

Assessment of Postpartum Posttraumatic Stress Disorder Symptoms Secondary to Childbirth at Delivery and 10 Weeks Postpartum

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Childbirth is recognized as a potential traumatic event and can lead to postpartum posttraumatic stress disorder (PTSD).¹ Postpartum PTSD may carry significant morbidity with negative ramifications on parent-infant bonding, marital relationships, comorbid psychiatric illnesses, and future reproductive decisions.¹ Emergency cesarean section, medical complications of mother or baby, high subjective distress, and presence of dissociation are risk factors with the highest predictive values for postpartum PTSD.² However, as deliveries without medical complications can also be perceived as traumatic, identifying women at risk for postpartum PTSD remains a challenge. The current study aimed to evaluate the feasibility of assessing the presence of trauma at delivery and progression of symptoms at 10 weeks.

Method

Participants

Women admitted to the postpartum unit at Magee-Womens Hospital from June 2017 to June 2018 within one week of delivery were eligible for enrollment. Women were excluded if they could not speak English or had a fetal demise. Nursing staff initially approached potential participants. Research staff then discussed the study if inclusion criteria were met. Approval for this research was obtained from the University of Pittsburgh Institutional Review Board.

Procedures

Participants provided informed consent prior to enrollment and questionnaires were administered and sent through Qualtrics. Participants who responded that they felt either their life or their baby's life was in danger at the time of delivery completed the Impact of Events Scale

Revised (IES-R) in the baseline assessment. A follow-up questionnaire was sent approximately 10 weeks after delivery to all participants. Those who responded that they felt their life or baby's life was in danger at the time of delivery completed the Posttraumatic Symptom Scale (PSS-SR) to assess for PTSD. Participants were compensated \$10.

Measures

- Edinburgh Postnatal Depression Scale³ (EPDS) are 10 self-rated items designed to screen for postpartum depression. A cutoff score of 12.5 was used.
- Adverse Childhood Experiences⁴ (ACEs) are 10 self-rated yes or no items to screen for adverse childhood experiences. The cutoff score of 4 was used.
- Generalized Anxiety Disorder⁵ (GAD-7) are 7 self-reported items on a 4-point Likert scale. A cutoff score of 10 showed probable moderate levels of anxiety.
- Impact of Events Scale Revised⁶ (IES-R) are 22 self-rated items to evaluate level of stress from a traumatic event, scored on a 5-point Likert scale. A score greater than a cutoff of 24 is of clinical concern.
- Posttraumatic Symptom Scale⁷ (PSS) are 22 self-rated items, rated on a 5-point Likert scale, to assess PTSD. A score of 3 or greater for each of the 4 symptom clusters follows the *DSM-V* criteria for diagnosis of PTSD.

Questions assessing subjective birth experience, objective factors during delivery including delivery mode, presence of code (defined as a change in medical status), neonatal intensive care unit (NICU) admission,

psychiatric history, and history of traumatic events were also assessed at delivery.

Statistical Analysis

The sample was divided into 4 groups which included 1) Persistent high risk: women who felt their life or their baby’s life were in danger at both times; 2) Early recovery: women who initially endorsed then did not report that their or their baby’s life was in danger; 3) Persistent low risk: women who did not report that their life or their baby’s life were in danger at both times; and 4) Delayed reporters: women who initially did not report then endorsed their or their baby’s life were in danger.

The groups were characterized by descriptive statistics for the following variables: presence of a code, NICU admission, delivery mode, stress level and presence of dissociation at delivery, psychiatric and/or trauma history, impact of events, and interim trauma. Analysis of variance (ANOVA) with Bonferroni post-hoc comparisons examined whether the 4 groups of women differed on self-report measures of trauma, anxiety, and depression within one week of delivery. ANOVAs were run without covariates, with socioeconomic status (SES), measured by reported income, as a covariate for trauma as the outcome, and psychiatric and trauma history as covariates for anxiety and depression symptoms as the outcomes. Lastly, obstetrical and self-report measures predicting PSS scores at 10 weeks postpartum were examined.

Results

Sample Characteristics

The recruited sample had a high retention rate of 74% (138/187) completing the full study. Sample characteristics of each group include persistent high risk (n=13, 9%), early recovery (n=13, 9%), persistent low risk (n=108, 78%), and delayed reporters (n=4, 3%). Of the 17 participants who endorsed a traumatic delivery at the 10-week follow up, 4 women met criteria for PTSD per DSM-5 criteria as assessed by the PSS score. Women who met criteria for PTSD had higher scores in the hyperarousal and negative cognitions symptom

domains. See Table 1 for demographic characteristics of participants and Table 2 for group characteristics.

Table 1. Demographic and Psychosocial Characteristics (n = 138)

	Mean (SD) %
Age	
Ethnicity	31 (5.20)
Hispanic	1
Non-Hispanic	99
Race	
White	51.4
African American	11.3
Asian	1.9
Other	0.5
Marital Status	
Married	42.5
Living together	39.6
Divorced/Separated	1.4
Single	15.1
Household Income	
<\$30K	18.2
\$30-60K	19.7
\$60-100K	28.5
>\$100K	33.6
Employment Status	
Employed	75.6
Unemployed	19.3
Student	3.0
Other	2.2
First Pregnancy	
Yes	48.2
No	51.8
Education	
Some high school	1.5
High school/GED	9.5
Some college	13.1
College/trade	32.1
Graduate	43.8

Table 2: Group Characteristics of Delivery

	Persistent high risk n = 13	Early recovery n = 13	Persistent low risk n = 108	Delayed reporters n = 4
	% (n) or Mean (SD)	% (n) or Mean (SD)	% (n) or Mean (SD)	% (n) or Mean (SD)
Code	23% (3)	15% (2)	1% (2)	50% (2)
NICU admission	23% (3)	15% (2)	6% (6)	25% (1)
Delivery mode	Vag = 31% (4) C-sec = 68% (9)	Vag = 39% (5) C-sec = 62% (8)	Vag = 66% (n = 71) Vag w/ assist = 4% (n = 4) C-sec = 31% (n = 33)	Vag = 50% (2) Vag w/ assist = 25% (1) C-sec = 25% (1)
Stress level at delivery	81.54 (17.61)	74.47 (24.70)	54.68 (21.77)	70.00 (21.463)
Psych and/or trauma history present	69% (9)	62% (9)	34% (n = 37)	75% (3)
Impact of events at the time of delivery (IES-R)	15% (2) > 24	31% (4) > 24	N/A	N/A
Interim trauma (post-delivery and up to 10 weeks)	7% (1)	7% (1)	3% (3)	0% (0)
Dissociation at delivery (PDEQ)	38% (5) ≥ 22	15% (2) ≥ 22	8% (9) ≥ 22	0% (0) ≥ 22

Note: Delivery mode consists of: C-sec=cesarean section; Vag = spontaneous vaginal delivery; Vag w/ assist = vaginal delivery with assistance. IES-R was not administered to participants in groups 3 and 4 as they did not indicate trauma at the time of delivery.

Effect of Group on Trauma, Depression, and Anxiety Postpartum

Correlations were first analyzed among the 3 outcome variables (ACEs, GAD-7, EPDS). The correlation between ACEs and EPDS was small, $r(1, 138) = .145, p = 0.089$. ACEs and GAD-7 were modestly correlated, $r(1, 138) = .24, p = 0.004$. As expected, GAD-7 and EPDS were moderately correlated, $r(1, 138) = .639, p < 0.001$.

Without covariates, there were statistically significant main effects of group membership in the remaining 3 groups on ACEs, GAD-7, and EPDS. The group difference was no longer significant when the ANOVA for ACEs was re-analyzed including household family income, a proxy for socioeconomic status (SES), as a covariate. When including psychiatric and trauma history in the ANOVA for GAD-7 and EPDS group, differences remained significant. See Table 3.

Relationship Between Obstetrical and Self-Report Measures at 10 Weeks Postpartum

The presence of a code ($\rho = .12, p = .69$), delivery mode ($\rho = .28, p = .27$), degree of dissociation at delivery ($r = -.27, p = .29$), history of psychiatric illness or trauma ($\rho = .40, p = .12$), and postpartum depression ($r = .34, p = .18$) were not found to be significantly associated with PSS score at 10 weeks postpartum. In contrast, NICU admission ($\rho = .51, p = .04$) was significantly associated with PSS score 10 weeks post-delivery.

Discussion

Consistent with findings from Creedy *et al.*⁸, women reported higher symptom burden closer to the time of delivery which follows the natural course of trauma. The early recovery group (9%; n=13) reported statistically significant lower baseline anxiety rates in compar-

Table 3. Comparison of Groups on Adverse Childhood Events, Anxiety, and Depression

	Persistent high risk n = 13 M (SD)	Early recovery n = 13 M (SD)	Persistent low risk n = 108 M (SD)	Delayed reporters n = 4 M (SD)	ANOVA F (df,n)	Post hoc comparisons groups 1 v 2 v 3
ACES- baseline; no covariates	2.85 (3.02)	1.62 (3.25)	1.26 (2.01)	0.75 (1.5)	$F(2, 131) = 2.90, p = 0.06$	1v3, $p = 0.06$ 2v3, $p = 0.87$ 1v2, $p = 1.00$
ACES, controlling for SES					$F(2, 130) = 2.26, p = 0.108$	
GAD-7 baseline	8.85 (5.34)	5.23 (4.97)	4.45 (3.75)	4.75 (7.09)	$F(2, 131) = 6.87, p = 0.001$	1v3, $p = 0.001$ 2v3, $p = 1.00$ 1v2, $p = 0.07$
GAD-7 baseline, control for psych/ trauma hx					$F(2, 130) = 4.82, p = 0.01$	
EPDS baseline	10.00 (5.39)	6.92 (4.63)	4.89 (4.25)	8.25 (4.79)	$F(2, 131) = 8.50, p < 0.001$	1v3, $p < 0.001$ 2v3, $p = 0.35$ 1v2, $p = 0.23$
EPDS baseline, control for psych/ trauma hx					$F(2, 130) = 5.59, p = 0.005$	

Note: The Delayed Reporters Group was excluded from the analysis of variance (ANOVA). Post hoc comparisons used Bonferroni correction. Group 1 = Persistent high risk; Group 2 = Early recovery; Group 3 = Persistent low risk; Group 4 = Delayed reporters

ison to the persistent high-risk group, which may affect cognitive processing of trauma. As the persistent high-risk group had higher ACEs, GAD-7, and EPDS scores, screening during pregnancy may identify patients who are at higher risk for perceiving the delivery as traumatic. This study did not find a significant association of PSS scores with presence of a code, delivery mode, postpartum depression, degree of dissociation at delivery, or history of psychiatric illness, which is inconsistent with other studies. This difference may be secondary to hospital specific initiatives including education of child-birth trauma and communication at the bedside among clinical staff.

NICU admission was significantly associated with PSS scores, though rates of admission did not differ between both groups. Unique stressors specific to a

NICU admission, including appearance and behavior of the infant and sounds of unit, may help maintain a perception of ongoing threat to the infant’s life. Further, physical separation from the infant and potential inability to participate in expected activities with the infant such as breastfeeding could influence severity of symptoms. As such, interventions that target perceived stress and trauma-informed care in this population could impact maternal health.⁹

Though the study encompassed a small sample size, the high retention rate of 74% was a notable strength. Nonetheless, there are challenges to diagnosing PTSD in the postpartum population. Specifically, hyperarousal symptoms have the potential to represent aspects of general motherhood rather than PTSD.¹⁰ In addition, self-report measures may result in higher prevalence

rates in comparison to clinical interviews. Prevalence in this sample (3%; n=4) was lower than reported in the current literature despite the sample consisting of significant medical complexity. Finally, 9% (n=13) reported subsyndromal symptoms of PTSD and the impact on quality of life and mother-infant bonding was not assessed.

Conclusion

Though screening for PTSD symptoms at delivery is likely to capture a higher number of patients, our study suggests this is not an appropriate time point for screening. As a NICU admission was found to be associated with PTSD symptoms, screening this population during a pediatrics follow up visit will likely identify more at-risk patients as opposed to universal screening.

Take Home Summary

Targeted screening of mothers who experienced a NICU admission will likely identify more at-risk patients for postpartum PTSD secondary to childbirth. Given unique stressors mothers face in the NICU, interventions to decrease perceived stress and increase approaches utilizing trauma-informed care are likely to improve quality of care.

References

1. Yildiz PD, Ayers S, Phillips L. The prevalence of post-traumatic stress disorder in pregnancy and after birth: A systematic review and meta-analysis. *J. Affect. Disord.* 2017; 208: 634–645. doi: 10.1016/j.jad.2016.10.009.
2. Andersen LB, Melvaer LB, Videbech P, Lamont RF, Joergensen J. Risk factors for developing post-traumatic stress disorder following childbirth: a systematic review. *Acta Obstet. Gynecol. Scand.* 2012; 91: 1261–1272. <https://doi.org/10.1111/j.1600-0412.2012.01476.x>
3. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry.* 1987;150:782-786. doi:10.1192/bjp.150.6.782
4. Felitti VJ, Anda RF, Nordenberg D, et al. Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study. *Am. J. Prev. Med.* 1998; 14: 245–258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
5. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *JAMA Intern. Med.* 2006; 166: 1092–1097. <https://doi.org/10.1001/archinte.166.10.1092>
6. Creamer M, Bell R, Failla S. Psychometric properties of the Impact of Event Scale—Revised. *Behavior Research and Therapy.* 2003;41:1489–1496. <https://doi.org/10.1016/j.brat.2003.07.010>
7. Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychol. Assess.* 1997; 9: 445–451. <https://doi.org/10.1037//1040-3590.9.4.445>
8. Creedy D, Shochet I, Horsfall J. Childbirth and the development of acute trauma symptoms: incidence and contributing factors. *Birth.* 2000; 27: 104–111. <https://doi.org/10.1046/j.1523-536x.2000.00104.x>
9. Sharp M, Huber N, Ward LG, Dolbier C. NICU-specific stress following traumatic childbirth and its relationship with posttraumatic stress. *The Journal of Perinatal & Neonatal Nursing.* 2021; 35(1): 57-67. <https://doi.org/10.1097/JPN.0000000000000543>
10. Olde E, van der Hart O, Kleber RJ, van Son M. Post-traumatic stress following childbirth: A review. *Clin. Psychol. Rev.* 2006; 26: 1–16. <https://doi.org/10.1016/j.cpr.2005.07.002>

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