Self-Harm, Self-Harm Ideation, and Mother-Infant Interactions: A Prospective Cohort Study

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ABSTRACT

Objective: To investigate the association between maternal self-harm (lifetime history of self-harm and self-harm ideation during pregnancy) and mother-infant interactions in a representative cohort from southeast London.

Methods: Data were drawn from a prospective cohort of 545 women attending antenatal appointments between 2014 and 2016. Women were asked about history of self-harm and current self-harm ideation during a research interview following first antenatal visit. Follow-up data on depressive symptoms using the Edinburgh Postnatal Depression Scale (EPDS) were collected at 28 weeks' gestation and 3 months postpartum, and data on mother-infant relationship using the CARE-Index and Postpartum Bonding Questionnaire were collected at 3 months postpartum. Linear regression analyses were conducted to investigate the associations between history of self-harm and (*a*) depressive symptoms and (*b*) the mother-infant relationship. Analyses were repeated with current self-harm ideation as the exposure.

Results: The population prevalence of history of self-harm was 7.9% (95% CI 5.5%–11.2%) and of current self-harm ideation was 2.3% (95% CI, 1.2%–4.2%). History of self-harm was associated with baseline depressive symptoms (adjusted regression coefficient = 2.23 [95% CI, 0.16–4.29], $P = .035$), and self-harm ideation was associated with depressive symptoms at all time points (adjusted regression coefficients = 11.53 [95% CI, 10.13–12.94], $P < .001$ at baseline; 8.16 [95% CI, 5.43–10.89], $P < .001$ at midpregnancy; and 6.73 [95% CI, 4.48–8.99], $P < .001$ postpartum). Self-harm ideation, but not history of self-harm, was associated with maternal controlling behaviors (adjusted regression coefficient = 2.34 [95% CI, 0.40–4.48], $P = .019$) and infant compulsive behaviors (adjusted regression coefficient = 2.37 [95% CI, 0.36–4.38], $P = .021$).

Conclusions: Self-harm ideation during pregnancy is associated with elevated depressive symptoms in the perinatal period and with poorer quality mother-infant interactions. These women require effective psychological help that targets their distress, risk, and interactions with their infants.

J Clin Psychiatry 2019;80(5):18m12708

To cite: Gordon H, Nath S, Trevillion K, et al. Self-harm, self-harm ideation, and mother-infant interactions: a prospective cohort study. *J Clin Psychiatry.* 2019;80(5):18m12708.

To share: https://doi.org/10.4088/JCP.18m12708

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Reports of self-harm are increasingly common.[1,2] Among women aged 16 to 24 years in the United Kingdom, lifetime prevalence of self-harm increased from 6.5% in 2000 to 19.7% in 2014.[1] Self-harm is also a marker of psychosocial vulnerability; recent population-based research[3] found that adolescent self-harm is associated with adverse psychosocial outcomes nearly 20 years later. Many young women who self-harm are, or may soon be, mothers. Yet, we know little about whether self-harm is associated with adverse perinatal mental health or mother-infant interactions. These potential associations are important to explore, given the evidence for persisting vulnerability among individuals with a history of self-harm and the potentially challenging transition associated with parenthood.[4]

Maternal mental illness, most notably depression, has been found to be associated with certain patterns of mother-infant interactions, specifically less sensitivity and responsiveness of some mothers to their infants.[5] For infants, these patterns have been associated with adverse social and academic outcomes, persisting through to adulthood.[6] Importantly, however, these outcomes are not inevitable, effect sizes are generally small or moderate, and effective interventions are available.[7] Previous studies[8–10] have found a relationship between suicidality and/or self-harm and adverse mother-infant bonding on self-report and observer-scored measures. There is a robust association between depressive disorders and self-harm, with suicidal thoughts and behaviors forming part of the diagnostic criteria for depression in the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (*DSM-5*), and the *International Classification of Diseases, Tenth Revision* (*ICD-10*).[11,12] However, no published studies have focused specifically on the implications of a history of self-harm or self-harm ideation in pregnancy on mother-infant interactions. In light of this lack, we set out to investigate 2 questions:

1. Is there an association between a history of maternal self-harm and (*a*) antenatal and postnatal depressive symptoms and (*b*) the quality of mother-infant interactions and maternal perceptions of bonding at 3 months postpartum?

Clinical Points

- Reports of self-harm and self-harm ideation are increasing, but little is known about their potential relationship with maternal mood and behavior during pregnancy and the postpartum period.
- Women with a history of self-harm or current self-harm ideation in pregnancy are more likely to experience depressive symptoms during the perinatal period, and thoughts of self-harm in pregnancy were found to be associated with controlling maternal and compulsive infant behaviors.
- Asking about thoughts of self-harm in early pregnancy may help identify a group of women with vulnerabilities throughout pregnancy and the postpartum period.

2. Is there an association between maternal self-harm ideation in pregnancy and (*a*) antenatal and postnatal depressive symptoms and (*b*) mother-infant interactions and maternal perceptions of bonding at 3 months postpartum?

METHODS

Participants and Procedure

Data were drawn from the WEll-being in pregNancy stuDY (WENDY), a prospective cohort study of pregnant women attending antenatal appointments in southeast London. Baseline interviews were conducted between November 2014 and June 2016 with follow-up between December 2014 and June 2017.

During the study period, 9,963 women were asked the Whooley questions (2 questions used to screen for depressive symptoms in pregnancy) by a midwife during their first antenatal appointment.[13] All Whooley-positive women (endorsing depressive symptoms) and a randomized sample of Whooley-negative women were approached for inclusion in the study. The recruited cohort included 258 Whooley-negative women and 287 Whooley-positive women. Women were excluded if they were aged ≤ 15 years, were unable to provide informed consent, had already undergone a first antenatal booking interview elsewhere, or had a pregnancy terminated or miscarried between booking and baseline interview. In the United Kingdom, the first antenatal appointment typically includes a full medical, obstetrics, psychosocial, and psychiatric history conducted by midwives. Further details of the recruitment process and study design have been published elsewhere.[14] The participant flow diagram is given in Supplementary Figure 1.

Within 3 weeks of first antenatal visit, 545 women completed baseline questionnaires, with follow-up interviews at 28 weeks' gestation (n = 514, 94%) and 3 months postpartum (n = 474, 87%). Video footage of mother-infant interactions was recorded in women's homes at 3 months postpartum for a subsample of the original study (197 women, 78% response rate among those approached), as funding for videotaping was obtained only after the 3-month postpartum follow-up of WENDY had already started. Ethics approval was granted from the Camberwell St Giles Research Ethics Committee, London (reference 14.LO.0075) on February 14, 2014. All participants gave written informed consent.

Measures

History of self-harm. All women completed the Structured Clinical Interview for *DSM-IV* (SCID) Research Version for Axis I Mood Episodes (SCID-I) mood disorders and anxiety disorders module, the SCID-I eating disorders module, and the SCID for Axis II Personality Disorders (SICD-II) module for borderline personality disorder. The SCID is a gold-standard research assessment used in the diagnosis of psychiatric disorders, with moderate-to-excellent interrater reliability across all diagnoses.[15] A history of self-harm or attempted suicide was determined from responses to the following questions:

- "Have you tried to hurt or kill yourself?" and "Have you ever cut, burned, or scratched yourself on purpose?" (from the borderline personality disorder module[16]).
- "During the worst 2 weeks of the last month… were things so bad that you were thinking a lot about death or that you would be better off dead?" and "Did you do anything to hurt yourself?" (from the depression module[17]).

History of self-harm was defined as at least 1 episode of participant-reported deliberate self-injury with or without suicidal intent. Data on history of self-harm were missing for 1 participant.

Self-harm and self-ideation. The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report questionnaire that was administered at baseline, 28 weeks' gestation, and 3 months postpartum. The EPDS has been validated for assessing depressive symptoms during antenatal and postnatal periods.[18,19] Each item is scored between 0 and 3, with overall scores ≥ 13 suggesting probable depression.[19]

Self-harm ideation was measured based on question 10 of the EPDS, which has been validated and used more widely than the single question in the SCID that addresses thoughts of self-harm.[20] Question 10 of the EPDS states, "The thought of harming myself has occurred to me…" (0) never, (1) hardly ever, (2) sometimes, (3) yes, quite often. Answers (2) and (3) were coded as endorsements of self-harm ideation, and (0) and (1) were coded as negative responses in keeping with similar published research.[20]

Mother-infant interactions. Mother-infant interactions were assessed using videotaped footage of a 5-minute free-play interaction between mothers and infants. All coding was done by an independent Child-Adult Relationship Experiment Index (CARE-Index) coder who was unaware of the study's aims and hypotheses. The coder was Level II+ (research coding level reliability) certified from the Family Relations Institute.[21,22] The CARE-Index is a validated, standardized, and widely used tool for assessing interactional and regulatory behaviors in infant-parent relationships.[23] It

Table 1. Unweighted Clinical and Demographic Characteristics[a]

Characteristic	Total Sample (N = 545)	No History of Self-Harm (n = 468)	Past History of Self-Harm (n = 76)[b]	*P* Value[c]
Age, y				
16–24	56 (10.3)	38 (8.1)	18 (23.7)	< .001
25–29	101 (18.5)	83 (17.7)	18 (23.7)	
30–34	179 (32.8)	154 (32.9)	25 (32.9)	
35–39	163 (29.9)	150 (32.1)	12 (15.8)	
≥ 40	46 (8.4)	43 (9.2)	3 (3.9)	
Ethnicity				
White (including English, Welsh, Scottish, Irish, British, other white)	284 (52.1)	239 (51.1)	44 (57.9)	.566
Black (including British, Caribbean, African, other black)	177 (32.5)	154 (32.9)	23 (30.3)	
Mixed (including white and black Caribbean, white and black African, white and Asian, other mixed/multiple ethnic)	23 (4.2)	20 (4.3)	3 (3.9)	
Asian (including British Indian, British Bangladeshi, British Pakistani, British Chinese, other Asian)	25 (4.6)	21 (4.5)	4 (5.3)	
Other (including Arab, Gypsy or Traveler, other)	36 (6.6)	34 (7.3)	2 (2.6)	
Born in the United Kingdom				
Yes	262 (48.1)	210 (44.9)	51 (67.1)	< .001
No	283 (51.9)	258 (55.1)	25 (32.9)	
Yearly household income, £[b,d]				
0–5,475	47 (8.7)	38 (8.2)	9 (12.0)	.825
5,476–14,999	30 (5.6)	25 (5.4)	5 (6.7)	
15,000–30,999	71 (13.2)	59 (12.7)	12 (16.0)	
31,000–45,999	60 (11.1)	52 (11.2)	8 (10.7)	
46,000–60,999	63 (11.7)	54 (11.6)	9 (12.0)	
61,000+	145 (26.9)	128 (27.6)	16 (21.3)	
Prefer not to say	124 (23.0)	108 (23.3)	16 (21.3)	
Highest qualification				
GCSE or below	65 (11.9)	55 (11.8)	10 (13.2)	.085
A-levels or vocational training	154 (28.3)	127 (27.1)	27 (35.5)	
University or professional	326 (59.8)	286 (61.1)	39 (51.3)	
Employment status[b]				
Full-time work	224 (41.3)	190 (40.8)	33 (43.4)	.512
Part-time work	125 (23.0)	114 (24.5)	11 (14.5)	
Student	22 (4.1)	19 (4.1)	3 (3.9)	
Unemployed	64 (11.8)	53 (11.4)	11 (14.5)	
Not working due to looking after home or illness	76 (14.0)	64 (13.7)	12 (15.8)	
Other	32 (5.9)	26 (5.6)	6 (7.9)	
Relationship status				
Single	62 (11.4)	52 (11.1)	10 (13.2)	.851
Partnered, married	474 (87.0)	408 (87.2)	65 (85.5)	
Separated, divorced, widowed	9 (1.7)	8 (1.7)	1 (1.3)	
EPDS score at baseline[b]				
< 13	403 (74.6)	362 (78.0)	40 (53.3)	< .001
≥ 13	137 (25.4)	102 (22.0)	35 (46.7)	
Whooley status				
Negative	258 (47.3)	241 (51.5)	17 (22.4)	< .001
Positive	287 (52.7)	227 (48.5)	59 (77.6)	

[a]Values are shown as n (%).
[b]Data missing for some participants.
[c]Significance tests were performed to compare the associations between variables: the Pearson χ^2 test was used for categorical variables, and the *t* test was used for continuous variables.
[d]One Pound Sterling equals 1.27 US Dollars.
Abbreviations: EPDS = Edinburgh Postnatal Depression Scale, GCSE = General Certificate of Secondary Education.

assesses maternal sensitivity, control, and unresponsiveness and infant cooperativeness, compulsivity, difficultness, and passivity. Each mother-infant interaction receives 7 scores plus an overall score for dyadic synchrony.

The focus of our analyses of mother-infant interactions was maternal control and infant compulsivity. Previous research[24] has found maternal controlling and unresponsive behaviors to be highly and negatively correlated, a finding also observed in our sample. Therefore, for simplicity, only maternal-controlling scales were included. While other measures of infant behavior were analyzed and are included in the results, the focus is on infant compulsivity (in which infants suppress undesirable behaviors and comply with mothers' demands as a maladaptive coping strategy) because infant compulsivity is commonly found to correlate with maternal control.[25,26]

Mother-infant bonding. Mothers' perceptions of bonding with their infants were assessed using the Postpartum Bonding Questionnaire (PBQ). The PBQ is a validated, self-report questionnaire consisting of 25 statements, with participants rating responses to each statement on a scale from "never" (0) to "always" (5).[27] Scores ranged from 0 to 55 (out of 125), with lower scores indicating greater perceived bonding.

Sociodemographic factors. Demographic information was collected at first antenatal research interview and included maternal age, ethnicity, country of birth, yearly household income, highest qualification, parity, employment status, and relationship status.

Data Analysis

Survey weighting. Baseline demographics were survey weighted to account for the overrepresentation of Whooley-positive women in the sample, as described in a previous publication.[14] Weights were based on the number of Whooley-positive and -negative women in the study as a proportion of all those who had maternity appointment bookings at the maternity unit during the study period (the sampling frame): 906/287 for Whooley-positive and 9,057/258 for Whooley-negative women.

Missing data. To address loss to follow-up, inverse probability weights were created for EPDS scores at 28 weeks and 3 months postpartum, and PBQ scores at 3 months postpartum. Variables used to generate these weights were age, ethnicity, relationship status, country of birth, highest level of education, number of other children, and baseline Whooley status.

Incomplete EPDS data were imputed using predictive mean matching for participants with 1–3 missing items on the EPDS (11, 5, and 4 participants at baseline, midpregnancy, and 3 months postpartum, respectively). A total of 5, 69, and 71 participants at each respective time point had no EPDS data, and 92 participants had missing PBQ data. Data were not imputed for these women.

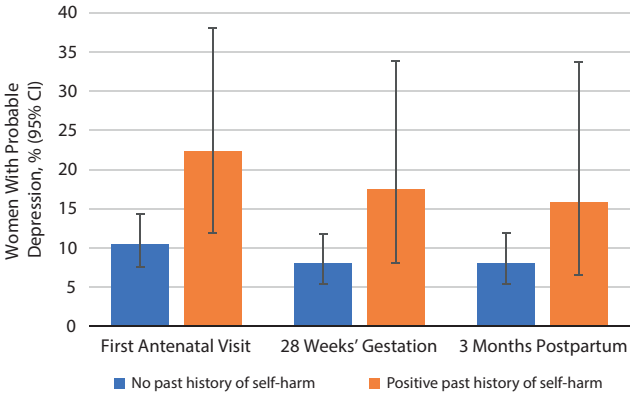
Statistical analyses. Analyses were computed using Stata 15.[28]

Summary statistics for clinical and demographic characteristics were calculated without survey weights to compare women with and without a history of self-harm, additionally comparing women lost and not lost to follow-up at 3 months postpartum (Supplementary Table 1). Pearson χ^2 tests were performed to compare the associations between variables.

Linear regression analyses were performed to examine the relationship between history of self-harm and continuous EPDS score at baseline, 28 weeks' gestation, and 3 months postpartum. Survey weights were used to account for oversampling of Whooley-positive women at baseline, and inverse probability weights were used to account for loss to follow-up. Analyses were adjusted for maternal age and ethnicity. The same analyses were performed using self-harm ideation across pregnancy as the exposure and continuous EPDS score (excluding question 10, as this was used to identify self-harm ideation) as the outcome.

Linear regression analyses were performed to examine the relationship between history of self-harm and mother-infant relationship on the PBQ and the CARE-Index. Analyses were adjusted for maternal age and ethnicity, infant sex and gestational age at birth, and maternal drug and alcohol use, socioeconomic status, and continuous baseline EPDS score. The same analyses were performed using self-harm ideation as the exposure and PBQ and CARE-Index scores as outcomes, adjusting for the same variables. Regression analyses using the PBQ as an outcome were performed in 2 ways: (1) using the CARE-Index subpopulation (unweighted as this group represented a subsample of the population [n = 197] and were not intended to be representative of the original sample) and (2) using the complete sample with inverse probability weights and survey weights.

Figure 1. Probable Depression (EPDS score ≥ 13) Across Pregnancy and the Postpartum Period by History of Self-Harm



Abbreviation: EPDS = Edinburgh Postnatal Depression Scale.

RESULTS

Five hundred forty-five women were recruited, with a mean (SD) age of 32.8 (5.7) years.[14] Clinical and demographic characteristics are summarized in Table 1. A total of 5.7% and 13.0% of the sample were lost to follow-up at 28 weeks' gestation and 3 months postpartum, respectively. Women lost to follow-up were likely to be younger, have been born outside the United Kingdom, and report higher depressive symptoms at baseline. For further demographic characteristics of loss to follow-up, see Supplementary Table 1.

Based on survey weighting, the population prevalence estimate for history of self-harm was 7.9% (95% CI, 5.5% to 11.2%). Women reporting a history of self-harm were more likely to be young (aged 16–24 years; 23.7% vs 8.1%) and born in the United Kingdom (67.1% vs 44.9%) compared to women without a history of self-harm. Lifetime self-harm was associated with a higher prevalence of probable depression per score on the EPDS at baseline (46.7% vs 22.0%).

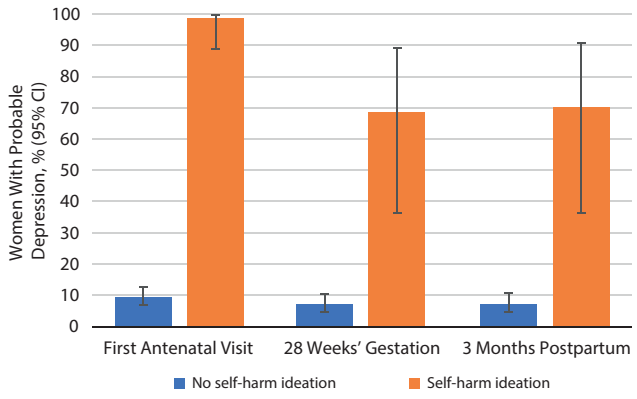
The estimated population prevalence of self-harm ideation at baseline was 2.3% (95% CI, 1.2% to 4.2%), with 2.0% (95% CI, 0.9% to 4.3%) and 1.6% (95% CI, 0.8% to 3.2%) reporting self-harm ideation at 28 weeks' gestation and 3 months postpartum, respectively. Women reporting self-harm ideation at baseline were more likely to be young (aged 16–24 years; 28.1% vs 9.0%) and black (53.1%

Table 2. Weighted Linear Regression Analysis of Association Between Past History of Self-Harm, Baseline Self-Harm Ideation, and EPDS Score ≥ 13

	Past History of Self-Harm		Baseline Self-Harm Ideation	
EPDS Score	Regression Coefficient (95% CI), *P* Value	Adjusted Regression Coefficient (95% CI),[a] *P* Value	Regression Coefficient (95% CI), *P* Value	Adjusted Regression Coefficient (95% CI),[a] *P* Value
Baseline	2.56 (0.53 to 4.60), *P* = .014	2.23 (0.16 to 4.29), *P* = .035	11.91 (10.52 to 13.30), *P* < .001	11.53 (10.13 to 12.94), *P* < .001
Midpregnancy	1.69 (−0.34 to 3.73), *P* = .103	1.63 (−0.50 to 3.77), *P* = .134	8.65 (6.07 to 11.22), *P* < .001	8.16 (5.43 to 10.89), *P* < .001
Postpartum	1.46 (−0.39 to 3.31), *P* = .121	1.61 (−0.23 to 3.45), *P* = .086	6.85 (4.70 to 9.00), *P* < .001	6.73 (4.48 to 8.99), *P* < .001

[a]Adjusted for age and ethnicity.
Abbreviation: EPDS = Edinburgh Postnatal Depression Scale.

Figure 2. Probable Depression (EPDS score ≥ 13) Across Pregnancy and the Postpartum Period by Self-Harm Ideation at Baseline



Abbreviation: EPDS = Edinburgh Postnatal Depression Scale.

vs 31.2%), compared with those who reported rare or no thoughts of self-harm.

Depressive Symptoms During Pregnancy and the Postpartum Period

Weighted prevalence estimates suggest that 22.4% (95% CI, 11.9 to 38.1) of women with a history of self-harm had scores above the cutoff for probable depression on the EPDS at baseline, compared with 10.5% (95% CI, 7.6 to 14.3) of women without a past history (Figure 1). On the basis of linear regression analyses, women with a history of self-harm had EPDS scores 2.56 (95% CI, 0.53 to 4.60; *P* = .014) points higher than women without a history of self-harm at baseline (Table 2). This relationship attenuated at midpregnancy (1.69 points higher [95% CI, −0.34 to 3.73]) and 3 months postpartum (1.46 points higher [95% CI, −0.39 to 3.31]). The same trends were seen following adjustment for confounders (see Table 2).

At baseline, an estimated 98.6% (95% CI, 88.8% to 99.8%) of women with self-harm ideation in early pregnancy had scores above the cutoff for probable depression, compared with 9.4% (95% CI, 6.8% to 12.8%) of women without self-harm ideation (Figure 2).

Self-harm ideation in pregnancy (EPDS question 10) was strongly associated with EPDS score (based on questions 1–9) at all time points. Women reporting baseline self-harm ideation had EPDS scores that were 11.91 (95% CI, 10.52 to 13.30; *P* < .001), 8.65 (95% CI, 6.07 to 11.22; *P* < .001), and 6.85 (95% CI, 4.70 to 9.00; *P* < .001) points higher than those without thoughts of self-harm at baseline, 28 weeks' gestation, and 3 months postpartum, respectively, with the same trends seen after adjustment (see Table 2).

Maternal Perception of Mother-Infant Bonding

There was no evidence for a relationship between a history of self-harm and PBQ score when the total sample was included and weighted (regression coefficient = 1.07 [95% CI, −1.76 to 3.91]) or when the sample included only women who also completed the CARE-Index (regression coefficient = −1.41 [95% CI, −4.43 to 1.60]).

However, women with baseline self-harm ideation had PBQ scores 6.28 (95% CI, 1.76 to 10.81; *P* = .007) points higher (ie, lower perceived bond) than those without self-harm ideation when the entire weighted sample was used, with adjustments. This relationship was substantially attenuated after adjustment for depression at baseline (regression coefficient = 3.34 [95% CI, −1.75 to 8.42]). When including only women who completed both the PBQ and the CARE-Index (n = 187), there was no association between self-harm ideation and PBQ scores (regression coefficient = 1.48 [95% CI, −2.71 to 5.66]).

Mother-Infant Interactions Using the CARE-Index

Women with a history of self-harm did not demonstrate differences in quality of mother-infant interactions across all scales of mother and infant behavior when compared with women with no history of self-harm (see Table 3). However, self-harm ideation at baseline was significantly associated with several aspects of mother-infant interactions. Mothers with self-harm ideation were more controlling, with CARE-Index scores 3.52 (95% CI, 1.46 to 5.57; *P* = .001) points higher than those without self-harm ideation. This association persisted after adjustment for maternal age and ethnicity, gestational age at delivery, and infant sex (regression coefficient = 2.34 [95% CI, 0.40 to 4.28]; *P* = .019); for socioeconomic status and maternal drug and alcohol use (regression coefficient = 3.55 [95% CI, 1.15 to 5.95]; *P* = .004); and for depressive symptoms at baseline (regression coefficient = 2.22 [95% CI, 0.14 to 4.29]; *P* = .036). Infants were more compulsive, with scores 3.63 (95% CI, 1.48 to 5.79; *P* = .001) points higher than infants whose mothers reported no self-harm ideation. This association persisted with the same adjustments (regression coefficients = 2.37

Table 3. Unweighted Linear Regression Analyses of History of Self-Harm, Self-Harm Ideation, and Mother-Infant Interactions

	Past History of Self-Harm			Self-Harm Ideation at First Antenatal Visit		
Mother-Infant Interaction Variable	Regression Coefficient (95% CI), *P* Value	Adjusted Regression Coefficient (95% CI),[a] *P* Value	Additionally Adjusted Regression Coefficient (95% CI),[a,b] *P* Value	Regression Coefficient (95% CI), *P* Value	Adjusted Regression Coefficient (95% CI),[a] *P* Value	Additionally Adjusted Regression Coefficient (95% CI),[a,b] *P* Value
Dyadic synchrony	−0.37 (−1.35 to 0.61), *P* = .452	0.00 (−0.90 to 0.90), *P* = .995	0.35 (−0.57 to 1.26), *P* = .455	−1.52 (−2.90 to −0.15), *P* = .030	−0.58 (−1.84 to 0.67), *P* = .362	−0.07 (−1.39 to 1.25), *P* = .916
Maternal pattern						
Sensitivity	−0.48 (−1.53 to 0.57), *P* = .366	−0.22 (−1.22 to 0.79), *P* = .673	0.11 (−0.92 to 1.15), *P* = .833	−1.60 (−3.08 to −0.13), *P* = .033	−0.82 (−2.22 to 0.59), *P* = .252	−0.36 (−1.86 to 1.13), *P* = .632
Controlling (total score)	0.34 (−1.16 to 1.85), *P* = .652	−0.42 (−1.85 to 1.00), *P* = .557	−0.83 (−2.29 to 0.60), *P* = .250	3.52 (1.46 to 5.57), *P* = .001	2.34 (0.40 to 4.28), *P* = .019	2.22 (0.14 to 4.29), *P* = .036
Unresponsiveness (total score)	0.14 (−1.17 to 1.44), *P* = .836	0.64 (−0.74 to 2.02), *P* = .362	0.72 (−0.71 to 2.15), *P* = .321	−1.91 (−3.73 to −0.09), *P* = .040	−1.52 (−3.43 to 0.40), *P* = .120	−1.85 (−3.90 to 0.19), *P* = .075
Infant pattern						
Cooperative	−0.68 (−1.77 to 0.42), *P* = .223	−0.44 (−1.51 to 0.63), *P* = .420	−0.16 (−1.27 to 0.95), *P* = .776	−1.26 (−2.81 to 0.28), *P* = .109	−0.48 (−1.99 to 1.02), *P* = .527	−0.03 (−1.63 to 1.57), *P* = .969
Compulsive	0.73 (−0.83 to 2.30), *P* = .354	−0.05 (−1.50 to 1.41), *P* = .949	−0.27 (−1.78 to 1.24), *P* = .728	3.63 (1.48 to 5.79), *P* = .001	2.37 (0.36 to 4.38), *P* = .021	2.41 (0.26 to 4.56), *P* = .028
Difficult	0.24 (−0.68 to 1.16), *P* = .606	0.23 (−0.77 to 1.23), *P* = .648	0.13 (−0.91 to 1.16), *P* = .810	−1.07 (−2.36 to 0.23), *P* = .107	−1.32 (−2.71 to 0.07), *P* = .062	−1.66 (−3.13 to −0.18), *P* = .028
Passive	−0.30 (−1.82 to 1.23), *P* = .701	0.25 (−1.33 to 1.84), *P* = .752	0.30 (−1.36 to 1.96), *P* = .720	−1.30 (−3.46 to 0.86), *P* = .236	−0.56 (−2.79 to 1.67), *P* = .619	−0.72 (−3.11 to 1.66), *P* = .551

[a]Adjusted for maternal age, ethnicity, infant sex, and gestational age at birth.
[b]Additionally adjusted for maternal depression at baseline.

[95% CI, 0.36 to 4.38]; *P* = .021; 3.84 [95% CI, 1.20 to 6.48]; *P* = .005; and 2.41 [95% CI, 0.26 to 4.56]; *P* = .028, respectively). Thoughts of self-harm were also associated with lower overall dyadic synchrony (see Table 3).

DISCUSSION

In this prospective study of a cohort of pregnant women, a history of self-harm was not associated with poorer quality mother-infant interactions or maternal perceptions of bonding despite the association of history of self-harm with elevated depressive symptoms in early pregnancy. Self-harm ideation in early pregnancy was associated with depressive symptoms at all time points and with increased maternal control and infant compulsivity even after adjustment for baseline depressive symptoms. This finding suggests that the association between thoughts of self-harm in early pregnancy and the mother-infant relationship is not merely because thoughts of self-harm are a proxy for depressive symptoms.

Mothers with self-harm ideation in early pregnancy additionally had poorer perceived bonding per the self-report measure. Interestingly, this relationship was significant only when the entire cohort, and not the cohort who completed the PBQ and had CARE-Index data, was considered. This finding suggests that the CARE-Index sample is perhaps not representative of the total study cohort. Women who reported increased depressive symptoms on the EPDS were slightly less likely to agree to being filmed for the CARE-Index, reporting that they felt uncomfortable being recorded (mean EPDS score was 8.28 for the cohort who declined compared with 7.07 for those who participated). This finding may explain the differences between the 2 cohorts.

Relationship With Previous Research

In our study, the prevalence of pregnant women endorsing self-harm ideation at baseline was 2.3%, slightly lower than in research[29] estimating prevalence at a similar stage of pregnancy (4%–5%). It is plausible that women may be less likely to endorse a history of self-harm during pregnancy due to concerns about being judged for behaviors that occurred years ago or being perceived as "unfit" future mothers, so our estimate may be an underestimate.

To our knowledge, this study is the first to be published that addresses the relationships between history of self-harm, self-harm ideation in pregnancy, and observed mother-infant interactions. Borschmann et al[10] found that in a population of 384 women, a past history of maternal self-harm was associated with depressive symptoms in pregnancy and adverse mother-infant bonding on maternal self-report. While our research found a relationship between history of self-harm and depressive symptoms in early pregnancy, history of self-harm was not predictive of depressive symptoms in the later perinatal period and for self-reported mother-infant bonding. Our research additionally measured

self-harm ideation in pregnancy and used externally scored as well as self-reported measures of mother-infant interactions and bonding.

Two further previous studies[8,9] found that women reporting acute suicidality were more likely to experience adverse self-perceived or observer-reported bonding outcomes relative to peers not expressing suicidal ideation. However, both studies included high-risk psychiatric populations, examined acute suicidality in the postpartum, and were not prospective cohort studies.

Strengths and Limitations

This was a large longitudinal study, representative of an ethnically diverse population of women in southeast London. Unlike in other studies, the exposures were measured during pregnancy, and both self-report and observer-scored measures were used to assess mother-infant interactions postpartum. Self-report measures of bonding can be problematic, as it is common for mental disorders to partly determine the way mothers view their relationships with their infants; eg, women with depression have negative cognitions associated with failure.[30] However, an observational measure is less prone to information bias associated with self-report and arguably provides more objective insights into mother and infant behaviors.[23] We were unable to follow up with all women in this cohort, but attrition was relatively low with more than 85% of women followed up, and weights predicting missingness were used to mitigate bias.

Maternal depression may be a confounding variable explaining the association between self-harm ideation and the quality of the mother-infant relationship. However, adjusting for baseline EPDS score did not change the relationships observed, suggesting that self-harm ideation could be an independent predictor of mother-infant relationship problems. For history of self-harm, we could not separate suicidal from non-suicidal intent, nor recent from earlier historical events. Recent self-harm and self-harm with suicidal intent may be more strongly associated with vulnerabilities in the transition to parenthood. Finally, the diagnostic label of borderline personality disorder has been associated with both self-harm and potential difficulties in early mother-infant interactions.[31] Self-harm and self-harm ideation may also be markers of other mental disorders or, importantly, adversities such as childhood trauma and domestic or sexual violence victimization that can be associated with mental health problems or interaction difficulties.[32–34] These relationships should be explored in future studies.

Implications for Future Research and Practice

Self-harm has been identified in the National Institute for Health and Care Excellence guidelines[35] as a potential risk area to be explored for women with suspected mental health problems during pregnancy and the postpartum period. Our results suggest that asking about self-harm ideation may be useful in clinical practice for identification of women at risk of mother-infant interaction difficulties in addition to other maternal psychopathologies. Further research is needed on self-harm ideation in the perinatal period; specifically, reporting thoughts of self-harm during this time may itself have implications on the mother-infant relationship. Additionally, further research is warranted into the acceptability of having maternity service professionals ask about self-harm in routine care.

CONCLUSION

Women with a history of self-harm or current self-harm ideation are more likely to experience depressive symptoms during pregnancy and the postpartum period. History of self-harm was not found to be associated with poorer mother-infant interaction quality; however, asking about thoughts of self-harm in early pregnancy may identify a group of women with vulnerabilities throughout pregnancy and the postpartum period.

Submitted: December 20, 2018; accepted April 23, 2019.

Published online: September 10, 2019.

Potential conflicts of interest: No authors have any conflicts of interest to declare.

Funding/support: This article summarizes independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research (PGfAR) Programme (Grant Reference Number: RP-PG-1210-12002) and supported by the NIHR/Wellcome Trust King's Clinical Research Facility and the NIHR Biomedical Research Centre at South London and Maudsley National Health Service (NHS) Foundation Trust and King's College London. The Nuffield Foundation (grant reference number KID/42599) funded the 3-month postpartum follow-up home visits for the data collection of observational mother-infant interactions. Dr Moran is supported by the NIHR Biomedical Research Centre at University Hospitals Bristol NHS Foundation Trust and the University of Bristol.

Role of the sponsor: The funders had no role in the conduct of the study nor the collection, analysis, and interpretation of data.

Disclaimer: The views expressed are those of the authors and not necessarily those of the NHS, the NIHR, or the Department of Health and Social Care.

Previous presentation: Preliminary partial results presented as a selected oral poster at the 26th European Congress of the European Board and College of Obstetrics and Gynaecology, Paris, France, March 8–10, 2018; final results presented orally at the RANZCOG Annual Scientific Meeting; September 16–19, 2018; Adelaide, Australia.

Acknowledgments: The study team acknowledges the study delivery support given by the South London NIHR Clinical Research Network.

Supplementary material: Available at PSYCHIATRIST.COM.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Women's Mental Health section. Please contact Marlene P. Freeman, MD, at mfreeman@psychiatrist.com.

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Supplementary Material

Article Title: Self-Harm, Self-Harm Ideation, and Mother-Infant Interactions: A Prospective Cohort Study

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DOI Number: https://doi.org/10.4088/JCP.18m12708

List of Supplementary Material for the article

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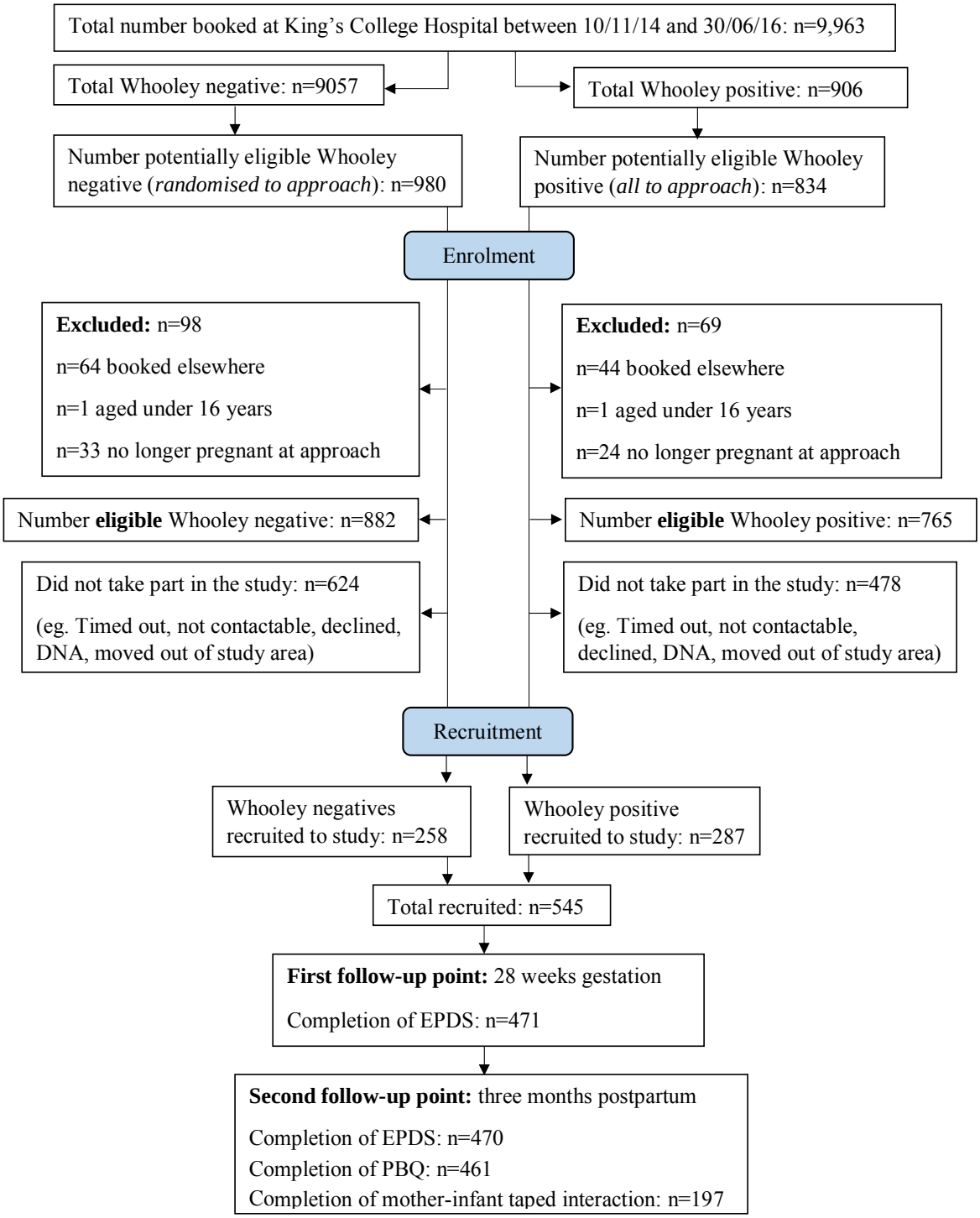
Supplementary material

Supplementary Figure 1: Participant selection



Supplementary Table 1: Unweighted demographics of participants lost to follow-up at three months postpartum				
		Data at three months postpartum (n=474)	Lost to follow up at three months postpartum (n=71)	P value[a]
		Number (%)	*Number (%)*	
Age	16 -24	43 (9.1)	13 (18.3)	0.122
	25 – 29	86 (18.1)	15 (21.1)	
	30 – 34	161 (34.0)	18 (25.4)	
	35 -39	146 (30.8)	17 (23.9)	
	≥40	38 (8.0)	8 (11.3)	
Ethnicity	White (including English, Welsh, Scottish, Irish, British, other white)	260 (54.9)	24 (33.8)	0.020
	Black (including British, Caribbean, African, other black)	146 (30.8)	31 (43.7)	
	Mixed (including white and black Caribbean, white and black African, white and Asian, other mixed/multiple ethnic)	19 (4.0)	4 (5.6)	
	Asian (including British Indian, British Bangladeshi, British Pakistani, British Chinese, other Asian)	21 (4.4)	4 (5.6)	
	Other (including Arab, gypsy or traveller, other)	28 (5.9)	8 (11.3)	
Born in UK	Yes	241 (50.8)	21 (29.6)	0.001
	No	233 (49.2)	50 (79.4)	
Yearly household income	£0-£5475	32 (7.3)	13 (18.3)	<0.001
	£5476-£14,999	26 (5.5)	4 (5.6)	

	£15,000-£30,999	60 (12.8)	11 (15.5)	
	£31,000-£45,999	56 (11.9)	4 (5.6)	
	£46,000-£60,999	58 (12.4)	5 (7.0)	
	£61,000+	138 (29.4)	7 (9.9)	
	Prefer not to say	97 (20.7)	27 (38.0)	
Highest qualification	GCSE or below	50 (10.6)	15 (21.1)	<0.001
	A-levels or vocational training	87 (18.4)	22 (31.0)	
	University or professional	337 (71.1)	34 (47.9)	
Relationship status	Single	48 (10.1)	14 (19.7)	0.009
	Partnered, not cohabiting	66 (13.9)	16 (22.5)	
	Married or cohabiting	351 (74.1)	41 (57.8)	
	Separated, divorced, widowed	9 (1.9)	0 (0.0)	
Number of other children	0	232 (49.0)	39 (54.9)	0.056
	1-2	221 (46.6)	25 (35.2)	
	3+	21 (4.4)	7 (9.9)	
EPDS score at baseline	<13	356 (75.7)	47 (66.2)	0.085
	≥13	114 (24.3)	24 (33.8)	
Past history of self-harm	No	408 (86.3)	60 (84.5)	0.692
	Yes	65 (13.7)	11 (15.5)	
Whooley status	Negative	236 (49.8)	22 (31.0)	0.003
	Positive	238 (50.2)	49 (69.0)	

[a] Significant test was performed to compare the associations between variables. Pearson chi2 test used for categorical variables and t test for continuous variables.