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The Transition to Parenthood and Mental Health in First Time Parents

The transition to parenthood involves major physiological, psychological and social adjustments for a couple, both positive and negative. Although many parents adapt well to the demands of parenthood, the transition to parenthood is associated with adverse effects on parental mental health such as depression and anxiety (e.g. Brockington, 2004). For example, studies show that the prevalence of postpartum depression in mothers ranges from 8% to 28% depending on time and type of assessment (e.g. Buist et al., 2008; Gavin et al., 2005; O'Hara and Swain, 1996). Depressive symptoms in pregnancy appear to be as common as postpartum depressive symptoms (Milgrom et al., 2008). Fathers' rates of depression pre- and postpartum have generally been found to be lower, ranging from 5% to 13% (Matthey, Barnett, Ungerer & Waters, 2000; Paulson & Bazemore, 2010), with highest rates at three to six months postpartum. Paternal depressive symptoms most commonly correlate with having a partner with elevated depressive symptoms (Wee, Skouteris, Pier, Richardson & Milgrom, 2010).

Anxiety disorders such as generalised anxiety disorder, phobia, obsessive compulsive disorder, panic and post-traumatic stress disorder (PTSD) also occur in men and women during the transition to parenthood (e.g., Matthey, Barnett, Howie & Kavanagh., 2003; Wenzel, Haugen, Jackson & Brendle, 2005). There is some evidence that anxiety may be more common than depression (Heron, O'Connor, Evans, Golding & Glover, 2004) with maternal postpartum rates of 16 % (Wenzel et al., 2005). Brockington, Macdonald and Wainscott (2006) found that, for women, clinically significant anxiety disorders during pregnancy were twice as prevalent as depression, but roughly equivalent postpartum. In men, evidence suggests anxiety may peak during pregnancy (Condon, Boyce & Corkindale, 2004). Parents are therefore at increased risk of a range of disorders and there is also high comorbidity between these. For example, Brockington, MacDonald et al. (2006) discovered that the majority of mothers with psychiatric problems suffered from two or more disorders

(e.g. anxiety, depression, PTSD, OCD). Similarly, between 50 and 75% of women with PTSD after birth may also have depression (Parfitt & Ayers, 2009; White, Matthey, Boyd & Barnett, 2006).

A range of biological, psychological and social interrelated risk factors are associated with postpartum mental health problems, with a complex and reciprocal interaction between these. The diathesis –stress model (e.g., Burns & Machin, 2013) is one way to view how parental vulnerability factors (diathesis) , such as genetic predispositions and neuro-behavioural vulnerabilities originating from early life adversity (e.g., Lai & Huang, 2011; Schlotz & Phillips, 2009; Talge, Neal & Glover, 2007) , own attachment problems (Simpson & Rholes, 2008), a personal family history of mood disorder (O'Hara & Swain, 1996), traumatic early life experiences (Czarnocka & Slade, 2000), may moderate the effect of a stressful life event (e.g. childbirth) on the person's mental health . Also, experiences of anxiety or depression in pregnancy (e.g., Correia & Linhares, 2007; Lee et al., 2007; Sutter-Dallay, Giaccone-Marcésche, Glatigny-Dallay & Verdoux , 2004) or psychological distress or obstetric complications and instrumental delivery (Henderson & Redshaw, 2013; Matthey et al., 2000; Ryding, Wijma & Wijma, 1997) increase the risk for postpartum mental health problems in women.

Other psychosocial risk factors include a poor couple relationship (Buist, Morse & Durkin, 2003; Wee et al., 2010), and lack of postpartum support (e.g., Buist et al., 2003; Milgrom et al., 2008). Sleep deprivation, both in pregnancy and postpartum could also contribute to the development of mental health problems (Hiscock, Bayer, Hampton, Ukoumunne & Wake, 2008; Skouteris, Wertheim, Germano, Paxton & Milgrom, 2009) and potentially have negative implications for the parent-infant relationship (e.g., Pires, Andersen, Giovenardi & Tufik, 2010) by, for example, exaggerating anger towards the baby (Cummings & Davies, 1994). Brockington, MacDonald, et al. (2006) highlighted

dysmorphophobia (shame of body) as another less commonly researched adjustment issue for women both in pregnancy and postpartum and found evidence of dysmorphophobia in pregnancy (27%) and postpartum (31%). Additionally Gjerdingen et al. (2009) found that body dissatisfaction was associated with poorer mental health.

The quality of the relationship between the mother and the father is one of the key contributors to the adjustment to parenthood, especially for first time parents. In many cases, new parents report a reduction of their satisfaction with their relationship in the months following childbirth (e.g., Belsky, 1984; Cowan & Cowan, 2002; Gjerdingen & Center, 2003; Levy-Shiff, 1994). The couple's sexual relationship may also be affected by pregnancy and birth, with a decrease of quality and frequency (e.g., Dixon, Booth & Powell, 2000; Van Brummen et al., 2006). Poor relationship satisfaction and perception of support from the partner has been identified as one of the main contributing risk factors to the development of postpartum depression (e.g., Milgrom et al., 2008) and anxiety (Buist et al., 2003). Conversely, relationship difficulties may be a consequence of depression and anxiety (Wenzel et al., 2005), and thus indicates the bi-directional association between these. Negative consequences of postpartum PTSD on a couple's sexual relationship have also been documented (Fones, 1996; Nicholls & Ayers, 2007). Combined this research thus suggests that parental mental health problems may put an extra strain on the couple's relationship or vice versa.

Brockington, Aucamp and Fraser (2006) emphasise the development of the parent-baby relationship as the most important psychological process for parents. This relationship starts in pregnancy where the mother may interact with the foetus and involve the partner to varying degrees. Unplanned pregnancy and poor bonding to the foetus has been associated with impaired postpartum bonding between the parent and the baby (e.g., Brockington & Aucamp et al., 2006; Siddiqui & Hagglof, 2000). They also suggested that persistent negative

feelings towards the baby may lead to a negative emotional response and /or pathological anger with aggressive impulses. There is very little research that examines the timing of parental bonding with the baby, with only one known earlier study by Robson and Moss (1970) reporting that most mothers' feelings grew during the first three months, from feeling distanced and tired at 3 to 4 weeks postpartum to seeing the baby as a person at 4 to 6 weeks. However, they did not look at this in relation to parental mental health.

Parent-baby relationship problems have been associated with poor maternal mental health. For example, in a psychiatric sample, Brockington (2004) found an impaired parent-baby relationship in 10% to 25% of the mothers. This is comparative to prevalence rates of 3% to 9% in a general population (Righetti-Veltema, Conne-Perrard, Bousquet & Manzano, 2002; Skovgaard et al., 2007). Although parent-baby relationship problems do not occur in all parents with mental health disorders, there is evidence for a negative impact of depression (for a review, see Field, 2010), anxiety (e.g., Glasheen, Richardson & Fabio, 2010, for a review) and PTSD (e.g., Parfitt & Ayers, 2009) on this relationship. Similarly, a meta-analytic review (Wilson & Durbin, 2010) found that depressed fathers showed decreased positive and increased negative behaviours in their parenting, which is corresponding to findings amongst mothers (Lovejoy, Graczyk, O'Hare & Neuman, 2000). Less consideration has been given to parental anger, but one research study indicates it is associated with both depression and anxiety (Mammen, Pilkonis & Kolko, 2000). Also, Wisner, Peindl, Gigliotti and Hanusa (1999) found that 54% of women with postpartum depression experienced aggressive thoughts about harming their baby. To date, no known studies have included fathers in the examination of associations between anger and mental health

Overall, this research shows the transition to parenthood is an important time when parents are at risk of a range of mental health, adjustment and relationship problems. However, very few studies have looked at this transition in depth for both men and women,

or compared this transition within couples. The present study contributes to knowledge in three ways. Firstly, the use of structured clinical interviews covering a broad range of social, psychological and psychiatric issues enables detailed analysis of the transition to parenthood in relation to mental health, relationships and adjustment factors. Secondly, to our knowledge, fathers have not been included in this type of in-depth parental interview and thirdly, with a few exceptions, previous studies regarding parental mental health mainly address mean differences between women and men, not within couple comparisons. The aims of the present study were therefore; (i) to provide a detailed descriptive examination of the transition to parenthood and mental health in men and women, and (ii) to explore which relationship and adjustment factors were most associated with postpartum mental health problems. Additionally, it aimed to explore any mean level differences between men and women and to assess the degree of similarity of mothers and fathers within families.

Method

Participants

Participants were recruited from the Sussex Journey to Parenthood Study, a longitudinal questionnaire study that followed a total of 141 parents from pregnancy to the postpartum. Inclusion criteria were that participants were expecting their first baby, were cohabiting, fluent in English and were over 18 years old. Exclusion criteria were if either member of the couple was currently being treated for a psychiatric disorder or if the baby had died before or after birth. Participants were invited for an interview if the family already had agreed to a previous home observations ($n = 48$ families). The current sample consisted of 86 participants, 46 women and 40 men from those families. Women were aged between 18 and 46 years ($M = 32.63$ years, $SD = 5.70$) and men were aged between 26 and 44 years ($M = 33.58$, $SD = 7.33$). The majority of participants in the current study were Caucasian (82%) and had university level education (74 %). At the time of the interview, babies were between

4 and 8 months old ($M = 5.38$ months, $SD = 1.04$). The length of the couple's relationship ranged from 12 to 308 months ($M = 75.21$ months, $SD = 54.48$). Participant who agreed to be interviewed ($n = 86$) did not differ from nonparticipants ($n = 55$) with regards to any demographic (e.g. age, ethnicity, marital status, qualification or length of relationship) or mental health variables.

Measures

The Birmingham Interview for Maternal Mental Health (BIMMH; 5th edition, Brockington, Chandra, et al., 2006) was used. A number of reliability studies (e.g. Brockington, Aucamp & Fraser, 2006; Chandra, Bhargavaraman, Raghunandan & Shaligram, 2006) have been carried out during the development of this semi-structured interview and it has also been used to validate the Postpartum Bonding Questionnaire (Brockington, Fraser & Wilson, 2006). It is divided into eight sections, covering the social, psychological and psychiatric course of pregnancy, birth and months after the birth. As part of the BIMMH parents are assessed on their degree of pre- and postpartum anxiety and depression on a 4-point scale, 0 to 3 (none, mild, moderate and severe) and postpartum PTSD on a 3-point scale, 0 to 2 (none, some evidence and severe). For clarity of presentation, in accordance with how other diagnostic interview assessments are reported and in line with previous studies using the BIMMH (e.g., Brockington et al., 2006), these were converted into binary variables indicating presence or absence of mental health. A cut off of ≥ 2 (moderate or severe disorder) was used to identify those with mental health problems. Adjustment and relationship variables were also categorised into binary variables indicating the presence or absence of adjustment or relationship problems. Similar to the mental health variables, a cut off of ≥ 2 (moderate problems) was used in the majority of items (See table 2 – 4).

Procedure

Ethical approval was obtained from the NHS Research Ethics Committee and the

University Research Governance Committee. Participants already enrolled in the Sussex Journey to Parenthood study, who had previously agreed to a home-visit, were sent a letter three months after birth inviting them to take part in this interview study and offering an incentive (baby shop vouchers). Those who agreed to take part were contacted by phone or email to arrange an interview date. Interviews were conducted in the participants' homes, approximately 5 months postpartum. Male and female partners were interviewed separately by an experienced healthcare professional. Written informed consent was obtained before the start of the interview and confidentiality, anonymity and the right to withdraw at any time was assured. After the interview all participants were debriefed. Interviews took between 75 minutes and 120 minutes and were audio recorded. All responses to the interviews were rated, either during the interview or immediately after the completion of the interview according to the Birmingham Interview schedule. Verbatim responses of the participants' own words were also recorded where appropriate and possible. An independent researcher rated approximately 10% of the interviews from the audio recordings to check reliability of the ratings. The intra class correlation coefficient (ICC) was calculated (two-way random, absolute agreement, single measure) and showed excellent agreement between the raters with an average total of $ICC = .83$ for the items included in the study.

Results

In accordance with the three aims of the study, a descriptive account of both parents' transition to parenthood is reported together with explorations of any differences in this transition in the context of parental gender and mental health. The first section presents parental mental health for men and women in the sample. Following this, adjustment and relationship problems are examined for mothers and fathers with and without mental health problems, using chi-square, odds ratios and correlations. The final section employs logistic

regression in order to identify key factors that are associated with postpartum mental health problems.

Mental health and parenthood

The proportion of men and women who reported mental health problems in pregnancy or in the postpartum is given in Table 1. This shows that approximately a quarter of men and women reported moderate to severe anxiety in pregnancy. This reduced after birth to 15% in the whole sample, but particularly reduced for men (8%). Table 1 also shows that the prevalence of moderate to severe depression was the same pre- and postpartum (10.9% in women; 7.5% in men). Comorbidity was common. In pregnancy, all men and women with depression had comorbid anxiety whilst after birth, 33.3% of women and men with mental health problems suffered from comorbid depression and anxiety. Additionally, 8.3% of women with postpartum mental health problems presented with comorbid PTSD, depression and anxiety. There was however no partner comorbidity of postpartum mental health. Only one gender difference regarding mental health was found, which showed that women on average suffered from postpartum anxiety more frequently than men ($\chi^2 (1) = 3.38, p = .05$). Within couple comparisons (Table 1) showed no significant associations of mental health between the parents.

Adjustment to pregnancy and after birth

Table 2 shows the main adjustment and birth variables in pregnancy and postpartum together with odds ratios and chi-square significance levels for parents with and without postnatal mental health problems. No significant overall mean gender differences were found for any of the adjustment variables. Therefore, separate information for men and women is not presented. However, the within couple associations are given in Table 2, showing that mothers and fathers have reported similar experiences in connection with their adjustments to pregnancy, birth and after birth. As can be seen in Table 2, approximately a quarter of

parents reported having had ambivalent or negative feelings towards parenthood in the third trimester of pregnancy. Abnormal irritability resulting in angry silence or outbursts and arguments was also common in pregnancy, and even more so after birth. Poor maternal physical health was evident amongst a majority of mothers in pregnancy and a third of mothers after birth. The mean duration of postpartum physical discomfort for mothers was 47 days (*SD* 44.8; range 0 - 180). Mothers also suffered from body dissatisfaction (dysmorphophobia), especially postpartum when a third of women felt ashamed of their body. Sleep deprivation was most commonly reported after birth, with more than half of all parents reporting losing two or more hours of sleep a night for a mean duration of 12 weeks (*SD* 9.0). Also, as table 2 shows, parents with postpartum mental health problems were significantly more likely to suffer from sleep deprivation than those without.

Almost half of parents (40% of mothers and 56% of fathers) appraised the birth experience as a very distressing or painful experience. Complications in labour were common, with 41% of babies delivered by forceps or ventouse, 11% by elective caesarean section and 24% by emergency caesarean section. Parents with postpartum mental health problems were five times more likely to have experienced complications in labour than parents without mental health problems.

The transition to parenthood and the couple's relationship

Relationship and support variables during pregnancy and postpartum for parents with and without mental health problems are reported in Table 3. Gender differences are not presented, as no overall significant differences were found between men and women. Parents within the same family are also seen to experience their relationship with their partners and others in similar ways, with the majority of maternal and paternal variables showing large sized positive correlations with each other. It can be seen that generally a higher proportion of parents reported a deterioration of their partner relationship and support postpartum

compared to in pregnancy, with significantly more parents with mental health problems reporting insufficient partner support. A deterioration of the sexual relationship, with reduced or complete loss of libido was reported by around three quarters of all parents in pregnancy and after birth, with half of parents (51%) not yet having returned to normal sexual relations at the time of the interview (5 months postpartum).

Formation of the parent-baby relationship

Table 4 shows variables relating to the parent-baby relationship. In pregnancy, a fifth of all parents (11 % of women and 28% of men) reported prenatal bonding problems with minimal or no interaction with the foetus, whilst postpartum bonding problems with absent or ambivalent feelings for their baby were reported by fewer parents. Although the majority of parents felt extreme joy, pride or satisfaction when they first saw their new born baby, many parents (30 % of women and 10 % of men) experienced an initial negative reaction to their baby. This was the only significant average difference between women and men's experiences concerning the parent-baby relationship ($\chi^2 (1) = 5.40, p = .02$). Most of the maternal variables related to the parent-baby relationship, such as pre and postnatal bonding and reports of the baby's temperament showed medium or large positive correlations with the equivalent paternal variables. Interview data further revealed that the mean onset of positive feelings for the baby was 2.5 weeks (SD 4.1; range 0 – 20 weeks), with parents suffering from postnatal mental health reporting a slower onset of positive feelings ($M = 4$ weeks) compared to the parents without mental health issues ($M = 2$ weeks). Feelings of parental unworthiness, with thoughts of not being fit to look after the baby, were significantly more frequent in parents with postpartum mental health. Strong feelings of anger towards the baby were also significantly more common amongst parents with mental health problems, who were four times more likely to report this. Impulses to treat the baby roughly, shake, strike or stop the baby breathing on one or more occasion (but with no actual physical abuse) were

evident in a fifth of all parents, but no differences were found between men and women or between parents with or without mental health problems.

Factors associated with postpartum mental health

Logistic regression (forced entry) was used to identify which of the above factors was most strongly associated with postpartum mental health problems. All the variables that differed significantly between parents with and without postpartum mental health problems were entered into the model (see Tables 2 – 4). Results are shown in Table 5 and it can be seen that five variables remained in the model. This final model was significant and accounted for 48% of the variance. It correctly identified 61% of parents with postpartum mental health problems and 88% of parents without postpartum mental health problems; with an overall correct classification rate of 83%. However, only three of the five predictors made an independent significant contribution. These were lack of partner support, feelings of parental unworthiness, and anger towards the infant. It was not possible to perform logistic regressions on men and women separately, as the small sample meant that the frequency in some cells was too low to perform these analyses successfully. However, to check that gender was not a confounding factor the regression was re-run with gender entered on the first step. This showed gender did not make significant contribution to the model or change the pattern of results.

Discussion

This study provides a detailed examination of men and women's transition to parenthood and mental health. The findings show that both men and women can suffer from mental health problems in pregnancy and postpartum, with anxiety being more common than depression both in pregnancy and after birth, although these are often interrelated with high co-morbidity rates. There were indications of a decline in relationships after birth, especially amongst with parents suffering from postpartum mental health problems who also reported

significantly more feelings of anger towards their baby, lack of partner support, parental unworthiness, sleep deprivation and complications during the birth. Only one overall significant gender difference was found, which was that women on average reacted more negatively to the new born than men. Comparisons of maternal and paternal variables showed that parents within the same couple have similar experiences in their transition to parenthood in terms of adjustments and relationships, but not with regards to mental health. These findings are discussed in turn below before looking at methodological limitations and possible implications for future research.

Parental mental health and adjustment

The results of this study substantiate other studies that show a proportion of both men and women suffer from mental health problems during pregnancy and after birth. For example, the 10% prevalence of depression in pregnancy and postpartum found here is similar to rates found in other studies (O'Hara & Swain, 1996; Buist et al., 2008, Paulson & Bazemore, 2010). The finding that more participants suffered from anxiety in pregnancy compared to postpartum is also consistent with other studies (Heron, O'Connor, Evans, Golding & Glover, 2004, Wenzel et al., 2005). Similarly, the finding that women in the study had higher rates of postpartum mental health problems than men is consistent with epidemiological research (Ramchandani et al., 2005). The occurrence of comorbidity between several mental health problems is also comparable to previous studies (e.g. Brockington, MacDonald, et al., 2006; White et al., 2006) and highlights the importance of being aware of the possible interaction of combinations of psychological issues when diagnosing and treating mental health problems in parents. Some researchers therefore suggest that "postnatal mood disorder" (PMD), may be a more suitable term to use, as it may be more useful to view depression and anxiety as part of the same continuum of stress instead of separating them into separate diagnoses (e.g., Matthey, 2003).

A few other interesting findings came up in this study. The first is that anxiety was more prevalent than depression in pregnancy – and the same is found for women after birth. This finding is supported by other empirical studies (Lee et al, 2007; Ross & McLean, 2006; Wenzel et al., 2005) and suggests anxiety may be more common than depression during the perinatal period. This is of concern, given the evidence that anxiety in pregnancy may have such wide ranging effects on foetal and infant neuro-behavioural development (e.g., Correia & Linhares, 2007; Van Den Bergh, Mulder, Mennes & Glover, 2005). More research is therefore required to explore the prevalence and effect of anxiety disorders in pregnancy and after birth.

Second, similar to previous literature which views poor mental health in pregnancy as a potential risk factor for postpartum mental health difficulties (e.g., Sutter-Dallay, et al., 2004), this study found that half of the parents (six women and three men) suffering from mental health problems postpartum also experienced mental health problems in pregnancy. Half of the parents (six women and three men) suffering with postpartum mental health problems also experienced mental health problems in pregnancy. For example, 70% of parents with pregnancy anxiety also reported anxiety after birth. This emphasises the importance of early identification of parental distress in order to help prevent problems postpartum, and to reduce negative epigenetic effects on the fetus and infant.

Finally, parents with postpartum mental health problems were more likely to report obstetric complications and sleep deprivation after birth, which is consistent with research showing that women with birth complications, such as emergency caesarean section, suffer from higher levels of PTSD symptoms (Ryding et al., 1997) and research suggesting that maternal depression is associated with sleep problems in the infant (Hiscock et al., 2008). The effects of parental sleep deprivation need further attention, especially as it may also be a risk factor for impaired parent-baby relationships (Pires et al., 2010) and development of

parental anger (Cummings & Davies, 1994). However, the direction of causality is difficult to discern as mental health problems may be both a cause and outcome of these factors.

Relationships and parental mental health

The findings that relationship satisfaction reduced after birth, the couples' sexual relationship declined both in pregnancy and postpartum and that parents with postpartum mental health problems perceived significantly less partner support are also broadly consistent with other research (e.g. Bateman & Bharj, 2009; Dixon et al., 2000; Gjerdingen & Center, 2005). This highlights the central role the couple's relationship could play in exaggerating or helping the mental health of new parents or vice versa and the need for interventions to target this to avoid long term implications

The slower onset of positive feelings for their baby ($M = 4$ weeks) amongst parents with mental health problems in the current sample is an interesting new finding which may have important clinical implications in terms of helping new parents to bond with their baby as early as possible. The high proportion of parents in the current study reporting strong feelings of anger towards their baby, especially amongst parents with mental health problems could be cause for concern. In connection with this result, Mammen et al. (2000) found that parental anger may be an important mediator between maternal mental health and actual parent to child aggression. Together this points to that these kinds of negative feelings may be common amongst new parents and emphasizes the importance of future research to include measures of parental anger when considering the link between mental health and the parent-baby relationship.

Methodological issues

The study has a number of strengths and limitations that need to be considered before drawing conclusions. The strengths are that it is the first study to look in depth at mental

health and the transition to parenthood in both men and women, using a semi-structured clinical interview specifically designed to examine adjustment to parenthood. However, in contrast to standard clinical interviews (e.g. Spitzer, Williams, Gibbon & First, 1989), the BIMMH is not a diagnostic interview in that it does not measure all DSM or ICD diagnostic criteria. Care should therefore be taken when extrapolating the prevalence rates found in this study, and it should be noted that the findings should be viewed as symptoms consistent with of diagnosis rather than an actual diagnosis. The retrospective measurement of pregnancy variables means these may be subjected to biased recall and the design of the study does not therefore enable examinations of causal pathways. Prospective, longitudinal studies are therefore needed to corroborate these findings.

Other methodological issues include that the sample was predominantly white European, well-educated and older age ($M = 32.6$ years for mothers, compared to the UK national average of $M = 27.9$ years). It is therefore important to explore whether these findings are applicable to other demographic groups. Although the sample was relatively large for an in-depth interview study such as this, the sample size meant that the study is statistically underpowered to find effects. This may have contributed to the wide confidence intervals observed for some of the variables, which indicates uncertainty regarding the true effect size. The small sample also restricted possibilities to perform separate logistic regression for mothers and fathers or to include both maternal and paternal variables in regression analyses to predict postnatal mental health separately for each gender. Further research is therefore needed on larger, more representative samples to substantiate these results. Larger samples would also enable research to examine patterns of differences between parents with postpartum depression, anxiety and PTSD and make further within couples' and gender comparisons

Conclusions and implications

In conclusion, this study substantiates research showing that a proportion of both men and women suffer from mental health difficulties, such as depression and anxiety during pregnancy and after birth. Results also indicate that the main variables associated with postpartum mental health problems were lack of partner support, parental feelings of unworthiness and parental anger. Overall gender differences and within couple differences were minimal. However, further research is needed to examine the direction of causality between adjustment and relationship factors and mental health further, in larger more representative samples of both parents. The importance of parental anger in mental health and for the parent-baby relationship also requires more attention in future research and interventions. Another implication of the present study is that interventions targeting men and women's sense of worthiness in their new role as parents may be beneficial to their mental health.

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Table 1. Prevalence of mental health problems during pregnancy and after birth

| | Total | Women | Men | | Correlations |
|--|---------------------------|---------------------------|---------------------------|-------------------------|--------------------|
| | N =86 | n = 46 | n = 40 | | between |
| | No. (%) | No. (%) | No. (%) | OR | men and |
| Mental health | (95% CI) | (95%CI) | (95% CI) | (95%CI) | women ^d |
| Anxiety (pregnancy) | 21 (24.4) (15.3, 33.5) | 11 (23.9) (11.6, 36.2) | 10 (25.0) (11.6, 38.4) | 0.83 (0.31 – 2.18) | .29 |
| Anxiety (postpartum) | 13 (15.1) (7.55,22.69) | 10 (21.7) (9.8, 33.7) | 3 (7.5) (-0.7, 15.7) | 3.43* (0.87 – 13.47) | .08 |
| Depression (pregnancy) | 8 (9.3) (3.2, 15.4) | 5 (10.9) (1.9, 19.9) | 3 (7.5) (-0.7, 15.7) | 1.50 (0.34 – 6.73) | .34 |
| Depression (postpartum) | 8 (9.3) (3.2, 15.4) | 5 (10.9) (1.9, 19.9) | 3 (7.5) (-0.7, 15.7) | 1.50 (0.34 – 6.73) | -.16 |
| Posttraumatic stress | 4 (4.7) (0.2, 9.1) | 2 (4.3) (- 1.5, 10.2) | 2 (5.0) (-1.8, 11.8) | 0.86 (0.12 – 6.43) | .17 |
| Total mental health issues (pregnancy) | 22 (25.6) (16.4, 34.8) | 11 (23.9) (11.6, 36.3) | 11 (27.5) (13.7, 41.3) | 0.83 (0.31 – 2.18) | .32* |
| Total mental health issues (postpartum) | 18 (20.9) (12.3, 29.5) | 12 (26.1) (13.4, 38.8) | 6 (15.0) (3.9, 26.1) | 2.00 (0.67 – 5.94) | .11 |

Note. ^a Cut-off ≥ 1 used. All other cut-offs ≥ 2 . CI = confidence interval. . Chi Square test ^{**} $<.01$ ^{***} $<.005$. ^c Fischer's exact test conducted due to cell frequencies < 5 . OR = odds ratio; CI = confidence interval. ^d ^{*} $p <.05$, ^{**} $p <.01$, Spearman's (*rho*)

Table 2. Adjustment in participants with and without postpartum mental health problems

| Adjustment | Mental health problem | No mental health problem | OR (95% CI) | Correlations between men and women ^d |
|--------------------------------------|---------------------------------|---------------------------------|------------------------------|---|
| | <i>n</i> = 18 <i>No.</i> (%) | <i>n</i> = 68 <i>No.</i> (%) | | |
| Pregnancy | | | | |
| Poor adjustment | 8 (44.4) | 16 (23.5) | 2.6 (0.9, 7.7) | .33* |
| Irritability | 6 (33.3) | 13 (19.1) | 2.1 (0.7, 6.7) | .23 |
| Sleep insomnia | 3 (16.7) | 4 (5.9) | 2.8 (0.7, 11.5) ^c | .44** |
| Dysmorphophobia ^b | 4 (22.2) | 4 (5.9) | 4.6 (1.0, 20.5) ^c | .39* |
| Poor physical health ^{a, b} | 14 (77.8) | 39 (57.4) | 2.6 (0.8, 8.7) | .78** |
| Birth and postpartum | | | | |
| Distress/pain during birth | 12 (66.7) | 28 (41.2) | 2.9 (1.0, 8.5) | .64** |
| Dissatisfaction with birth | 6 (33.3) | 16 (23.5) | 1.6 (0.5, 5.0) | .23 |
| Complications in labour ^b | 13 (72.2) | 23 (33.8) | 5.1 (1.6, 16.0)** | .98** |
| Irritability | 8 (44.4) | 17 (25.0) | 2.4 (0.8, 7.1) | -.04 |
| Sleep deprivation | 16 (88.9) | 35 (51.5) | 7.5 (1.6, 35.4)** | .72** |
| Dysmorphophobia ^b | 8 (44.4) | 17 (25.0) | 2.4 (0.8, 7.1) | .47* |
| Physical discomfort ^b | 7 (38.9) | 19 (27.9) | 1.6 (0.6, 4.9) | .77** |

Note. ^a Cut-off ≥ 1 used. All other cut-offs ≥ 2 . ^b For the men in the sample, these questions were answered in relation to their partner. Chi Square test ** $<.01$ *** $<.005$. ^c Fischer's exact test conducted due to cell frequencies < 5 . OR = odds ratio; CI = confidence interval ^d * $p <.05$, ** $p <.01$, Spearman's (*rho*)

Table 3. Relationships and support in participants with and without postpartum mental health problems

| Relationship | Mental health problem n =18 No. (%) | No mental health problem n = 68 No. (%) | OR (95% CI) | Correlations between men and women ^d |
|--|---|---|------------------------------|---|
| | Pregnancy | | | |
| Poor partner relationship | 2 (11.1) | 6 (8.8) | 1.3 (0.2, 7.0) ^c | .42** |
| Poor partner support | 2 (11.1) | 6 (8.8) | 1.3 (0.2, 7.0) ^c | .46** |
| Poor sexual relationship | 10 (55.5) | 52 (76.5) | 0.4 (0.1, 1.1) | .72** |
| Poor family relationship | 2 (11.1) | 5 (7.4) | 1.6 (0.3, 8.9) ^c | -.03 |
| Poor relationship friends | 8 (44.4) | 16 (23.5) | 2.6 (0.9, 7.7) | .20 |
| Lack of network support | 3 (16.7) | 17 (25.0) | 0.6 (0.1, 2.3) ^c | .53** |
| Lack of support in labour ^a | 1 (5.6) | 2 (2.9) | 1.9 (0.2, 22.7) ^c | - |
| Postpartum | | | | |
| Poor partner relationship | 4 (22.2) | 8 (11.8) | 2.1 (0.6, 8.1) ^c | .52** |
| Poor partner support | 7 (38.9) | 5 (7.4) | 8.0(2.2,29.8)** | .55** |
| Poor sexual relationship | 13 (72.2) | 54 (79.4) | 0.7 (0.2, 2.2) | .63** |
| Poor relationship own family | 2 (11.1) | 3 (4.4) | 2.7 (0.4,17.6) ^c | -.14 |
| Poor relationship friends | 8 (44.4) | 18 (26.5) | 2.2 (0.8, 6.5) | .28 |
| Lack of network support ^a | 5 (27.8) | 8 (11.8) | 2.9 (0.8, 10.3) | .71** |

Note. ^a Cut-off ≥ 1 used. All other cut-offs ≥ 2 . ^b For the men in the sample, these questions were answered in relation to their partner. Chi Square test ** $<.01$ *** $<.005$. ^c Fischer's exact test conducted due to cell frequencies < 5 . OR = odds ratio; CI = confidence interval. ^d * $p <.05$, ** $p <.01$, Spearman's (*rho*)

Table 4. *Perceptions of the baby and parent-baby relationship in participants with and without postpartum mental health problems*

| | Mental health problem <i>n</i> =18 | No mental health problem <i>n</i> = 68 | <i>OR</i> (95% CI) | Correlations between men and women ^d |
|--|---------------------------------------|---|------------------------------------|---|
| Parent-baby relationship | <i>No.</i> (%) | <i>No.</i> (%) | | |
| Prenatal bonding problems | 2 (11.1) | 14 (20.6) | 0.5(0.1, 2.3) ^c | .49** |
| Negative reaction to newborn | 7 (38.9) | 11 (16.2) | 3.3 (1.0,10.4) | .30 |
| Feelings for baby absent or ambivalent | 3 (16.7) | 3 (4.4) | 4.3 (0.8, 23.6) ^c | .50** |
| Feelings of parental unworthiness ^a | 5 (27.8) | 3 (4.4) | 8.3 (1.8, 39.3) ^c ** | -.08 |
| Anger towards the baby | 10 (55.6) | 15 (22.1) | 4.4(1.5,13.1)** | .26 |
| Rough treatment of the baby ^a | 7 (38.9) | 14 (20.6) | 2.5 (0.8, 7.5) | -.02 |
| Baby: poor condition at birth ^a | 6 (33.3) | 12 (17.6) | 2.3 (0.7, 7.5) | .87** |
| Baby: difficult temperament ^a | 8 (44.4) | 16 (23.5) | 2.6 (0.9, 7.7) | .87** |

Note. ^a Cut-off ≥ 1 used. All other cut-offs ≥ 2 . Chi Square test ** <.01 .

^c Fischer's exact test conducted due to cell frequencies < 5. *OR* = odds ratio; CI = confidence interval. ^d **p* <.05, ***p*<.01, Spearman's (*rho*)

Table 5. *Logistic regression of the role of adjustment and relationship variables in risk for postpartum mental health problems (N = 86)*

| Dependent variable | Variables in the model | B (SE) | OR (95% CI) | Overall model statistics |
|-----------------------------------|-----------------------------------|---------------|---------------------|----------------------------|
| Postpartum mental health problems | Lack of partner support | 1.80 (0.84)* | 6.06 (1.16, 31.57) | $\chi^2 (5) = 31.41^{***}$ |
| | Complications in labour | 1.32 (0.73) | 3.73 (0.90, 15.49) | |
| | Sleep deprivation | 1.29 (0.96) | 3.63 (0.55, 23.93) | |
| | Feelings of parental unworthiness | 2.40 (0.96)** | 11.01 (1.68, 72.21) | |
| | Anger towards the baby | 1.79 (0.73)** | 5.96 (1.43, 24.82) | |

Note. R^2 = Nagelkerke; OR = odds ratio; CI = confidence interval N = 86, * $p < .05$, ** $< .01$ *** $< .001$.