Validation of Childbirth-Related Posttraumatic Stress Disorder Using Psychophysiological Assessment

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Condensation.

Women with posttraumatic stress disorder (PTSD) related to traumatic childbirth show similarly elevated psychophysiological responses as individuals with PTSD related to other traumatic events.

Keywords

OBJECTIVE

Posttraumatic stress disorder (PTSD) results from a specific, psychologically traumatic event, e.g., war, accidents, physical and sexual assaults. Increasing evidence indicates childbirth and its attendant circumstances can be experienced as a traumatic event and cause posttraumatic symptoms or even full PTSD.[1] This condition is not limited to pregnancy loss, stillbirth, and prematurity. It can develop after a full-term, healthy birth, with an estimated prevalence between 4.6-6.3% and clinically significant symptoms in up to 16.8% of postpartum women.[1] Provisional diagnosis of maternal, childbirth-related PTSD (CB-PTSD)

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primarily relies on subjective report using questionnaires targeting PTSD DSM symptom severity in the past month and resulting from childbirth as the index trauma.[1] Because some PTSD symptoms may overlap with other mental postpartum conditions (e.g., depression)[2], we investigated whether CB-PTSD is characterized by the elevated psychophysiological reactivity observed in PTSD stemming from combat and other traumatic stressors.[3]

STUDY DESIGN

Thirty-four (34) women aged approximately 35 years, with an immediate postpartum Peritraumatic Distress Inventory score >21, were recruited through hospital announcements. Average gestational delivery week was 38.76. The 13 with a subsequent PTSD-5 Checklist score >43 were classified as CB-PTSD; the remaining 21 as no CB-PTSD (Table). The study was approved by the Massachusetts General Brigham Human Research Committee. After giving written, informed consent following a full explanation of the procedures, patients were assessed using an established method that quantified skin conductance (SC), heart rate (HR), and left lateral frontalis and corrugator electromyogram (EMG) responses during script-driven mental imagery of their childbirth experience.

The primary analyses were univariate and multivariate analysis of variance. As an ancillary, a composite (univariate) measure of physiological responsivity was calculated as the "posterior probability" (PPrb) of a patient's belonging to the PTSD reference group using an *a priori* discriminant function derived from a large sample of PTSD and non-PTSD individuals who had experienced other, non-childbirth related traumatic events and had undergone the same psychophysiological procedure.[4]

RESULTS

CB-PTSD patients were more physiologically responsive during imagery of their childbirth experiences, compared to no CB-PTSD patients (Figure). Mean univariate physiologic responses of the CB-PTSD group were largely above working PTSD cutoffs (dotted lines) from previous studies of individuals exposed to other traumas such as combat, sexual abuse, motor vehicle accidents.[5] No significant psychophysiological group differences were observed during imagery of a non-childbirth-related, stressful event that was used as a control. These findings suggest that CB-PTSD patients exhibit physiological responses similar to those of other PTSD individuals.

CONCLUSION

Our work provides a validation of the clinical reality of the CB-PTSD diagnosis. Women with CB-PTSD show similarly elevated physiological responses during mental imagery of the traumatic childbirth experience as found in PTSD resulting from other types of traumas. Their physiological alterations are evoked by childbirth. Our findings encourage revising the formal recognition of mental illness with postpartum onset by expanding the spectrum to include disorders of traumatic stress. A simplified physiological assessment, performed during routine obstetric care, of women endorsing clinically significant childbirth-related

peritraumatic distress may aid in the identification of those likely to meet CB-PTSD diagnosis.
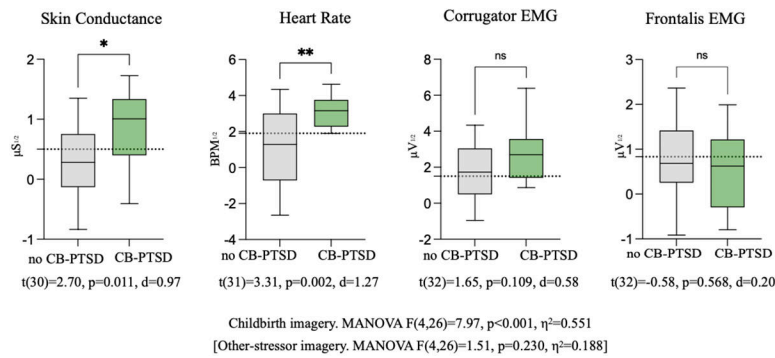
ACKNOWLEDGMENTS

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Skin Conductance — t(30)=2.70, p=0.011, d=0.97
Heart Rate — t(31)=3.31, p=0.002, d=1.27
Corrugator EMG — t(32)=1.65, p=0.109, d=0.58
Frontalis EMG — t(32)=-0.58, p=0.568, d=0.20

Childbirth imagery. MANOVA $F_{(4,26)}=7.97$, $p<0.001$, $\eta^2=0.551$
[Other-stressor imagery. MANOVA $F_{(4,26)}=1.51$, $p=0.230$, $\eta^2=0.188$]

Figure. Physiological responsivity during childbirth imagery by maternal PTSD status
The figure shows the physiological responses of patients with and without provisional CB-PTSD during mental imagery of personal childbirth traumatic events. Data are displayed as box and whisker plots. Boxes span the first and third quartiles, with the horizontal lines representing the median, and whiskers the minimum to maximum values. Gray boxes represent no CB-PTSD. Green boxes represent CB-PTSD. Dashed lines represent empirical cutoffs for PTSD based on previous research. The square root of the average physiological values is derived from 2 personal scripts concerning labor, delivery, or immediate postpartum stressful events. Differences in degrees of freedom in t tests analyses are owing to missing data. Other stressors refer to traumatic events that are non-childbirth-related. (Mean values for skin conductance, heart rate, corrugator EMG, and frontalis EMG for the no CB-PTSD group are 0.33, 1.12, 1.76, and 0.78 and for the CB-PTSD group 0.92, 3.15, 2.64, and 0.61, respectively).

Table

Demographics, childbirth factors, and overall physiological responsivity during childbirth imagery by maternal PTSD status

Measures	CB-PTSD n = 13	No-CB-PTSD n = 21			
	n (%)/ M (SD)	n (%)/ M (SD)	χ^2/ t	OR (95% CI)	p
At delivery					
Age (years)	30.53 (3.63)	32.94 (5.10)	−1.49		0.15
Primiparity	9 (69.23)	17 (80.95)	0.61	0.53 (0.11-2.63)	0.68
Sleep deprivation (before childbirth, 6 hours)	10 (76.92)	19 (90.48)	1.18	0.35 (0.05-2.46)	0.35
Medication for pain	12 (92.31)	15 (71.43)	2.14	4.80 (0.51-45.50)	0.21
Medication for induction	7 (53.85)	15 (71.43)	1.09	0.47 (0.11-1.98)	0.46
Degree of pain in labor/delivery	11 (84.62)	17 (80.95)	0.07	1.29 (0.20-8.31)	1.00
Obstetrical complications	10 (76.92)	16 (76.19)	0.00	1.04 (0.20-5.34)	1.00
Mode of delivery					
Vaginal/Natural	4 (30.77)	6 (28.57)	0.02	1.11 (0.25-5.04)	1.00
Vaginal Assisted	2 (15.38)	3 (14.29)	0.01	1.09 (0.16-7.59)	1.00
Planned Cesarean	0	0			
Unplanned Cesarean	7 (53.85)	12 (57.14)	0.04	0.88 (0.22-3.52)	1.00
Gestational age (weeks)	39.23 (1.83)	38.48 (2.55)	0.93		0.36
NICU admission	6 (46.15)	6 (28.57)	1.09	2.14 (0.51-9.08)	0.46
Skin-to-skin contact	9 (69.23)	10 (47.62)	1.52	2.48 (0.58-10.62)	0.30
Rooming in	9 (69.23)	14 (66.67)	0.02	1.13 (0.25-4.98)	1.00
At informed consent and psychometric testing					
Age (years)	34.29 (4.90)	35.65 (5.40)	−0.74		0.47
Years postpartum	3.77 (3.88)	2.71 (2.84)	0.91		0.37
Married	11 (84.62)	20 (95.24)	1.13	0.28 (0.02-3.39)	0.54
Bachelor's degree	10 (76.92)	18 (85.71)	0.43	0.56 (0.09-3.29)	0.65
Employed	9 (69.23)	14 (66.67)	0.02	1.13 (0.25-4.98)	1.00
Household income (100K)	5 (38.46)	11 (52.38)	0.62	0.57 (0.14-2.32)	0.50
Non-Hispanic White	9 (69.23)	18 (85.71)	1.33	0.38 (0.07-2.05)	0.39
Acute stress response to childbirth	38.08 (7.33)	33.76 (6.75)	1.75		0.09
CB-PTSD symptoms	50.77 (5.15)	24.38 (13.00)	6.96		0.00
Breastfeeding	12 (92.31)	16 (76.19)	1.44	3.75 (0.39-36.43)	0.37
At physiological testing					
Overall physiological responsivity	0.51 (0.21)	0.33 (0.17)	2.73		0.01

Note. CB-PTSD = childbirth-related posttraumatic stress disorder, based on PTSD Checklist-5 score> 43; At delivery time point is in regard to the traumatic childbirth; Sleep deprivation defined as less than 6 hours of sleep on the night before the childbirth; Degree of pain in labor/delivery refers to at least "great" degree; NICU = Neonatal intensive care unit; Acute stress response = immediate, self-reported negative cognitive, emotional, and physiological responses to childbirth based on the Peritraumatic Distress Inventory; Overall physiological responsivity to childbirth imagery refers to average posterior probability (PPrb) score, using skin conductance, heart rate and frontalis electromyogram responses during two childbirth script-driven imageries per patient. Breastfeeding status (yes/no) pertains to currently or in the past. Physiological testing was conducted on average 13 days after informed consent and psychometric testing.

OR = odd ratios, 95% CI = 95% confidence interval; significance estimates from *t-* or Fisher's exact tests.