

Research Article

PTSD SYMPTOMS ACROSS PREGNANCY AND EARLY POSTPARTUM AMONG WOMEN WITH LIFETIME PTSD DIAGNOSIS

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Background: Little is known about trajectories of PTSD symptoms across the peripartum period in women with trauma histories, specifically those who met lifetime PTSD diagnoses prior to pregnancy. The present study seeks to identify factors that influence PTSD symptom load across pregnancy and early postpartum, and study its impact on postpartum adaptation. **Method:** The current study is a secondary analysis on pregnant women with a Lifetime PTSD diagnosis ($N = 319$) derived from a larger community sample who were interviewed twice across pregnancy (28 and 35 weeks) and again at 6 weeks postpartum, assessing socioeconomic risks, mental health, past and ongoing trauma exposure, and adaptation to postpartum. **Results:** Using trajectory analysis, first we examined the natural course of PTSD symptoms based on patterns across peripartum, and found four distinct trajectory groups. Second, we explored factors (demographic, historical, and gestational) that shape the PTSD symptom trajectories, and examined the impact of trajectory membership on maternal postpartum adaptation. We found that child abuse history, demographic risk, and lifetime PTSD symptom count increased pregnancy-onset PTSD risk, whereas gestational PTSD symptom trajectory was best predicted by interim trauma and labor anxiety. Women with the greatest PTSD symptom rise during pregnancy were most likely to suffer postpartum depression and reported greatest bonding impairment with their infants at 6 weeks postpartum. **Conclusions:** Screening for modifiable risks (interpersonal trauma exposure and labor anxiety) and/or PTSD symptom load during pregnancy appears critical to promote maternal wellbeing. *Depression and Anxiety* 33:584–591, 2016. © 2016 Wiley Periodicals, Inc.

Key words: PTSD; trauma; pregnancy and postpartum; depression; maternal child

INTRODUCTION

Posttraumatic stress disorder (PTSD) is common following trauma, and low income and minority women

are at particularly high risk for both exposure to trauma^[1,2] and development of PTSD.^[3–5] Prevalence rates among women ranges from 10 to 20% for lifetime PTSD and around 5%^[6,7] for current PTSD. With growing awareness of cross-generational transmission of risk for psychopathology there is increasing attention to PTSD during the peripartum (i.e., pregnancy and first year postpartum). PTSD rates are up to 24%

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during pregnancy for high-risk women who are racial minorities, teens, less educated or poor.^[8]

Maternal PTSD in pregnancy, even after controlling for demographic factors, increases the odds for poor pregnancy and birthing outcomes, such as ectopic pregnancy, miscarriage, preterm labor,^[8] and low birth weight.^[9] Furthermore, maternal gestational stress, trauma, and PTSD adversely impact fetal functional and structural brain development. Maternal stress hormones during pregnancy modulate fetal stress hormone reactivity^[10] and babies of “stressed” mothers are likely to show altered HPA axis functioning of basal cortisol^[11,12] and stress reactivity.^[13,14] Additionally, animal work demonstrates a link between prenatal stress exposure and alterations in specific brain structures.^[15] Although evidence from humans is still sparse in this area,^[16] there is initial evidence that prenatal maternal stress, trauma, or PTSD might be associated with child difficult temperament^[17–19] attention problems,^[20,21] mood and anxiety symptoms,^[22–24] cognitive delay,^[25,26] and adult disease.^[27]

The peripartum period may be experienced as stressful and/or traumatic, particularly for women with past trauma histories.^[28] PTSD often exhibits chronic course with fluctuating symptom severity that can be exacerbated by reexposure to traumatic/stressful events.^[29,30] Women with prior reproductive trauma^[31] or prior interpersonal trauma history, especially childhood maltreatment, may have increased risk for reemergence of PTSD symptoms.^[29,32,33] Onoye and colleagues^[34] reported that community-recruited women peaked with PTSD symptoms in late gestation if they were exposed to trauma during pregnancy.

Thus, reducing the prevalence of maternal trauma exposure and the incidence or severity of PTSD during pregnancy has important public health implications, for both the mother and child. Systematic screening for trauma exposure and signs of PTSD relapse early in gestation may reduce risk for relapse to clinical PTSD diagnosis during the peripartum, and subsequently reduce risks for adverse outcomes in both mother and baby.^[11,35,36] Women with PTSD symptoms in pregnancy might be in critical needs for services^[37] in order to facilitate a healthy course of pregnancy and to promote adequate fetal growth and development.

Although cumulatively prior research has demonstrated clinically significant impact of PTSD on peripartum women^[37] and their infants,^[9–12] there are no longitudinal studies of PTSD across peripartum in women at greatest risk. Therefore, the primary goal of this study is to examine the natural course of PTSD symptoms across the peripartum period in women with heightened vulnerability for illness or relapse (i.e., current/lifetime PTSD diagnoses due to interpersonal violence).^[30] Based on prior works, we hypothesize that the majority of such vulnerable women will experience an increase in PTSD symptoms during the peripartum period.^[28,31–34] Additionally, although research shows that past trauma,^[28] poverty,^[8] concurrent stress/trauma,^[34] his-

tory of PTSD,^[30] and pregnancy^[28] itself can increase risk for PTSD, we have no actual data to model the course of PTSD symptoms across pregnancy and early postpartum in these vulnerable women. Therefore, our secondary research question is to identify risk factors (demographic, historical, gestational) that shape the natural course of peripartum PTSD symptom trajectories. We hypothesize that more risk factors, especially experiencing trauma, will be associated with a greater increase in PTSD symptoms. Finally, our third research question will examine the impact of peripartum PTSD symptom trajectories on women’s postpartum functioning in other domains relevant to motherhood (i.e., depression, subjective bonding with infant, breastfeeding).

This study is the first to longitudinally follow women with PTSD risk across gestation and early postpartum with the goals of describing naturalistic PTSD symptom patterns, identifying risk factors, and examining consequences of these PTSD patterns on postpartum adaptation. We aim to shed light on those vulnerable for and resilient to symptom exacerbation with the hope that findings can guide development of more targeted interventions to reduce illness burden and reduce transmission of risk to the child.

METHOD

The current study is a secondary analysis from a larger study focused on determining the effects of PTSD on childbearing outcomes (i.e., pregnancy health, birth, and postpartum adjustment) in a community sample of pregnant women (NIH NR008767; “the Stress, Trauma, Anxiety, and the Childbearing Year, STACY project”). Eligible women presenting to antenatal care (≥ 18 years, English speaking, expecting their first infant, < 28 weeks completed gestation) were recruited from 2005 to 2008. The study oversampled for low SES by recruiting from prenatal clinics of three academic health centers, two of which were in an urban area, with one serving 90% women who were publically insured. Women initiating prenatal care in these clinics were invited to participate by obstetric nurses and those interested in participating gave contact information and assent to be called up by a research survey organization (DataStat, Inc.) for more interviewing over the phone. DataStat team was comprised of 13 diverse women who specialized in health-related standardized telephone interviews, who conducted all participant interviews averaging 32 min each. Ten percent of interviews were monitored live by a supervisor. The phone contacts were as follows: at or before 28 weeks gestation (wave 1); at 35 weeks gestation (wave 2); and at 6 weeks postpartum (wave 3). Of the 2,689 interested women, 758 were unreachable, 284 were ineligible, 58 declined at the start of the first interview, and eight interviews were interrupted and not completed, leaving 1,581 women enrolled in the study. Prior published work shows detailed screening and enrollment flow chart on these 1,581 eligible women with complete first interviews at wave 1.^[38] Among these 1,581 women, 319 (20.2%) had met PTSD diagnosis (lifetime or current), 532 (33.6%) were subsyndromal (i.e., had few PTSD symptoms but never had met diagnostic criteria), 380 (24%) were trauma-exposed resilient without PTSD, and finally, 350 (22.1%) were healthy controls. For the current study, we selected the subsample of women with heightened risk for PTSD, those who either at present or in lifetime had met diagnostic criteria for PTSD ($n = 319$, 20.2% of total sample), with the aim to study the course of symptoms among these risk women across gestation and early postpartum (see Table 1).

TABLE 1. Sample characteristics (N = 319)

Characteristic	Category	n or M	SD or %
Maternal age		26	6
Race	Caucasian	107	34
	African American	155	49
	Asian	17	5
	Hispanic	4	1
	Native American	8	3
Marital status	Married/partnered	164	51
	Never married/divorced	155	49
Education	College or greater	144	45
	High school/GED or less	175	55
Household income	<\$15,000	100	32
	\$15,000–25,000	56	18
	\$25,000–50,000	60	19
	>\$50,000	94	30
Traumatic events	Child abuse	0.83	1.05
	Adult abuse	.50	.76
	Non-abuse Trauma	3.79	2.14

MEASURES

Demographics. Demographics were assessed using the Perinatal Risk Assessment Monitoring Survey (PRAMS).^[39] A score of “1” was assigned for each “risk” (under 21 years, non-White, no partner, high school diploma or less, income less than \$15,000); scores were summed as a cumulative risk index for analyses.^[40]

Historical and Gestational Characteristics. The National Women’s Study PTSD Module (NWS-PTSD)^[41] was utilized for the assessment of both continuous PTSD 17 symptom count and a diagnosis based on DSM-IV criteria.^[41] Depression was assessed at wave 1 with the Composite International Diagnostic Interview short form (CIDI).^[42] The Dissociative Experience Scale-Taxonomic Version (DES-T)^[43] assessed lifetime status of dissociative experiences commonly associated with PTSD and childhood abuse.^[44] The Life Stressor Checklist-Revised (LSC-R)^[45] assessed lifetime trauma for 29 potential trauma exposures. Three subscales were derived from this checklist including: child abuse (five items), adult abuse (three items), and nonabuse trauma (21 items). In wave 2, 13 of the items assessed the occurrence of concurrent stress/trauma, the most frequent of which included “severe financial problems,” “family member put in jail” and “care for an ill family member.” Also at wave 2, labor anxiety was assessed using a five-item subscale of the Childbirth Self-Efficacy Inventory,^[46] social support was assessed using the Family APGAR,^[47] a five-item five-point scale that measures family functioning, and the client’s appraisal of the quality of her maternity care providers was assessed using the Health Care Alliance Questionnaire, a 16-item scale adapted from therapeutic alliance measurements.^[48]

Postpartum Adaptation. Using the Postpartum Bonding Questionnaire,^[49] participants self-rated problematic bonding with their infant and indicated whether they were breastfeeding at wave 3. Depression was assessed using the Postpartum Depression Screening Scale (PDSS),^[50] which is more detailed and valid in obstetric settings compared to other common screening measures.^[51] It provides a continuous score (35–175), with a validated cut-off >80 indicating probable depressive diagnosis.^[50]

PLAN FOR ANALYSES

Missingness. Prior to analyses addressing the primary research aim, we performed imputation of missing data. First, item-level imputation was done to compensate for a single-item omission error of a PTSD symptom at waves 2 and 3 using the dissociation score

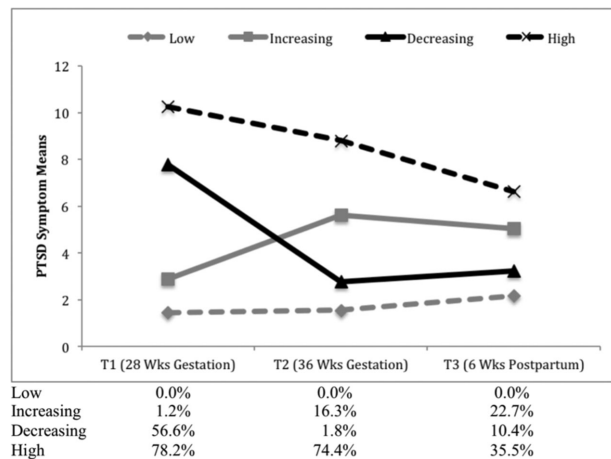


Figure 1. PTSD symptoms across three waves by trajectory group membership with PTSD diagnostic rates.

and trauma items (receptive operative characteristics curve of .91). Following guidelines,^[52] we also imputed for attrition because 42.9% had missing data at wave 2 and 51.1% at wave 3. These rates are consistent with methodological studies showing imputation should not yield bias in parameter estimates.^[53–55] Attrition analyses found those who completed all three waves of data collection had significantly lower cumulative sociodemographic risk than those lost to follow up, but there were no significant differences in PTSD status or outcome variables of interest. We proceeded with the SAS PROC TRAJ procedure with a Poisson distribution, an approach that handles random wave nonresponse. Results describing the complete dataset ($N = 319$) and a smaller dataset without missing values ($n = 156$) were similar.

Hypothesis Testing. To examine the course of PTSD symptoms across peripartum, we conducted semiparametric, group-based trajectory analysis.^[56] Conclusions about the best number and shape of the trajectory groups are based on the Bayesian Information Criterion (BIC),^[56] seeking the most parsimonious models.^[56] To examine demographic, historical, and gestational predictors ($N = 319$) and postpartum adaptation ($n = 156$) that might explain the distinct PTSD trajectories, we utilized two-tailed ANOVAs and chi-square tests, and general linear model regressions with manual backward steps.

RESULTS

PTSD SYMPTOM TRAJECTORY GROUPS

Posterior probability scores $\geq .80$ were calculated to assign each participant to a trajectory yielding the optimal number of distinct PTSD trajectories of four, with quadratic shapes (BIC = -2431 ; Fig. 1). This means that PTSD symptoms over time were likely to follow a nonlinear path for all groups; however, the groups meaningfully differed from each other. We identified two groups with rapid symptom changes across gestation: a rapidly increasing group (Increase), and a rapidly decreasing group (Decrease). These groups had significantly different starting points in early pregnancy, with Increase intercept significantly lower than Decrease ($t(173) = -15.54$, $P < .001$). Across gestation the trajectories of these two groups cross—Increase shows significant rise from T1 to T2

($t(84) = -10.00, P = .000$), whereas Decrease shows significant decline ($t(98) = 15.85, P = .000$). At 6 weeks postpartum Increase endpoint is significantly higher than Decrease ($t(181) = 5.41, P < .001$).

In contrast, the other two trajectory groups show more stable patterns. One group shows constant low PTSD symptoms across pregnancy to 6 weeks postpartum (low; T1 to T2 ($t(49) = -0.49, P = ns$, and T2 to T3 ($t(49) = -2.19, P = .033$)). Finally, the remaining trajectory group shows a slow significant decline of PTSD symptoms across this time period (T1 to T2 ($t(86) = 3.93, P = .000$); and T2 to T3 ($t(86) = 6.45, P = .000$), yet remains overall significantly above all other PTSD trajectory groups (High).

PTSD diagnostic rates highlight the clinical significance of these PTSD symptom trajectories throughout peripartum (see bottom of Fig. 1).

DEMOGRAPHIC, HISTORICAL, AND GESTATIONAL FACTORS BY TRAJECTORY GROUP

First we analyzed demographic and historical predictors to PTSD trajectory groups (Table 2). Women in the trajectory groups that showed *low* PTSD symptom load in early gestation (i.e., low and increase) were *less* likely non-White ($X^2(3, N = 318) = 44.05, P = .000$), poor ($F(3, 306) = 20.42, P = .000$), single ($X^2(3, N = 319) = 45.30, P = .000$), and very young ($F(3, 315) = 29.75, P = .000$), and overall had *less cumulative risk* ($F(3, 315) = 39.59, P = .000$) (<21 years, < \$15,000, ≤HS education, non-White, and not having a partner) compared to women in the other two groups (i.e., decrease and high). Not having a high school education ($X^2(3, N = 319) = 72.38, P = .000$) followed a dose effect in the expected direction (low > increase > decrease > high).

As historical predictors, we tested lifetime PTSD and dissociation symptoms, and lifetime trauma exposure. We found that low and increase had fewer lifetime PTSD symptoms than decrease and High ($F(3, 315) = 28.87, P = .000$). Moreover, Low experienced significantly less child abuse than High ($F(3, 315) = 3.77, P = .011$). Finally, lifetime dissociation scores also differed by group ($F(3, 315) = 4.27, P = .006$); Low and Decrease were similar in dissociation scores, and both had significantly lower scores than High. Lifetime adult abuse and lifetime nonabuse trauma did not differentiate group membership.

We next explored gestational factors and found anticipatory labor anxiety, social support, comorbid depression, and trauma exposure during pregnancy as relevant for symptom course. Specifically, we found that Low experienced less labor anxiety compared to all other groups ($F(3, 147) = 6.09, P = .001$); and had significantly more social support than High ($F(3, 178) = 3.48, P = .017$). Low and Increase also had less comorbid depression compared to Decrease and High ($X^2(3, N = 319) = 13.43, P = .004$). Trauma exposure differed by group status ($F(3, 178) = 3.48, P = .017$), but this time

Low and Decrease were less likely to experience trauma compared to Increase and High. Health care alliance did not differentiate group membership.

POST-HOC ANALYSES PREDICTING PTSD SYMPTOM CROSSING PATTERNS

Intrigued by the crossing pregnancy PTSD trajectory patterns (Increase vs. Decrease), we investigated predictors of these patterns, using for each as contrast, the group with complimentary starting point. We found as predictors for Increase (compared to Low) having more stressors during pregnancy ($\beta = 1.448, P = .013$) and more labor anxiety ($\beta = 0.274, P = .015$) ($X^2(3, N = 72) = 16.49, P = .000$; Nagelkerke $R^2 = .281$). By contrast, predictors for Decrease (compared to High) were less pregnancy stressors ($\beta = 1.307, P = .016$) and less lifetime PTSD symptoms ($\beta = 0.376, P = .001$) ($X^2(3, N = 79) = 25.18, P = .000$; Nagelkerke $R^2 = .364$).

TRAJECTORY GROUP IMPACT ON POSTPARTUM ADAPTATION

PTSD trajectory group membership, rather than initial baseline PTSD status, was significantly associated with postpartum adaptation (Table 3). Women across the PTSD trajectory groups differed on 6 weeks postpartum depression ($X^2(3, N = 156) = 12.17, P = .007$), with Increase group showing greatest prevalence of major depression (52.3%), followed by Decrease and High (48.4 and 41.7%, respectively), and then Low (15.2%). Results for bonding impairment paralleled depression findings ($F(3, 152) = 6.08, P = .001$), such that Increase mothers reported highest bonding problems with their infants compared to all other groups. Low rates of breastfeeding at 6 weeks postpartum were associated with mothers' PTSD symptoms in early pregnancy, but not concurrent PTSD ($F(3, 155) = 15.843, P = .001$).

DISCUSSION

In this secondary data analysis paper utilizing a sample of pregnant community women with PTSD risk, we aimed to examine naturalistically occurring patterns of PTSD symptoms across gestation and early postpartum (i.e. peripartum), and relate symptom occurrence to the presence or absence of various demographic, historical, and gestational factors. We found four distinct patterns of PTSD symptoms across peripartum. We had proposed that women with PTSD risk based on lifetime/current PTSD diagnoses such as those in our sample would increase in PTSD symptoms across gestation. However, in contrast to our primary hypothesis, only one group showed (26% of sample) significant increase in PTSD symptoms over peripartum. This was surprising and unexpected. Moreover, the majority of women in our sample (58%) started with high PTSD rates, and these women all significantly decreased in symptom load throughout peripartum. We identified, not surprisingly, several risk

TABLE 2. Demographic and historical characteristics by trajectory group (N = 319)

	Low (N = 49)		Increase (N = 84)		Decrease (N = 99)		High (N = 87)	
	M or %	(SD)	M or %	(SD)	M or %	(SD)	M or %	(SD)
Demographics								
Ethnicity								
Non-White (%)	44.90 ^a		46.40 ^a		77.80 ^b		84.90 ^b	
Education								
<HS (%)	18.40 ^a		34.50 ^b		65.70 ^c		82.80 ^d	
Marital Status								
No partner (%)	8.20 ^a		21.40 ^a		36.40 ^b		48.30 ^b	
Income (1–4)	3.22 ^a	(0.96)	2.93 ^a	(1.19)	2.20 ^b	(1.15)	1.92 ^b	(1.23)
Age	29.55 ^a	(5.96)	28.38 ^a	(6.02)	23.40 ^b	(4.43)	22.91 ^b	(5.13)
Cumulative risk	1.08 ^a	(1.53)	1.52 ^a	(1.75)	2.91 ^b	(1.54)	3.51 ^b	(1.31)
Historical factors								
Lifetime PTSD sx	9.78 ^a	(2.53)	9.89 ^a	(2.48)	10.35 ^a	(2.48)	12.81 ^b	(2.09)
Lifetime dissociation	1.80 ^a	(3.67)	2.56 ^{ab}	(3.24)	2.15 ^a	(3.15)	3.76 ^b	(4.37)
Child abuse	0.55 ^a	(0.89)	0.77 ^{ab}	(1.03)	0.76 ^{ab}	(0.98)	1.13 ^b	(1.17)
Adult abuse	0.47 ^a	(0.79)	0.39 ^a	(0.74)	0.52 ^a	(0.69)	0.61 ^a	(0.85)
Non abuse trauma	4.00 ^a	(2.05)	3.60 ^a	(2.08)	3.58 ^a	(2.15)	4.10 ^a	(2.22)
Gestational factors								
W1 MDD dx (%)	12.2 ^a		59.6 ^b		36.6 ^a		73.7 ^b	
W2 labor anxiety	12.11 ^a	(2.30)	14.15 ^b	(2.72)	13.93 ^b	(3.60)	15.26 ^b	(2.63)
W2 social support	21.54 ^a	(3.23)	20.24 ^{ab}	(3.11)	19.81 ^{ab}	(5.22)	18.44 ^b	(4.72)
W2 health care alliance	68.62 ^a	(10.26)	62.52 ^a	(12.74)	64.07 ^a	(13.09)	64.62 ^a	(9.52)

A different superscript letter indicates groups are significantly different; income categories are as follows: (1) <15k, (2) 15–25k, (3) 25–50k, (4) >50k
Wave 1 ≤ 28 weeks

Cumulative risk was the sum of risk status from the following: non-White, <HS education, no partner, <22 years, <15k annually.

factors (i.e., current/lifetime PTSD symptoms, history of child abuse, demographic risk) associated with higher PTSD symptoms at the early pregnancy starting point. Furthermore, variation in women's PTSD trajectories across peripartum was best predicted by their experience of pregnancy stress/trauma exposure, labor anxiety, and lifetime PTSD symptoms; confirming our second hypothesis that stress/trauma during pregnancy would be a particularly salient predictor for symptom exacerbation. Finally, PTSD trajectory was significantly associated with postpartum adjustment such that women whose PTSD symptoms rose during pregnancy were most impacted by postpartum depression and subjective bonding impairment with their infant at 6 weeks postpartum.

In contrast with our first hypothesis and despite substantial impairment during early pregnancy, the majority of vulnerable women in our cohort did not increase in PTSD symptoms during peripartum. In fact, the two highest risk groups of women who had started

pregnancy with high PTSD symptoms (High and Decrease) both dropped in PTSD diagnosis across peripartum by almost half, confirming prior work^[34] that showed PTSD symptom reduction in postpartum. We speculate that increases in estradiol and progesterone concentrations at the end of pregnancy^[57] may be associated with lower perceived distress and more positive perception of peripartum to promote reproduction and offspring care.^[58] This was pronounced in High mothers who reported low subjective bonding impairment. These significant improvements in the High group occurred despite these women carrying great historical and psychosocial burden: 50–70% of these High women had entered pregnancy with a current PTSD diagnosis, the majority had high lifetime PTSD symptoms, childhood abuse exposure, were younger, more likely poor, uneducated, single, and of ethnic minority status. All these risks are in fact associated with greater illness burden in the literature,^[28,59–61] thus, it is interesting

TABLE 3. Six-week postpartum adaptation by trajectory group (n = 156)

	Low (N = 33)		Increase (N = 44)		Decrease (N = 48)		High (N = 31)	
	M or %	(SD)	M or %	(SD)	M or %	(SD)	M or %	(SD)
MDD dx (%)	15.20 ^a		52.30 ^b		41.70 ^b		48.40 ^b	
Breastfeeding (%)	75.80 ^a		72.70 ^a		47.90 ^b		36.70 ^b	
Bonding impairment	19.61 ^{ab}	(6.34)	23.86 ^b	(9.68)	17.06 ^a	(7.07)	17.87 ^a	(8.85)

A different superscript letter indicates groups are significantly different.

that PTSD women actually improve in symptom load across pregnancy. More research with larger samples and a wider range of potential predictors (e.g., physical health complications, factors related to maternity care, mental health treatment, biological markers, etc.) is needed to shed light on this phenomenon.

Women classified in Decrease dropped dramatically in PTSD diagnoses across pregnancy (56.6% to only 1.8%). Interestingly, Decrease members shared one similar feature with the Low group—only a few experienced stress/trauma during pregnancy. Based on these findings, we propose that excessive stress/trauma exposure during pregnancy is the most salient factor for mental health in pregnancy and immediate postpartum, confirming our second hypothesis and prior work on the detrimental effects of trauma/stress on maternal perinatal outcomes.^[8,10,62]

The women showing the greatest change in risk constellation across gestation were mothers in the Increase group; starting with low PTSD symptoms and increasing to high rates of active illness in postpartum (PTSD: 23%; MDD: 52%). The predictors for this striking deterioration were twofold more exposure to stress/trauma during pregnancy, and higher labor-related anxiety compared to members in the Low group. This is consistent with past studies finding that interim stress or trauma leads to a 2.4-fold increase in PTSD symptoms across pregnancy.^[34]

Increase mothers showed highest rates of postpartum mental illness (>50% depression and 22% PTSD) and reported the highest levels of subjective bonding impairment with their infants. This finding is consistent with prior research showing link between postpartum mental illness and poor bonding.^[63] While bonding impairment is a mother's self-perception and open to distortions, prior research has shown associations to observed parenting.^[63] Because bonding impairment was associated with PTSD trajectory across pregnancy, and not simply the postpartum PTSD symptom load alone, our data seem to validate the clinical utility of longitudinal data collection over and above cross-sectional data. Interestingly, breastfeeding frequencies were not associated with group trajectories, even in Increase mothers, who had high rates of postpartum psychopathology. Perhaps breastfeeding may be more a product of education and other demographic factors,^[64] than driven by psychopathology.

Our findings are a novel contribution to the field as no known past research has considered factors related to PTSD symptom trajectories across the perinatal period. Put together, our results highlight the essential need for repeated assessment of symptomology during this time given the substantial fluctuation in symptoms. This is relevant for several reasons. First, it gives a message of hope that a current/lifetime diagnosis of PTSD is by no means deterministic of worsening PTSD in the perinatal period. In fact, results indicate that it is more likely than not that PTSD symptoms will remain the same or get better during the perinatal period.

Second, it highlights a vulnerable group (Increase) and describes factors that providers can identify as heightening risk for symptom exacerbation (e.g., pregnancy stressors/trauma, labor-related anxiety, lifetime PTSD load). Preventing symptom exacerbation and manifest postpartum illness protects the offspring from the detrimental impact of postpartum mental illness on parental capacity.^[65] Treatment providers could quickly identify (via a few questions/brief screening measures) mothers who are experiencing such risk factors and heighten awareness for support, case management and referrals for treatment. Lastly, our results identify a modifiable protective factor that promotes resilience in risk women with lifetime PTSD, namely social support (more so than healthcare alliance).

LIMITATIONS

This study selected participants with heightened risk for PTSD who at baseline met either lifetime or current diagnostic criteria, thus women's symptom levels at baseline were high. As such, generalizability of the findings from this population to other obstetrics populations and women with less baseline risk may be limited. In order to maximize our sample size, we imputed data; this is a limitation, which is mitigated by the use of a sophisticated approach and by validation of results of the total dataset using the nonimputed data ($n = 156$). It would have benefitted the study if measures assessed at only wave 2 were assessed at multiple time points to better understand their roles as group determinants. Although we may infer negative child outcomes of mothers with subjective impaired bonding and postpartum psychopathology based on the literature, we remain cautious in this implication and suggest future research directly investigate this link. As our study was a secondary analysis with limited range of collected variables potential confounding factors (e.g. physical health complications etc.) that may influence PTSD risk were unavailable. Lastly, we focused on the progression of PTSD, and although the overlap of PTSD with depression was high for some groups, for others the link was more distinct. Future studies could better understand the interaction of these two psychopathologies over time. Please note, PTSD diagnosis is based on DSM-IV^[66] criteria.

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