The Relationship between Postpartum Depression and Beliefs about Motherhood and Perfectionism during Pregnancy

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Abstract

Postpartum depression is a common mood disorder following childbirth. Depression occurring at this crucial stage in a child's life is known to have far reaching and potentially damaging consequences for the mother, the baby and her family. Whilst a number of risk factors have been identified in the literature as contributing to the development of postpartum depression, including a past psychiatric history and lack of social support, some of these are not easily modifiable through psychological interventions. The aim of this longitudinal study was to examine the contribution of specific psychological factors, including maternal beliefs about motherhood and perfectionism and perceived social support, in the development of postpartum depression.

Seventy-three pregnant women consented to take part and returned questionnaires during the third trimester of their pregnancy. Of those women, 61 also completed questionnaires 4-6 weeks following the birth of their baby.

Significant associations were identified for postpartum depression and the psychological variables of perfectionistic beliefs and social support, whereas many demographic factors were not significantly implicated in the development of depression.

Using a multiple hierarchical regression analysis, the study examined whether maternal beliefs about motherhood and beliefs about perfectionism predicted more of the variance in postpartum depression scores than other demographic variables, including a past history of emotional difficulties. As predicted, beliefs about motherhood and perceptions of poor social support from friends and family were significant predictors of postpartum depression, when the influence of antenatal depression scores were accounted for. A past history of emotional difficulties was also retained in the final model, whereas beliefs about perfectionism were not.

These findings have implications for clinical services, highlighting the need for refined assessments of expectant mothers' beliefs about motherhood and their perceptions of their social support during pregnancy and the need for more refined psychological interventions that address these beliefs.

Introduction

Postpartum depression is a common mental health problem, but as a result of differences in method and population between studies estimates of prevalence and incidence vary[1]. While a meta-analysis (which included only studies using rigorous assessment methods) suggested a period prevalence of 21.9% over the first year postpartum.[2] Davé et al.[3] linked childbirth and depression diagnoses and antidepressant prescriptions in medical records for couples ($N > 72, 000$) and found an incidence of depression or antidepressant prescription in the first year postpartum of 13.93% for women. According to the National Institute for Clinical Excellence,[4] depression and anxiety affect 15-20% of women in the first year after childbirth.

Unlike the maternity or 'baby blues', a transitory condition experienced in the days immediately following birth which remits in a few days[5],postpartum depression can be a seriously debilitating condition for both mother and baby.[6] Postpartum depression typically occurs within four weeks following childbirth and although the duration of symptoms varies[7],many mothers continue to report significant symptoms for up to 12 months postpartum.[8]

Postpartum depression is unique from major depression in terms of the context in which it occurs[9] and because its negative consequences affect a much wider system than the mother alone. Depression in a recent mother has been linked to increased conflict and reduced affection in the marital relationship[10, 11] and an increase in depression in fathers.[12] Mothers with postpartum depression tend to be less sensitive to their infants' needs, more negative and punitive in parenting style and more apathetic and rejecting during interactions.[13, 14] Consequently, infants of depressed mothers are significantly less likely to develop a secure attachment[15]. Attachment difficulties are widely implicated in impairments in children's emotional, behavioural and cognitive development[16].

The severity and range of psychological sequelae of postpartum depression has precipitated a large body of literature investigating the factors which cause a woman to be at risk of depression following childbirth. Several review papers [5, 17-20] suggest that educational attainment, parity and length of relationship with partner are not significant risk factors, while age is implicated insofar as teenage mothers are more at risk. However, factors which have been found to be significantly associated with postpartum depression encompass all domains of biological, social and psychological factors. One of the most consistent predictors of perinatal depression is a past personal or family history of major depressive episodes.[5,20,21] It is most likely that postpartum depression develops and is maintained through a combination of these factors[18], some of which are difficult to modify through interventions.

As cognitive processes can be modified through psychological interventions[4], research into the cognitive features of postpartum depression and role of cognitions in its development has increased in perinatal populations. Several qualitative studies have provided valuable insight into the thoughts and beliefs held by mothers with postpartum depression. Worries about maternal competence and conflict of roles have been consistently found to be present in depressed mothers[22]. In a meta-synthesis, the incongruence between women's expectations of and beliefs about motherhood and the reality and a pervasive sense of loss were the main presenting themes[23]. Considering the role of perfectionism in postpartum depression, Cutrona and Troutman[24] identified a sense of maternal competence as a key mediating factor. Hall and Wittkowski[25] identified a number of cognitive themes in non-depressed mothers, including perfectionism, unrealistic expectations of motherhood, heightened responsibility, concerns over the safety of the baby, negative judgements by others and negative appraisals of their current situation. It is possible that negative thoughts are common in all mothers, but that

the severity of the expectations or beliefs, or the discrepancy between expectations and reality, are more pronounced in mothers with postpartum depression.

The role of dysfunctional attitudes during pregnancy has been investigated in studies using the Dysfunctional Attitudes Scale[26] (DAS),but these have failed to find a significant role for negative thoughts in the prediction of postpartum depression.[27, 28, 29] As the DAS does not contain items relating to pregnancy and motherhood, it may not be specific enough to identify the cognitions which are implicated in postpartum depression. Using the Maternal Attitudes Questionnaire[30] (MAQ), Church, Brechman-Toussaint and Hind[31] found that maternal specific cognitions mediated the relationship between having a difficult baby and postpartum depressive symptomatology. However, their study was not longitudinal and investigated cognitions specific to the postpartum period only (which reflects the items on the MAQ). Furthermore, Sockol[32] highlighted the poor internal reliability of the MAQ in expectant mothers.

In their cross-sectional studies, Sockol and colleagues[33] provided some evidence of the role of maternal attitudes in predicting symptoms of depression and anxiety among pregnant and postpartum first-time mothers and the incremental predictive validity of maternal attitudes over general dysfunctional attitudes (measured by the DAS), marital satisfaction and social support, whilst finding no contribution of maternal age, perinatal stage (pregnancy vs postpartum), marital status and ethnicity to depression[33].

Given the paucity of longitudinal studies, the aim of the current study was to investigate the contribution of specific antenatal psychological risk factors to postpartum depression. It was hypothesised that postpartum depression would be significantly correlated a) with antenatal beliefs about motherhood, b) with perfectionism, and c) with perceived levels of social support during pregnancy. We also predicted that postpartum depression would be predicted by maternal beliefs about motherhood and beliefs about perfectionism, when the influence of antenatal depression was controlled for.

Methodology

Design

The study adopted a prospective, repeated measures design. Participants completed questionnaires and provided demographic information during the third trimester of pregnancy (Time 1) and at 4-6 weeks following childbirth (Time 2).

Participants

Women in their third trimester of pregnancy were eligible to take part in the study, regardless of age or parity. They were recruited through antenatal classes in a large National Health Service Hospital in Manchester, United Kingdom. As all questionnaires were presented in English, participants who indicated that their understanding of English was insufficient were excluded.

Measures

Postpartum Depression. Two measures were used to assess postpartum depression. The 10-item Edinburgh Postnatal Depression Scale[34] (EPDS) is a screening tool, rated on a 4-point scale. Although a score of 12 indicates depression, a cut-off score of 10 has been used in community samples to prevent false negatives.[35] The EPDS has a Cronbach's alpha reliability of .87 (.85 for this sample), specificity of 78% and sensitivity of 86%[34] and good face validity[36]. This is a widely used measure which has been validated for use during pregnancy.[37, 38] Some EPDS scores are presented to allow for comparison with other studies.

The Beck Depression Inventory II[39] (BDI-II) is a revision of the original BDI[40] designed to correlate more with DSM-IV criteria for depressive disorders. It is a 21-item-measure using a 4-point rating scale (0-3). Scores can be categories into minimal depression (0-13), mild depression (14-19), moderate depression (20-28) and severe depression (29-63).

The BDI-II has good internal consistency (alpha .92 for outpatients) and good test-retest reliability (.93; .82 for this sample). The BDI-II has been used with postpartum populations and has good concurrent validity with measures of postpartum depression[41]. The BDI-II provides a depression severity score and its total score was therefore used as the main indicator of depression.

Maternal-specific cognitions. The Pregnancy Related Beliefs Questionnaire[42] (PRBQ) was developed to identify the underlying beliefs of pregnant women, which may be associated with the development of postpartum depression. It was piloted on 42 women between 6 to 40 weeks gestation. It has 54 items rated on a 7-point scale from 'totally agree' to 'totally disagree'. Scores range from 128 to 245; a mean score of 191.1 (SD=29.6) was reported by Moorhead and colleagues[42]. High scores denote unrealistic expectations. The PRBQ has good internal reliability (.85; .93 for this sample). Examples of items included are 'motherhood is an instinctive and natural state for a woman' and 'if my baby is unhappy I will feel that it is my fault'. The PRBQ was chosen because this scale comprehensively assesses maternal beliefs about pregnancy and motherhood.

Perfectionistic attitudes. The Multidimensional Perfectionism Scale[43] (MPS) consists of 35 items, scored on a 5-point scale from 'strongly disagree' to 'strongly agree'. It has six subscales: concern over mistakes; personal standards; parental expectations; parental criticism, doubts about actions and organisation. A total perfectionism score can also be obtained by totalling all responses except those in the organisation subscale. Therefore total scores range from 29 to 145. The MPS has good internal reliability (.91; .96 for this sample). It has previously been used with postpartum populations and moderate associations have been found between the concern over mistakes subscale and doubts about actions subscale and the EPDS (.34 and .31 respectively).[44]

Perceived social support. Developed with the aim of providing a meaningful measure of women's perception of their social support, the 6-item Maternity Social Support Scale[45] (MSSS) was used. This scale is rated on a 5-point likert rating scale (always, most of the time, some of the time, rarely, never). The MSSS has good reliability with Cronbach's alpha scores of .69 (.80 for this sample) in the antenatal period and .78 (.77) postpartum.

Demographic information including age, parity, current or previous psychiatric disorder, marital and employment status and their emotional response to being pregnant were also collected.

Procedure

Ethical approval was granted by relevant committees. Participants were approached in the antenatal clinic waiting room of a local Manchester hospital and given an information sheet outlining the study. Once they provided written consent, they were given the initial questionnaire pack (demographic information sheet, EPDS, BDI-II, MSSS, PRBQ and MPS), which they could choose to complete in the clinic or return in a stamped, addressed envelope. Participants also provided information on their estimated date of delivery and a contact health professional (e.g., GP, health visitor or midwife), who was contacted following the due date to ensure that it would be appropriate for the mother to continue with the study. The Time 2 packs were sent out to the women 4-6 weeks following the birth of their baby.

Data Analysis

Data were analysed using SPSS for Windows. Sample characteristics were examined using descriptive statistics. Missing data were minimal but excluded. One-sample Kolmogorov-Smirnov tests indicated that the use of parametric tests was permitted for most variables. As log transformations were unsuccessful for two MPS subscales and the MSSS at Time 2, equivalent non-parametric tests were used. Univariate and multivariate analyses, including hierarchical multiple regression anal-

ysis, were used to test hypotheses. For this purpose, some variables (e.g., marital status) were recoded as dichotomous variables. Pearson correlation coefficients were used to examine bivariate comparisons. In order to reduce the risk of Type 1 error, a stricter p-value of .01 was adopted as the criterion for statistical significance, because of the number of multiple comparisons.

Results

Sample size and characteristics

One hundred and sixty-four women were approached to take part in the study, of those 130 agreed and were given questionnaires. Seventy-three returned Time 1 questionnaires and of those women, 61 also completed Time 2 questionnaires. At the end of the study period, two women had not yet had their babies and the remaining 10 women were lost to the study. This produced an overall response rate of 46.92% and a retention rate of 83.56%.

The mean age of the sample was 28.11 years (the youngest participant was 17 and the oldest was 41) (see Table 1). Twenty-six women were married, 28 were in a long-term relationship and 7 women were single. Thirty-three women were employed full time, 17 part-time and 11 were unemployed. All of the women who responded had some qualifications, 14 had GCSE's or equivalent and the remaining 37 had gone on to further and higher education with 5 women being educated to doctoral level. Overall, women in the sample were reasonably satisfied with their current financial situation (see Table 1). Thirty-seven of the women were primiparious, 14 had 1 child and 10 participants had two or more children already.

Whilst their feelings about pregnancy were fairly positive, participants varied in respect of whether pregnancy was expected or planned. In terms of their mental well-being, 14.8% of participants reported having a current emotional difficulty; 4.9% indicated experiencing anxiety and 9.8% experienced depression. Forty-three % reported past emotional difficulties: 11.5% reported prior experience of anxiety, 24.6% reported past depression and 6.6% experienced anxiety comorbid with depression in the past.

Assessment of cognitive and clinical factors in postpartum depression

Table 2 presents an overview of mean scores for antenatal and postnatal depression, perfectionism beliefs, perceived social support, maternal beliefs about motherhood. Paired samples t-tests indicated significant differences between antenatal and postnatal scores for EPDS (t=-4.72, df=60, p<0.001) and BDI-II (t=-8.32, df=60, p<0.001). Although participants endorsed significantly more items on both depression measures after childbirth, their mean scores were not indicative of severe depression. For example, using the EPDS cut-off score of 10 for community samples, 14.5% participants screened positive for antenatal depression and 17.2% for postpartum depression. When the stricter cut-off of 12 was used, only 7.2% women appeared to be antenatally depressed and 6.9% postnatally. Using the suggested categories for BDI-II scores, 95.1% presented with minimal symptoms and 4.9% with mild antenatal depression. After childbirth 77.0% presented with minimum depression, 21.3% with mild and 1.6% with moderate symptoms.

No significant differences were observed for participants' perceptions of their social support, their beliefs about motherhood and their perfectionistic beliefs. These variables remained relatively stable from late pregnancy until after childbirth (see Table 2).

The relationships between maternal variables and postpartum depression

The relationships between antenatal maternal beliefs about motherhood, beliefs about perfectionism, perceived social support, labour experience and postpartum depression were examined by carrying out Pearson correlation coefficients (Table 3). No significant associa-

Table 1: Demographic characteristics of participants (n=61)		
Maternal age in years	Mean=28.11	Range=17-41
Marital status	Married=26	Single= 7
	In long-term relationship=28	
	Total= 54	
Number of children	Primiparous= 37	1 child already= 14
		2+ children= 10
		Total=24
Education	GCSEs= 14	Higher education=27
		Doctorate=5
		Total=32
Employment	Full-time=33	Unemployed=11
	Part-time=17	
Financial satisfaction (scale of 1-10, with 1=unsatisfactory and 10=satisfactory)	Mean=6.64 (SD=1.28)	Median=7, Range=3-10
Feelings about finding out about pregnancy (scale of 1-10, with 1=most unhappy and 10=very happy)	Mean=5.43 (SD=4.21)	Median=5, Range=1-10
Current emotional difficulties (self-report)	Any emotional difficulty= 14.8% (9/61)	Breakdown by condition:
		Anxiety = 4.9% (3/61)
		Depression = 9.8% (6/61)
Past emotional difficulties (self-report)	Any emotional difficulty= 43% (26/61)	Breakdown by condition:
		Anxiety= 11.5% (7/61)
		Depression= 24.6% (15/61)
		Comorbid anxiety and depression= 6.6% (4/61)

Table 2: Overview of mean and median scores (and standard deviations) for psychological and labour experience variables for the total sampl

Variable	Possible range	Time 1			Time 2			Paired samples t-test/ Wilcoxon Signed Ranks Test
		Range of scores	Mean (SD)	Median	Range of scores	Time 2- Mean (SD)	Time 2-Median	
EPDS (n=61)	0-30	0-13	3.69 (3.74)	2	0-13	5.51 (3.52)	5	t=-4.72, df=60, p<0.001
BDI-II (n=61)	0-63	0-18	5.56 (4.69)	5	21-Feb	9.98 (4.46)	10	t=-8.32, df=60, p<0.001
PRBQ (n=60)	54-324	142-307	211.72 (34.43)	212	163-271	212.80 (27.91)	206.5	t=-0.43, df=59, p=0.67
MPS total score (n=60)	29-145	41-123	75.92 (22.1)	80	36-119	75.75 (20.98)	78	t=0.17, df=59, p=0.87
Concern over Mis-takes (n=60)	9-45	9-38	22.37 (7.93)	23.5	9-34	21.85 (7.33)	23	z= -1.54, df=59, p=0.12
Personal Standards (n=60)	7-35	11-34	20.80 (5.27)	21	10-31	20.67 (4.81)	21	t=0.37, df=59, p=0.71
Parent Ex-pectations (n=60)	5-25	5-22	13.88 (4.48)	13	6-23	13.63 (4.45)	14	t=1.16, df=59, p=0.25
Parent Criti-cism (n=60)	4-20	4-20	9.35 (4.03)	9	4-20	9.43 (3.64)	10	t=-0.39, df=59, p=0.70
Doubting of Actions (n=60)	4-20	4-15	9.52 (3.15)	10	5-34	10.20 (4.44)	11	z=-1.55, df=59, p=0.12
Organisation (n=60)	6-30	12-30	20.07 (4.61)	23	11-30	19.75 (4.44)	19	t=0.93, df=59, p=0.36
MSSS (n=56)	0-30	17-30	25.21 (3.70)	26	10-30	25.50 (3.35)	26	z=-1.42, df=55, p=0.15

Table 3. Pearson's correlations for antenatal maternal cognitions, perfectionistic beliefs, perceived social support and antenatal and postnatal depression (mostly n=61)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. EPDS Time 1	1.00														
2. BDI-II Time 1	.740**	1.00													
3. PRBQ Time 1	0.005	-0.142	1.00												
4. MPS Total Time 1	0.193	.311*	.325*	1.00											
5. MPS Concern Time 1	0.227	.266*	.436**	.959**	1.00										
6. MPS PS Time 1	0.244	.410**	0.146	.868**	.750**	1.00									
7. MPS PE Time 1	0.027	0.209	.270*	.887**	.793**	.755**	1.00								
8. MPS PC Time 1	0.134	.348**	0.138	.906**	.843**	.742**	.812**	1.00							
9. MPS Doubting Time 1	0.176	0.094	.390**	.769**	.788**	.545**	.541**	.597**	1.00						
10. MPS Organisation Time 1	0.125	-0.017	0.193	0.18	0.101	.358**	0.159	-0.011	.334**	1.00					
11. MSSS Time 1	-0.141	-.417**	0.152	-.325*	-0.265	-.285*	-.302*	-.387**	-0.24	0.227	1.00				
12. BDI-II Time 2	.477**	.588**	0.224	.339***	.338***	.323*	.268*	.259*	.291*	0.126	-.442**	1.00			
13. EPDS Time 2	.661**	.610**	0.033	0.154	0.151	.267*	-0.002	0.005	.259*	.452**	-0.25	.656**	1.00		
14. Feelings about finding out about pregnancy	.399**	-.352**	-0.052	-0.171	-0.252	-0.157	0.008	-0.143	-0.137	0.059	.294*	-.266*	-.330**	1.00	
15. Extent to which pregnancy was planned/expected	0.116	0.1	.305*	0.005	0.088	-0.087	-0.044	-0.022	0.052	-0.074	-0.199	0.212	0.19	-.664**	1.00

* $p<0.05$, ** $p<0.01$

tions were found between antenatal maternal beliefs about motherhood and antenatal depression as well as postpartum depression (as measured by either EPDS or BDI-II at Time 2). However, postpartum depressive symptoms as measured by the BDI-II were positively correlated with overall antenatal perfectionistic beliefs (r = 0.339, p<0.01 for total MPS score) and with its subscale of concerns over mistakes (r=0.338, p<0.01). With the exception of perfectionistic beliefs about organisation, associations were also noted between postpartum depression and personal standards (r=0.323, p<0.05), parental expectations (r=0.268, p<0.05), parental criticism (r=0.256, p<0.05) and doubts about actions (r=0.291, p<0,05), albeit at a lesser significance level. Weaker correlations were also noted for postpartum depression as measured by the EPDS at Time 2 and antenatal personal standards (r=0.267, p<0.05) and doubts about actions (r=0.259, p<0.05).

A highly significant negative association was noted between perceived antenatal social support (MSSS) and postpartum depression (r=-0.417 for BDI-II and r=0.610 for EPDS, p<0.01). These findings suggest that participants with elevated postpartum depression scores endorsed more beliefs about needing to be perfect and perceived their partner or family as less supportive during pregnancy.

Postpartum depression scores were not associated with age, marital status or whether the pregnancy was expected or planned in this sample. However, postpartum depression scores were associated with participants feeling less happy about their pregnancy (on the BDI-II- r = -.27, p<.05, on the EPDS -.33, p<.01). Participants with elevated postnatal depression scores were also more likely to have had a past history of emotional difficulties (t(59) = -2.78, p<.01) but this was only the case for the BDI-II.

Prediction of postpartum depression

Linear regression analyses revealed that post-

partum depression (using BDI-II) was not predicted by maternal age, marital status, educational status, employment status, financial status, number of children or whether the pregnancy was planned but feelings about the pregnancy and a history of emotional difficulties were predictive (as dichotomous variable). Of the psychological variables PRBQ scores did not predict postpartum depression, but perceptions of social support did so. Although all MPS subscales, except for organisation, predicted postpartum depression, only the MPS total scores were used in the hierarchical regression analysis because the sample size would only allow for a limited of variables to be entered.

Using the enter method at step one to control for the influence of antenatal depression (as measured by BDI-II at Time 1), a multiple hierarchical regression analysis was undertaken to explore the contribution of maternal beliefs (PRBQ), perfectionistic beliefs (MPS) and perceived social support (MSSS), to postpartum depression (BDI-II at Time 2). All other variables were entered using stepwise and these included participants' happiness about the pregnancy and their past history of emotional difficulties.

As anticipated, at stage 1 antenatal depression contributed significantly to the regression model, $F_{(1,53)}=20.93$, $p<0.001$, and accounted for 27% of the variance (see Table 4). The introduction of PRBQ explained an additional 15% of variation and this change in R^2 was significant, $F_{(2,52)}=20.71$, $p<0.001$. The addition of MSSS explained a further 11%, $F_{(3,51)}=21.01$, $p<0.001$. Finally, the addition of past history of emotional difficulties to the regression model explained an additional 4% and this change in R^2 was also significant, $F_{(4,50)}=18.38$, $p<0.001$. Perfectionism and feelings about the pregnancy (i.e., happiness) were not retained in the model. The final model accounted for 57% of the variance in postpartum depression scores.

Table 4. Results of hierarchical multiple regression

Step	Variables entered/retained	Adjusted R2	R2 change from previous	Unstandardized Coefficients		Standardized coefficients	t	P (for t value)	F	df	p (for F value)
				B	Std. Error	Beta					
1	Antenatal BDI-II	0.27	0.27	0.49	0.11	0.53	4.58	<.001	20.93	1, 53	<.001
2	Antenatal BDI-II	0.42	0.15	0.53	0.1	0.58	5.55	<.001	20.71	2, 52	<.001
	PRBQ			0.05	0.01	0.4	3.87	<.001			
3	Antenatal BDI-II	0.52	0.11	0.39	0.10	0.42	4.08	<.001	21.01	3, 51	<.001
	PRBQ			0.05	.01	0.44	4.67	<.001			
	MSSS total			-0.42	0.12	-0.37	-3.53	<.01			
4	Antenatal BDI-II	0.57	0.04	0.32	0.10	0.35	3.29	<.01	18.38	4, 50	<.001
	PRBQ			0.05	.01	0.44	4.83	<.001			
	MSSS total			-0.37	0.12	-0.33	-3.21	<.01			
	Past history of emotional difficulties			1.95	0.85	0.23	2.29	<.05			

Discussion

The current study found that postpartum depression scores were significantly associated with perfectionism and perceived social support. Contrary to our hypothesis, postpartum depression scores were not significantly associated with antenatal beliefs about motherhood despite this sample's mean scores being higher than that of 191.1 reported by Moorhead and colleagues[42]. Thus, women who endorsed more symptoms on a depression self-report measure indicated to have had more beliefs about perfectionism and poorer social support from family and friends. We also noted an associated between how these women felt on first finding out about their pregnancy and subsequent postpartum depression scores. No associations were found for postpartum depression and maternal age, number of children or other socio-demographic factors.

Although antenatal beliefs about motherhood were not significantly associated with postpartum depression, this variable was included in the multiple hierarchical regression analysis, because variables may interact to cause an effect. When the influence of antenatal depression was accounted for, beliefs about motherhood were retained in the final model as the most important contributory predictive factor followed by perceived social support. These findings add additional weight to those reported by Sockol and colleagues[33, 46] who used different self-report measures to assess maternal attitudes towards motherhood and social support in perinatal samples from the US. They highlighted that maternal attitudes or beliefs predicted depression over and above other dysfunctional beliefs. Perceived lack of social support has been demonstrated to be predictive of postpartum depression in our study as well as previous research.[47] Consistent with previous research[20, 45, 48], we also found a link between a history of emotional difficulties and postpartum depression, but this variable made the least contribution to our final regression model. Interestingly, beliefs about perfectionism were associated

with postpartum depression but these were not retained in our model, nor were how the mothers felt about their pregnancy.

Although this study makes a significant contribution to the identification of modifiable risk factors in the development of postpartum depression, some limitations have to be acknowledged. The sample size was rather small, but the overall retention rate for this longitudinal study was excellent. We sought to overcome the recognised problem of a lack of socio-demographic diversity in health care research[49, 50] through recruitment from a large inner city maternity hospital serving a socially diverse perinatal population; however, the participants were generally well adjusted in terms of their backgrounds. As participants completed self-report questionnaires which they posted back, it was not possible to obtain a formal diagnosis of antenatal or postpartum depression. For this reason we opted to use the BDI-II as our main outcome measure instead of a screening measures for postpartum depression (e.g., EPDS but we decided to include EPDS scores to allow for comparison with other studies). Another strength is the fact that we used a stringent p-value for comparisons.

The findings of this study have several implications for health care providers and clinicians. Although NICE guidelines[4] recommend assessments for the identification of women at risk of developing perinatal distress, health care professionals should focus on asking expectant mothers about their beliefs about motherhood and their perceived social support in addition to questions about past emotional difficulties. Furthermore, it would be advisable to explore women's tendencies to endorse perfectionistic beliefs and how happy they felt about first finding out about their pregnancy. Our findings suggest that whether the pregnancy was expected or not does not affect the likelihood of a woman going on to develop postpartum depression, but if the woman was not happy about becoming pregnant (planned or otherwise), she might be at greater risk of depression

postpartum. Health care providers could offer more appointments to these women at risk and if necessary, fast track them to additional psychiatric or psychological support. Sockol and colleagues[33, 46] highlighted that many risk factors for postpartum depression are not necessarily easily modifiable (such as a past psychiatric history), whereas maternal beliefs and attitudes are. The fact that women's beliefs about motherhood predict postpartum depression allows for the development of new psychological interventions or the refinement of existing ones, including cognitive behavioural therapy with its focus on challenging beliefs and cognitive biases[4]. Clinicians should clearly explore and address women's feelings about their pregnancy in the context of their beliefs about motherhood. However, the assessment of maternal beliefs and/or attitudes about motherhood require further investigation so that better self-report measures can be developed. Future studies are also required to explore the psychometric properties of the PRBQ further. With 54 items the PRBQ is unnecessarily lengthy and not suitable as a screening measure in its current format; however, this study highlights the need to assess beliefs about motherhood in perinatal populations. Whilst the PRBQ was the most suitable measure at the time this study was initiated, the Attitudes Towards Motherhood Scale[30] (AToM), with its focus on the evaluative aspect of maternal attitudes including expectations and experiences, appears to be another promising tool with good psychometric properties.[33, 46] More longitudinal studies exploring the predictive validity of specific maternal cognitions and beliefs about motherhood in larger, more socially diverse samples of perinatal women are also warranted.

In conclusion, this longitudinal study offers valuable insights into the role that maternal beliefs about motherhood, perfectionism and perceived social support play in relation to postpartum depression.

Acknowledgements

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