

Perinatal depression and anxiety and their effect to maternal perception

Ph.D. Doctoral Thesis

Eszter Lefkovics

Semmelweis University
Doctoral School of Clinical Medicine



Supervisor: Ildikó Baji, M.D., Ph.D.

Official reviewers: Anna Bátki, M.D., Ph.D.
György Szekeres, M.D., Ph.D.

Head of Examination Board: János Réthelyi, M.D., Ph.D.

Members of the Examination Board: Bálint Szuromi, M.D., Ph.D.
Eszter Turi, M.D., Ph.D.

Budapest
2018

Introduction

Depressive and anxiety symptoms in the peripartum period

Puerperium - the period of pregnancy and one year after delivery - is a time of particular vulnerability in women. This period can be defined as a normative crisis which may cause off-balance and requires accommodation. Perinatal period may increase the risk of mental problems which can be seen in the high prevalence rates of peripartum depression and anxiety. Despite these findings, mental disorders continue to be undetected and undertreated in this period as common symptoms may be misinterpreted as normative experiences of the pregnancy and the postpartum period.

The strongest predictors of postpartum depression (PPD) is prenatal depression, previous history of depression and low level of social support. Postpartum depressive symptoms may affect maternal behaviour and cognitions, altering the perception of the infants and reducing the sensitivity of the mothers' responsiveness. Children of depressed mothers are at increased risk for impaired functioning across cognitive, social and psychomotor development.

There is increasing evidence that anxiety occurs frequently in the peripartum period and its prevalence can be even higher than

depression. During pregnancy women typically experience an increase in worries related to the health of their baby, childcare and parenting, which may lead physicians to overlook a potential clinical diagnosis.

Perceptual differences through maternal depression

Perceptions about the infant can alter maternal behaviour towards the child, playing an important role as a transmitter affecting the mother–child relationship. Maternal perception is based on the objective, observable characteristics of the infant’s behaviour and also on the subjective, perceived „meaning” of that, influencing by mothers’ emotions, expectations and fears. Parents attribute cognitions and emotions to their infants and it has a reactive effect to their own behaviour. Mothers feeling less positive emotions apart from their children towards themselves and more difficulties to care for their infant may have more difficulties to create a mutually beneficial relationship with their infant.

Social support as a protective factor

Social support is central to obtaining and maintaining one’s self-value and emotional support. The perceived social support seems to be the most important for the individual receiving the support and it is consistently associated with reduced risk of depression. Mothers who

received social support during their pregnancy or after childbirth were significantly less likely to experience PPD and more likely to create successful relationship with their infant. Healthcare interventions directly addressing mothers' needs for consistent, interpersonal contact and support can be crucial in the prevention of the negative effects of maternal mental problems.

Objectives

I would like to present two studies in my thesis. The aim of the first study was to investigate the potential correlation of prenatal depression and anxiety with postpartum depression. The purpose of the second study was to investigate the correlation of postpartum depressive and anxiety symptoms with maternal perception of the infant and the protective role of social support.

1. Correlation of prenatal depression and anxiety with postpartum depression:
 - 1.1. Correlation of prenatal depressive and anxiety symptoms with postpartum depression
 - 1.2. Correlation of prenatal state and trait anxiety with postpartum depression

- 1.3. Comparison of the assessment instruments used in the prenatal period in order to measure their predictive power to postpartum depression
2. Correlation of postpartum depressive and anxiety symptoms with maternal perception of the infant and the protective role of social support:
 - 2.1. Correlation of postpartum depressive symptoms with maternal perception of the infant
 - 2.2. Correlation of postpartum anxiety symptoms with maternal perception of the infant
 - 2.3. Examination of the effect of perceived social support to maternal perception of infant

Methods

My studies were part of a larger longitudinal research examining the prevalence of mental disorders and their effects to obstetric outcome and quality of life. Recruitment and screening were conducted by physicians and midwives during routine visits to the First Obstetrical and Gynaecological Hospital. 2,122 outpatients were enrolled in the research between September 2012 and May 2015 in three different phases of the peripartum period: between the 22-40 weeks of pregnancy, 3-5 days after delivery and 8-12 months postpartum.

Written informed consent was obtained from each patient before the examination. Ethical approval was obtained from Semmelweis University Regional Institutional Scientific and Ethical Review Board N° 88/2012.

In the sample of the first study, 476 participants were examined, those who completely filled in the requested questionnaires at 22-40 weeks gestational at the clinic and sent them back by post between 8 and 12 months postpartum. The sample of the second study has contained 431 participants who completely filled in the requested questionnaires and sent them back by post 8-12 month postpartum.

Part of the questionnaires used in the research are based on international standards and having been validated in Hungary, while some of the questionnaires have been constructed by appropriate professional considerations. Participants were screened for depressive and anxiety symptoms using the Hungarian version of the Edinburgh Postnatal Depression Scale (EPDS) and the State Trait Anxiety Inventory (STAI). The Mothers' Object Relations Scale (MORS) has been used for gathering parental perceptions about the child and Multidimensional Scale of Perceived Social Support (MSPSS) has been used to measure perceptions of support. A questionnaire has been constructed in order to measure the socio-demographic background and the characteristics of pregnancy and delivery.

Results

A participant with an EPDS score of 13 or above at the 8-12 month postpartum assessment was considered as being at risk for postpartum depression (PPD group). In the first study, prenatal EPDS score has been a significant predictor of PPD (OR=1.19; $p<0.001$). Principal component analysis on prenatal EPDS revealed two components enabling differentiated examination of depressive and anxiety symptoms. In univariable modelling both anxiety subscale (OR=1.41; $p<0.001$) and depression subscale (OR=1.22; $p<0.001$) were significant predictors of PPD. In multivariable modelling, when controlling for the effect of prenatal depression, prenatal anxiety remained a significant predictor of PPD (OR=1.41; $p<0.001$). However, when controlling for the effect of prenatal anxiety, prenatal depression was not a significant predictor of clinically significant depression (OR=1.02; $p=0.76$).

The effect of prenatal trait anxiety and state anxiety on PPD has been also tested using multivariable logistic regression analysis. In univariable modelling both prenatal trait anxiety (OR=1.12; $p<0.001$) and state anxiety (OR=1.06; $p<0.001$) were significant predictors of PPD. In multivariable modelling, when controlling for the effect of prenatal state anxiety, prenatal trait anxiety remained a significant predictor of PPD (OR=1.13; $p<0.001$). However, when controlling for the effect of prenatal trait anxiety, prenatal state anxiety was not a

significant predictor of PPD. Based on the above results, prenatal trait anxiety has been proved as the strongest predictor of later PPD.

In accordance with the above results, based on the evaluation of the discriminative ability of each prenatal scales (EPDS and STAI), STAI trait scale has shown the highest sensitivity and specificity (74% and 70%, respectively) in discriminating cases with and without PPD.

In the second study, PPD was a significant predictor of both MORS scales. PPD had a significant effect on MORS warmth-coldness scores (Beta: -0.21, 95% CI: -0.12 - -0.31, $p < 0.001$) indicating lower scores in this axis; and also to MORS invasion-withdrawal scores (Beta: 0.21 95% CI: 0.11 - 0.30, $p < 0.001$) indicating higher scores in this axis. Accordingly, mothers with PPD feel less positive emotions apart from their children towards themselves, and they found more difficulties to care for their infant than the non-PPD group.

When examining the correlation between state and trait anxiety with mothers' perception, in univariable modelling, state and trait anxiety and also depression had a significant effect on both MORS scales. In multivariable modelling, when controlling for the effect of state anxiety and depression, trait anxiety negatively correlated with MORS warmth-coldness axis (Beta=-0.26; $p < 0.001$) while state anxiety and depression didn't have a significant effect on it. Concerning MORS invasion-withdrawal, state anxiety (Beta=0.21; $p < 0.001$), trait anxiety

(Beta=0.34; $p<0.001$) and PPD (Beta=0.13; $p<0.001$) had significant effect on the scale in multivariable modelling.

Univariable analysis was used to examine the relationship between perceived social support and MORS scales in PPD and non-PPD groups. Social support had a significant effect on both MORS warmth-coldness scores (Beta: 0.24 95% CI: 0.02 – 0.56; $p=0.04$) and on MORS invasion-withdrawal scores (Beta: -0.39, 95% CI: -0.08 - -0.70; $p=0.01$) in the PPD group as well as in the non-PPD group for warmth-coldness scores (Beta: 0.18 95% CI: 0.09 – 0.28; $p<0.001$) and for invasion-withdrawal scores (Beta: -0.29, 95% CI: -0.20 - -0.39; $p<0.001$). To further analyse the effect of perceived social support to mothers' perception in the two groups, I used multivariable regression model. Perceived social support had a significant effect on MORS warmth-coldness scale after controlling for the effect of PPD with an increased level of perceived positive emotions expressed by the child in the no PPD group (Beta: 0.21, 95% CI: 0.10 – 0.31, $p<0.001$). Examining the effect of perceived social support to MORS invasion-withdrawal scale, social support significantly decreased the level of invasiveness perceived by mothers after controlling for the effect of PPD (Beta: -0.32, 95% CI: -0.23 – -0.42, $p<0.001$). The effect of perceived social support to mothers' perception has been similar in the non-PPD group.

Conclusions

The results of the first study suggest that anxiety symptoms during pregnancy are significantly associated with PPD, independently of the existence of prenatal maternal depression. When anxiety and depression subscale scores were correlated with the postpartum EPDS score, the anxiety subscale showed a stronger effect on the development of PPD than the depression subscale when controlling for the effect of prenatal depression in multivariable modelling. Along with the widespread use of the EPDS in the puerperium, depression has become a marker for postnatal maladjustment. Symptoms of anxiety tend to be subsumed within diagnoses of depression, which can result in anxiety being overlooked in the absence of depression.

In order to further understand the predictive role of anxiety, it is important to discover whether the symptoms of anxiety in the prenatal period are best conceptualized as a predictor of later depression or merely as a general characteristic that is typical during a stressful period in life. My results indicated that higher rates of PPD were reported by mothers who had higher trait anxiety scores measured by STAI. Comparing the effect of the prenatal trait anxiety and the prenatal state anxiety on the later maternal mental health, the predictive role of trait anxiety is clear-cut. Prenatal trait anxiety has been proven as a

significant predictor of PPD. Therefore, women who generally worry about things need special attention during prenatal care.

Regarding the discriminating accuracy of the different scales used in the prenatal period, STAI trait scale has been found the most effective in predicting PPD. Therefore, in a clinical context, it might be useful to use this scale to rapidly screen general anxiety level in order to prevent PPD in time.

The second study aimed to examine the correlation of depressive and anxiety symptoms with self-reported maternal perceptions about infant in the postpartum period. One clear implication of my research is that maternal depression has an effect on mothers' perception of their infant. Mothers with PPD feel less positive emotions apart from their children towards themselves, and they found more difficulties to care for their infant than the non-PPD group. This result reinforces that depression can cause negative bias in perception. This effect plays a particularly important role in this sensitive postpartum period, as the negative perception bias interferes with a mother's capacity to attune herself to the needs of her infant, affecting the sensitivity of her responsiveness. This has adverse effects on not only the women experiencing it but also the children.

It is important to discover that the symptoms of anxiety play an important role in the negative perception bias. Separately examining

trait anxiety, my results indicated that more negative perception bias was reported in MORS scales by mothers who had higher trait anxiety scores measured by STAI. Comparing the effect of the state anxiety and depression on the maternal perception of infants' positive emotions, the strongest predictive role of the trait anxiety is clear-cut. The trait anxiety has also been proven as significant predictor of perceived invasiveness of infants, together with state anxiety and depression.

Other important result of this study reinforces the protective role of perceived social support which can mediate the negative effect of depression on the perception of infant. Based on my results, the higher the level of the perceived social support, mothers perceive more positive feelings and less dominant behaviour apart from their infant in the PPD and non-PPD group as well.

In both of the studies, the outstanding role of trait anxiety is clear-cut. Based on the results, women who generally worry about things need special attention during prenatal care. The results also reinforce the importance of altered perception as a transmitter between depressive and anxiety symptoms and the mother-infant relationship. This result might have implications for early detection during pregnancy of women at risk for postpartum depression as the long-term effects of maternal negative perceptual bias on mother-infant attachment and the child's development are well-known.

Other important result of the study reinforces the protective role of perceived social support which can mediate the negative effect of depression on the perception of infant. Therapeutic interventions directly addressing mothers' needs for consistent, interpersonal contact and support can effectively reduce the risk of the negative perception bias and also foster adaptive parenting behaviours.

List of articles connected to the Ph.D. thesis:

Eszter Lefkovich, Ildikó Baji, János Rigó, 2014, The Impact of Maternal Depression on Pregnancies and Early attachment, *Infant Mental Health Journal*, Vol.35 (4) 354-365.

János Rigó, András Kecskeméti, Attila Molvarec, *Eszter Lefkovich*, Bernadett Szita, Ildikó Baji, 2015, [233-POS]: Postpartum depression and anxiety in hypertensive disorders of pregnancy. 01; 5(1):117-8.

Eszter Lefkovich, János Rigó, Bernadett Szita, Júlia Talabér, András Kecskeméti, Illés Kovács, Ildikó Baji, 2017, Relevance of anxiety in the perinatal period: prospective study in a Hungarian sample, *Journal of Psychosomatic Obstetrics & Gynecology*, Vol. 38, 1-8.

Eszter Lefkovich, János Rigó, Illés Kovács, Júlia Talabér, Bernadett Szita, András Kecskeméti, László Szabó, Zsolt Somogyvári, Ildikó Baji, 2018, Effect of maternal depression and anxiety to mother's perception of child, *Journal of Reproductive and Infant Psychology*, Published online, DOI: 10.1080/02646838.2018.1475726

List of articles not connected to the Ph.D. thesis:

Judit Balázs, Andrea Bíró, Dominika Dálnoki, *Eszter Lefkovics*, Zsuzsa Tamás, 2004, A Gyermek M.I.N.I. kérdőív magyar nyelvű változatának ismertetése, [Presentation of the Hungarian version of M.I.N.I. kid] *Psychiatria Hungarica*, 19/4, 358-364.

Lauren M Bylsma, Ilya Yaroslavsky, Jonathan Rottenberg, Enikő Kiss, Krisztina Kapornai, Kitti Halas, Roberta Dochnal, *Eszter Lefkovics*, Ildikó Baji, Ágnes Vetró, Maria Kovacs, 2015, Familiality of mood repair responses among youth with and without histories of depression, *Cognition and Emotion* 04. 807-16.

Lauren M Bylsma, Ilya Yaroslavsky, Jonathan Rottenberg, J Richard Jennings, Charles J George, Enikő Kiss, Krisztina Kapornai, Kitti Halas, Roberta Dochnal, *Eszter Lefkovics*, István Benák, Ildikó Baji, Ágnes Vetró, Maria Kovacs, 2015, Juvenile onset depression alters cardiac autonomic balance in response to psychological and physical challenges, *Biological psychology* 07. 110. 167-174.

Roberta Dochnal, Ágnes Vetró, Enikő Kiss, Ildikó Baji, *Eszter Lefkovics*, Lauren Bylsma, Ilya Yaroslavsky, Jonathan Rottenberg, Maria Kovacs, Krisztina Kapornai, 2018, Emotion regulation among

adolescents with pediatric depression as a function of anxiety
comorbidity, Depression and Anxiety (in press)