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High-risk Antenatal Caregiving Representations and Perinatal Behavior in Mothers with Severe Lifetime Psychopathology

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HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

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Abstract

A maternal lifetime history of severe psychopathology poses a risk for parenting. This study is the first to explore antenatal caregiving representations among clinical groups as markers for later risk of non-optimal maternal behavior. Sixty-five mothers diagnosed with psychosis, bipolar disorder, depression, and non-clinical controls participated in a longitudinal study from pregnancy to 16 weeks after birth. Past and present mental health diagnoses and caregiving representations were assessed during pregnancy. Maternal behavior, sensitivity and intrusiveness, was assessed during the five-minute recovery phase of the Still Face paradigm at 16 weeks. Mothers with psychopathology showed significantly higher levels of heightened caregiving representations (i.e., difficulty in separating from your child) than controls. As predicted, mothers diagnosed with psychosis were most likely to report high-risk levels of caregiving representations (helplessness, role reversal). Antenatal caregiving representations predicted perinatal mother behavior. Role reversal predicted lower levels of maternal sensitivity and higher levels of intrusiveness. However, the only significant diagnostic group difference in perinatal maternal behavior was found for mothers diagnosed with depression compared to non-clinical controls, with depressive mothers exhibiting more intrusive behavior. The findings are interpreted in the context of representational transformation to motherhood during pregnancy. The results also provide preliminary evidence for the potential of the PCEQ as a screening instrument to screen for antenatal representational risk.

Keywords: antenatal caregiving representation; perinatal maternal behavior; psychopathology; psychosis, depression

Introduction

Severe maternal psychopathology affects parenting behavior and places children at risk for poor developmental outcomes (Oyserman, Mowbray, Meares, & Firminger, 2000). There is substantial evidence that a diagnosis of depression is associated with non-optimal maternal behavior, including during remission phases (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). A recent systematic review concluded that mothers diagnosed with schizophrenia showed impaired parental behavior during the first 12 months compared to non-clinical controls (Davidsen, Harder, MacBeth, Lundy, & Gumley, 2015). Research on maternal behavior among mothers with bipolar disorder is sparse; the few studies conducted find that bipolar depressed mothers are *more* likely to vocalize and engage in positive interactions with their children compared to unipolar depressed mothers (Goodman & Liu, 2014). However, children of mothers with bipolar disorder are still more likely to become insecurely attached than children of mothers without a psychiatric history, suggesting that bipolar disorder poses a risk factor for maternal behavior and child development.

Severe mental illness (SMI) is by nature episodic (Oyserman et al., 2000). Thus, children of mothers with a lifetime history of SMI will be likely to be parented both during active and remission episodes of psychopathology. Epidemiological research have demonstrated that more than half of women with severe psychopathology (e.g. schizophrenia, bipolar disorder and other psychotic disorders) become mothers with no clinical differences between those with or without children (Howard, Kumar, & Thornicroft, 2001). Most parenting studies of mothers diagnosed with severe psychopathology are cross-sectional and based on admissions to mother-baby units (Davidsen et al., 2015). So far, most research on the impact of SMI on maternal behavior are thus conducted during periods of active symptoms. Less is known about how a lifetime history of SMI affects parental behavior during remission phases. It has been suggested that persistent emotional and relational difficulties among mothers with SMI play an important role

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

(Oyserman et al., 2000). Antenatal caregiving representational development could be one important parental domain affected by psychopathology and potentially allow early detection of mothers at risk of non-optimal caregiving behavior.

Caregiving Representations

Five decades of research has demonstrated that transformations during pregnancy prepares women for motherhood (Slade, Cohen, Sander, & Miller, 2011). This process involves maternal representations that develop from emotional engagement with the fetus (maternal-fetal attachment) and expectations for the future relationship with the child. Following attachment theory, George and Solomon (2008) theorized that all parents transform their self-representation from *seeking protection* (attachment system goal) to *providing comfort and care* for their child (caregiving system goal) in order to become the “stronger and wiser” member of the attachment-caregiving relationship. Further, these authors demonstrated that mothers of children with disorganized attachment have caregiving representations characterized by helplessness or role reversal, conceived as high risk representations of maternal abdication of care and failed protection (Solomon & George, 2011).

Antenatal assessment of maternal representations predict observed and mother-reported maternal behavior as well as infant attachment at 12 months (Crawford & Benoit, 2009; Dayton, Levendosky, Davidson, & Bogat, 2010; Siddiqui & Hägglöf, 2000; van den Bergh & Simons, 2009). A meta-analysis concluded that depression is a predictor of maternal-fetal attachment (Yarcheski, Mahon, Yarcheski, Hanks, & Cannella, 2009). The only study involving clinically depressed mothers found lower intensities of maternal-fetal attachment among depressed women compared to non-depressed women (McFarland et al., 2011). However, knowledge about the impact of psychosis and bipolar disorder on caregiving representations is sparse and perinatal

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

research involving clinical groups is needed. Furthermore, so far assessment of antenatal caregiving representation have relied on the use of time-consuming interviews of the mother limiting the practical usefulness of these instruments in larger samples and clinical practice. Early screening of mothers could be important in identifying mothers in need of interventions.

Aim and hypothesis

The present study aimed to explore associations between past and present psychopathology, antenatal caregiving representations, and perinatal infant interaction (pregnancy – 16 weeks) in a sample of mothers with severe mental disorders. We expected non-optimal antenatal caregiving representations to be associated with psychopathology and predictive of perinatal maternal behavior.

Method

Design

Data were drawn from a prospective, longitudinal cohort of the Wellbeing and resilience: mechanisms of transmission of health and risk in parents with complex mental health problems and their offspring—The WARM Study - following women with a history of severe psychopathology from pregnancy to 16 weeks infant age (Harder et al., 2015). Data were collected in Denmark and Scotland between October 2014 and November 2016. The WARM study had ethical approval from Health research Ethics, Capital Region of Denmark (Protocol no: H-2-014-024) and the West of Scotland Research Ethics Service (REC Reference 14/WS/1051).

Participants

Participants were Danish or Scottish pregnant women and their infants. Inclusion criteria were a) a DSM-5 diagnosis of Delusional Disorder, Schizophreniform Disorder, Schizophrenia or Schizoaffective Disorder, Psychosis NOS, Brief Psychotic Disorder, or b) a DSM-5 diagnosis of Bipolar I and II Disorder, or c) a DSM-5 diagnosis of Major Depressive Disorder (current moderate or severe episode or lifetime recurrent moderate or severe), or d) a non-psychiatric control group defined as mothers without any history of treatment or admission for a psychiatric disorder or drug or alcohol addiction. Exclusion criteria for the current study were: a) mother unable to speak English or Danish, b) miscarriage, c) diagnosis of Autistic Spectrum Disorder, and d) unable to provide informed and written consent for their own and their unborn child's participation in the study. Furthermore, if an infant were born with a congenital developmental disorder, which can be diagnosed from birth, such as for example Down's Syndrome, or the mother had a miscarriage after antenatal assessments were completed, this led to termination of further follow-up of the family.

Seventy participants consented to participate in the study. Five participants dropped out before antenatal data collection had finished and were not included in the present study (flow of participants presented in Figure 1).

Insert Figure 1 here

Measures

Maternal psychopathology. Past and present psychiatric diagnoses were assessed using the psychosis and mood modules of the Structured Clinical Interview for DSM-5 (First, Williams, Karg, & Spitzer, 2016). All diagnoses were discussed and confirmed through consensus discussion among the senior researchers (SH, AG, KD, AM) and supervised by a researcher trained on the SCID (KR).

General level of symptom severity was assessed during pregnancy using the symptom scale of The Global Assessment of Functioning (GAF; American Psychiatric Association, 2013). The GAF is a numeric scale (0 through 100). Reliability obtained on 15 % of the sample was $ICC(1) = 0.602$.

Caregiving representations. Antenatal caregiving representations were assessed using the Prenatal Caregiving Experience Questionnaire (PCEQ, Brennan & George, 2013), a 40-item self-report measure reflecting thoughts and feelings regarding mothers' expectations about their future relationship with their children. Responses are given on a 5-point Likert scale. The PCEQ was translated into Danish by two independent researchers and back translated by a bilingual English-Danish speaking Associate Professor in Psychology. Any translational divergences compared to the original version were solved by discussion with and guidance from the PCEQ co-

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

authors (CG, JB). A cross-cultural validated four-factor model of the postnatal version of the questionnaire (CEQ Age 1.5-5) was used in the current study (Røhder et al., submitted). There are four subscales: *Enjoyment*, mothers expect positive feelings about the child ($\alpha = .709$); *heightened*, mothers expect difficulties in separating from their child ($\alpha = .758$); *helplessness*, mothers expect their child to be out of control and themselves as unable to take care of child ($\alpha = .801$); and *role reversal*; mothers expect the child to understand and cheer up the mother ($\alpha = .672$). High-risk representations are defined as scores in the upper quartile on the helplessness or role reversal subscales (George & Solomon, 2011).

Maternal behavior. Maternal behavior was assessed during the recovery phase of a 10-minute interaction based on the Still-face paradigm (three minutes face-to-face interaction, two minutes still-face and five minutes recovery phase). Split-screen recordings displayed both mother and infant. The 5-minutes recovery phase was coded using Coding Interactive Behavior manual (CIB, Feldman 1998). CIB is a global measure that incorporates parent, child, and dyadic affective states and interactive styles validated for use in dyads with infants 2-36 months of age. The coding consist of 33 items, that constitutes maternal composites of sensitivity and intrusiveness, infant involvement and withdrawal, and dyadic reciprocity and dyadic negative states. The current study used the maternal sensitivity and intrusiveness composites. The item *parental gaze* was excluded from the original sensitivity composite due to lack of correlation with other composite items. The adjusted sensitivity composite showed high internal consistency ($\alpha = .805$). The intrusiveness composite showed poor internal consistency ($\alpha = .192$), therefore the single item *overriding behavior* – the most central item in the intrusiveness composite - was used to measure non-optimal maternal behavior. All interactions were coded blind to maternal psychopathology diagnoses by the first author and a second judge. Both had passed the CIB reliability test from Ruth Feldman. Inter-

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

rater reliability calculated using 20 % of the interactions rated by the first author showed good reliability (ICC (2,1) = .805).

Procedure

Participants were recruited through obstetric wards in Capital Region of Denmark, Region of Southern Denmark, and Region Zealand, and in Scotland through perinatal mental health services and midwifery in Greater Glasgow and Clyde through a non-selective procedure (see Harder et al., 2015 for further information).

Written informed consent was obtained from all participants included in the study. Maternal psychopathology and caregiving representations was assessed during pregnancy and took place during home-visits or at the obstetric ward according to the mother's preference. Mother-infant interaction was assessed at 16 weeks of infant age during home-visits.

Statistical analysis

First, assumptions for the use of parametric tests were explored. A series of ANOVAs with planned contrast were conducted to explore the impact of psychopathology on caregiving representations and maternal behavior. Chi-square test was used to explore which mothers were most likely to report high-risk caregiving representations. Spearman's rho correlation was used to evaluate associations between antenatal caregiving representations and maternal caregiving behavior (sensitivity and overriding behavior). Multiple hierarchical regression was used to explore the predictive validity of antenatal caregiving representations on maternal behavior. Independent t-test was used to assess differences in maternal behavior between mothers with high vs. low antenatal caregiving risk. All effect sizes reported are Cohen's *f* or Cohen's *d*.

Missing and Dropout analysis

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Missing items in the symptom interviews and the PCEQ were analyzed and handled with mean imputation on subscale level as data were missing at random. Analyses of dropout and missing data indicated no differences between participants with missing data, participants who dropped out during the study and those that remained in the study.

Results

Sample Characteristics

Demographic data and clinical characteristics of the mothers and their infants are presented in Table 1.

Insert Table 1

Psychopathology and Caregiving

The first analysis examined the association between psychopathology and antenatal caregiving representations. Table 2 reports descriptive statistics on caregiving representations and behavior. Mothers diagnosed with psychosis reported the highest levels of non-optimal caregiving representations followed by mothers diagnosed with depression. There were significant differences between diagnostic groups on heightened caregiving representations, $F(3,60) = 6.040, p = .001$; Cohen's $f = .549$. Furthermore, mothers diagnosed with psychosis were the most likely to report high-risk caregiving representations (scores in the upper quartile of helplessness and role reversal) (69%), compared to mothers with bipolar disorder (50%), mothers diagnosed with depression (46%), and non-clinical mothers (14%), $X^2 = 8.565, p = .036$.

The next analysis examined the association between psychopathology and perinatal maternal behavior (Table 2). There were no significant overall effect of psychopathology groups on maternal sensitivity, $F(3,42) = 0.072, p = .975$, or maternal overriding behavior, $F(3,42) = 2.343, p = .087$. However, planned contrast revealed that mothers diagnosed with depression displayed more overriding behavior compared to the non-clinical control group, $p = .037$; Cohen's $f = .331$. While the difference is statistically significant the relative small group sizes has the implication that the estimate of effect (0.71 difference in averages) has a 95% confidence interval of 0.044 to 1.376.

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Mothers diagnosed with psychosis and bipolar disorder did not differ in maternal behavior from non-clinical controls.

Insert Table 2

Association between Antenatal Caregiving Representations and Perinatal Maternal Behavior

We then explored the associations between antenatal caregiving representations and maternal behavior (Table 3). As hypothesized, helplessness and role reversal were associated with less maternal sensitivity and more overriding maternal behavior.

Insert Table 3

Regression analyses exploring the effect of antenatal caregiving representations on perinatal maternal behavior are presented in Table 4 (sensitivity) and 5 (overriding behavior). Representations of role reversal during pregnancy predicted both lower maternal sensitivity and more overriding behavior at 16 weeks with a medium effect size. Furthermore, high-risk antenatal caregiving representations were associated with lowered sensitivity, $t(44) = 3.040, p = .004$; Cohen's $d = .882$, 95% CI [.128; .631] and heightened overriding behavior $t(44) = -2.368, p = .022$; Cohen's $d = .694$, 95% CI [- 1.118; - .090].

Insert Table 4 & 5

Discussion

The present study explored associations between psychopathology, antenatal caregiving representations, and maternal behavior among mothers diagnosed with psychosis, bipolar disorder, depression, compared to non-clinical controls. This is the first study to explore the association between psychopathology and antenatal caregiving representations. The study found that mothers with psychopathology during pregnancy expected more separation difficulties with their children (heightened caregiving) as compared to non-clinical controls. Previous research have also found more such over-activated caregiving representations in clinical groups (Vreeswijk, Maas, & van Bakel, 2012). Furthermore, Dayton et al. (2010) found that mothers who's caregiving representations during pregnancy could be termed affectively over-activated (e.g. distorted representations in the WMCI) were more hostile in interactions with their one-year old child and Benoit, Parker, and Zeanah (1997) found an association to resistant infant attachment. These findings points to the potential negative effects of antenatal heightened caregiving representations on later mother-infant interactions and child attachment even though we did not see an negative effect on early caregiving behavior in our study. High-risk caregiving representations of helplessness and role reversal were in our study most prominent among mothers diagnosed with psychosis. Previous studies have linked high-risk representations to depression (George & Solomon, 2011; Huth-Bocks, Guyon-Harris, Calvert, Scott, & Ahlfs-Dunn, 2016). Our study is the first to demonstrate that psychosis is another important risk factor for the development of high-risk caregiving representations.

Consistent with existing studies of depression and maternal behavior, we found that mothers diagnosed with depression showed more overriding behavior compared to mothers without psychopathology (Lovejoy et al., 2000). Mothers diagnosed with psychosis and bipolar disorder resembled non-clinical mothers. Other studies on mothers with psychosis in remission have

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

reported similar findings. For example, mothers with psychotic disorders admitted to a mother-baby unit did not need social services supervision when discharged (Howard, Thornicroft, Salmon, & Appleby, 2004), did not differ from healthy controls in their ability to respond appropriate to their infant's cues (Pawlby et al., 2010), and mother-infant interaction quality improved when maternal psychotic symptoms declined (Snellen, Mack, & Trauer, 1999).

Finally, antenatal caregiving representations predicted perinatal maternal behavior, especially role reversal. Similar results have been found using interview-based measures of caregiving representations (Crawford & Benoit, 2009; Dayton et al., 2010). Our findings are the first to demonstrate this relationship using a questionnaire. Crawford and Benoit (2009) found that the presence of disrupted representations of the unborn child (e.g. role/boundary confusion, fearfulness/dissociation/disorientation, intrusiveness/negativity, affective communication errors, and withdrawal) during pregnancy were predictive of atypical maternal behavior (AMBIANCE) at 12 months. Vulliez-Coady, Obsuth, Torreiro-Casal, Ellertsdottir, and Lyons-Ruth (2013) suggest that role reversal/confusion represents the mother's need for emotional support from her child. Similarly, qualitative studies have reported that for some mothers living with psychopathology motherhood holds a special significance, often described as "a new beginning" or as "providing meaning to their lives" (Dolman, Jones, & Howard, 2013), or as an opportunity to *receive* love or their children as meeting mothers' unmet emotional needs (role reversal) (Birtwell, Hammond, & Puckering, 2015). These findings suggest that the antenatal development of caregiving representations are important for the mother's emotional preparation for motherhood and that representational role reversal is an important focus for antenatal clinical interventions.

Strengths and Limitations

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Whereas most studies on psychopathology and motherhood involve mothers with depression, a strength in this study was the inclusion of a broader range of maternal psychopathology allowing for comparison among different clinical groups. Adding to this, all participants were non-selectively, consecutively identified. Second, participants in our study represent mothers living with SMI in the community. As previous research have relied mostly on mothers admitted to inpatient psychiatric facilities, our study expands this research by exploring maternal behavior among the more well-functioning mothers with SMI who are functioning in the community.

Study limitations involve small group sizes leading to lack of power in consistently detecting group differences. Thus, the current results should be confirmed in future larger studies. Finally, the PCEQ is a new instrument with no previous studies reporting on its use. The usefulness of the PCEQ for screening will need to be explored in large community-based samples that could identify norms and cut-offs for non-optimal caregiving representations.

Conclusion

This study explored the impact of psychopathology on antenatal caregiving representations and perinatal maternal behavior among women diagnosed with lifetime psychosis, bipolar disorder, depression, and non-clinical controls. We found that antenatal high-risk caregiving representations of helplessness and role reversal predict lower sensitivity and more overriding-intrusive maternal behavior at 16 weeks. Furthermore, mothers with psychopathology were more likely to demonstrate high-risk caregiving representations than non-clinical mothers, with mothers diagnosed with psychosis at the highest risk. We suggest that lifetime psychopathology places mothers at increased risk of difficulty in the perinatal transformation processes needed to establish a self-representation as the stronger and wiser, protective parental

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

figure in the mother-child relationship. Finally, our results provide preliminary evidence for the screening potential of assessing antenatal representational risk in all mothers using a brief questionnaire.

References

- Association, A. P. (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)* (Fifth edition ed.). Washington, DC: American Psychiatric Publishing.
- Benoit, D., Parker, K. C. H., & Zeanah, C. H. (1997). Mothers' representations of their infants assessed prenatally: Stability and association with infants' attachment classifications. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *38*(3), 307-313. doi:10.1111/j.1469-7610.1997.tb01515.x
- Birtwell, B., Hammond, L., & Puckering, C. (2015). 'Me and my bump': An interpretative phenomenological analysis of the experiences of pregnancy for vulnerable women. *Clinical Child Psychology and Psychiatry*, *20*(2), 218-238. doi:10.1177/1359104513506427
- Brennan, J., George, C., & Solomon, J. (2013). *Prenatal Caregiving Experiences Questionnaire. Developmental version*. Mills College. Oakland, CA.
- Crawford, A., & Benoit, D. (2009). Caregivers' Disrupted Representations of the Unborn Child Predict Later Infant-Caregiver Disorganized Attachment and Disrupted Interactions. *Infant Mental Health Journal*, *30*(2), 124-144. doi:10.1002/imhj.20207
- Davidson, K. A., Harder, S., MacBeth, A., Lundy, J. M., & Gumley, A. (2015). Mother-infant interaction in schizophrenia: transmitting risk or resilience? A systematic review of the literature. *Soc Psychiatry Psychiatr Epidemiol*, *50*(12), 1785-1798. doi:10.1007/s00127-015-1127-x
- Dayton, C. J., Levendosky, A. A., Davidson, W. S., & Bogat, G. A. (2010). The Child as help in the Mind of the Mother: The Influence of Prenatal Maternal Representations on Parenting Behavior. *Infant Mental Health Journal*, *31*(2), 220-241. doi:10.1002/imhj.20253
- Dolman, C., Jones, I., & Howard, L. M. (2013). Pre-conception to parenting: A systematic review and meta-synthesis of the qualitative literature on motherhood for women with severe mental illness. *Archives of Women's Mental Health*, *16*(3), 173-196. doi:10.1007/s00737-013-0336-0

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

- Feldman, R. (1998). *Coding Interactive Behavior (CIB)*. Coding manual. Department of Psychology and the Gonda Brain Sciences Center. Bar-Ilan University. Ramt-Gan, Israel.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2016). *Structured Clinical Interview for DSM-5 Disorders - Clinical Version (SCID-5-CV)*. Arlington, VA: American Psychiatric Association.
- George, C., & Solomon, J. (2008). The Caregiving System. A Behavioral Systems Approach to Parenting. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of Attachment*. (2. Edition ed.). New York: The Guildford Press.
- George, C., & Solomon, J. (2011). Caregiving Helplessness. The Development of a Screening Measure for Disorganized Maternal Caregiving. In J. a. G. Solomon, C. (Ed.), *Disorganized Attachment and Caregiving*. New York: The Guilford Press.
- Goodman, J. H., & Liu, C. H.-J. (2014). Maternal Psychopathology and Child Attachment. In A. Wenzel (Ed.), *The Oxford Handbook of Perinatal Psychology*: 'Oxford University Press'.
- Harder, S., Davidsen, K., MacBeth, A., Lange, T., Minnis, H., Andersen, M. S., . . . Gumley, A. (2015). Wellbeing and resilience: mechanisms of transmission of health and risk in parents with complex mental health problems and their offspring--The WARM Study. *BMC Psychiatry*, *15*(1), 310. doi:10.1186/s12888-015-0692-6
- Howard, L. M., Kumar, R., & Thornicroft, G. (2001). Psychosocial characteristics and needs of mothers with psychotic disorders. *British Journal of Psychiatry*, *178*(MAY), 427-432. doi:10.1192/bjp.178.5.427
- Howard, L. M., Thornicroft, G., Salmon, M., & Appleby, L. (2004). Predictors of parenting outcome in women with psychotic disorders discharged from mother and baby units. *Acta Psychiatrica Scandinavica*, *110*(5), 347-355. doi:10.1111/j.1600-0447.2004.00375.x
- Huth-Bocks, A. C., Guyon-Harris, K., Calvert, M., Scott, S., & Ahlfs-Dunn, S. (2016). The Caregiving Helplessness Questionnaire: Evidence for Validity and Utility with Mothers of Infants. *Infant Ment Health J*, *37*(3), 208-221. doi:10.1002/imhj.21559

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

- Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: a meta-analytic review. *Clin Psychol Rev*, *20*(5), 561-592.
doi:[https://doi.org/10.1016/S0272-7358\(98\)00100-7](https://doi.org/10.1016/S0272-7358(98)00100-7)
- McFarland, J., Salisbury, A. L., Battle, C. L., Hawes, K., Halloran, K., & Lester, B. M. (2011). Major depressive disorder during pregnancy and emotional attachment to the fetus. *Archives of Womens Mental Health*, *14*(5), 425-434. doi:10.1007/s00737-011-0237-z
- Oyserman, D., Mowbray, C. T., Meares, P. A., & Firminger, K. B. (2000). Parenting among mothers with a serious mental illness. *Am J Orthopsychiatry*, *70*(3), 296-315. doi:<https://doi.org/10.1037/h0087733>
- Pawlby, S., Fernyhough, C., Meins, E., Pariante, C. M., Seneviratne, G., & Bentall, R. P. (2010). Mind-mindedness and maternal responsiveness in infant-mother interactions in mothers with severe mental illness. *Psychological Medicine*, *40*(11), 1861-1869. doi:10.1017/S0033291709992340
- Røhder, K., George, C., Brennan, J., Nayberg, E., Trier, C. H., & Harder, S. (submitted). The Cross-Cultural Validity of the Caregiving Experiences Questionnaire (CEQ) among Danish Mothers with Preschool Children.
- Siddiqui, A., & Hägglöf, B. (2000). Does maternal prenatal attachment predict postnatal mother-infant interaction? *Early Human Development*, *59*(1), 13-25. doi:10.1016/S0378-3782(00)00076-1
- Slade, A., Cohen, L. J., Sander, L. W., & Miller, M. (2011). The Psychology and Psychopathology of Pregnancy. Reorganization and Transformation. In C. H. Zeanah (Ed.), *Handbook of Infant Mental Health* (Third Edition ed.): Guildford Publications.
- Snellen, M., Mack, K., & Trauer, T. (1999). Schizophrenia, mental state, and mother-infant interaction: examining the relationship. *Aust N Z J Psychiatry*, *33*(6), 902-911. doi:10.1046/j.1440-1614.1999.00641.x
- Solomon, J., & George, C. (2011). Disorganization of Maternal Caregiving across Two Generations. The Origins of Caregiving Helplessness. In J. Solomon & C. George (Eds.), *Disorganized Attachment and Caregiving*.

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

van den Bergh, B., & Simons, A. (2009). A review of scales to measure the mother-foetus relationship.

Journal of Reproductive and Infant Psychology, 27(2), 114-126. doi:10.1080/02646830802007480

Vreeswijk, C. M. J. M., Maas, A. J. B. M., & van Bakel, H. J. A. (2012). Parental representations: A systematic review of the working model of the child interview. *Infant Mental Health Journal, 33*(3), 314-328.

doi:10.1002/imhj.20337

Vulliez-Coady, L., Obsuth, I., Torreiro-Casal, M., Ellertsdottir, L., & Lyons-Ruth, K. (2013). Maternal Role

Confusion: Relations to Maternal Attachment and MotherChild Interaction from Infancy to

Adolescence. *Infant Mental Health Journal, 34*(2), 117-131. doi:10.1002/imhj.21379

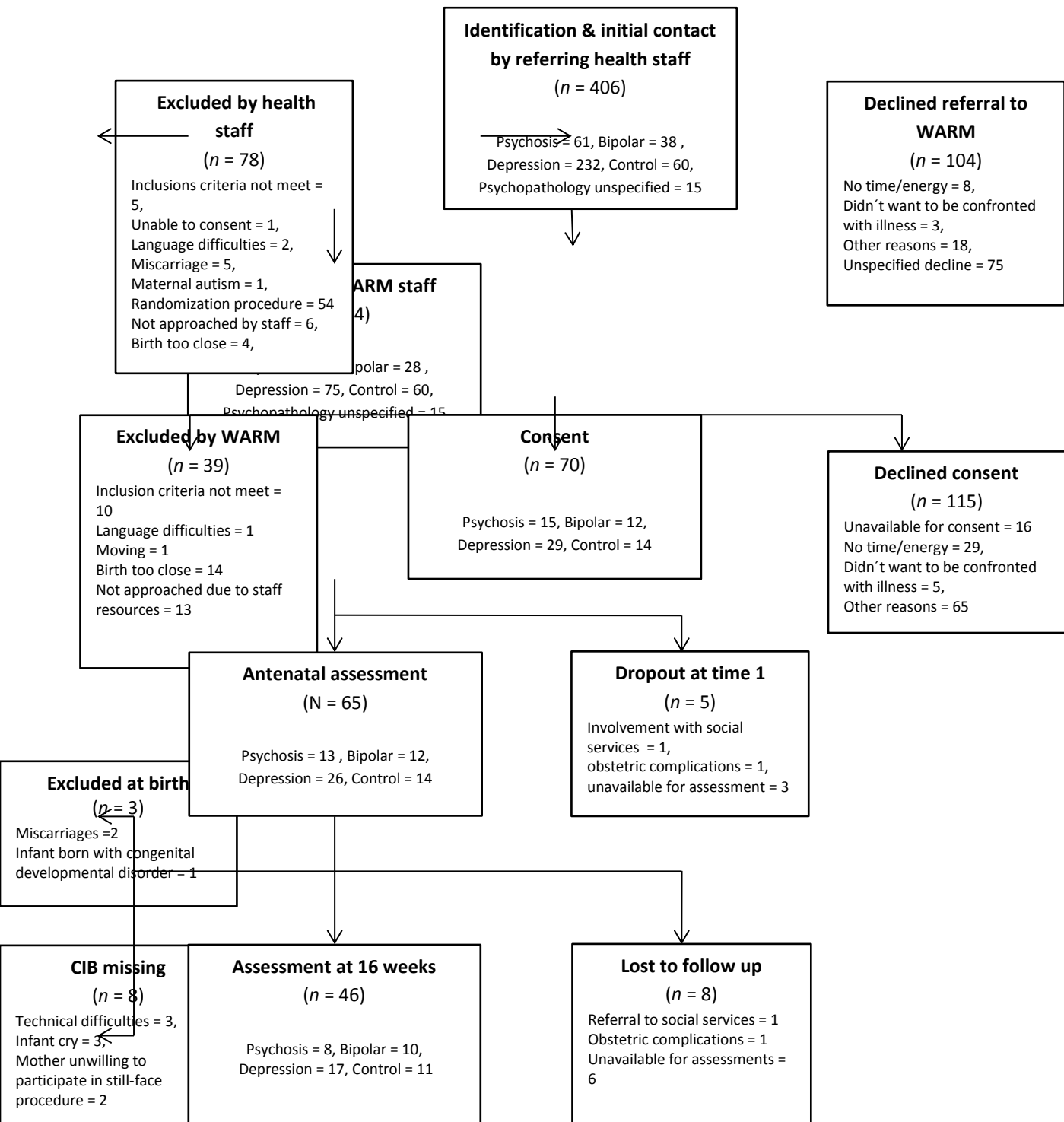
Yarcheski, A., Mahon, N. E., Yarcheski, T. J., Hanks, M. M., & Cannella, B. L. (2009). A meta-analytic study of predictors of maternal-fetal attachment. *International Journal of Nursing Studies, 46*(5), 708-715.

doi:10.1016/j.ijnurstu.2008.10.013

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Figure 1

Flow chart of recruitment and dropout at 16 weeks



HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Table 1

Maternal and infant characteristics

	Psychosis	Bipolar disorder	Depression	Non-clinical control	
	<i>n</i> = 13 (20.0 %)	<i>n</i> = 12 (18.5 %)	<i>n</i> = 26 (40.0 %)	<i>n</i> = 14 (21.5%)	
Maternal characteristics	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>p</i>
Maternal age (years)	29.1 (5.6)	32.0 (5.7)	29.3 (4.2)	30.7 (3.5)	.33 ^a
GAF, symptomatic functioning during pregnancy	64.3 (14.7)	73.2 (11.6)	66.4 (11.7)	90.71 (5.5)	< .000 ^a
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Primiparous	8 (61.5)	6 (50.0)	18 (69.2)	11 (78.6)	.46 ^b
Living with a partner	9 (69.2)	12 (100)	20 (76.9)	12 (85.7)	.52 ^b
Education, completed ISCED level 5 or higher of tertiary education	2 (15.4)	6 (50)	16 (61.5)	13 (92.9)	.001 ^b
Employment	1 (7.7)	6 (50)	13 (50.0)	11 (78.6)	.003 ^b
Danish nationality	10 (76.9)	10 (83.3)	13 (50.0)	14 (100)	.005 ^b
DSM-V diagnosis of Schizophrenia, Bipolar I Disorder, or Recurrent Depression	8 (61.5)	8 (66.7)	22 (84.6)		
Infant characteristics	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
Infant age (weeks)	18.1 (3.0)	18.6 (2.8)	17.9 (2.6)	18.7 (3.6)	.87 ^a
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Infant gender (girls)	4 (44.4)	8 (66.7)	11 (57.9)	10 (83.3)	.29 ^b

Note. ^a ANOVA; ^b X².

Sample size at 16 weeks: Psychosis *n* = 8 (17.4%); Bipolar disorder *n* = 10 (21.7%); Depression *n* = 17 (37.0%), and non-clinical controls *n* = 11 (23.9%).

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Table 2

Group differences in maternal representations and behavior

Variables	Psychosis	Bipolar disorder	Depression	Non-clinical control
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Antenatal representations				
Enjoyment	4.66 (.27)	4.58 (.36)	4.54 (.34)	4.50 (.25)
Heightened	3.35(1.04)***	2.83 (.85)*	3.14 (.81)***	2.14 (.49)
Helplessness	2.11 (.42) ⁺	2.14 (.60) ⁺	2.08 (.68) ⁺	1.71 (.44)
Role Reversal	3.56 (1.07) ⁺	3.08 (.88)	3.39 (.62)	2.98 (.69)
Perinatal Behavior				
Maternal sensitivity	3.40 (.49)	3.35 (.47)	3.32 (.47)	3.38 (.45)
Maternal Overriding	1.81 (.65)	1.89 (.96)	2.53 (.83) *	1.82 (.96)

Note. *M* = Mean; *SD* = Standard deviation.

⁺*p* ≤ .08, **p* < .05; ***p* < .01; ****p* < .001; all *p*-values are two-tailed and indicate differences from non-clinical controls.

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Table 3

Correlations between antenatal caregiving representations and perinatal maternal behavior: Spearman's rho

	Maternal sensitivity	Maternal overriding behavior
Enjoyment	.11	-.21
Heightened	-.20	.15
Helplessness	-.23	.31*
Role Reversal	-.27 ⁺	.33*

Note. ⁺ $p \leq .087$ * $p < .05$; all p -values are two-tailed and indicate differences from non-clinical controls.

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Table 4

Hierarchical Multiple Regression Analysis Predicting Maternal Sensitive Behavior At 16 Weeks Infant Age From Antenatal Caregiving Representations

	B	SE	β	<i>t</i>	<i>p</i>
Step 1	4.176	.345		12.090	.000
Helplessness	-.089	.119	-.109	-.752	.456
Role Reversal	-.197	.084	-.339	-2.343	.024
Step 2	3.003	1.337		2.246	.030
Helplessness	-.012	.144	-.015	-.084	.933
Role Reversal	-.190	.089	-.328	-2.139	.039
Enjoyment	.245	.263	.158	.930	.358
Heightened	-.042	.081	-.083	-.513	.611

Note. $R^2 = .136$ for step 1; $\Delta R^2 = .020$ for step 2 ($p = .626$).

SE = Standard error; *p*-values are two-tailed.

HIGH RISK ANTENATAL AND PERINATAL CAREGIVING

Table 5

Hierarchical Multiple Regression Analysis Predicting Maternal Overriding Behavior At 16 Weeks Infant Age From Antenatal Caregiving Representations

	B	SE	β	<i>t</i>	<i>p</i>
Step 1	.105	.646		.163	.871
Helplessness	.444	.222	.280	2.005	.051
Role Reversal	.347	.157	.309	2.216	.032
Step 2	2.847	2.484		1.146	.259
Helplessness	.318	.267	.200	1.190	.241
Role Reversal	.373	.165	.332	2.260	.029
Enjoyment	-.545	.489	-.182	-1.115	.272
Heightened	-.028	.151	-.029	-.188	.852

Note. $R^2 = .196$ for step 1; $\Delta R^2 = .737$ for step 2 ($p = .485$).

SE = Standard error; *p*-values are two-tailed.