas, fatores de risco, mitos e consequências);
3. Explorar a diversidade de respostas emocionais no pós-parto.

PRINCIPAIS EXERCÍCIOS:

- Mealheiro das Boas Experiências;
- Mitos sobre a maternidade;
- Diversidade emocional;
- O Termómetro das Emoções.

SESSÃO 3 – Modelo da Terapia Cognitivo-Comportamental

OBJETIVOS:

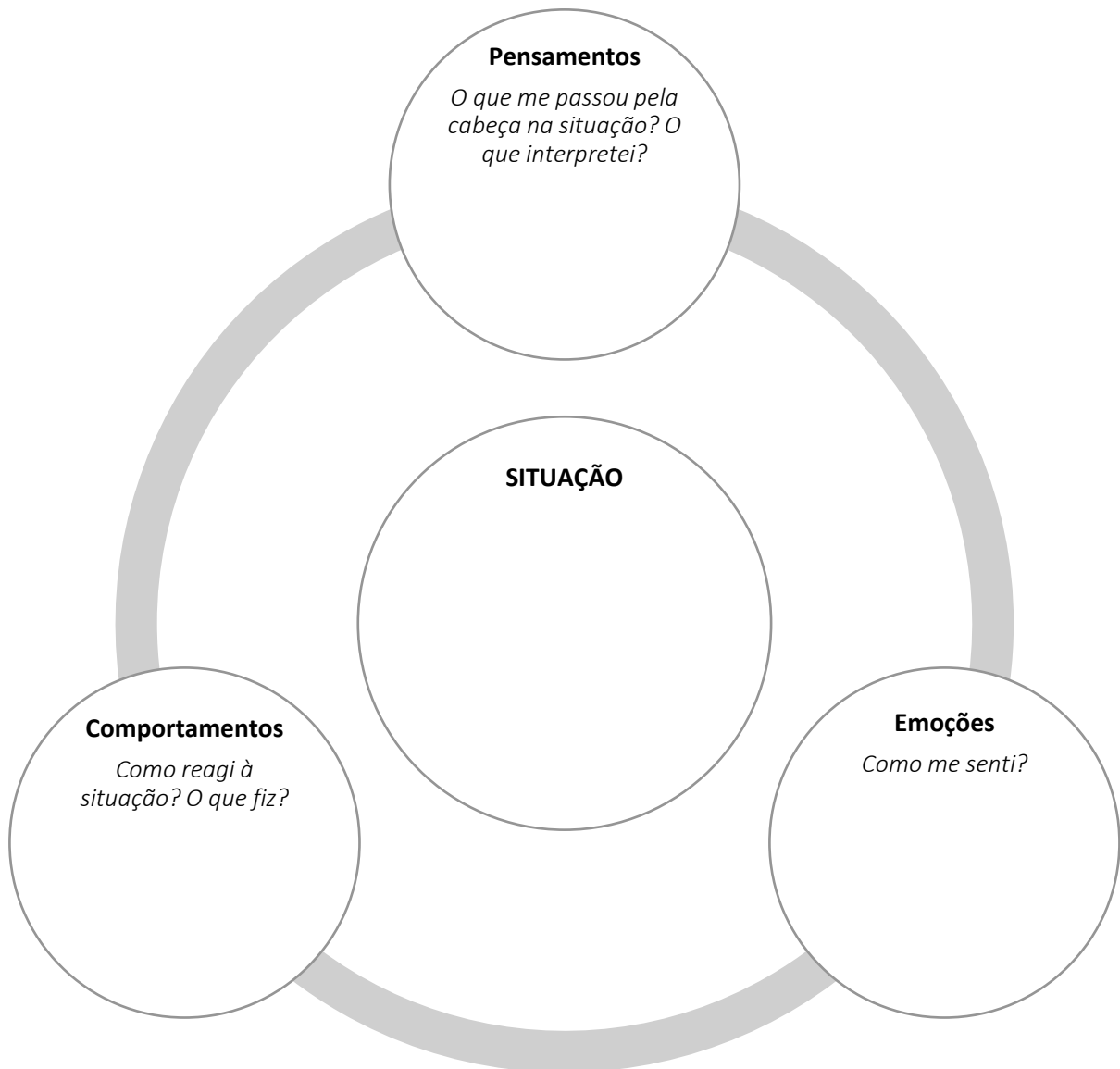
1. Refletir sobre o impacto das expectativas da maternidade (*abordado na sessão online*);
2. Compreender a função e o funcionamento das emoções;
3. Rever o modelo da terapia cognitivo-comportamental (*abordado na sessão online*) e promover a flexibilização cognitiva (Introdução).

ESTRUTURA:

Conteúdos	Duração
Solicitar feedback da semana	10 min
Apresentar os objetivos da sessão	5 min
Pedir feedback da sessão online e esclarecer dúvidas	5 min
Refletir sobre o impacto das expectativas da maternidade	10 min
Racional sobre a função das emoções	15 min
Rever o modelo da terapia cognitivo-comportamental e promover a flexibilização cognitiva	15 min
Finalizar sessão	5 min

EXERCÍCIOS:

- Ficha 4. “O que influencia as emoções?”

Ficha 4. "O que influencia as emoções?"

SESSÃO 4 (online) – Pensamentos

Esta sessão corresponde ao **Módulo 2** do programa online.

OBJETIVOS:

1. Distinguir pensamentos úteis e pensamentos negativos;
2. Refletir sobre o impacto dos pensamentos (nas emoções e nos comportamentos);
3. Apresentar estratégias para lidar com pensamentos: questionar o pensamento; promover interpretações alternativas; defusão cognitiva; autocompaixão.

PRINCIPAIS EXERCÍCIOS:

- Diário dos pensamentos;
- Supressão do pensamento (exercício áudio);
- Distanciar-se dos pensamentos (exercício áudio).

SESSÃO 5 – Pensamentos

OBJETIVOS:

1. Psicoeducar sobre o funcionamento cognitivo individual: reconhecer pensamentos negativos e normalizar a sua ocorrência;
2. Promover a flexibilização cognitiva (continuação): reconhecer a ineficácia das estratégias utilizadas para lidar com os pensamentos (e.g., controlo) e praticar estratégias adaptativas para lidar com pensamentos negativos: exercícios de desfusão cognitiva; questionar os pensamentos; interpretações alternativas; exercícios de autocompaixão.

ESTRUTURA:

Conteúdos	Duração
Solicitar feedback da semana	10 min
Apresentar os objetivos da sessão	5 min
Pedir feedback da sessão online e esclarecer dúvidas	5 min
Psicoeducar sobre o funcionamento cognitivo individual: Reconhecer pensamentos negativos	10 min
Prática de estratégias adaptativas para lidar com os pensamentos	20-30 min
Reflexão “O que funciona melhor comigo?”	5 min
Finalizar sessão	5 min

SESSÃO 6 (online) – Valores

Esta sessão corresponde ao **Módulo 3 (parte 1)** do programa online.

OBJETIVOS:

1. Identificar estratégias habitualmente utilizadas para lidar com emoções e pensamentos desagradáveis;
2. Definir e identificar valores;
3. Definir comportamentos de acordo com os valores (planeamento e agendamento flexível com compromisso).

PRINCIPAIS EXERCÍCIOS:

- Como lido com pensamentos e emoções desagradáveis?;
- A Bússola de Valores.

SESSÃO 7 – Valores

OBJETIVOS:

1. Rever a identificação de valores (*abordado na sessão online*);
2. Explicar a importância de realizar ações valorizadas e comprometidas e o seu papel nos pensamentos e emoções e identificar dificuldades e obstáculos;
3. Colocar em prática as estratégias aprendidas para lidar com emoções e pensamentos negativos - “Como agir em função dos meus valores?”

ESTRUTURA:

Conteúdos	Duração
Solicitar feedback da semana	10 min
Apresentar os objetivos da sessão	5 min
Pedir feedback da sessão online e esclarecer dúvidas	5 min
Identificação de valores - Rever o exercício “Bússola de valores”	10 min
Explicar a importância de realizar ações valorizadas e comprometidas o seu papel nos pensamentos e emoções	10 min
Identificar dificuldades e obstáculos	10 min
Colocar em prática as estratégias aprendidas para lidar com emoções e pensamentos negativos	10 min
Finalizar sessão	5 min

SESSÃO 8 (online) – Relação com os outros

Esta sessão corresponde ao **Módulo 3 (parte 2)** do programa online.

OBJETIVOS:

1. Identificar necessidades de apoio social e as fontes de apoio disponíveis;
2. Promover o estilo de comunicação assertiva;
3. Reconhecer estratégias úteis para pedir ajuda.

PRINCIPAIS EXERCÍCIOS:

- Lista SOS;
- Eu comunico de forma assertiva (clara e aberta)?.

SESSÃO 9 – Apoio Social e Competências Interpessoais

OBJETIVOS:

1. Refletir sobre a importância do apoio social no período pós-parto: rever as fontes de apoio (*abordado na sessão online*) e refletir sobre a sua utilidade;
2. Promover um estilo de comunicação mais assertivo perante situações de dificuldades: exercício prático de role-play.

ESTRUTURA:

Conteúdos	Duração
Solicitar feedback da semana	10 min
Apresentar os objetivos da sessão	5 min
Pedir feedback da sessão online e esclarecer dúvidas	5 min
Refletir sobre a importância do apoio social no período pós-parto e identificar dificuldades	20 min
Distinguir os estilos de comunicação: passividade, agressividade e assertividade	10 min
Exercício prático de role-play para promover um estilo de comunicação mais assertivo	10 min
Finalizar sessão	5 min

SESSÃO 10 (online) – Relação de casal

Esta sessão corresponde ao **Módulo 4** do programa online.

OBJETIVOS:

1. Reconhecer a influência dos pensamentos e emoções na relação de casal;
2. Psicoeducar sobre possíveis mudanças no casal - diminuição do desejo sexual;
3. Promover a comunicação assertiva no casal;
4. Reconhecer possíveis fontes de conflitos e promover a negociação e a resolução de problemas;
5. Psicoeducar sobre a partilha de valores na parentalidade.

PRINCIPAIS EXERCÍCIOS:

- Agenda da Comunicação;
- Negociar a organização doméstica;
- Somos pais diferentes?.

SESSÃO 11 – Relação de casal

OBJETIVOS:

1. Refletir sobre as mudanças no casal, após o nascimento de um filho, e as estratégias que promovam o afeto e a intimidade no casal (*abordado na sessão online*);
2. Promover a comunicação no casal;
3. Rever estratégias de flexibilização cognitiva no casal;
4. Rever estratégias de resolução de problemas e negociação de conflitos.

ESTRUTURA:

Conteúdos	Duração
Solicitar feedback da semana	10 min
Apresentar os objetivos da sessão	5 min
Pedir feedback da sessão online e esclarecer dúvidas	5 min
Refletir sobre as mudanças no casal	5 min
- Estratégias para promover o afeto e a intimidade	10-15 min
- Promover a comunicação no casal	10-15 min
- Rever estratégias de flexibilização cognitiva no casal	10-15 min
- Estratégias de resolução de problemas e negociação de conflitos.	10-15 min
Finalizar a sessão	5 min

SESSÃO 12 (online) – Balanço final

Esta sessão corresponde ao **Módulo 5** do programa online.

OBJETIVOS:

1. Refletir sobre as mudanças obtidas e as competências aprendidas;
2. Elaborar um Plano de Prevenção de Recaída: Antecipar problemas e integrar competências

PRINCIPAIS EXERCÍCIOS:

- Plano de Prevenção de Recaída;
- O Plano de Procura de Ajuda.

SESSÃO 13 – Balanço final e prevenção de recaída

OBJETIVOS:

1. Rever as aprendizagens terapêuticas;
2. Dar o racional para o Plano de Prevenção de Recaída;
3. Rever o Plano de Prevenção de Recaída (*abordado na sessão online*) e praticar as estratégias aprendidas através de um exercício de imaginação guiada;
4. Finalizar intervenção - reconhecer o progresso terapêutico e facilitar a atribuição causal interna dos sucessos observados.

ESTRUTURA:

Conteúdos	Duração
Solicitar feedback da semana	10 min
Apresentar os objetivos da sessão	5 min
Pedir feedback da sessão online e esclarecer dúvidas	5 min
“A minha jornada” – rever as aprendizagens terapêuticas	20-30 min
Rever o Plano de Prevenção de Recaída	15 min
Finalizar intervenção	15 min

EXERCÍCIOS:

- Ficha 5. “Os meus ganhos e as minhas forças”
- Ficha 6. “O que foi mais importante para mim?”
- Ficha 7. “A minha evolução”

Appendix II

A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: Study Protocol for a Randomized Controlled Trial

Mariana Branquinho, Maria Cristina Canavarro & Ana Fonseca

2020

International Journal of Environmental Research and Public Health, 17(22), 8631.

<https://doi.org/10.3390/ijerph17228631>

A Blended Cognitive–Behavioral Intervention for the Treatment of Postpartum Depression: Study Protocol for a Randomized Controlled Trial

Abstract

Despite the existence of effective treatment for postpartum depression, few women seek professional help, indicating the need for a new and innovative format of treatment that can overcome help-seeking barriers. This article presents the study protocol for a blended cognitive–behavioral intervention for the treatment of postpartum depression, by integrating face-to-face sessions with a web-based program (Be a Mom) into one treatment protocol. This study will be a two-arm, noninferiority randomized controlled trial comparing blended intervention to usual treatment for postpartum depression provided in healthcare centers. Portuguese postpartum adult women diagnosed with postpartum depression (according to the DSM-5 diagnostic criteria for major depressive disorder) will be recruited during routine care appointments in local healthcare centers and will be eligible to participate. Measures will be completed at baseline, postintervention, and at three and six-month follow-ups. The primary outcome will be depressive symptoms. Secondary outcomes will include anxiety symptoms, fatigue, quality of life, marital satisfaction, maternal self-efficacy, and mother–child bonding. Cost-effectiveness analysis and mediator and moderator analysis will be conducted. This study will provide insight into the efficacy and cost-effectiveness of a blended psychological intervention in the Portuguese context and increase the empirically validated treatment options for postpartum depression.

Keywords: Postpartum depression; cognitive–behavioral therapy; blended treatment; Be a Mom; study protocol

Introduction

Postpartum depression (PPD) is a serious clinical condition affecting approximately 13% of Portuguese women after childbirth [1]. When left untreated, PPD poses adverse and persistent consequences for the entire family system. It affects the woman's health (e.g., increased tiredness [2], decreased quality of life [3]) and mother–child interaction (e.g., mother-child bonding, lower parenting self-efficacy) [3,4]. Moreover, it can have consequences for the infant's development (e.g., infant sleep patterns, emotional development) [3] and for the entire family environment, including the couple's relationship [5].

Despite the existence of effective treatments (e.g., cognitive–behavioral therapy [CBT]) [6], few women with PPD seek professional help [7]. A Portuguese study revealed that only 13.6% of women with depressive symptoms during the perinatal period sought professional help to address their emotional difficulties [8]. Time and financial constraints and struggles with transportation and childcare issues are some of the structural barriers to seeking professional help reported by postpartum women [9,10], suggesting the need for new delivery formats to improve women's access to evidence-based PPD interventions.

E-mental health tools are an innovative form of treatment delivery that use digital technology, including web-based technology, in the mental health field [11]. These tools can overcome PPD treatment uptake barriers given their reduced costs, flexibility, and improved accessibility [12]. Women in the postpartum period already use the internet frequently to search for information about PPD [10]. Moreover, e-mental health tools have been perceived as acceptable and useful among Portuguese women in the perinatal period, particularly among those women presenting clinically relevant depressive symptoms [13].

Existing web-based interventions for PPD treatment based on CBT have proven to be effective in the reduction of postpartum depressive symptoms [14–16]. Interventions such as MomMoodBooster [17], NetMums [18], and Mom-Net [19] have shown promising results not only in reducing postpartum depressive symptoms but also in improving self-efficacy, marital relationship, and mother–child bonding.

However, there is also evidence that web-based interventions suffer from important limitations related to the accuracy of diagnosis, which is based only on online assessments [20], and with low engagement and high attrition rates [15,16] due to the absence of therapist support during the intervention [15,20]. Web-based interventions also lack nonverbal communication as well as the opportunity to discuss specific problems and to deal with crises [21,22]. Instead of

replacing traditional psychological interventions, e-mental health tools can be an important complement to them [23].

Blended treatment is the combination of face-to-face treatment with web-based interventions that are integrated and used sequentially in one treatment protocol [24]. Therefore, delivering PPD treatment using a blended format could benefit from the potential of both treatment modalities (face-to-face and online) [23]. Blended treatment presents the advantages of the utilization of e-mental health tools, namely, flexibility in application, good accessibility, and travel time savings [21,25]. Additionally, online sessions can improve patient self-management and help patients better prepare for a session with a therapist [21,22]. Blended treatment allows professional guidance in the therapeutic process, which increases adherence, prevents dropout, facilitates increased treatment intensity, and leads to better results compared to unguided treatments [20]. CBT therapists recognize that blended intervention formats support the patient's motivation, can be adjusted to the patient's specific needs, and reduce the treatment gap between sessions [23,26]. Online sessions can also replace some face-to-face sessions with the therapist, allowing for time savings in healthcare systems as well as decreased treatment costs [24,27].

There is growing evidence of the efficacy of blended treatments for several psychological disorders [24], including depression [21,28,29]. Existing studies have indicated that blended treatment for depression is perceived positively by patients [22,28]. Despite its advantages and considering the aforementioned barriers to professional help-seeking in the postpartum period [9,10], to our knowledge, there is no blended treatment format targeting PPD.

This article presents the study protocol for a blended CBT intervention combining face-to-face sessions with the online program *Be a Mom* for the treatment of PPD in the Portuguese context. In Portugal, the *Be a Mom* program was developed as a culturally sensitive web-based CBT intervention that is designed as a self-guided tool for the prevention of PPD. Preliminary evidence of *Be a Mom*'s pilot trial suggests its effectiveness in reducing depressive symptoms among women presenting early-onset PPD symptoms [30], thus supporting its potential as a PPD treatment tool integrated into a blended treatment protocol.

Therefore, we herein outline the protocol for a randomized controlled trial to examine the acceptability and efficacy of a blended CBT intervention for PPD treatment, considering postintervention and follow-up improvements in primary and secondary outcomes. It is expected that the blended CBT intervention will be as effective as treatment usually provided for PPD in decreasing depressive symptoms. In this study, we will evaluate the mediating role of

psychological competences (self-compassion, emotion regulation, psychological flexibility) in treatment response. These mechanisms have been core psychological processes underlying the development of the Be a Mom program [31]. Moreover, previous studies have found that these psychological mechanisms were associated with improvements in depressive symptoms in the perinatal period [30,32,33]. We will also examine the moderator effect of characteristics of the patient (e.g., sociodemographic characteristics, motivation for therapy) and of the therapeutic process (e.g., therapeutic relationship, user's satisfaction) in the efficacy of the blended intervention for PPD.

Materials and Methods

Study Design

This study will be a two-arm, noninferiority randomized controlled trial (RCT) comparing blended CBT intervention for PPD (Blended Be a Mom) to the usual treatment that women receive to treat PPD in primary healthcare centers (treatment as usual; TAU). Participants in both the Blended Be a Mom and TAU conditions will complete baseline, postintervention, and follow-up (three and six months postintervention) assessments through a link sent by email that gives access to the survey.

Ethical Issues

This study was approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences, University of Coimbra, and it will follow the ethical standards and procedures for research with human beings [34,35]. This study protocol was registered with ClinicalTrial.gov (Protocol Record NCT04441879). Participants will be informed about the study goals and procedures and the researcher and participants' roles. An informed consent form to participate in the study will be signed by participants. Participation in the study will be free of cost to women, and no compensation will be given. Women can withdraw at any time, and dropout will not compromise medical care. All collected data will be stored in a secure server in accordance with the General Data Protection Regulation (GDPR) and will only be used for the purposes of the present study. Participants' information will be confidential and anonymized (i.e., no personal data that allow the participant's identification) and will only be treated at a collective level. Trial results will be shared with both the scientific community and health professionals, through publications in scientific peer-reviewed journals and presentations at national and international conferences.

Participants (Inclusion and Exclusion Criteria)

Adult women during the postpartum period (up to 12 months postpartum) with a confirmed diagnosis of PPD (according to the Structured Clinical Interview for DSM-5 [SCID-5] disorders criteria) will be eligible to participate in this study. Additionally, participants must be residents of Portugal, be able to write and read Portuguese, and have regular access to computers and the internet.

Exclusion criteria will include the presence of psychiatric comorbidity requiring alternative treatment primary to depression treatment, the presence of suicidal ideation, a serious medical condition of either the mother or the baby, and current treatment for depression (e.g., other psychological interventions). Participants who are not eligible to participate in the study will be referred to intervention by local providers.

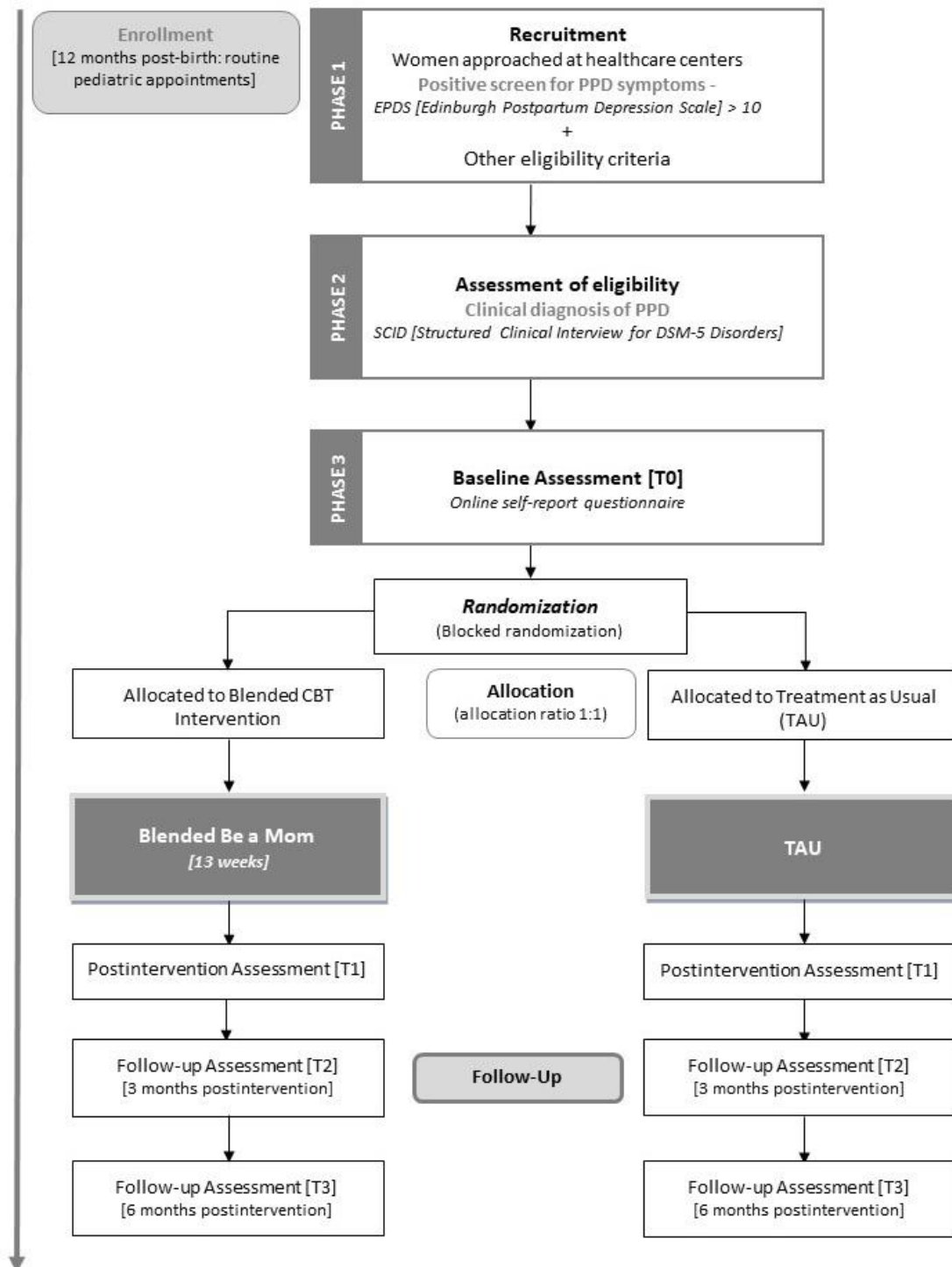
Recruitment and Eligibility Assessment

Participants will be recruited in primary healthcare units of the region in routine care appointments during the postpartum period. Alternative recruitment methods (e.g., other institutions, online advertisement) will be considered if sample recruitment difficulties arise (e.g., if the sample size is not achieved, or if the current COVID-19 pandemic disrupts the contact with patients within healthcare institutions). Local healthcare providers (e.g., primary care nurses) will be informed about the study and will ask women if they are interested in participating. Women will be informed in detail about the study, both verbally and through a written flyer. If they are willing to participate, they will be asked to sign an informed consent form and to complete a questionnaire including sociodemographic information, a questionnaire to screen for the presence of depressive symptoms (Edinburgh Postnatal Depression Scale), and other eligibility criteria questions (e.g., technology access, not currently undergoing treatment for PPD). Assessment of depressive symptoms will be conducted every two weeks during the period of the study. When women have a positive screen (indicating the presence of clinically relevant depressive symptoms) and meet the remaining eligibility criteria, they will be further contacted by the researchers through telephone or email to inform them that they will proceed to the second phase of the study. In the second phase, an interview (SCID-5) will be conducted by the researcher (licensed psychologist) to assess the presence of the diagnosis of PPD. Women with a clinical diagnosis of PPD will be eligible to participate in the study and will be included in the third phase of the study. In the third phase of the study, eligible women will receive an email containing a link to complete an online self-report questionnaire (baseline assessment). The

flowchart of the study is presented in Figure 1, demonstrating the recruitment and eligibility assessment.

Figure 1

Flowchart of the study



Randomization

After completing the baseline assessment, participants will be randomly assigned (blocked randomization, allocation 1:1) to the intervention (Blended Be a Mom) or the TAU conditions (see Figure 1). Randomization will be conducted by a researcher blind to the assessment procedure and will be performed using a computerized random number generator. Women in both conditions will be informed about their assigned treatment condition. Blinding for treatment conditions will not be possible.

Interventions

Blended Intervention

The blended protocol will be developed based on existing evidence-based CBT interventions for PPD delivered both face-to-face (e.g., [36]) and online (e.g., [37]). The final blended CBT intervention protocol for PPD (Blended Be a Mom) will be developed by the research team and reviewed and approved by a panel of researchers with clinical expertise in the area of PPD. A pilot study with women with a clinical diagnosis of PPD will be conducted prior to the RCT, to assess the acceptability and feasibility of the structure and content of the blended intervention, and to gather preliminary evidence of its clinical efficacy (noncontrolled). Appropriate adjustments to the blended intervention protocol will be done accordingly.

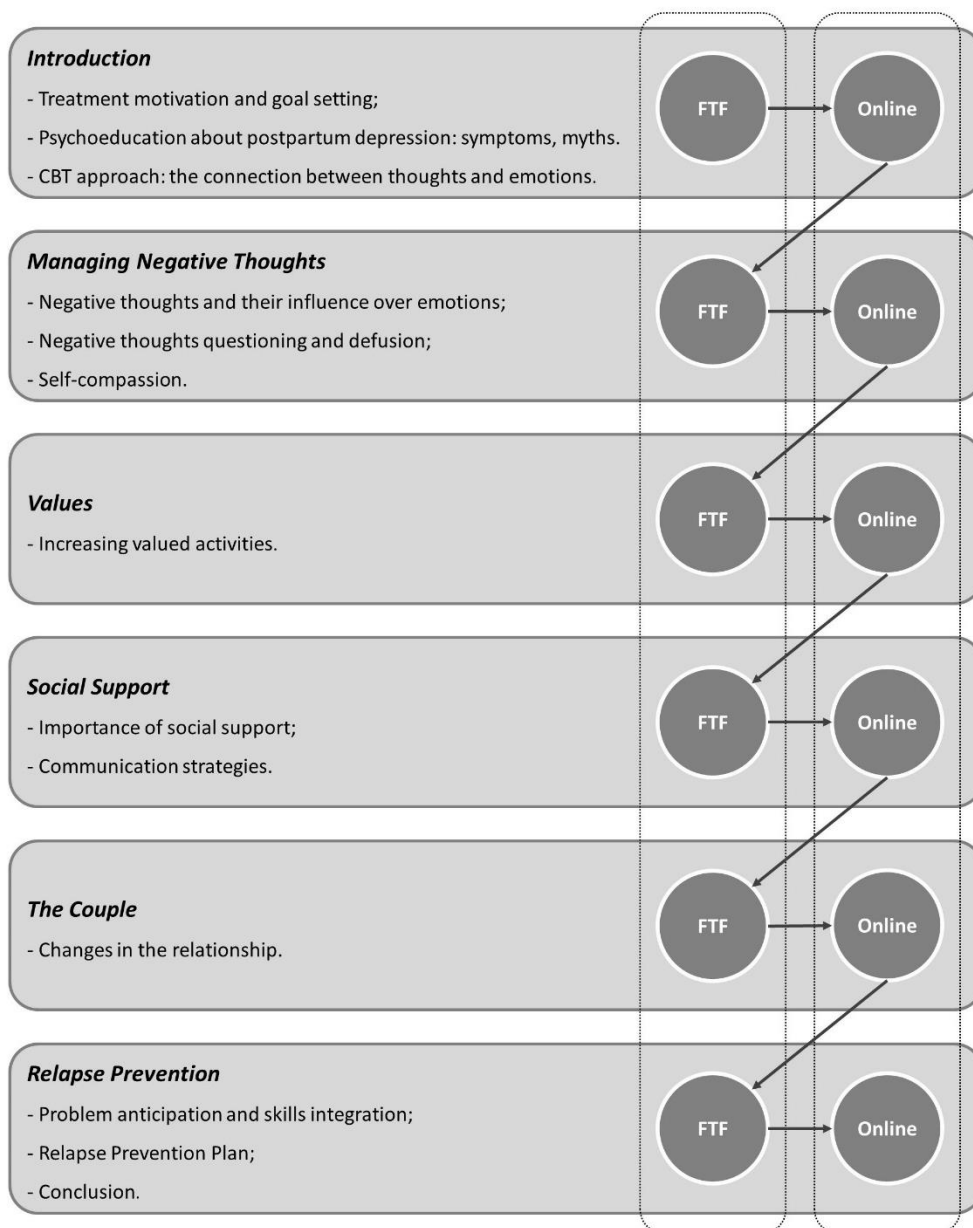
The Blended Be a Mom intervention will integrate 7 face-to-face CBT sessions that are weekly alternated with 6 online sessions over a period of 13 weeks. The online part of the blended intervention will be adapted from the Be a Mom program. Both face-to-face and online sessions will be designed according to CBT principles: problem-oriented, structured, time-limited, educative, and promoting the active participation of the patient [38]. The content of sessions will include psychoeducation, cognitive strategies for negative thoughts, behavioral activation, and relapse prevention (more detailed information is presented in Figure 2). The intervention will also include the utilization of a mobile phone application to conduct ecological momentary assessment, a method to collect information in real time and in the natural environment of participants, over a period of time [39].

Each face-to-face session (with an approximate length of 45–60 min) begins with mood checking and discussion of women's symptoms. The therapist then reviews the experience with the online program and each module's content (i.e., to discuss homework assignments and to practice the strategies learned in the online session), provides feedback, and discusses any doubts. The session ends with the presentation of the upcoming online program module's

objectives. The face-to-face sessions will be delivered by a predoctoral-level licensed psychologist, with the supervision of an experienced postdoctoral-level psychologist. To ensure fidelity to treatment protocol, a detailed therapist manual will be available and weekly supervision will be provided by a senior psychologist. At the end of each session, the therapist will fill a checklist to confirm that the topics of the session were covered.

Figure 2

Blended Be a Mom—structure and content of sessions



Note. FTF: Face-to-face sessions; Online: Online sessions (Be a Mom).

The Be a Mom program was originally designed for the prevention of PPD among Portuguese women. It contains five modules addressing several thematic contents (e.g., Changes and Emotional Reactions, Managing Negative Thoughts, Values and Social Support) and incorporates the recent contributions of third-wave CBT approaches (e.g., self-compassion and acceptance and commitment therapy). Adaptation will be made to the modules to address the specific needs of PPD intervention. Each online session (with an approximate length of 30–45 min) opens with an introduction to the session goals and content, followed by specific information and strategies. Exercises and activities are included to practice the session's specific content, and information is presented through different formats, such as text, interactions, animation, and videos.

After participants access the program, all modules will be available. Participants will be instructed to complete one module at a time (one session per week) alternating with face-to-face sessions. Online sessions (Be a Mom modules) will be self-guided and an asynchronous communication channel with the therapist through the program will be available. Before entering a new module, participants must confirm that it is in accordance with the therapist. Participants can pause the module at any time and resume the last page visited during subsequent access. Email reminders will be sent to participants to motivate and encourage engagement in online sessions.

The blended intervention will be discontinued if there is a high risk for suicide, possibility to harm others, or the development of severe depressive symptoms. Risk assessment during the intervention, postintervention, and at follow-up assessments will be conducted, through both self-reported and EPDS scores and specific suicidal intention item on the questionnaires that will be administered. These participants will be immediately referred to other mental health services (psychological or psychiatric services) and their participation in the blended intervention will end.

Treatment as Usual

TAU involves the treatment provided in routine healthcare for PPD. It can include different types of traditional face-to-face treatment (e.g., CBT, interpersonal psychotherapy). TAU will be conducted by healthcare center providers (e.g., psychologists), and information concerning the type and duration of therapy (e.g., number of sessions) will be obtained.

Measures

Table 1 presents the study variables and assessment times.

Table 1*Study variables and assessment points*

Variables	Baseline [T0]	Post intervention [T1]	Follow-up [T2]	Follow-up [T3]
Sociodemographic, clinical and obstetric information				
Depressive symptoms	x			
Anxiety symptoms	x	x	x	x
Fatigue	x	x	x	x
Quality of life	x	x	x	x
Marital satisfaction	x	x	x	x
Maternal self-efficacy	x	x	x	x
Mother-child bonding	x	x	x	x
Self-compassion	x	x	x	x
Emotion regulation	x	x		
Psychological flexibility	x	x		
Motivation for therapy	x	x		
Therapeutic relationship	x	x		
Acceptability, satisfaction & usability		x		
Economic evaluation		x		

Sociodemographic, Clinical, and Obstetric Information

Women's sociodemographic (e.g., age, marital status, number of children, educational level, professional status, average monthly income, socioeconomic status and residence) and obstetric (e.g., parity, pregnancy complications, type of labor, postpartum data) information will be collected through a questionnaire developed by the researchers. It will also include self-reported clinical information concerning history of psychological/psychiatric problems ("Have you had psychological or psychiatric problems [e.g., depression, anxiety]?", Yes or No) and history of psychological/psychiatric treatment ("Have you had psychological or psychiatric treatment?", Yes or No). Infant-related information (e.g., infant age, infant sex, infant gestational weeks at birth, infant feeding patterns) will also be collected.

Primary Outcome

Changes in depressive symptoms, the primary outcome, will be measured with the Portuguese version of the Edinburgh Postnatal Depression Scale (EPDS) [40]. The EPDS is a 10-

item scale (e.g., “I have felt sad or miserable”) that assesses how women felt over the last seven days concerning several symptoms using an individualized four-point Likert scale (from 0 to 3). The total score can range between 0 and 30, and higher scores are indicative of more severe depressive symptoms. In Portuguese validation studies, a score of 10 or higher suggests the presence of clinically relevant depressive symptoms. The Portuguese version of EPDS showed good levels of internal consistency (Cronbach’s alpha = 0.85) and adequate validity [40].

Secondary Outcomes

Anxiety symptoms will be measured with the Anxiety Subscale of the Portuguese version of the Hospital Anxiety and Depression Scale (HADS-A) [41]. This subscale comprises seven items (e.g., “Worrying thoughts go through my mind”) answered on a four-point response scale (ranging from 0 to 3). Higher scores indicate more symptomatology. A score of 11 or higher is indicative of the presence of clinically relevant anxiety symptoms. The Portuguese version of HADS [41] is a reliable scale, with an adequate internal consistency (Cronbach’s alpha = 0.76 for the Anxiety Subscale).

Fatigue will be measured with the Portuguese version of the Fatigue Severity Scale (FSS) [42]. The FSS is composed of nine items (e.g., “Fatigue interferes with my work, family, or social life”) answered on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores suggest more severe fatigue. The Portuguese version of FSS proved to be a reliable and valid instrument, with a good internal consistency (Cronbach’s alpha = 0.87) [42].

Quality of life will be assessed with the Portuguese version of the Euroqol Five-Dimension Scale (EQ-5D) [43]. It is composed of five items (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression), and each item is rated on a scale ranging from 1 (no problems) to 3 (extreme problems). Additionally, participants are asked to rate their own health through visual analogue on a scale ranging from 0 (worst imaginable health state) to 100 (best imaginable health state). The total score is obtained through an algorithm (the digits of the answers to five dimensions) and describes the health state. The Portuguese version of EQ-5D has adequate levels of internal consistency (Cronbach’s alpha = 0.72) and was found to be a valid and reliable measure [43].

Marital satisfaction will be assessed with the Portuguese version of the Investment Model Scale—Satisfaction subscale (IMS) [44]. This subscale comprises five items (e.g., “My relationship is close to ideal”) rated on a nine-point scale ranging from 0 (do not agree at all) to 8 (completely agree). Higher scores suggest higher satisfaction with the relationship. The

Portuguese version of IMS presented good reliability and validity, and found a Cronbach's alpha of 0.91 for the Satisfaction subscale [44].

Maternal self-efficacy will be assessed with the Portuguese version of the Perceived Maternal Parenting Self-Efficacy Questionnaire (PMPS-E; psychometric studies ongoing) [45]. This instrument comprises 20 items (e.g., "I can read my baby's cues") answered on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). Higher scores are indicative of higher perceived maternal self-efficacy.

Mother-child bonding will be measured with the Portuguese version of the Postpartum Bonding Questionnaire (PBQ) [46]. The PBQ is a 12-item instrument (e.g., "I feel close to my baby") with a six-point Likert answer scale ranging from 0 (never) to 5 (always). Higher scores are indicative of a more impaired mother-child bond. The Portuguese version of PBQ found good levels of internal consistency (Cronbach's alpha = 0.71) and validity [46].

Ecological momentary assessments of mood (rated on a scale from "very low" to "very good"), self-esteem, motivation, ability to feel pleasure, depressed mood, and insomnia (Yes or No) will be conducted on a daily basis.

Psychological Competences

Emotion regulation difficulties will be assessed with the Portuguese version of the Difficulties in Emotion Regulation Scale—Short Form (DERS-SF; psychometric studies ongoing) [47]. The DERS-SF is a self-report instrument composed of 18 items (e.g., "When I'm upset, I believe there is nothing I can do to make myself feel better") answered on a five-point scale ranging from 1 (almost never) to 5 (almost always). Higher scores indicate more difficulties in emotion regulation.

Self-compassion will be measured with the Portuguese version of the Self-Compassion Scale—Short Form (SCS-SF) [48]. This is a 12-item instrument (e.g., "I try to see my failings as part of the human condition") with a five-point response scale ranging from 1 (almost never) to 5 (almost always). Higher scores suggest higher levels of self-compassion. The Portuguese version of SCS-SF is a valid and reliable instrument, with good internal consistency (Cronbach's alpha = 0.86) [48].

Psychological flexibility will be assessed with the Portuguese version of the Acceptance and Action Questionnaire-II (AAQ-II) [49]. The AAQ-II comprises seven items (e.g., "I'm afraid of my feelings") rated on a seven-point scale ranging from 1 (never true) to 7 (always true). Higher scores are indicative of lower psychological flexibility (i.e., higher psychological inflexibility). The

Portuguese version of AAQ-II showed good internal consistency (Cronbach's alpha = 0.90) and adequate validity [49].

Intervention-Related Outcomes

Motivation for therapy will be measured with the Portuguese version of the Client Motivation for Therapy Scale (CMTS; psychometric studies ongoing) [50]. The CMTS comprises 24 items (e.g., "Because I would like to make changes to my current situation") rated on a seven-point response scale ranging from 1 (not true at all) to 7 (totally true). Higher scores suggest higher motivation for therapy.

The therapeutic relationship will be assessed with the Portuguese version of the Working Alliance Inventory—Short revised (WAI-SR) [51], a 12-item instrument with a five-point response scale ranging from 1 (rarely or never) to 5 (always). Higher scores indicate better therapeutic alliance. The Portuguese version of WAI-SR is a reliable measure and has good levels of internal consistency (Cronbach's alpha = 0.85).

Acceptability, satisfaction, and usability of the blended treatment will be measured through specific questions developed by the researchers (e.g., satisfaction with the program, usefulness, acceptability, demandingness, recruitment rate, dropout rate, web system data).

The feasibility of the program will be assessed through website utilization (e.g., number of logins, average visit length, total time spent on the website, number of exercises completed) and dropout rate.

Economic Evaluation

Cost-effectiveness will be assessed with an adapted version of the Treatment Inventory Cost in Psychiatric Patients (TiC-P) [52]. This instrument measures medical costs and indirect nonmedical costs, through the assessment of the participant's healthcare use in the last three months (i.e., the number of contacts with healthcare providers), productivity losses (i.e., the number of days of absence from work due to illness), and efficiency at work in the last four weeks.

Sample Size and Statistical Analyses

The sample size for this study was determined based on power analysis (G*Power). A sample of 45 women per condition is required to detect medium effects in comparison analyses, considering the primary outcome. Considering an expected dropout rate of 20%, we plan to recruit a sample of at least 110 participants (55 per condition) to account for attrition effects.

Statistical analyses to examine the efficacy of the program will be conducted following the intention-to-treat (ITT) and per-protocol (PP) principles in accordance with the CONSORT recommendations [53]. ITT analyses allow us to examine data from all randomized participants, even those with missing values on outcome measures. In contrast, PP analysis includes only participants who followed the assigned treatment protocol. Statistical analyses will be performed using the Statistical Package for the Social Sciences (SPSS, Version 25.0; IBM SPSS) and the Mplus program (Version 7). Linear mixed models will be conducted to determine the effects of the intervention over time (time × group interaction effects) on primary and secondary outcomes and changes in psychological competences. Other appropriate statistical analyses such as two-wave latent change score models, reliable change index, Chi-square tests, and within-group effect sizes will be performed, as well as mediator and moderator analysis. Preliminary cost-effectiveness analysis will be conducted from a healthcare cost perspective and a societal perspective, comparing the differences between the intervention and control group on the outcomes, with the differences in the costs generated. The contribution of a health economics expert will be required.

Discussion

Despite the existence of effective treatment, few women seek professional help to deal with their depressive symptoms in the postpartum period [7,8], indicating the need for a new and innovative format of treatment that can overcome help-seeking barriers. This study aims to evaluate the acceptability and effectiveness of a blended CBT intervention for the treatment of PPD in the Portuguese context by integrating face-to-face sessions with the web-based program Be a Mom.

To our knowledge, this will be the first study to develop a blended CBT treatment protocol for PPD. Blended Be a Mom benefits from both treatment formats, offering the flexibility, accessibility, and self-management of e-health tools as well as clinical support, increased motivation, and higher treatment intensity [21]. Moreover, it can potentially decrease the number of face-to-face sessions and reduce costs in healthcare systems. A blended CBT intervention can therefore increase help-seeking behaviors among women in the postpartum period by providing treatment that mitigates the impact of the identified barriers in professional help-seeking.

Existing studies have revealed that blended treatment for depression can be effective in reducing depressive symptoms and maintaining these gains over a period of six months [28]. Additionally, previous findings have shown that blended interventions are more effective compared to control groups without intervention (i.e., waiting lists) [24] and that it can be as effective as standard CBT treatments [29]. We expect that Blended Be a Mom will be as effective as TAU with regard to long-term effects on primary and secondary outcomes. The feasibility, acceptability, and usability of the blended intervention will be considered in addition to its cost-effectiveness.

Despite its advantages, there is still limited knowledge about the suitability of blended treatment for every patient [20]. Characteristics such as age, severity of symptoms, or the ability to use technology should be considered and further studied to optimize the effectiveness of blended interventions. The results of our study will provide insights into the processes underlying the treatment effects of blended intervention and the characteristics that moderate the effectiveness of blended intervention.

Our study will also be innovative due to the inclusion of daily ecological momentary assessments during the intervention. This approach allows the collection of information in women's natural environment in real time and therefore prevents retrospective biases [39]. This will provide important information about intraindividual variations over the treatment, the dynamic evolution of PPD symptoms over time, and temporal relationships between mood and other experiences. The inclusion of ecological momentary assessment is recommended in RCTs because it can optimize statistical power effects, improve measurements precision, and potentially increase treatment's adherence [54]. This data collection method has previously been used both in the postpartum period and in depression disorders, and it was considered feasible and acceptable by the users [55,56].

Conclusions

This will be the first study to develop and test the effectiveness of a blended CBT intervention for the treatment of PPD in the Portuguese context. This innovative format of treatment delivery can potentially reduce costs in healthcare systems, increase its efficiency, and promote help-seeking behaviors among women in the postpartum period.

We will contribute to the existing research on the topic of e-health technologies applied to mental health. This study is in line with the current directions from the Portuguese e-health

Strategy [57] and the European e-Health Action Plan 2012–2020 [58] that encourage the integration of web-based technologies into clinical practice and the use of these tools to enhance patient-centered care and to increase health systems' sustainability and efficiency. We will provide the Portuguese population with access to an evidence-based blended psychological intervention for PPD treatment while contributing to the more effective management of resources in healthcare services.

References

1. Maia, B.R.; Marques, M.; Bos, S.; Pereira, A.T.; Soares, M.J.; Valente, J.; Macedo, A.; Azevedo, M.H. Epidemiology of perinatal depression in Portugal: Categorical and dimensional approach. *Acta Med. Port.* **2011**, *24*, 443–448.
2. Woolhouse, H.; Gartland, D.; Perlen, S.; Donath, S.; Brown, S.J. Physical health after childbirth and maternal depression in the first 12 months post partum: Results of an Australian nulliparous pregnancy cohort study. *Midwifery* **2014**, *30*, 378–384.
3. Slomian, J.; Honvo, G.; Emonts, P.; Reginster, J.Y.; Bruyère, O. Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health* **2019**, *15*, 1–55.
4. Field, T. Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behav. Dev.* **2010**, *33*, 1–6.
5. Barnes, D.L. Postpartum depression: Its impact on couples and marital satisfaction. *J. Syst. Ther.* **2006**, *25*, 25–42.
6. Sockol, L.E. A systematic review of the efficacy of cognitive behavioral therapy for treating and preventing perinatal depression. *J. Affect. Disord.* **2015**, *177*, 7–21.
7. Henshaw, E.; Sabourin, B.; Warning, M. Treatment-seeking behaviors and attitudes survey among women at risk for perinatal depression or anxiety. *J. Obs. Gynecol. Neonatal Nurs.* **2013**, *42*, 168–177.
8. Fonseca, A.; Gorayeb, R.; Canavarro, M.C. Women's help-seeking behaviours for depressive symptoms during the perinatal period: Socio-demographic and clinical correlates and perceived barriers to seeking professional help. *Midwifery* **2015**, *31*, 1177–1185.
9. Bina, R. Predictors of postpartum depression service use: A theory-informed, integrative systematic review. *Women Birth* **2019**, *33*, e24–e32.
10. Maloni, J.A.; Przeworski, A.; Damato, E.G. Web recruitment and internet use and preferences reported by women with postpartum depression after pregnancy complications. *Arch. Psychiatr. Nurs.* **2013**, *27*, 90–95.
11. Riper, H.; Andersson, G.; Christensen, H.; Cuijpers, P.; Lange, A.; Eysenbach, G. Theme issue on e-mental health: A growing field in internet research. *J. Med. Internet Res.* **2010**, *12*, e74.

12. Lal, S.; Adair, C.E. E-mental health: A rapid review of the literature. *Psychiatr. Serv.* **2014**, *65*, 24–32.
13. Fonseca, A.; Gorayeb, R.; Canavarro, M.C. Women’s use of online resources and acceptance of e-mental health tools during the perinatal period. *Int. J. Med. Inform.* **2016**, *94*, 228–236.
14. Jannati, N.; Mazhari, S.; Ahmadian, L.; Mirzaee, M. Effectiveness of an app-based cognitive behavioral therapy program for postpartum depression in primary care: A randomized controlled trial. *Int. J. Med. Inform.* **2020**, *141*, 104145.
15. Lee, E.W.; Denison, F.C.; Hor, K.; Reynolds, R.M. Web-based interventions for prevention and treatment of perinatal mood disorders: A systematic review. *BMC Pregnancy Childbirth* **2016**, *16*, 38.
16. Nair, U.; Armfield, N.R.; Chatfield, M.D.; Edirippulige, S. The effectiveness of telemedicine interventions to address maternal depression: A systematic review and meta-analysis. *J. Telemed. Telecare* **2018**, *24*, 639–650.
17. Danaher, B.G.; Milgrom, J.; Seeley, J.R.; Stuart, S.; Schembri, C.; Tyler, M.S.; Ericksen, J.; Lester, W.; Gemmill, A.; Kosty, D.B.; et al. MomMoodBooster web-based intervention for postpartum depression: Feasibility trial results. *J. Med. Internet Res.* **2013**, *15*, 1–20.
18. O’Mahen, H.A.; Woodford, J.; McGinley, J.; Warren, F.C.; Richards, D.A.; Lynch, T.R.; Taylor, R.S. Internet-based behavioral activation—Treatment for postnatal depression (Netmums): A randomized controlled trial. *J. Affect. Disord.* **2013**, *150*, 814–822.
19. Sheeber, L.B.; Seeley, J.R.; Feil, E.G.; Davis, B.; Sorensen, E.; Kosty, D.B.; Lewinsohn, P.M. Development and pilot evaluation of an internet-facilitated cognitive-behavioral intervention for maternal depression. *J. Consult. Clin. Psychol.* **2012**, *80*, 739–749.
20. Andersson, G.; Titov, N. Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry* **2014**, *13*, 4–11.
21. Schuster, R.; Pokorny, R.; Berger, T.; Topooco, N.; Laireiter, A.R. The advantages and disadvantages of online and blended therapy: Survey study amongst licensed psychotherapists in Austria. *J. Med. Internet Res.* **2018**, *20*, e11007.
22. Van der Vaart, R.; Witting, M.; Riper, H.; Kooistra, L.; Bohlmeijer, E.T.; van Gemert-Pijnen, L.J. Blending online therapy into regular face-to-face therapy for depression: Content, ratio and preconditions according to patients and therapists using a delphi study. *BMC Psychiatry* **2014**, *14*, 355.

23. Wentzel, J.; van der Vaart, R.; Bohlmeijer, E.T.; van Gemert-Pijnen, J.E. Mixing online and face-to-face therapy: How to benefit from blended care in mental health care. *JMIR Ment. Health* **2016**, *3*, 1–9.
24. Erbe, D.; Eichert, H.C.; Riper, H.; Ebert, D.D. Blending face-to-face and internet-based interventions for the treatment of mental disorders in adults: Systematic review. *J. Med. Internet Res.* **2017**, *19*, 1–22.
25. Mol, M.; van Genugten, C.; Dozeman, E.; van Schaik, D.J.; Draisma, S.; Riper, H.; Smit, J.H. Why uptake of blended internet-based interventions for depression is challenging: A qualitative study on therapists' perspectives. *J. Clin. Med.* **2020**, *9*, 91.
26. Titzler, I.; Saruhanjan, K.; Berking, M.; Riper, H.; Ebert, D.D. Barriers and facilitators for the implementation of blended psychotherapy for depression: A qualitative pilot study of therapists' perspective. *Internet Interv.* **2018**, *12*, 150–164.
27. Kooistra, L.C.; Ruwaard, J.; Wiersma, J.E.; van Oppen, P.; van der Vaart, R.; van Gemert-Pijnen, J.E.; Riper, H. Development and initial evaluation of blended cognitive behavioural treatment for major depression in routine specialized mental health care. *Internet Interv.* **2016**, *4*, 61–71.
28. Høifødt, R.S.; Lillevoll, K.R.; Griffiths, K.M.; Wilsgaard, T.; Eisemann, M.; Kolstrup, N. The clinical effectiveness of web-based cognitive behavioral therapy with face-to-face therapist support for depressed primary care patients: Randomized controlled trial. *J. Med. Internet Res.* **2013**, *15*, e153.
29. Kooistra, L.C.; Wiersma, J.E.; Ruwaard, J.; Neijenhuijs, K.; Lokkerbol, J.; van Oppen, P.; Smit, F.; Riper, H. Cost and effectiveness of blended versus standard cognitive behavioral therapy for outpatients with depression in routine specialized mental health care: Pilot randomized controlled trial. *J. Med. Internet Res.* **2019**, *21*, e14261.
30. Fonseca, A.; Monteiro, F.; Alves, S.; Gorayeb, R.; Canavarro, M.C. Be a mom, a web-based intervention to prevent postpartum depression: The enhancement of self-regulatory skills and its association with postpartum depressive symptoms. *Front. Psychol.* **2019**, *10*, 265.
31. Fonseca, A.; Pereira, M.; Araújo-Pedrosa, A.; Gorayeb, R.; Ramos, M.M.; Canavarro, M.C. Be a mom: Formative evaluation of a web-based psychological intervention to prevent postpartum depression. *Cogn. Behav. Pract.* **2018**, *25*, 473–495.

32. Fourianalistyawati, E.; Uswatunnisa, A.; Chairunnisa, A. The role of mindfulness and self compassion toward depression among pregnant women. *Int. J. Public Health Sci.* **2018**, *7*, 162–167.
33. Stotts, A.L.; Villarreal, Y.R.; Klawans, M.R.; Suchting, R.; Dindo, L.; Dempsey, A.; Spellman, M.; Green, C.; Northrup, T.F. Psychological flexibility and depression in new mothers of medically vulnerable infants: A mediational analysis. *Matern. Child Health J.* **2019**, *23*, 821–829.
34. World Medical Association. Declaration of Helsinki—Ethical Principles for Medical Research Involving Human Subjects. Available online: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/> (accessed on 7 September 2020).
35. American Psychological Association. *Publication Manual of the American Psychological Association*; American Psychological Association: Washington, DC, USA, 2020.
36. Wenzel, A.; Kleiman, K. *Cognitive Behavioral Therapy for Perinatal Distress*; Routledge: New York, NY, USA, 2014.
37. Pugh, N.E.; Hadjistavropoulos, H.D.; Dirkse, D. A randomised controlled trial of therapist-assisted, internet-delivered cognitive behavior therapy for women with maternal depression. *PLoS ONE* **2016**, *11*, e0149186.
38. Beck, J.S. *Cognitive Therapy: Basics & Beyond*; Guilford Press: New York, NY, USA, 1995.
39. Shiffman, S. *Ecological Momentary Assessment*; Oxford Handbooks Online: Oxford, UK, 2014.
40. Areias, M.E.G.; Kumar, R.; Barros, H.; Figueiredo, E. Comparative incidence of depression in women and men, during pregnancy and after childbirth: Validation of the Edinburgh postnatal depression scale in Portuguese mothers. *Br. J. Psychiatry* **1996**, *169*, 30–35.
41. Pais-Ribeiro, J.; Silva, I.; Ferreira, T.; Martins, A.; Meneses, R.; Baltar, M. Validation study of a Portuguese version of the hospital anxiety and depression scale. *Psychol. Health Med.* **2007**, *12*, 225–237.
42. Laranjeira, C.A. Translation and adaptation of the fatigue severity scale for use in Portugal. *Appl. Nurs. Res.* **2012**, *25*, 212–217.
43. Ferreira, P.L.; Ferreira, L.N.; Pereira, L.N. Contribution for the validation of the Portuguese version of EQ-5D. *Acta Med. Port.* **2013**, *26*, 664–675.

44. Rodrigues, D.; Lopes, D. The investment model scale (IMS): Further studies on construct validation and development of a shorter version (IMS-S). *J. Gen. Psychol.* **2013**, *140*, 16–28.
45. Barnes, C.R.; Adamson-Macedo, E.N. Perceived maternal parenting self-efficacy (PMP S-E) tool: Development and validation with mothers of hospitalized preterm neonates. *J. Adv. Nurs.* **2007**, *60*, 550–560.
46. Nazaré, B.; Fonseca, A.; Canavarro, M.C. Avaliação da ligação parental ao bebé após o nascimento: Análise fatorial confirmatória da versão portuguesa do postpartum bonding questionnaire (PBQ). *Laboratório Psicol.* **2012**, *10*, 47–61.
47. Moreira, H.; Gouveia, M.J.; Canavarro, M.C. A bifactor analysis of the difficulties in emotion regulation scale-short form (DERS-SF) in a sample of adolescents and adults. *Curr. Psychol.* **2020**, 1–26.
48. Castilho, P.; Pinto-Gouveia, J.; Duarte, J. Evaluating the multifactor structure of the long and short versions of the self-compassion scale in a clinical sample. *J. Clin. Psychol.* **2015**, *71*, 856–870.
49. Pinto-Gouveia, J.; Gregório, S.; Dinis, A.; Xavier, A. Experiential avoidance in clinical and non-clinical samples: AAQ-II Portuguese version. *Int. J. Psychol. Psychol. Ther.* **2012**, *12*, 139–156.
50. Soares, L.; Lemos, M.S. *Escala de Motivação para a Terapia (Versão Portuguesa)*; Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto: Porto, Portugal, 2003; documento não publicado.
51. Ramos, M.A.F. Análise das Características Psicométricas da Versão Portuguesa do Working Alliance Inventory—Short Revised. Master’s Thesis, Universidade do Minho, Guimarães, Portugal, 2008.
52. Bouwmans, C.; De Jong, K.; Timman, R.; Zijlstra-Vlasveld, M.; Van der Feltz-Cornelis, C.; Tan, S.S.; Hakkaart-van Roijen, L. Feasibility, reliability and validity of a questionnaire on healthcare consumption and productivity loss in patients with a psychiatric disorder (TiC-P). *BMC Health Serv. Res.* **2013**, *13*, 217.
53. Eysenbach, G.; CONSORT EHEALTH-Group. CONSORT-EHEALTH: Improving and standardizing evaluation reports of web-based and mobile health interventions. *J. Med. Internet Res.* **2011**, *13*, e126.

54. Schuster, R.; Schreyer, M.L.; Kaiser, T.; Berger, T.; Klein, J.P.; Moritz, S.; Laireiter, A.; Trutschnig, W. Effects of intense assessment on statistical power in randomized controlled trials: Simulation study on depression. *Internet Interv.* **2020**, *20*, 100313. [CrossRef]
55. Demirci, J.R.; Bogen, D.L. Feasibility and acceptability of a mobile app in an ecological momentary assessment of early breastfeeding. *Matern. Child Nutr.* **2017**, *13*, e12342.
56. Wenze, S.J.; Miller, I.W. Use of ecological momentary assessment in mood disorders research. *Clin. Psychol. Rev.* **2010**, *30*, 794–804.
57. SPMS. *Ehealth em Portugal: Visão 2020*; SPMS: Lisboa, Portugal, 2015.
58. European Commission. eHealth Action Plan 2012–2020—Innovative Healthcare for the 21st Century, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Available online: http://ec.europa.eu/health/ehealth/docs/com_2012_736_en.pdf (accessed on 7 September 2020).

