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Parenting and mother-infant interactions in the context of maternal postpartum Obsessive-compulsive disorder: obsessional symptom and mood effects.

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Abstract

Background: Maternal mental illness is associated with negative effects on the infant and child. Increased attention has been paid to the effects of specific perinatal disorders on parenting and interactions as an important mechanism of influence. OCD can be a debilitating disorder for the sufferer and those around them. Although OCD is a common perinatal illness, no previous studies have characterized parenting and mother infant interactions in detail for mothers with OCD.

Methods: 37 mothers with postpartum OCD and a 6 month old infant were compared with 37 community control dyads on a variety of measures of psychological distress and parenting. Observed mother-infant interactions were assessed independently.

Results: Mothers with OCD were less confident, reported more marital distress and less social support than healthy peers. Mothers were rated as less sensitive in interactions than the comparison group, partly attributable to levels of concurrent depression.

Conclusions: Maternal postpartum OCD is a disorder that can affect experiences of parenting and mother-infant interactions although this may not be driven by OCD symptoms. Longitudinal studies are required to assess the trajectory and impact of maternal difficulties as the infant develops.

Key words: Postpartum, obsessive-compulsive disorder, mother-infant interactions, parenting, anxiety.

1.1 INTRODUCTION

The postpartum period is well known to be a time of increased risk for a range of psychiatric disorders, with approximately 15% of women affected at any one time (Andersson, Sundström-Poromaa, Wulff, Åström, & Bixo, 2006; Ross & McLean, 2006; Vesga-Lopez et al., 2008). The most common of these, postpartum depression, has been associated with potential negative effects on infant development and interactions (Murray, Cooper, & Hipwell, 2003) as well as a number of longer term adverse outcomes (Halligan, Murray, Martins, & Cooper, 2007; Hay et al., 2001). Attention has been extended in recent years to the spectrum of disorders at this time and the distinct presentations and impact that they might have on women and their infants (Matthey, Barnett et al. 2003). Untreated postpartum anxiety has been associated with adverse effects in the offspring such as inhibited temperament and compromised mother–infant interactions as well as later adverse child development (Glasheen, Richardson, & Fabio, 2010; Vedova, 2014) and maternal low self-confidence (Zietlow et al., 2014).

One distinctive anxiety disorder is obsessive-compulsive disorder (OCD). Pregnancy and childbirth have long been identified as onset or exacerbating events in retrospective studies of (OCD; (Maina, Albert, Bogetto, Vaschetto, & Ravizza, 1999; Neziroglu, Anemone, & Yaryura-Tobias, 1992; Williams & Koran, 1997). Increased preoccupation with harm and safety is likely to be a useful adaptation to rearing a vulnerable infant (Leckman et al., 1999) and the majority of parents experience unwanted intrusive thoughts of their infant coming to harm ((Abramowitz, Schwartz, & Moore, 2003); however a proportion of mothers and fathers develop clinical levels of symptoms that interfere with their functioning. Estimates of prevalence of postpartum OCD vary widely ranging from 0.7-9% (Kitamura et al., 2006; Navarro et al., 2008; Wenzel, Haugen, Jackson, & Brendle, 2005; Zambaldi et al., 2009). Given the varied cultural contexts and methodologies used it is difficult to determine whether this represents a significantly raised risk compared with the non-childbearing population (McGuinness, Blissett, & Jones, 2011; Russell, Fawcett, & Mazmanian, 2013). At the most conservative estimate, postpartum OCD appears to be no less common than at other times.

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There is abundant evidence that OCD can be a very debilitating disorder. Sufferers can be engaged in obsessions or compulsions for many hours each day. It is known to significantly affect quality of life for the individual and those around them. (Albert, Maina, Bogetto, Chiarle, & Mataix-Cols, 2010; Bobes et al., 2001; Olatunji, Cisler, & Tolin, 2007; Subramaniam, Abidin, Vaingankar, & Chong, 2012). Families often become involved in compulsive rituals and avoidance or significantly adapt family life to the demands of the disorder (Stewart et al., 2008). If a woman has OCD, quality of life is diminished during pregnancy, and is likely to be affected in the postpartum (Gezginc, Uguz et al. 2008). Little is yet known as to the specificity of issues that affect functioning for mothers with OCD in the perinatal period, of which parenting is the most important.

For some, the onset of perinatal OCD can be sudden and unexpected (Abramowitz, Schwartz, Moore, & Luenzmann, 2003). For those with pre-existing OCD, the context of pregnancy or looking after a small vulnerable child may present a particular set of stresses that increases the severity of their problem. The phenomenology of perinatal OCD symptomatology reflects this: contamination fears appear to be prominent in pregnancy whilst having intrusive thoughts of intentionally harming the baby is a common postnatal presentation.

The pervasive nature of symptoms and the likely impact on family systems has implications for parenting and childcare when a parent has OCD, as well as implications for the potential transmission of symptoms and stress to children. Evidence of the intergenerational transmission of OCD is mixed (Black, Gaffney, Schlosser, & Gabel, 2003; Black, Noyes, Goldstein, & Blum, 1992; F. Challacombe & Salkovskis, 2009). However, mothers with OCD perceive the quality of their parenting to be affected, in particular the ability to enjoy and have fun with their child (F. Challacombe & Salkovskis, 2009). If present in the postpartum, such difficulties could affect mother-infant interactions and may influence general vulnerability factors for later difficulties, such as attachment security (Tietz, Zietlow, & Reck, 2014).

Mother-infant interactions are important as they form the basis of the infant's experience in the first months of life. Parental sensitivity in interactions has been linked

to child attachment in older children in samples of mothers with anxiety disorders (Kertz, Smith, Chapman, & Woodruff-Borden, 2008) and high trait anxiety (Stevenson-Hinde, Chicot, Shouldice, & Hinde, 2013). Maternal anxiety has been found to affect early mother-infant interactions in terms of sensitivity and infant reactivity (Feldman et al., 2009; Nicol-Harper, Harvey, & Stein, 2007; Warren et al., 2003). Disorder-specific effects have been found on interactions in the context of maternal generalised anxiety disorder and social phobia (Murray, Cooper, Creswell, Schofield, & Sack, 2007; Murray et al., 2012; Stein et al., 2012). The impact of specific symptomatology on infant directed behaviour is important as it may be one mechanism by which vulnerabilities for child difficulties can be transmitted. For example, a recent study linked the interaction between anxiety and infant stroking with subsequent child internalising problems (Sharp, Hill, Hellier, & Pickles, 2015). Postnatal anxiety is frequently comorbid with depression (Austin et al., 2010). The effect of anxiety on postnatal interactions may be distinct from or interactive with that of depression although evidence is limited and mixed (Nicol-Harper et al., 2007; Tietz et al., 2014).

No previous studies have examined the impact of postpartum OCD on parenting or mother-infant interactions. It is an important area of enquiry given the severity and nature of the symptoms, in particular fears of deliberately harming the child, which can cause alarm in some professionals, and lead to assumptions that the infant is at risk (F. L. Challacombe & Wroe, 2013).

2. Material and Methods

2.1 Participants

Ethical approval for the study was granted by the Lewisham Research Ethics Committee (REC reference 08/H0810/18).

34 mothers with primary OCD and a baby of less than six months old were recruited from samples of convenience. The study was advertised via OCD service user networks and parenting websites as well as within clinical services local to the research centre as part of a broader treatment study. Exclusion criteria were: OCD not being the primary

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diagnosis; presence of psychosis, alcohol or substance abuse' having twins, or an unwillingness to be videotaped. An additional 3 mothers with OCD were included from the community sample as they had developed OCD when their babies were six months. One was from the control group and two from a separate 'higher risk of OCD group' being studied in parallel. All met inclusion/exclusion criteria as described.

37 control participants were recruited from a parallel study examining the development of symptoms during the postnatal period in a community sample of mothers. These mothers were recruited antenatally from sonography clinics and were included on the basis of not having a diagnosis of OCD at six months postpartum (one mother from this group did develop OCD and was included in the OCD group at 6 months). They were therefore known not to be carrying twins and were agreeable to being videotaped. No other exclusion criteria were applied.

Variable	Control group N=37	OCD group N=37	
Maternal age	34.65 (4.27)	33.00 (4.88)	$t_{(72)}=1.551$, $p=0.125$
N (%) White Ethnicity ^s	31 (83.8)	31 (83.8)	$P=1$ Chi square
N (%) Educated to A level or above	37 (100)	32 (86.49)	$p=0.054$ (Fisher's exact)
N (%) Single parent	1 (2.7)	1 (2.7)	1 (Fisher's exact)
N (%) First time parent	19 (51.35)	21 (56.76)	$p=0.512$ Chi square
N (%) Male child	16 (43.2)	18 (48.64)	$p=0.323$ Chi square

Table 1: Demographic characteristics of OCD v control groups

Participants were therefore well matched on demographic variables.

2.2 Measures

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Structured clinical interview for DSM-IV (SCID-IV, (First, Spitzer et al. 1995). This semi-structured interview is used to establish DSM-IV diagnoses (APA, 1994). The SCID has been shown to have acceptable reliability (Segal, Hersen et al. 1994) with most kappas of 0.6 or above (Williams, Gibbon et al. 1992).

Yale-Brown Obsessive-Compulsive Inventory (YBOCS) (Goodman, Price et al. 1989)

The YBOCS is a 14-item clinician administered interview to establish the severity of obsessional and compulsive symptoms. Convergent validity of the measure with other clinician rated measures such as the CGI are reasonable $r=0.74$. Inter-rater reliability correlations have been reported as $r=0.86-0.97$ for individual items and $r=0.98$ for total scores (Goodman, Price et al. 1989; Woody, Steketee et al. 1995). This was only administered to mothers with OCD.

Obsessive Compulsive Inventory-Revised (OCI; (Foa, Kozak et al. 1998). This is a 42-item self-report inventory concerning symptoms of OCD. over the preceding month. Items are rated on a 0-4 Likert scale for how frequently it occurred (0 = Never to 4 = Almost always) and the distress caused (0 = Not at all to 4 = Extremely). It is composed of seven subscales relevant to different manifestations of obsessional behaviour (washing, checking, doubting, ordering, obsessing (i.e. having obsessional thoughts), hoarding and mental neutralising. The internal consistency for the full scale is high (0.86-0.95), whilst it is satisfactory for the subscales (>0.7 , apart from neutralising). The OCI has good test-retest reliability for total scores, and satisfactory reliability for subscale scores. The OCI also shows good discriminative validity and is reliable to measure change in symptoms over time (Abramowitz, Tolin et al. 2005). The distress scale only was used for this study.

Postpartum Thoughts and Behaviours Checklist (PTBC, Abramowitz et al., 2006): The PTBC involves a checklist of common intrusions and mental and behavioural compulsions. These are based on the seven themes of postpartum thoughts listed by Abramowitz et al. (2003), which include: (a) suffocation/SIDS, (b) accidents, (c) intentional harm, (d) losing the baby, (e) illness, (f) sexual thoughts, and (g) contamination. Participants rate how disturbed they have been by each of intrusive thoughts listed and how much time they engaged in a number of behavioural and mental compulsions. This measure was chosen as it focused specifically on the obsessive-compulsive symptoms commonly reported in perinatal populations. A

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shortened version of the PTBC (consisting of nine key themes of intrusive thoughts described by Abramowitz et al. (2003) was used for this study and it was used dichotomously to establish the presence of these thoughts and behaviours postnatally in each group.

Responsibility Attitudes Scale (RAS; Salkovskis, Wroe, Gledhill, Morrison, Forrester, Richards, Reynolds & Thorpe S, 2000). This 26-item questionnaire was designed to assess general beliefs about responsibility. Respondents are asked to rate the degree to which a series of statements generally applies to them. Ratings are on a seven-point scale from totally disagree to totally agree. The scale has high test-retest reliability and internal consistency ($r = 0.94$; $\alpha = 0.92$; Salkovskis et al, 2000).

Depression, Anxiety and Stress Scale (DASS; (Lovibond & Lovibond, 1995). The DASS is a 42-item self-report questionnaire designed to measure states of depression, anxiety and tension/stress. Items refer to three types of symptoms and the frequency/severity with which they occurred over the last week. Depression items tap symptoms related to dysphoric mood, anxiety items tap symptoms related to physiological arousal whilst the stress scale taps symptoms related to irritability and overreaction to stressful events. Respondents rate items on a 0 ('did not apply to me at all') to 3 ('applied to me very much/most of the time'). Scores are calculated for each subscale by summing the relevant items. In a normative sample internal consistency for each scale was Depression 0.91; Anxiety 0.84, Stress 0.9, and the three factors have been found to be distinct (Lovibond and Lovibond 1995). Similar properties have been demonstrated in clinical samples (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown, Chorpita, Korotitsch, & Barlow, 1997).

Social Support Questionnaire (PSSS; (Marshall & Barnett, 1993). This is an 11-item self-report measure based on Weiss's (1974) conceptualization of the function of social relationships with regard to the sharing of concerns, intimacy, opportunity for nurturance, reassurance of worth and assistance or guidance. Items are scored from 1 ('none of the time') to 6 ('all of the time') according to the respondent's experiences over the past month, and a total score is then calculated. Cronbach's alpha was reported as .91. Test-retest correlation over 4 months is .68. It was found to correlate with depression ($r = -0.38$, $p < .001$), anxiety ($r = -.23$, $p < .001$) and physical health as measured by physical symptoms ($r = -.20$, $p < .001$).

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Golombok-Rust Inventory of Marital Satisfaction (GRIMS) (Rust, Bennun, Crowe, & Golombok, 1986). The GRIMS is a 28 item self-report questionnaire assessing the quality of a respondent's intimate relationship (i.e. a marriage or similar partnership). Items are scored on a four-point Likert scale ranging from 'strongly agree' (0) to 'strongly disagree' (3). Items are summed to obtain a total score, from which a satisfaction banding is then derived. Alphas of 0.86 in community and 0.89 in clinical groups have been reported and mean differences have distinguished between groups seeking treatment for relationship and sexual difficulties (Rust, Bennun, Crowe, & Golombok, 1990).

Maternal Self-Efficacy Scale (Pederson, Bryan, Huffman, & Del Carmen, 1989)

This scale contains 16 items rated on 7-point scales that pertain to mothers' perceptions of their competence on basic skills required in caring for an infant (e.g., "I feel confident in my role as a parent," "I can soothe my baby easily when he or she is crying or fussing," "Touching, holding, and being affectionate with my baby is comfortable and pleasurable for me"). Scores were obtained by summing individual items to yield a total efficacy score, with higher scores reflecting greater feelings of efficacy. In the past, this scale has shown robust test-retest reliability and moderate to high internal consistency (Pedersen et al., 1989). (Porter & Hsu, 2003) reported an internal reliability (Cronbach's alpha) of the scale of 0.91 during the antenatal assessment and 0.78 at both 1 and 3 months postnatal. In this study, one month efficacy scores were found to correlated with maternal anxiety ($r=-0.42$, $p<0.001$) but not depression.

Bates Infant Temperament Questionnaire (ITQ) (Bates, Freeland, & Lounsbury, 1979)).

This parent-report measure consists of 24 items, each requiring the mother to rate her baby on a 1-7 scale of how her baby fits with the characteristic described. Four factors emerge from the questionnaire: 'infant difficultness', 'unadaptability' (how much the infant dislikes new experience, somewhat akin to behavioral inhibition), 'dullness' (how much or little the infant responds positively to stimuli) and 'unpredictable' (how much the infant is able to get into a routine). Internal consistency for subscales ranges from alphas of 0.39 for the dull subscale to 0.79 for infant difficultness. Test-retest reliability for subscales ranges from 0.47 unpredictable subscale to 0.70 for infant difficultness. Moderate correlations have been reported between independent observation of fussiness (0.22) and soothability (0.18) and ICQ infant difficultness (Bates et al., 1979).

2.3 Coding of observed interactions

Ratings of maternal sensitivity and cooperativeness/intrusiveness on a 1-9 scale used Ainsworth's definitions and descriptions (Ainsworth, unpublished scales). Maternal warmth during interactions was rated using a 1-9 scale. A novel code of 'overconscientiousness' was devised to capture observable rituals or excessive behaviours designed to prevent harm e.g. excessive use of wipes. This was rated globally as present/absent. Global ratings were made for infant behaviour (1 = not lively; 2 = average; 3=exceptionally lively) and dyadic interaction using a 1-5 scale. Infant-directed maternal vocalisations were time sampled in 15 second segments; scores are presented as a percentage of the interaction. Maternal and infant emotion were coded. Mothers were rated for each 15 second segment on whether they displayed any of neutral/positive, flat, anxious/stressed emotions. Infants were rated using 15 second segments for neutral/positive affect, flat affect and fussy/distressed. These codes were not mutually exclusive. Full details are available from the first author.

2.4 Procedure

Mothers and infants were visited at home and took part in a clinical interview including demographics, symptoms ratings of enjoyment of parenting tasks. They were observed and videotaped in three 'everyday' interactions. These were (i) a solid feed, (ii) a nappy change and (iii) play (firstly without any toys and then with toys provided by the researcher). Up to 8 minutes of tape were rated. For play the mother was asked to play with the infant for three minutes without toys, following which a bag of various age appropriate toys was handed to the mother with the sole instruction "*these are for you to play with in any way that you like*". Five minutes of play with toys was filmed. Questionnaires were completed in participants own time.

Interactions were coded by a graduate psychologist trained in the coding system and blind to the mother's clinical status. A second rater (FC) coded 10 randomly selected tapes of mothers. Intraclass correlations were: 0.93 for sensitivity; 0.71 for cooperation; 0.81 for warmth; 0.89 for dyadic interactions; 0.94 for maternal mood and 0.97 for

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infant mood. Percentage agreement for over-conscientiousness was 90%. Percentage agreement for infant liveliness was 76.6%.

3. Theory

It was hypothesized that similar content of obsessions and intrusions mothers with OCD would be found in OCD and control groups, but groups would differ in psychopathology and contextual variables. Given differences in sensitivity identified in studies of anxious mothers, and the high levels of preoccupation and daily interference in everyday tasks that characterize OCD, it was hypothesized that mothers with symptoms of OCD would exhibit less sensitive interactions (as defined by Ainsworth, see above) at 6 months with their children than those without clinical anxiety. It was also hypothesized that mothers would perceive parenting to be affected.

4. Results

4.1 Maternal psychopathology

Mothers with OCD were characterised by predominant symptom subtype. The group comprised: 43% fears of deliberate harm; 30% contamination; 16% fears of accidental harm; 5% ordering/symmetry; 3% religious OCD; 3% checking OCD.

Mothers with OCD had a mean YBOCS score of 24.5 (5.4), falling in the 'severe' category. Mothers stated that they were troubled by obsessions and/or compulsions for a mean of 9.61 hours per day. 15 mothers had a new onset related to the current pregnancy. Total OCI scores for mothers with OCD were 57.30 (25.88) compared with 8.14 (9.83) in the control group. Responsibility attitudes scale scores were 131.81 (24.97) compared with 81.19 (25.47) suggesting very distinct groups in terms of obsessive psychopathology. Current symptom scores on the DASS distinguished the OCD group in terms of depression (18.41 (13.66) v 1.78 (2.80)); anxiety (14.08 (9.26) v 1.24 (1.79)) and stress (24.17 (10.46) v 6.19 (5.07)).

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All current and past diagnoses were established in both groups. Depression and phobias were more common as comorbid conditions in the OCD group (Fisher's exact, $p=0.002$ and 0.0005). 9 (24%) in the OCD group had current depression and 15 (41%) had past only depression; 7 (19%) had current phobias and one (3%) a past only phobia.

Mothers were asked to report established diagnoses in first degree relatives. There was more history of OCD in first degree relatives in the OCD group (Fisher's exact= 0.005) and of anxiety (Fisher's exact= 0.025) but not of depression Fisher's exact= 0.800).

Mothers in both OCD and control groups were asked to note whether they had experienced common perinatal obsessions and compulsions since the birth of their child and their responses.

	Control group N=37	OCD group N=36	Fisher's exact
Intrusive thoughts experienced in first six months postpartum			
Baby suffocating	19	14	0.350
Sexual thoughts about baby	1	8	0.013*
Baby may get contaminated	6	17	0.005**
SIDS (cot death)	25	23	0.808
Baby having an accident	28	20	0.087
Intentionally harming the baby	4	18	0.0001***
Losing the baby somewhere	9	13	0.315
Illness	22	22	1
Magical thinking about bad things happening to the baby	3	13	0.004**
Other not listed	0	4	0.051
Compulsions engaged in as a response to the intrusive thoughts			
Self-reassurance	21	33	0.0001***
Seek reassurance from others	21	28	0.081
Checking	26	24	0.804

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Seeking social support in general	13	19	0.160
Avoidance	2	27	0.0001***
Cleaning	7	12	0.190
Cognitive distraction (trying to think about something else)	10	27	0.0001***
Religious/prayer	5	10	0.057
Behavioural distraction (trying to do something else)	4	24	0.0001***
Perform a ritual (counting, tapping, straightening)	1	12	0.001***
Other not listed	2	4	0.417

Table 2: Presence of obsessions and compulsions in OCD and control groups

All categories of obsessions and compulsions were present in both groups, with mothers with OCD experiencing more sexual thoughts, thoughts of contamination, intentional harm and magical thinking regarding the baby. Mothers with OCD were more likely to use self-reassurance, distraction, avoidance and rituals in response to the thoughts.

4.2 Parenting variables

Mothers with OCD differed from controls on all parenting and relationship variables assessed by self-report.

Variable	Control group N=37	OCD group N=36	
Parenting self-efficacy	97.30 (9.00)	81.58 (15.26)	$t_{[56.41]}=5.34^{\S}$, $p<0.0001^{***}$
Social support scale	58.27 (6.49)	46.72 (12.39)	$t_{[52.54]}=4.97^{\S}$, $p<0.001^{**}$
GRIMS Marital Satisfaction scale	21.91 (10.26)	28.51 (9.80)	$t_{[71]}=-2.81$ $p=0.009^{*}$
GRIMS relationship banding of 'poor' or worse	3	12	Fisher's exact=0.018*
Enjoyment of nappy change	2.49 (0.69)	1.92 (0.83)	$t_{[72]}=3.20$,

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Enjoyment of feed	3.16 (0.73)	2.62 (1.09)	p=0.002** t _[62.77] =2.51 [§] , p=0.015*
Enjoyment of play	3.78 (0.48)	3.39 (0.77)	t _[58.48] =2.63 [§] , p=0.011*

Table 3: Mean scores on self-reported parenting and contextual variables in OCD and control groups at 6 months postpartum

Ratings of infant temperament using the Bates ICQ did not differ between groups on any subscale ($p > 0.1$).

4.3 Obstetric variables

There were no differences in numbers of planned pregnancies, assisted conception, history of miscarriage and caesarean delivery. Control mothers were more likely to have a history of termination ($p = 0.03$ chi square), and fewer mothers with OCD were breastfeeding at six months postpartum ($p = 0.01$ chi square).

4.4 Mother-infant interactions

Mean ratings across the three interaction situations are presented below. Mothers with OCD were found to differ across all variables apart from over-conscientiousness.

Variable	Control group N=35	OCD group N=36	
Ainsworth sensitivity (1-9)	6.238 (1.539)	4.861 (1.737)	t _[69] = 3.53, p = 0.001**
Ainsworth cooperation-	6.200 (1.405)	5.259	t _[69] = 2.76,

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interference (1-9)		(1.463)	p=0.007**
Maternal warmth (1-9)	6.55 (1.19)	5.28 (1.54)	t _[69] =3.88, p<0.0001***
Maternal vocalizations (%)	95.2 (6.94)	86.1 (14.90)	t _[69] =3.29, p=0.002**
Overconscientiousness (0-2)	0.20 (0.38)	0.35 (0.41)	t _[69] =-1.61, p=0.112
Dyadic synchrony (1-5)	3.48 (0.85)	2.43 (0.85)	t _[69] =3.19, p=0.002**

Table 4: Interactional variables in mothers with OCD and control groups at 6 months postpartum

A MANOVA (2x3 mixed model) was conducted to determine if there were differences between the two groups for the two Ainsworth Scales (sensitivity and cooperation-interference) across the three parenting tasks (play, feed, nappy change). No third order interaction was detected ($F_{[2,138]}=0.993$, $p=0.373$). Significant interactions were found between Ainsworth scale and group ($F_{[1,69]}=5.052$, $p=0.028$) and Ainsworth scale and task ($F_{[1,69]}=6.269$, $p=0.002$) but not between group and task ($F_{[1,69]}=0.816$, $p=0.445$). This analysis showed that the tasks had differing characteristics, but that mothers with OCD were less sensitive and more intrusive according to Ainsworth scales across all three tasks. Main effects of task and the task by scale interaction were therefore disregarded. The effect size of the difference in sensitivity between the two groups was 0.839 (Cohen's d).

Warmth was analysed using a repeated measures ANOVA with task as the repeated factor (three levels) and group as the between groups factor. This was conducted in order to determine group differences in warmth across the three tasks. There was no interaction ($p=0.758$) but there were main effects for task ($F_{[1,79,123.81]}=7.17$, $p=0.002$) and group ($F_{[1,69]}=15.09$, $p=0.0001$) indicating that mothers with OCD differed from controls, and both groups showed different levels of warmth relative to task.

The amount that the mother vocalised to the baby was examined during the three tasks and across groups using a repeated measures ANOVA with task as the repeated factor (three levels) and group as the between groups factor. This indicated an interaction between task and group ($F_{[2,138]}=4.55$, $p=0.012$) and main effects for task

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($F_{[1.79,123.57]}=13.98$, $p=0.000$) and group ($F_{[1,69]}=10.84$, $p=0.002$). T tests revealed that OCD and controls differed on vocalisations during nappy change $t_{[48.18]} = 3.58$, $p<0.001$ but not the other tasks (play vocalisations: $t_{[43.61]} = 1.83$, $p=0.68$; feed vocalisations $t_{[59.81]} = 1.67$, $p=0.10$). OCD participants made significantly fewer vocalisations only during the nappy change. Over-conscientiousness did not differ between groups (Fisher's exact 0.160).

In terms of maternal mood, control mothers exhibited very little negative emotion (flat or anxious) in any tasks. They did not show any flat emotion on any task. Mothers with OCD showed flat mood and anxiety in some tasks. An omnibus ANOVA (3x3) was utilised to compare the three types of maternal mood (neutral/positive, flat, fussy/distressed) across tasks and between groups. There was an interaction between type of maternal mood and group ($F_{[2,138]}=7.573$, $p=0.001$) and an interaction between task and group ($F_{[2,138]}=5.039$, $p=0.008$). t tests revealed significant differences between the groups in the display of positive/neutral mood ($t_{[35]}=2.533$, $p=0.016$) and flat mood ($t_{[35]}=-3.121$, $p=0.04$) but not anxiety ($t_{[42.76]}=-1.998$, $p=0.52$).

Group membership did not affect infant mood.

Given the differences in sensitivity, a regression was performed in order to establish predictors of sensitive responding.

Table 5: correlation table for regression analysis

	OCI N=71	ANX N=71	DEP N=71	SENS N=68	FUSS N=71
OCI	1				
ANX	0.670**	1			
DEP	0.586**	0.815**	1		
SENS	-0.376**	-	-0.493**	1	
		0.378**			
FUSS	0.269*	0.15	0.194	-0.136	1

OCI = OCI total score; ANX=DASS anxiety; DEP=DASS depression; SENS = sensitivity;

FUSS=fussy/difficult subscale of the ICQ; OCD Dx=Diagnosis of OCD at 6m

Pearson correlations: * $p < 0.05$; ** $p < 0.01$

Although there were no group differences in the Bates infant fussy-difficult scale, it was included in investigations of correlation due to previous research suggesting relationships with maternal mood and sensitivity. However, as no relationship between fussiness and sensitivity emerged in this sample it was discarded in further analyses. Given the significant relationships between the remaining variables, and that there were no pre-existing hypotheses about specific predictors for maternal sensitivity ratings, a simultaneous regression analysis was conducted entering OCD diagnostic status, six month OCI, depression and anxiety scores, with Ainsworth sensitivity score as the dependent variable. The overall model was significant ($F_{[4,69]} = 5.49, p = 0.001$) and explained 20.7% of the variance (adjusted R^2).

Table 6: Regression table for six month sensitivity ratings

	B	Std. Error	Beta	t	p
Constant	6.451	0.463		13.938	0.001
6m OCD diagnosis	-0.047	0.331	-0.027	-0.141	0.888
6m OCI	-0.010	-0.01	-0.177	-0.984	0.329
6m Anxiety	0.02	0.039	0.104	0.508	0.613
6m Depression	-0.060	0.025	-0.446	-2.377	0.02

This analysis indicated that depression was the only significant predictor over and above the other variables at six months.

5. Discussion

The current study was consistent with previous research (Abramowitz, Schwartz, Moore, et al., 2003) indicating that fears of deliberate harm and contamination fears comprise the majority of postnatal presentations of the disorder. However, a variety of presentations were noted. The infant was usually but not universally the focus of obsessional concerns. No previous study has compared postnatal obsessive-compulsive symptoms in concurrent samples of mothers with and without OCD. The

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current study found the same range of symptoms in both groups, with more OCD mothers experiencing fears of deliberate harm and contamination, and endorsing a range of thought neutralization and control strategies. This is further evidence in support of the cognitive conceptualization of OCD and the notion that intrusive thoughts differ in meaning and responses between clinical and non clinical groups rather than their occurrence per se (Salkovskis, 1985).

Mothers in the clinical OCD group had a greater frequency of family history of OCD and depression than mothers without OCD, which is consistent with previous studies in both OCD and perinatal OCD (Uguz, Akman, Kaya, & Cilli, 2007), although not those taking a strict definition of established diagnosis (which the current study did not) (Forray, Focseneanu, Pittman, McDougle, & Epperson, 2010).

Mothers with OCD in this study did not differ in frequency of miscarriage (which was relatively common in both groups), unlike (Geller, Klier, & Neugebauer, 2001) and had lower rates of termination unlike (Uguz et al., 2007). Lower rates of termination might fit with the presenting psychopathology of OCD including fear of causing or allowing harm to others (harm avoidance), although this is purely speculative. Breastfeeding has been implicated as playing a protective role in postnatal anxiety (Buttolph & Holland, 1990; Ross & McLean, 2006) and has been associated with maternal sensitivity (Tharner et al., 2012). Rates of breastfeeding were lower in mothers with OCD. Several of these mothers did or could not breastfeed, many of them because of the medication they were prescribed. It is possible that this interfered with the protective effects of breastfeeding either hormonally and/or by the indirect effect of psychological variables such as lower self-efficacy in the mothering role.

Previous literature has described interference in parenting behaviour from OCD, mainly using anecdotal evidence from case studies. However, the details of this have not been well characterized. Results from the current study show that OCD affects several aspects of the postnatal parenting context in terms of lower self efficacy, social support and marital satisfaction than mothers without OCD. However, no differences were found in mothers rating of infant temperament. Mothers rated lower enjoyment of

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parenting tasks than controls. These two findings indirectly suggest that they perceived this difficulty as a function of their OCD rather than of the infant's characteristics.

Mothers with OCD were found to be less sensitive than controls across everyday parenting situations, consistent with previous research in parenting by anxious mothers (Nicol-Harper et al., 2007). The group mean score for mothers with OCD fell closest to the 'inconsistently sensitive' categorical rating. Secondary analysis indicated that maternal depression was the single significant psychological predictor of sensitivity at six months, although the combined effect of maternal distress was also significant. This is consistent with Tietz et al (2014). No observed OCD specific interactions were found.

Lower levels of vocalizing were found in mothers with OCD during the nappy change which may have indicated a degree of 'online' preoccupation, similar to reduced vocalizations following priming in mothers with GAD in the study by (Stein et al., 2012). This may also have been driven by low mood. For some, for example those with intrusive thoughts of harm, the presence of the researcher attenuated the feelings of risk and danger they would otherwise have felt in that situation. However, for other mothers (e.g. with contamination fears) the presence of the researcher and seeing the baby playing with unfamiliar toys was a source of additional stress. Small numbers meant that it was not possible to analyse tasks according to symptom type, but general differences in parenting interactions between OCD and controls groups were still detectable.

Limitations of the study are the relatively small, self-selected sample and cross sectional nature of the study. Given the reported difficulties for some mothers with anxiety to deal with the increasing autonomy of the child, interactions may be increasingly affected as the child develops (Warren et al., 2003). The only longitudinal study of postpartum OCD found that, if left untreated for the postnatal year, the disorder remains at a similar level of severity, so any impact is likely to be ongoing/unfolding with the development of the child (Uguz, Kaya et al. 2008). Future research and intervention must also consider the effect of depression on interactions within the context of anxiety disorders.

6. Conclusions

Postpartum OCD can occur in any symptom subtype and is an extension of reactions to normal thoughts of harm. Results of this study suggest it significantly affects the subjective experience of parenting and also has an observable effect on sensitivity in interactions with infants. However, future work needs to determine the clinical significance of such differences, particularly as the infant develops. Given the varied presentations of OCD, it is possible that different subtypes may affect parenting in different ways and at different times, particularly when the key symptoms are activated. A fine grained understanding would help identify potentially modifiable parenting patterns within the disorder. A further question is if such difficulties persist if the maternal disorder resolves.

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Highlights (needs to be sep file).

- OCD can be triggered or exacerbated by having a baby
- Intrusive thoughts and compulsions are found in clinical and control groups.
- The experience of parenting is negatively affected for mothers with OCD, particularly rates of breastfeeding, and confidence and enjoyment of parenting.
- Mothers with OCD were less sensitive in interactions than their healthy peers, which may be attributable to the depression associated with the disorder
- Maternal sensitivity and the issues associated with postpartum OCD may change as the child develops