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Eficácia do treinamento em psicoeducação e reconhecimento de emoções em mulheres com depressão pós-parto

Effectiveness of psychoeducation and emotion recognition training in women with postpartum depression

Efectividad de la formación en psicoeducación y reconocimiento de emociones en mujeres con depresión posparto

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Resumo

Os efeitos negativos da depressão pós-parto (DPP) são encontrados na saúde da mãe e do bebê, assim como na relação entre a díade. Os fatores negativos na relação mãe-bebê parecem ser importantes mediadores das consequências da DPP no desenvolvimento infantil. Assim, para que uma intervenção seja considerada eficaz, deve trazer benefícios à saúde da mãe e à qualidade do relacionamento da díade. Objetivo: Verificar a efetividade do treinamento em psicoeducação e reconhecimento de emoções na qualidade da interação mãe-bebê em mães com DPP. A psicoeducação visa abordar questões típicas do desenvolvimento, enquanto o treinamento enfatiza o processamento das faces maternas. Método: 14 mães com DPP participaram de

um estudo caso-controle com três grupos de comparação: psicoeducação, treinamento para reconhecimento de emoções e lista de espera. Avaliações pré e pós-intervenção foram realizadas. Resultados: Foram encontrados efeitos positivos de um aumento na precisão no reconhecimento de rostos felizes de adultos em mães que participaram de todos os grupos, com uma diminuição na precisão de raiva e rostos tristes. A participação no grupo psicoeducação apresentou efeito positivo nas dimensões maternas de proximidade e relaxamento avaliadas na relação mãe-bebê. Conclusões: A psicoeducação melhorou a qualidade da relação mãe-bebê quando comparada aos demais grupos. Mais estudos com amostras maiores são necessários para confirmar os efeitos encontrados.

Palavras-chave: Depressão pós-parto. Psicoeducação. Intervenção. Relação mãe-bebê.

Abstract

The negative effects of Postpartum Depression (PD) are found in the health of the mother and the infant, as well as in the relationship between the dyad. The negative factors in the mother-infant relationship seem to be important mediators of the consequences of PD in child development. Thus, for an intervention to be considered effective, it should bring benefits to both the mother's health and to the quality of the dyad relationship. Objective: To verify the effectiveness of psychoeducation and emotion recognition training in the quality of mother-infant interaction in mothers with PD. Psychoeducation aims to address typical developmental issues, while training emphasizes the processing of maternal faces. Method: 14 mothers with PD participated in a case-control study with three comparison groups: psychoeducation, speech emotion training, and a waiting list. Pre and post-intervention evaluations were performed. Results: Positive effects of an increase in accuracy in the recognition of adult happy faces in mothers who participated in all groups were found, with a decrease in accuracy of anger and sad faces. Participation in the Psychoeducation group presented a positive effect on the maternal dimensions of proximity and relaxation evaluated in the mother-infant relationship. Conclusions: psychoeducation had an improvement in the quality of the mother-infant relationship when compared to the other groups. Further studies with larger sample sizes are needed in order to confirm the effects found.

Keywords: Postpartum depression. Psychoeducation. Intervention. Mother-infant relationship.

Resumen

Los efectos negativos de la depresión posparto (EP) se encuentran en la salud de la madre y el bebé, así como en la relación entre la diada. Los factores negativos en la relación madre-hijo parecen ser mediadores importantes de las consecuencias de la EP en el desarrollo infantil. Por lo tanto, para que una intervención se considere efectiva, debe traer beneficios tanto para la salud de la madre como para la calidad de la relación de diada. Objetivo: verificar la efectividad de la capacitación en psicoeducación y reconocimiento de emociones en la calidad de la interacción madre-bebé en madres con EP. La psicoeducación tiene como objetivo abordar problemas de desarrollo típicos, mientras que la capacitación enfatiza el procesamiento de rostros maternos. Método: 14 madres con EP participaron en un estudio caso-controle con tres grupos de comparación: psicoeducación, capacitación en reconocimiento de emociones y una lista de espera. Se realizaron evaluaciones previas y posteriores a la intervención. Resultados: Se encontraron efectos positivos de un aumento en la precisión en el reconocimiento de caras felices de adultos en madres que participaron en todos los grupos, con una disminución en la precisión de la ira y caras tristes. La participación en el grupo de psicoeducación presentó un efecto positivo sobre las dimensiones maternas de proximidad y relajación evaluadas en la relación madre-infante. Conclusiones: la psicoeducación tuvo una mejora en la calidad de la relación madre-bebé en comparación con los otros grupos. Se necesitan más estudios con muestras de mayor tamaño para confirmar los efectos encontrados.

Palabras clave: Depresión posparto. Psicoeducación Intervención. Relación madre-hijo.

Introducción

In Brazil, a systematic review found Postpartum Depression (PD) prevalence rates between 7.2% and 39.4%, similar to research conducted in other socioeconomically similar countries (Lobato, Moraes, & Reichenheim, 2011). The PD influence on mother-

infant interaction has been prominent among researchers on this subject in recent decades. Studies point out that the implications of PD on mother-infant interaction occur in the first months of a child's life, considering the higher incidence of depressive conditions during this period (Campbell, Cohn, & Meyers, 1995; Kettunen, Koistinen, & Hintikka, 2014; O'hara & McCabe, 2013).

When comparing depressed to non-depressed mothers, the interaction of depressed mothers with their babies is characterized by less time spent looking, touching, and talking with their child, and the mothers have more negative expressions, less responsiveness, less spontaneity, and lower rates of activity with the infant (Cohn, Campbell, Matias, & Hopkins, 1990; Field, Healy, Goldstein, & Guthertz, 1990; Stewart & Vigod, 2019). In this way, depressed mothers often fail to respond appropriately to their infant, relieve their child's stress and are less effective at responding to their children's needs (Murray & Cooper, 1997). The quality of this mother-infant relationship is strongly related to the trajectory of child development (Milgrom & Holt, 2014), marked by deficits in emotional, social, cognitive and physical development (Arteche & Murray, 2011; Tiffany Field, 2010; Goodman, Guarino, & Prager, 2013; Lynne Murray, Halligan, Goodyer, & Herbert, 2010).

In one of the studies on PD conducted with Brazilian subjects, a survey of 165 mothers and their babies in a city in the state of Rio Grande do Sul correlated changes in risk indexes to the development of the infant and the presence of PD. The results indicate a positive correlation, mothers with higher depression scores were more at risk to negatively affect their infants' development (Carlesso, Souza, & Moraes, 2014). In another Brazilian study, over 90% of mothers reported finding it important to stimulate their infants with practices such as reading books, talking to and holding their children on their laps. However, just slightly over 60% of them actually did engage in these practices, and the depressed mothers did significantly less than the non-depressed mothers (Campos & Rodrigues, 2015).

Thus, interventions for PD should consider not only the remission of maternal symptomatology but also the effects on the mother-infant relationship (Letourneau et al., 2011). In a systematic review published in 2013, only 14.8% of treatments aimed to improve the quality of the mother-infant relationship and 18.5% were integrative, focusing on both relationship quality and the reduction of maternal symptoms (Olhaberry

et al., 2013). Although there are treatments, PD is often underdiagnosed and undertreated (Stewart & Vigod, 2019).

The World Health Organization (2013) suggests that prevention, diagnosis, and treatment for PD should be carried out in an integrated manner in primary care to the family. A meta-analysis by Stephens et al. (2016) found positive results in decreasing depressive symptoms in interventions by primary care providers. However, these interventions were not intended to improve the quality of the mother-infant relationship (Stephens et al., 2016). In Brazil, there is a lack of procedures designed to achieve this. Adding to this lack of effective interventions are the difficulties encountered by depressed mothers in the postpartum period to seek and adhere to appropriate treatment. Among these barriers we highlight displacement issues, the need for a caregiver for the child while the mother receives care, the cost of treatment, the stigma of seeking treatment for psychological and psychiatric issues, as well as the lack of information, both to recognize difficulties and to find suitable places to seek help (Ko, Farr, Dietz, & Robbins, 2012; O'Hara & McCabe, 2013).

Objectives

This study aims to verify the effects of a psychoeducational intervention and expression recognition training on the quality of the mother-infant relationship. These two interventions were compared with mothers who were assigned to the waiting list group. The hypothesis of the study is that mothers who receive facial expression training and psychoeducation will improve the quality of their mother-infant relationship, and the mothers who complete the facial expression training will have an even greater improvement than mothers in the psychoeducation group. Additionally, improvements in maternal mood are expected in both the psychoeducation group and the expression recognition training group.

Methods

This study is a case-control study with three comparison groups: psychoeducation, expression recognition training, and a waiting list. Pre and post-intervention evaluations were performed.

Sample

A total of 14 dyads of women with infants between four and twelve weeks of age participated in the study and completed the post-intervention assessment. Five dyads participated in the psychoeducation group, three in the expression recognition training group and six on the waiting list. Inclusion criteria consisted of the following: a) mothers 18 years of age or older, literate and diagnosed with PD (EPDS ≥ 11 and current depressive episode in SCID), b) full-term infants with no health problems. Exclusion criteria included: a) mothers with HIV / AIDS, drug addiction, schizophrenia, postpartum psychosis, and mental retardation; b) twin babies, babies with congenital malformation, genetic syndrome or visual impairment. The use of medication during pregnancy and during the execution of the interventions was investigated, and one mother in each group was using Fluoxetine.

There were no significant differences in participant age between groups [$F(2,11) = 1.553, p = .255, n^2 = .220$] nor in the intensity of depressive symptoms by pre-intervention EPDS [$F(2,11) = 0.361, p = .705, n^2 = .062$], with 50% of the mothers having previous episodes of SCID depression. In the Brazil Economic Classification criterion, most mothers were in groups D and E (57.1%), and 35.7% in groups C1 and C2. Most mothers (64.3%) declared themselves as white and lived in Porto Alegre, followed by 21.4% living in the metropolitan region of Porto Alegre and only 14.3% in other cities. As shown in Table 1, there were no significant differences between groups regarding educational level [$\chi(4) = 2.508, p = .643$], marital status [$\chi(2) = 1.805, p = .406$] and occupation [$\chi(2) = 0.62, p = .969$]. Among the infants, most were girls [$\chi(2) = 0.253, p = .881$] and only children [$\chi(2) = 1.079, p = .583$].

Table 1.
Demographic characteristics of the sample.

	Psychoeducation (n=5)	Training (n=4)	Waiting List (n=6)
Mother's Characteristics			
Age (Mean/SD)	22.60 (3.05)	27.75 (7.41)	28.50 (5.57)
Score EPDS (Mean/SD)	16.40 (3.78)	17.25 (6.45)	14.17 (4.07)
Education (%)			
Elementary School	1 (20.0%)	1 (25%)	2 (33.32%)
Complete high school	4 (80.0%)	2 (50%)	3 (49.98%)
Higher Education	0	1 (25%)	1 (16.66%)
Occupation (%)			
Employed	4 (80.0%)	2 (50%)	4 (66.68%)
Not employed	1 (20.0%)	2 (50%)	2 (33.32%)
Marital Status (%)			
Married/Live Together	1 (20.0%)	1 (25%)	2 (33.3%)
Single	4 (80.0%)	3 (75%)	4 (66.7%)
Infant Characteristics			
Sex (%)			
Male	2 (40.0%)	1 (25%)	3 (50.0%)
Female	3 (60.0%)	3 (75%)	3 (50.0%)
Age in days (mean/SD)	86.40 (22.68)	78.00 (33.10)	79.33 (32.42)
Only Child (%)			
Yes	4 (80.0%)	3 (75%)	3 (50%)
No	1 (20.0%)	1 (25%)	3 (50%)

Procedures

This study was approved by the Research Ethics Committee (CEP) of the PUCRS, approved by CAAE number: 62179216.0.0000.5336. Mothers were recruited using the snowball method, through social media dissemination and through contact with mothers in Fêmima Hospital within 48 hours postpartum. Mothers contacted via hospital were accessed in person by research assistants during a period of 9 months in 2017. The purpose of the study was explained to the mothers and a contact telephone number were requested for those interested in participation. Using this basic information the study excluded underage mothers and infants who fit any of the exclusion criteria for the survey. The other inclusion and exclusion criteria were verified in the pre-intervention evaluation, as well as possible health problems of the infants.

Between four and twelve weeks postpartum, telephone contact was made with all mothers, resuming the objectives and procedures of collection, in addition to performing the EPDS application. At least two contact attempts were made and a message was sent. The mothers who did not respond to any of these attempts were excluded.

The application of EPDS was done by telephone and mothers who scored ≥ 11 were invited to participate in the study. At this time, the application of the pre-intervention

evaluation was scheduled, allowing the mother to opt to do it at university or at home. This evaluation occurred mostly at the mothers' homes (73.33%) and the others were performed at the university. Among the three groups, 60% of psychoeducation, 75% of training and 83.34% of the waiting list performed the assessment and intervention at home. In the initial evaluation, the Informed Consent Form was signed and the subjects were randomized into one of the three interventions through the block randomization software. Participants were not informed about their intervention group. Both pre and post-intervention evaluations were applied by an evaluator blinded to which group the mother had been randomized. The order of application of the instruments began with the sociodemographic questionnaire and, if the infant was awake, the mother-infant interaction was filmed first. After the post-intervention evaluation, mothers who continued to have depressive symptoms or showed interest in continuing psychological follow-up were referred for care. Seven mothers were referred for psychological care and five were referred for psychiatric care.

Figure 1 shows the data collection diagram to date. Of these mothers, one did not complete the intervention due to the infant's death; one moved to another city; one pre-assessment video was erroneous and the mother was partially excluded because the dyad interaction could not be evaluated, and only the outcomes in the recognition of facial expressions were evaluated, and eight dropped out between the beginning of the sessions and the post-intervention evaluation.

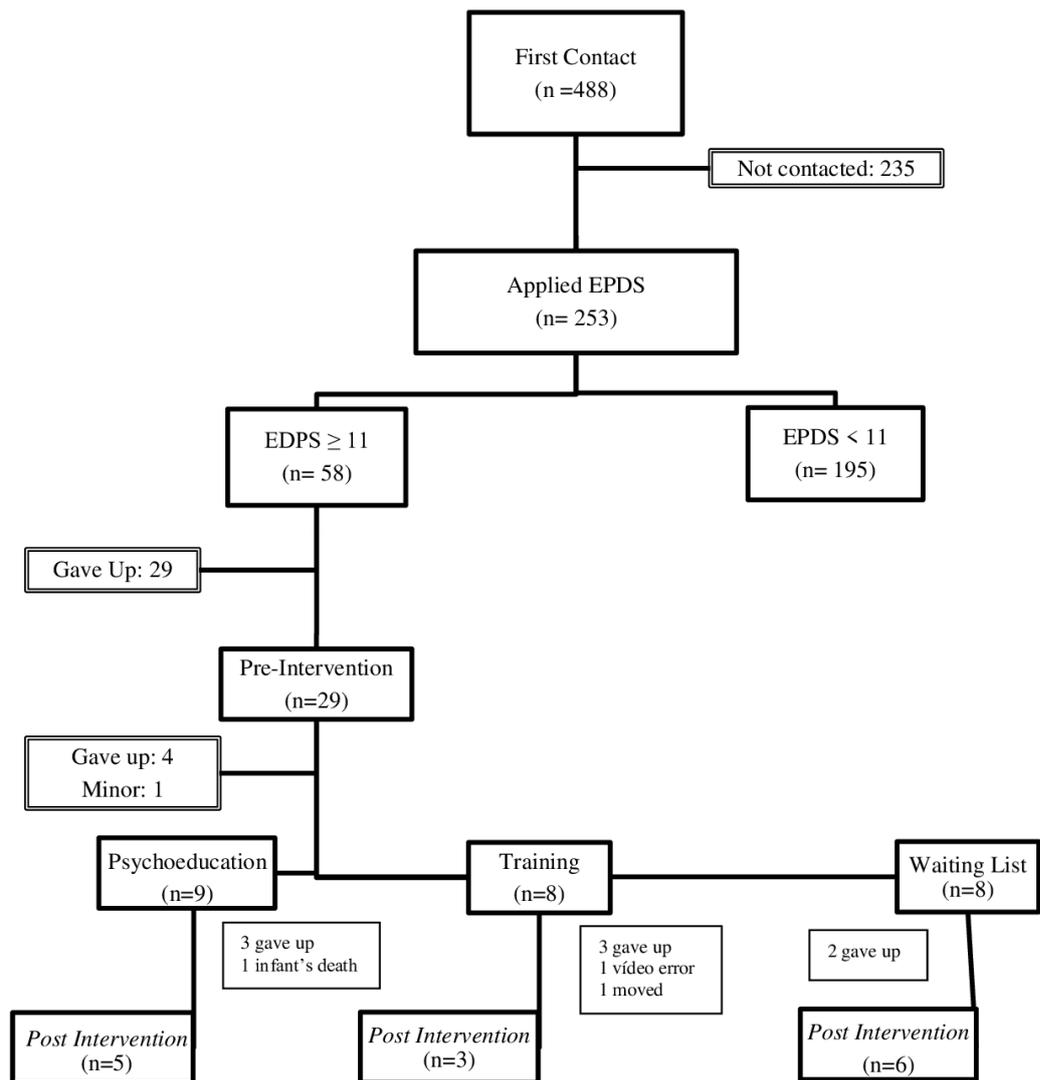


Figure 1.
Data collection diagram

Interventions

Psychoeducation

Four individual weekly meetings were held with mothers with durations of about 60 minutes. Issues of typical development were addressed; breast-feeding; food; hygiene; bathing; problems such as crying, acid reflux, irritability, cramps, restless sleep, excessive sleep, poor sleep; and changes in family configuration, in maternal thoughts and feelings through booklets about these themes. All sessions were attended by the mother and infant and were conducted by a psychologist and an undergraduate researcher to assist in the

care of the infant, if necessary. The intervention was performed by female professionals, with previous training and who did not participate in the assessment of the mothers.

Emotion Recognition Training

The emotion recognition training targeted maternal face processing. A total of four meetings were held with this group, one meeting per week lasting 60 minutes. All sessions were attended by the mother and the infant and were conducted by a psychologist and an undergraduate researcher to assist in the care of the infant, if necessary. The training was performed by female professionals, with previous training who did not participate in the assessment of the mothers.

Waiting List

The waitlist group functioned as a control group format. The participants in the waiting list group were free to seek treatment according to their personal needs, but the mothers only sought follow-up after the post-intervention evaluation with the indication of the team. After the pre-intervention evaluation was completed, telephone contact was made with the mothers of this group, informing them that they will receive a reevaluation five weeks after the evaluation. In the case of maintenance of depressive symptoms or identification of other difficulties, a referral was made according to the participant's need.

Evaluation Instruments

These instruments were used in both pre and post-intervention evaluation, except for the demographics questionnaire.

Sociodemographic Questionnaire: questionnaire developed specifically for this research. Used only during the pre-intervention evaluation.

Edinburgh Postpartum Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987; Santos, Martins, & Pasquali, 1999): consists of 10 items on a 3-point Likert scale for depressive symptoms frequently observed in the postpartum period. The scale has good internal consistency indices (Cronbach's alpha $\alpha = .87$). The EPDS was originally adapted for Brazil by Santos et al. (1999) (Santos et al., 1999) who from the evaluation of 69 women proposed a cutoff of ≥ 11 , with 84% sensitivity and 82% specificity. More recently, using a sample from the city of Pelotas-RS, 378 women were evaluated in the third postpartum month, and the results indicated ≥ 11 as the best cutoff point for PD

screening, with 82.6% sensitivity and 65,4% specificity (Santos, 2007). This research used as a cutoff point a score equal to or greater than 11 for screening for PD.

Structured Clinical Interview for DSM Disorders (SCID): semi-structured interview compatible with DSM-IV criteria. The SCID-I (Del-Ben et al., 2001; First, Spitzer, Gibbon, & Williams, 1997) enables the diagnosis of Axis I disorders and includes a structured screening interview containing 42 items scored on a categorical scale for the presence or absence of symptoms. In this study, the SCID-I subscales were applied based on the categories answered positively in the screening interview.

Infant Emotional Face Recognition Task: Infant face images representing the emotions happiness, sadness and neutral from the Oxford Parent Project image bank and the Brazilian collection were used. The images were presented on a 15-inch screen laptop using the Eprime software program. Each participant was asked to evaluate each image and to name the emotion corresponding to that facial expression and its intensity. The images were presented at two different exposure times 200ms and 1000ms. Twenty-six faces of babies were presented (five happy and sad faces and three neutral, repeated in both stimulus duration 200ms and 1000ms). To assess accuracy, one point was given for each correct identification of the emotion presented on the face for each of the trials. Thus, average accuracy was constructed for each emotion at each stimulus duration, both in the pre- and post-intervention assessment. The intensity was measured on a five-point Likert scale, 1 being very weak and 5 very strong, which the participant assigned to each face. An average of the intensity assigned by the participant was performed for each emotion in each of the stimulus presentation times, pre and post-intervention.

Adult Emotional Face Recognition Task (Vasconcellos, Jungbluth, & Salvador-Silva, 2009): images of adult faces were used to verify how the study's participants identify the emotions expressed by the faces. The photos displayed the basic emotions of fear, sadness, happiness, disgust, surprise, neutral and anger, considering the universality of these emotions already highlighted in previous works. Each participant was asked to name and identify the intensity of one of these emotions from the image presented. The procedure of presentation and evaluation of the faces followed the same pattern that the infant images used. Fifty-two adult faces were presented (four for each of the emotions and two for the neutral faces, repeated at both stimulus durations of 200ms and 1000ms). Accuracy and intensity scores follow the pattern of infant images, the first being averaged from correct assignments (one point) and the second by scores assigned on a five-point

Likert scale. In this study, the emotions of happiness, fear, anger and sadness were presented by the relevance described in the literature for PD.

Global Rating Scale for Mother-infant Interaction – GRS (Murray, Fiori-Cowley, Hooper, & Cooper, 1996): Mother-infant interaction was assessed from direct observation of play between mother and infant through the GRS instrument designed to assess the quality of mother-infant interaction. The instrument has been used to assess the quality of the mother-infant relationship in mothers with postpartum depression and has been shown to have good validity in discriminating interaction (Murray et al., 1996). In addition, the GRS has cross-cultural validation, with studies in Europe, Africa and South America. Mothers and babies were filmed interacting for five minutes at their residence. The infant was positioned on a child basket, crib, mother's lap or sofa. The interaction was filmed freely, the mother positioned her child as she preferred, as long as it was possible to make eye contact with him. The mother was invited to interact with her child and could play and talk to the infant, as she pleased, with or without the aid of objects or toys, for 5 minutes. The camcorder was positioned to capture the entire face of the infant and its mother. Interactions were assessed every minute on a 5-point Likert scale in the following dimensions: mother (warm/positive; accepting; responsive; demanding; sensitive; non-intrusive behavior; non-intrusive speech/speech; not distant; not silent; happy; a lot of energy/motivation; involved with the child; and relaxed), for the infant (attention to the mother; active communication; positive vocalizations; involved with the environment; alert; happy; not irritable) and the evaluation of the pair's interaction (gentle/easy; funny; satisfactory; very engaging; and lively). The interaction videos were evaluated by two trained independent evaluators, the pair being composed of a psychologist and an undergraduate student of psychology. When there was a disagreement of 30% or more between the characteristics evaluated, a third, previously trained, psychologist and blind judge evaluated the videos again. The score attributed to performing the analyzes was the average of the judges' score in the five minutes of interaction for each of the dimensions. In this study, we present only those that obtained significant results or have a greater relevance described in the literature of interventions for PD.

Data analysis

Data from mothers who completed the four sessions scheduled for the intervention groups and the post-evaluation were analyzed. Analyses were performed using the Statistical Package for Social Sciences (SPSS) version 18.0 software. Initially, the normality of data distribution was verified with the Kolmogorov-Smirnov test. For demographic variables and results from the scales, descriptive analyses were used.

For the analysis of the main outcomes of the study, a depressive symptom improvement score was performed by subtracting the post-intervention EPDS score from the pre-assessment EPDS score (Post-EPDS Pre-Intervention). In assessing the accuracy of face recognition in both adults and infants, one point was assigned to each correct identification for each trial. From this, an average of accuracy for each emotion in each stimulus duration was constituted. Then repeated measures analyses were conducted in a 3 x 2 x 2 design to investigate group effects, stimulus duration and time, and interactions between group and stimulus duration and group and time. For intensity, the overall mean intensity for each emotion at each stimulus duration was analyzed. Similar to the accuracy assessment, repeated measures analyses were conducted in a design 3 (group) x 2 (stimulus duration) x 2 (time: T1 and T2). All analyses were conducted considering the improvement in the intensity of depressive symptoms by EPDS as a covariate.

To assess the effect of training on the quality of interaction, the average score given by evaluator one and two in each of the dimensions within the five minutes evaluated was recorded. A repeated measures analysis was performed, considering the dimensions of the mother-infant interaction as a dependent variable and the mother group as an independent variable and covariate for the improvement in the intensity of depressive symptoms by EPDS. For all analyses, the significance value of $p \leq 0.05$ was used.

Results

Maternal Symptomatology

There was a significant difference in maternal symptoms of depression assessed before and after the intervention by the total EPDS score [$F(1,12) = 8.461$, $p = .013$, $\eta^2 = .414$, with the overall mean pre-intervention sample. $M = 15.73$ ($sd = 4.56$); post intervention $M = 12.00$ ($sd = 6.63$)]. However, the interaction group * time was not

significant [$F(2,12) = 1.857, p = .198, \eta^2 = .236$], suggesting an improvement in depression scores over time and not as an outcome of interventions. Although not significant, the psychoeducation group showed a greater tendency to decrease maternal depressive symptoms [Pre-intervention $M = 16.40$ ($sd = 3.78$); Post Intervention $M = 9.40$ ($sd = 5.32$)], compared to the other groups: training [Pre-intervention $M = 17.25$ ($sd = 6.45$); Post Intervention $M = 16.00$ ($sd = 10.49$)] and waiting list [Pre-intervention $M = 14.17$ ($sd = 4.07$); Post Intervention $M = 11.50$ ($sd = 3.83$)]. From this result, the Depression Symptom Improvement Score (Post-EPDS Pre-Intervention) was constructed to be used as a covariate of the main outcome analyzes, assessing whether the differences found would not only be due to the improvement in maternal depressive symptoms.

Effect of interventions on facial expression recognition

The task of recognizing the emotional faces of infants had a ceiling effect, with high accuracy rates for sad faces, both pre and post-intervention (all indexes above 90% accuracy) in the three groups. This result did not allow investigation of group effects in these outcomes. Happy faces also showed high levels of accuracy (all indexes above 73% accuracy), but variability was observed - allowing the investigation of group effects. Only within the 1000ms time, all groups showed improvement in the recognition of faces of happiness, but the differences were not significant [being the general average of the pre-intervention sample $M = 4.20, sd = 1.08$; post-intervention $M = 4.53, sd = 1.06$]. However, it is noteworthy that the training group tended to increase the level of accuracy of happiness at all times, while the psychoeducation group showed a greater tendency to worsen accuracy at 200ms. When assessing the intensity assigned to the faces, there was not a significant difference between pre and post evaluation.

In the task of recognizing emotional faces of adults, the average accuracy rates ranged from zero to 100%, with the lowest rates in happiness and the highest in anger and sadness. In regards to happiness, significant effect of time [$F(1,11) = 41.760, p \leq .001, \eta^2 = .792$] and moderate effect of group * time [$F(1,11) = 3.806, p = .055, \eta^2 = .409$] were observed at 200ms [Pre-intervention: psychoeducation $M = .0$ ($sd = .0$), training $M = .43$ ($sd = .37$), waiting list $M = .45$ ($sd = .40$); Post-intervention: psychoeducation $M = .95$ ($sd = .11$), training $M = 1.00$ ($sd = .0$), and waiting list $M = .87$ ($sd = .14$)]. Also, in 1000ms there was a significant effect of time [$F(1,11) = 38.102, p \leq .001, \eta^2 = .776$] with all groups increasing the accuracy [Pre-intervention: psychoeducation $M = .0$ ($sd = .0$),

training $M = .56$ ($sd = .42$), waiting list $M = .37$ ($sd = .34$); Post-intervention: psychoeducation $M = .95$ ($sd = .11$), training $M = 1.00$ ($sd = .0$), and waiting list $M = 1.00$ ($sd = .0$).

Regarding the intensity of the happiness displayed, there were significant differences in group * time in 200ms [$F(2,11) = 4.338$, $p = .041$, $n^2 = .441$], and the psychoeducation group significantly decreased the assigned intensity [Pre-intervention: psychoeducation $M = 3.60$ ($sd = .45$), training $M = 3.20$ ($sd = .61$), waiting list $M = 2.12$ ($sd = .68$); Post-intervention: psychoeducation $M = 3.55$ ($sd = .81$), training $M = 4.18$ ($sd = .85$), and waiting list $M = 3.16$ ($sd = .52$)]. And the same group * time effect was found at 1000ms [$F(2,11) = 10.464$, $p = .003$, $n^2 = .655$] also with the psychoeducation group significantly decreasing the assigned intensity [Pre-intervention: psychoeducation $M = 3.10$ ($sd = .87$), training $M = 3.31$ ($sd = 1.04$), waiting list $M = 2.37$ ($sd = .72$); Post-intervention: psychoeducation $M = 2.80$ ($sd = .84$), training $M = 3.62$ ($sd = 1.19$), and waiting list $M = 3.67$ ($sd = .26$)].

Regarding the emotion of fear, no significant effect of time or group * time were observed at 200ms and 1000ms. Regarding the intensity attributed to fear, only at 200ms there was a significant effect of time [$F(1,11) = 2.838$, $p = .001$, $n^2 = .643$]. The pre-intervention mean scores were $M = 3.11$ ($sd = .74$) and post-intervention $M = 3.87$ ($SD = .80$). Regarding anger, no significant effect was observed at 200ms. However, at 1000ms a significant time effect was observed [$F(1,11) = 8.729$, $p = .013$, $n^2 = .442$], and all groups decreased accuracy [pre-intervention: psychoeducation $M = 1.00$ ($sd = .00$), training $M = .81$ ($sd = .24$), and waiting list $M = .87$ ($sd = .13$); post-intervention: psychoeducation $M = .85$ ($sd = .13$); training $M = .75$ ($sd = .20$); and waiting list $M = .58$ ($sd = .12$). There were no significant differences in intensity at any of the stimulus presentation times.

For sadness, there were a significant time effect at 200ms [$F(1,11) = 5.548$, $p = .038$, $n^2 = .335$], and all groups had a worse accuracy [pre-intervention: psychoeducation $M = 1.00$ ($sd = .00$), training $M = .56$ ($sd = .42$), and waiting list $M = .79$ ($sd = .40$); post-intervention: psychoeducation $M = .65$ ($sd = .28$); training $M = .43$ ($sd = .37$); and waiting list $M = .29$ ($sd = .24$). There were no significant effects at 1000ms for sadness and in the intensity at any of the stimulus presentation times.

Figure 2 presents the accuracy performance for each of the emotions, pre, and post-intervention, for each of the groups, at both stimulus exposure times and figure 3 shows the assigned intensities.

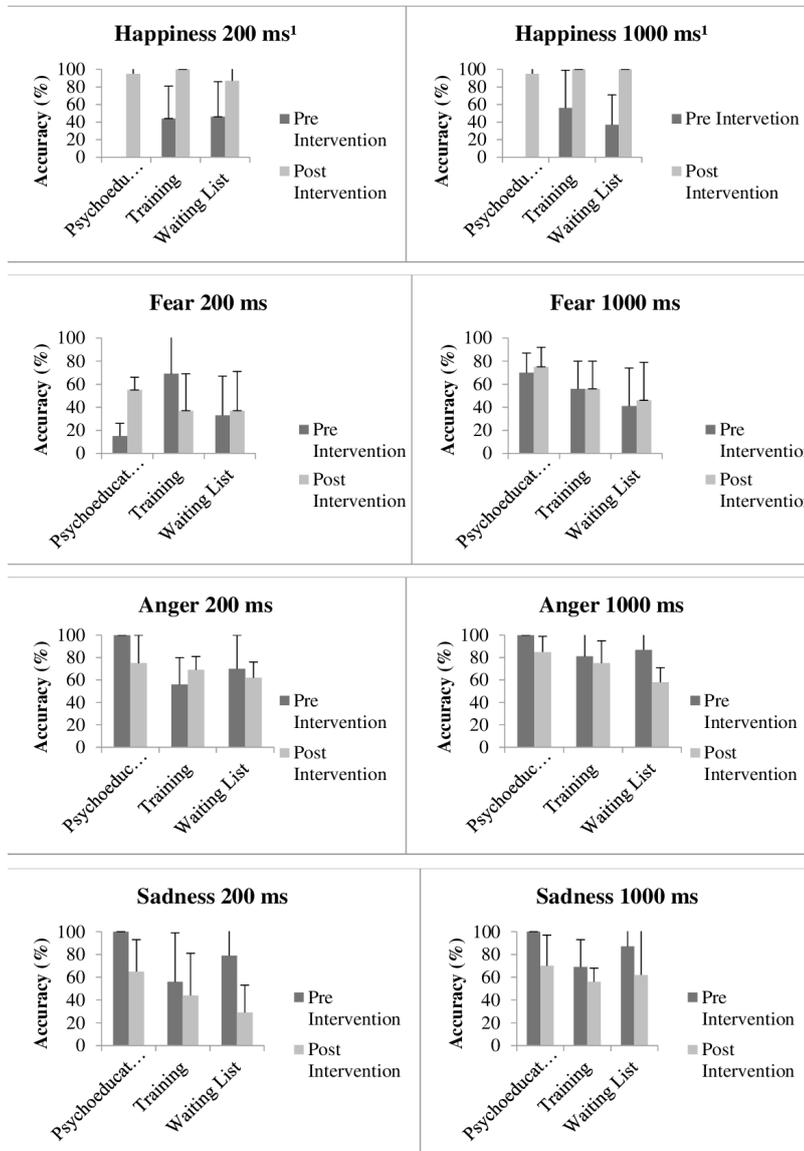


Figure 2.

Effect of groups on the accuracy of adult facial expression recognition

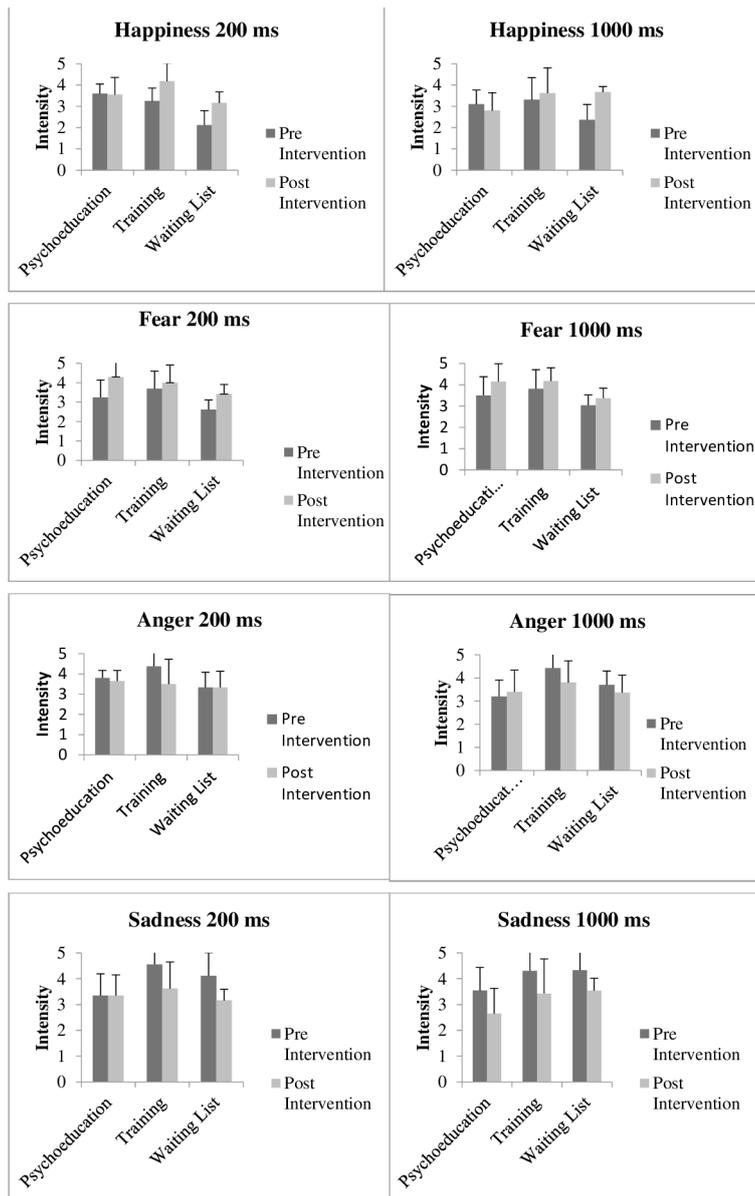


Figure 3.

Effect of groups on intensity attributed to adult facial expressions

Effect of interventions on the quality of the mother-infant relationship

When evaluating the means of the interaction dimensions, the mothers presented intermediate scores with averages close to three, suggesting that the study mothers generally had positive interactions with their babies. Regarding the effects of time and group * time on the dimensions of maternal behavior evaluated, there was a group * time effect on two dimensions of maternal behavior evaluated, and in both cases the psychoeducation group showed an improvement in interaction - when compared to the other two groups. The effect on the non-distant dimension was significant [$F(2,10) =$

7.035, $p = .012$, $n^2 = .585$], and the pre-intervention means of the groups were: psychoeducation $M = 3.60$ ($sd = .59$), training $M = 3.70$ ($sd = .56$), waiting list $M = 4.08$ ($sd = .23$) and post intervention: psychoeducation $M = 4.24$ ($sd = .43$), training $M = 3.47$ ($sd = .46$) and waiting list $M = 3.88$ ($sd = .35$). There was also a marginally significant effect group * time on the relaxed maternal dimension [$F(2,10) = 3.025$, $p = .094$, $n^2 = .377$]. The pre-intervention means in this dimension were: psychoeducation $M = 3.42$ ($sd = .20$), training $M = 3.85$ ($sd = .72$) and waiting list $M = 3.48$ ($sd = .58$), while post-intervention the means of the psychoeducation group $M = 3.90$ ($sd = .54$), training $M = 3.30$ ($sd = .57$) and waiting list $M = 3.38$ ($sd = .64$).

Regarding the infant's behaviors, the averages obtained were close to three, suggesting a good interaction of the infant with its mother. Regarding the vocalizations of the infants, the averages were lower, justified by the age of the children in the collection. In the infant dimensions evaluated, the dimension of vocalizations had a time effect [$F(1,10) = 4.986$, $p = .05$, $n^2 = .333$], with an increase in the vocalizations of babies [pre-intervention $M = 2.00$ ($sd = .71$); post-intervention $M = 2.40$ ($sd = 1.00$)].

Regarding the dyad dimensions, the pairs of the three groups presented averages close to or below three, indicating relatively low levels of interactivity. There were no significant time or group * time effects in this dimension.

Discussion

This study aimed to analyze the effectiveness of two interventions for women with PD in the quality of the mother-infant relationship. The main hypothesis of the study was that expression recognition training would increase maternal accuracy in facial expression recognition and, consequently, there would be an increase in the quality of the mother-infant relationship. Mothers in the psychoeducation group would not have improved facial expression recognition, but to a lesser extent have improved the quality of their mother-infant relationship. Both intervention groups would have benefits compared to the waiting list. Although this study provides preliminary and limited data, the results suggest the effectiveness of interventions developed in different components.

There was a high percentage of mothers not adhering to participate in the study after applying the EPDS by telephone (50%). This is an important fact that corroborates the difficulties found in the literature regarding the search for care and adherence to it by

mothers with PD (Bauer, Ofner, Pottenger, Carroll, & Downs, 2017; Grote et al., 2014), given that it is a project that proposed to follow the mothers through home visits. Interventions that can be carried out by the primary health care team, as recommended by the WHO (2013), may facilitate mothers' acceptance to participate and reduce stigma involved with psychological care and psychiatric illness, as this monitoring would be performed by professionals who already have a previous bond with the mothers. Our intervention by a research group, not linked by a prior relationship with the mothers, was a factor cited for non-adherence to it. Some mothers reported their spouse not accepting their participation in the collection, and marital conflict is an important issue to be evaluated. However, most mothers showed no interest in participating for reasons like lack of motivation, possibly related to PD symptoms. Symptoms of loss of interest or pleasure, feelings of hopelessness and helplessness, loss of energy and sleep difficulties, when more intense, may increase the difficulty in adhering to the treatment of mothers with PD. The majority of subjects of this study (66.66%) had at least completed high school or completed higher education, and it is possible that due to their high level of education, these mothers had an easier time understanding the importance of professional monitoring during this period and, consequently, in joining the study.

All three groups improved in the maternal symptoms of PD by EPDS, indicating a tendency to decrease in symptom intensity over time, ie a spontaneous remission. This result may have been influenced to the extent that the three groups all received some form of follow-up, including the mothers in the waiting list, with pre and post evaluation. In these meetings, the mothers were welcomed, had space to talk about their difficulties and were diagnosed with PD, normalizing the difficulties encountered by them. In addition, health services provided through home visits, as were performed in this study, are related to an increase in the perception of social support (Milani et al., 2017). Lack of social support is considered an important risk factor for PD and the decrease in this factor may be associated with decreased symptoms of depression.

Due to the improvement in maternal symptoms in all groups, the importance of the depressive symptoms improvement score (EPDS Post - EPDS Pre-Intervention) is important to be used as the covariate of the main outcome analyzes. This improvement in symptoms may result in increased quality of mother-infant interaction and recognition of facial expressions alone, without representing the effect of interventions.

It is important to highlight that the psychoeducational group showed a greater tendency to improve the symptoms of depression, although it is not a specific objective of the intervention. A possible explanation for this result is that psychoeducation, through regular contact with someone questioning the mothers' emotional health, with the reception time at the beginning and end of all sessions, promoted a satisfactory level of support and reassurance. The booklets used in the sessions, along with the themes worked on, may have increased the monitoring of maternal behaviors directed to the infant, as more interaction tips are given and may also increase the mother's confidence. Other studies, such as Howell et al. (2010) (Howell, 2010) found results in which preparation for the postpartum experience was associated with decreased PD, while Razurel et al. (2017) (Razurel et al., 2017) found positive postpartum psychoeducation results in improving mother-infant relationship and perception of maternal self-efficacy, reinforcing the positive effects of interventions such as psychoeducation. Facial expression recognition training which is done less directly than psychoeducation could have generated less positive outcomes due to the interaction of this style of intervention with the symptoms of depression.

Regarding the effects of interventions on the assessed outcomes, preliminary data indicated that the maternal accuracy for babies' faces was quite high and this effect may have occurred because the babies' faces used in this study were of high emotional intensity, facilitating their identification. Another hypothesis, corroborated by the study by Gil et al. (2011) (Gil, Teissède, Chambres, & Droit-Volet, 2011), is that the recognition of babies' facial expressions is mainly influenced by anxiety symptoms. Mothers with higher postpartum anxiety had a more negative perception of child emotional expressions, but this was not maintained with symptoms of depression. Therefore, in future studies, it is suggested to include lower-intensity stimuli and also the evaluation of maternal anxiety symptom effects.

Regarding the faces of adults, the emotions that presented the highest accuracy were anger and sadness, in contrast to happiness with the lowest accuracy. Although the purpose of this study was not to investigate the effects of PD on the ability to recognize facial expressions, previous studies indicate that women with PD have lower accuracy rates on adult faces of happiness (Flanagan, White, & Carter, 2011) and this result was maintained in the present study. Difficulty in recognizing happy faces may indicate patterns linked to depressive symptoms, suggesting that this bias occurs through a

selective process that maximizes negative stimuli and filters or minimizes positive ones (Gotlib, Krasnoperova, Neubauer Yue, & Joormann, 2004; Joormann & Gotlib, 2007; Stein et al., 2010). Even with this pattern, all groups had improved recognition of happy faces after the intervention, even the waiting list group.

In addition, other studies conducted with adults diagnosed with depression indicate that they have a higher reactivity to negative emotions and lower reactivity to positive facial emotions (Gollan, Hoxha, Getch, Sankin, & Michon, 2013), requiring higher emotional intensity stimuli on happy face recognition training to improve accuracy. In our study, the accuracy of anger recognition decreased at 1000ms in all groups, suggesting that there is a modification at a more conscious level. In the same direction, all groups decreased the accuracy of sadness at 200ms. This may be associated with improved depression symptoms and, therefore, a lower reactivity to negative emotions.

Regarding the increase in the quality of the mother-infant relationship, in mothers who participated in psychoeducation, there was an increase in the maternal dimensions of approximation and relaxed. Possibly participation in a more directive intervention, providing information about the normal development of the infant, may have facilitated maternal behaviors directed towards the infant. Other maternal dimensions that did not obtain positive results may have a relevant cultural learning factor, requiring interventions focused on these behaviors to make a significant difference. Role-play training where a professional can serve as a role model and giving feedback on maternal behavior can assist in this process.

Testing the main hypothesis of this study, although it found a positive effect in improving the accuracy of recognition of facial expressions of happiness in mothers who participated in all groups, no improvement in the quality of their mother-infant relationship was identified in the training group as expected. The main hypothesis for this result is that the emotions of sadness, considered in the literature as one of the most impacted by the bias of PD, did not have positive results by training. In addition, as the training group didn't receive a directive intervention, this may help to maintain less satisfactory maternal relationship patterns.

Conclusions

PD has a high prevalence in Brazil and there a significant amount of evidence of its negative consequences on mother and infant health, as well as impaired interaction (Moehler, Brunner, Wiebel, Reck, & Resch, 2006). In addition, there is a gap in the preparation of Brazilian professionals for both proper diagnosis and interventions in this population, making this a public health issue. Among the community sample of 15 mothers participating in this study, none of them were identified with a diagnosis of PD by the healthcare system and only one was seeking psychological treatment. However, they were all clinically depressed and all had difficulties in their moods and their relationships with their infants.

The main limitation of this study is the small sample size, making it impossible to perform more sophisticated analyses and for the results to have a larger effect size. This limitation made it impossible to perform correlational studies between the recognition of facial expressions and the quality of the mother-infant relationship. To confirm the patterns of the results found, the collection continues in progress, seeking an increase in the sample size. Correct identification of the effects of interventions on the accuracy of facial expression recognition will allow adaptation to the procedures used. In addition, this study performed only a single post-intervention assessment not long after the intervention or after four weeks on the waiting list, and further follow-up was required to assess the maintenance of the changes found. To the extent that one of the negative effects of PD occurs on the child's development, follow-up is needed to assess the actual impact on the trajectory of these children.

There is a need to create interventions that invest in the quality of the mother-infant relationship, adapted to the Brazilian reality and that can be applied through home visits, increasing their adherence. Future studies are needed to determine how much these interventions can prevent negative effects on mother, infant and dyad health, and follow-up in the long term after the intervention.

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References

- Arteche, A., & Murray, L. (2011). Maternal Affective Disorder and Children's Representation of Their Families. *Journal of Child and Family Studies*, 20(6), 822–832. <https://doi.org/10.1007/s10826-011-9450-7>
- Bauer, N. S., Ofner, S., Pottenger, A., Carroll, A. E., & Downs, S. M. (2017). Follow-up of Mothers with Suspected Postpartum Depression from Pediatrics Clinics. *Frontiers in Pediatrics*, 5(October). <https://doi.org/10.3389/fped.2017.00212>
- Campbell, S. B., Cohn, J. F., & Meyers., T. (1995). Depression in first-time mothers: mother-infant interaction and depression chronicity. *Developmental Psychology*, 31(3), 349–357.
- Campos, B. C. De, & Rodrigues, O. M. P. R. (2015). Depressão Pós-Parto Materna: Crenças, Práticas de Cuidado e Estimulação de Bebês no Primeiro Ano de Vida. *Psico (Porto Alegre)*, 46(4), 483–492. <https://doi.org/http://dx.doi.org/10.15448/1980-8623.2015.4.20802>
- Carlesso, J. P. P., Souza, A. R., & Moraes, A. B. (2014). Análise da relação entre depressão materna e indicadores clínicos de risco para o desenvolvimento infantil. *Revista CEFAC*, 16(2), 500–510.
- Cohn, J. F., Campbell, S. B., Matias, R., & Hopkins, J. (1990). Face-to-face interactions of postpartum depressed and nondepressed mother-infant pairs at 2 months. *Developmental Psychology*, 26(1), 15–23.
- 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.
- Del-Ben, C. M., Vilela, J. A. A., de S Crippa, J. A., Hallak, J. E. C., Labate, C. M., & Zuardi, A. W. (2001). Confiabilidade de “Entrevista Clínica Estruturada para o DSM-IV-Versao Clínica” traduzida para o português. *Revista Brasileira de Psiquiatria*.
- Field, T., Healy, B. T., Goldstein, S., & Guthertz, M. (1990). Behavior-state matching and synchrony in mother-infant interactions of nondepressed versus depressed dyads. *Developmental Psychology*, 26(1), 7–14.

- Field, Tiffany. (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>
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. (1997). Structured clinical interview for DSM-IV clinical version (SCID-I/CV).
- Flanagan, T. J., White, H., & Carter, B. G. (2011). Differential impairments in emotion face recognition in postpartum and nonpostpartum depressed women. *Journal of Affective Disorders*, 128(3), 314–318. <https://doi.org/10.1016/j.jad.2010.07.021>
- Gil, S., Teissèdre, F., Chambres, P., & Droit-Volet, S. (2011). The evaluation of emotional facial expressions in early postpartum depression mood: A difference between adult and baby faces? *Psychiatry Research*, 186(2–3), 281–286. <https://doi.org/10.1016/j.psychres.2010.06.015>
- Gollan, J. K., Hoxha, D., Getch, S., Sankin, L., & Michon, R. (2013). Affective Information processing in pregnancy and postpartum with and without major depression. *Psychiatry Research*, 206(2), 206–212.
- Goodman, J. H., Guarino, A. J., & Prager, J. E. (2013). Perinatal dyadic psychotherapy: design, implementation, and acceptability. *Journal of Family Nursing*, 19(3), 295–323. <https://doi.org/10.1177/1074840713484822>
- Gotlib, I. H., Krasnoperova, E., Neubauer Yue, D., & Joormann, J. (2004). Attentional Biases for Negative Interpersonal Stimuli in Clinical Depression. *Journal of Abnormal Psychology*, 113(1), 127–135. <https://doi.org/10.1037/0021-843X.113.1.127>
- Grote, N. K., Katon, W., Lohr, M. J., Carson, K., Curran, M., Galvin, E., ... Gregory, M. (2014). Culturally relevant treatment services for perinatal depression in socio-economically disadvantaged women: The design of the MOMCare study*. *Contemporary Clinical Trials*, 39(1), 34–49.
- Howell, E. A. (2010). Lack of patient preparation for the postpartum period and patients' satisfaction with their obstetric clinicians. *Obstetrics & Gynecology*, 115(2), 284–289.
- Joormann, J., & Gotlib, I. H. (2007). Selective attention to emotional faces following recovery from depression. *Journal of Abnormal Psychology*, 116(1), 80–85. <https://doi.org/10.1037/0021-843X.116.1.80>

- 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), 402. <https://doi.org/10.1186/s12884-014-0402-2>
- Ko, J. Y., Farr, S. L., Dietz, P. M., & Robbins, C. L. (2012). Depression and treatment among U.S. pregnant and nonpregnant women of reproductive age, 2005-2009. *Journal of Women's Health*, 21(8), 830–836. <https://doi.org/10.1089/jwh.2011.3466>
- Letourneau, N., Stewart, W., Dennis, C.-L., Hegadoren, K., Leger-Duffet, L., & Watson, B. (2011). Effect of home-based peer support on maternal-infant interactions among women with postpartum depression: a randomized, controlled trial. *International Journal of Mental Health Nursing*, 20(5), 345–357.
- Lobato, G., Moraes, C. L., & Reichenheim, M. E. (2011). Magnitude da depressão pós-parto no Brasil: uma revisão sistemática. *Revista Brasileira de Saúde Materno Infantil*, 11(4), 369–379. <https://doi.org/10.1590/S1519-38292011000400003>
- Milani, H. S., Amiri, P., Mohsey, M., Monfared, E. D., Vaziri, S. M., Malekxahi, A., & Salmani, F. (2017). Effect of health care as the “home visiting” on postpartum depression: A controlled clinical trial. *International Journal of Preventive Medicine*, 8, 1–6. <https://doi.org/10.4103/2008-7802.204003>
- Milgrom, J., & Holt, C. (2014). Early intervention to protect the mother-infant relationship following postnatal depression: study protocol for a randomized controlled trial. *Trials*, 15, 385. <https://doi.org/10.1186/1745-6215-15-385>
- Moehler, E., Brunner, R., Wiebel, A., Reck, C., & Resch, F. (2006). Maternal depressive symptoms in the postnatal period are associated with long-term impairment of mother-child bonding. *Archives of Women's Mental Health*, 9(5), 273–278. <https://doi.org/10.1007/s00737-006-0149-5>
- Murray, L., Fiori-Cowley, A., Hooper, R., & Cooper, P. (1996). The impact of postnatal depression and associated adversity on early mother-infant interactions and later infant outcomes. *Child Development*, 2512–2526.
- Murray, L., & Cooper, P. J. (1997). Postpartum depression and child development. *Psychological Medicine*, 27(2), 253–260. <https://doi.org/10.1017/S0033291796004564>
- Murray, Lynne, Halligan, S. L., Goodyer, I., & Herbert, J. (2010). Disturbances in early parenting of depressed mothers and cortisol secretion in offspring: A preliminary

- study. *Journal of Affective Disorders*, 122(3), 218–223.
<https://doi.org/10.1016/j.jad.2009.06.034>
- 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>
- Olhaberry, M., Escobar, M., San Cristóbal, P., Santelices, M. P., Farkas, C., Rojas, G., & Martínez, V. (2013). Intervenciones psicológicas perinatales en depresión materna y vínculo madre-bebé: una revisión sistemática. *Ter. Psicol*, 31(2), 249–261.
<https://doi.org/http://dx.doi.org/10.4067/S0718-48082013000200011>.
- Razurel, C., Antonietti, J. P., Rulfi, F., Pasquier, N., Domingues-Montanari, S., & Darwiche, J. (2017). The impact of pre- and post-natal psycho-educational intervention on the construction of parenthood. *Archives of Women's Mental Health*, 20(3), 469–472. <https://doi.org/10.1007/s00737-017-0720-2>
- Santos, I. (2007). Validation of the Edinburgh Postnatal Depression Scale (EPDS) in a sample of mother from the 2004 Pelotas Birth Cohort Study. *Caderno de Saúde Pública*, 23(11), 2577–2588.
- Santos, M. F. S., Martins, F. C., & Pasquali, L. (1999). Post-natal depression self-rating scales: Brazilian study. *Rev Psiq Clin*, 26(2), 32–40.
- Stein, A., Arteché, A., Lehtonen, A., Craske, M., Harvey, A., Counsell, N., & Murray, L. (2010). Interpretation of infant facial expression in the context of maternal postnatal depression. *Infant Behavior and Development*, 33(3), 273–278.
<https://doi.org/10.1016/j.infbeh.2010.03.002>
- Stephens, S., Ford, E., Paudyal, P., & Smith, H. (2016). Effectiveness of Psychological Interventions for Postnatal Depression in Primary Care: A Meta-Analysis. *Annals of Family Medicine*, 14(5), 463–473.
<https://doi.org/10.1370/afm.1967>.INTRODUCTION
- Stewart, D. E., & Vigod, S. N. (2019). Postpartum Depression: Pathophysiology, Treatment, and Emerging Therapeutics. *The Annual Review of Medicine*, 70, 183–196.
- Vasconcellos, S. J. L., Jungbluth, A., & Salvador-Silva, R. (2009). Elaboração de um software para avaliar a percepção das emoções expressas pela face. IV Congresso Brasileiro de Avaliação Psicológica. Apresentação de Pôster.