

“Post-concussive” somatic symptoms in trauma—head injury or more complex picture?

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**This presentation will be discussing topics of trauma and sexual assault.*

Somatic symptoms frequently occur after traumatic stress exposure

Headache

Dizziness

Light/noise sensitivity

Nausea

Difficulty concentrating

Blurred/double vision

Restlessness

Insomnia

Fatigue

- ▶ These are termed “post-concussive” symptoms.
- ▶ “Post-concussive syndrome” (PCS) was defined as ≥ 6 PCS new or worsening symptoms
 - ▶ Clinically-significant new or worsening (CSNW) symptoms defined as an increase of ≥ 2 in symptom severity



Somatic symptoms are common after sexual assault, and increasing evidence suggests this is not due to brain trauma

Health status, not head injury, predicts concussion symptoms after minor injury[☆]

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Association of Epidemiologic Factors and Genetic Variants Influencing Hypothalamic-Pituitary-Adrenocortical Axis Function With Postconcussive Symptoms After Minor Motor Vehicle Collision

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- Evaluating somatic symptoms in a patient population that experienced stress exposure, but uncommonly head injury, provides an opportunity to further evaluate this hypothesis



Present study

- ▶ Data for this analysis were drawn from the Women's Health Study, the first large-scale, multi-site, prospective study of adult women sexual assault survivors
- ▶ The aim for this analysis was to assess for differences in the incidence of clinically significant new or worsening PCS in those with and without head injury, and to establish potential predictors for development of PCS.

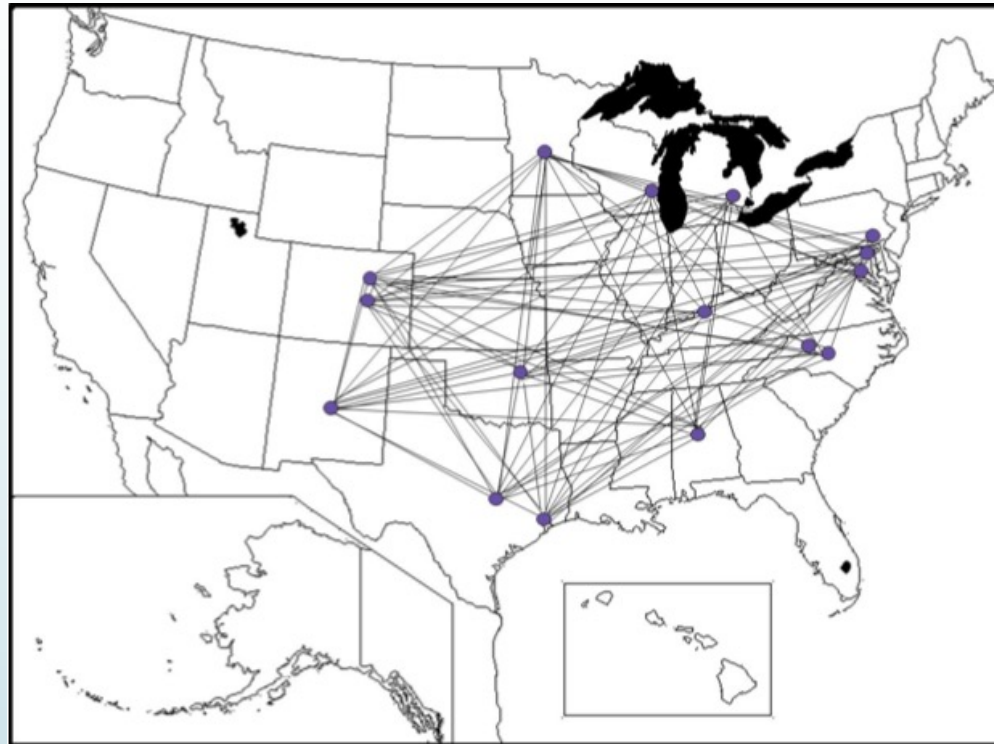


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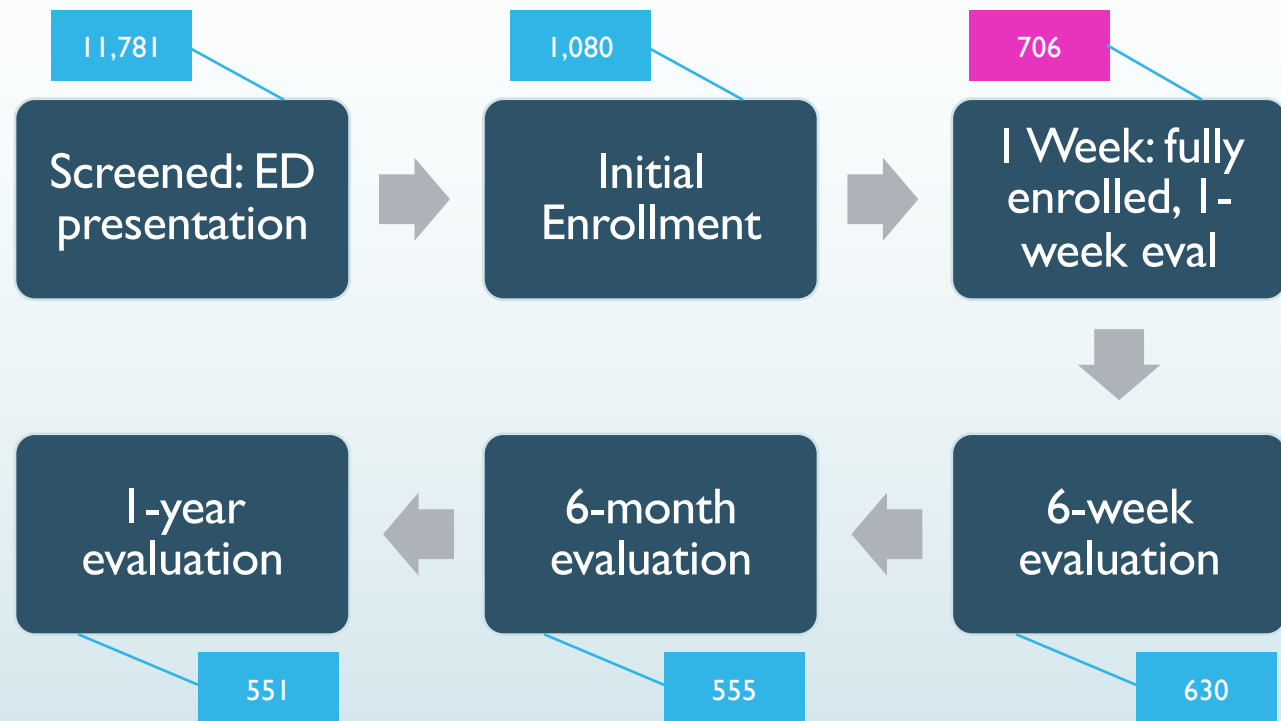




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Women's Health Study: Overview



Selected characteristics of cohort

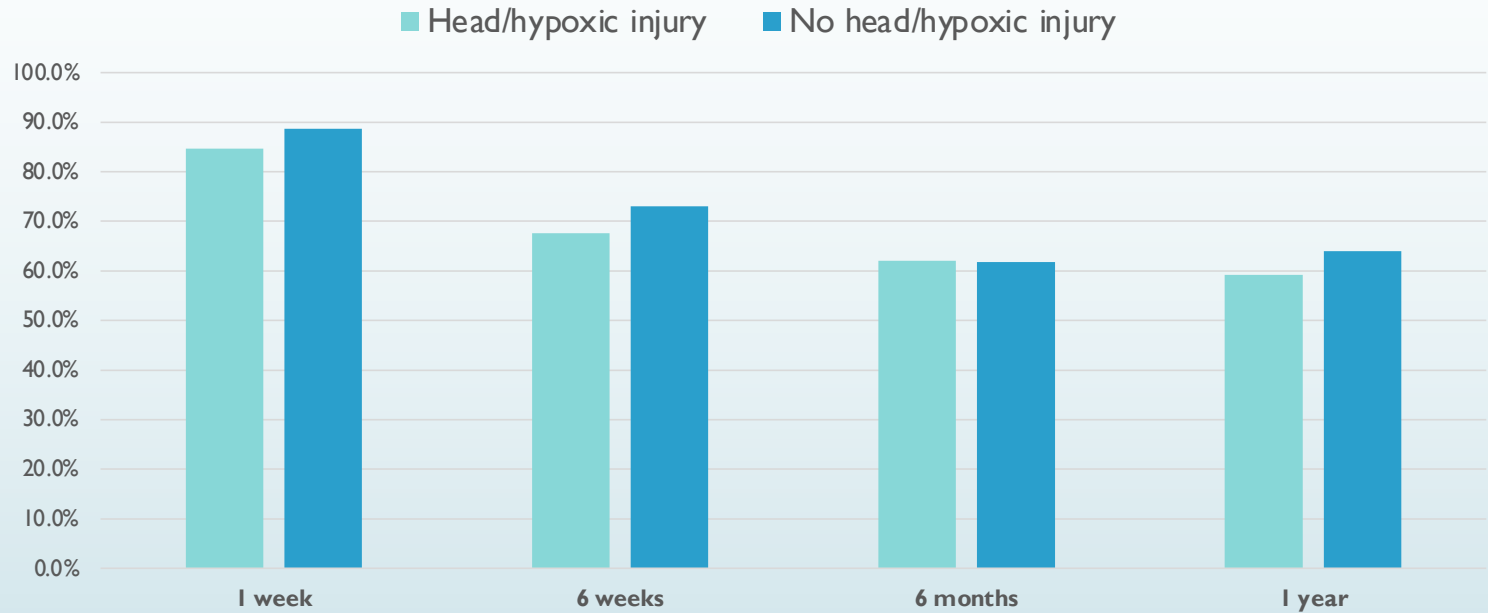
	Baseline (n=706) n (%) or M (SD)
Age	28.4 (9.7)
Race	
White	397 (57.3)
Black	104 (15.0)
Asian	13 (1.9)
Native American	76 (11.0)
Other	103 (14.9)
Ethnicity	
Hispanic	181 (26.3)
Education	
Less than high school	56 (8.0)
High school or equivalent	172 (24.6)
Post-high school/some college	330 (47.1)
4-year degree	113 (16.1)
Graduate degree	29 (4.1)

Assault characteristics

Assault Characteristics	with all participants	no LOC (n=457)
	n (%)	
Complete loss of consciousness	249 (35.3)	–
Strangled	129 (18.3)	95 (20.8)
Head or face injury	140 (19.8)	91 (19.9)
Head/face injury or strangled*	218 (30.8)	153 (33.5)
Any physical injury	538 (76.2)	316 (69.1)
Substance use prior to assault*	410 (58.1)	232 (50.8)
Stranger assailant	152 (21.5)	104 (22.8)
Multiple assailants	140 (19.8)	84 (18.4)
Presence of a weapon	72 (10.2)	55 (12.0)

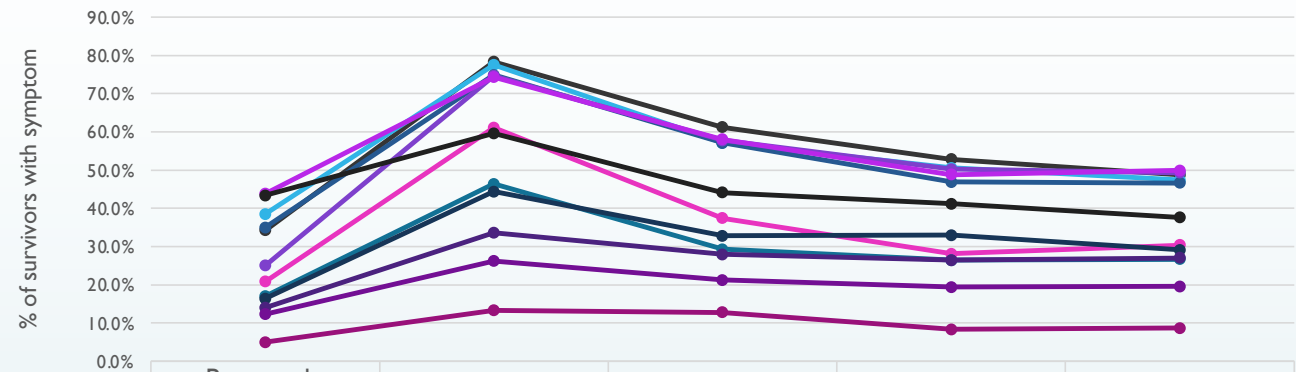
* χ^2 analysis indicated a significant difference between “all” and “no LOC” groups for these variables

Incidence of PCS at each timepoint *with and without head/hypoxic injury*



Head/hypoxic injury defined as evidence of injury to head or face on initial physical exam, report of injury to head or face in narrative, and/or report of strangulation or suffocation during assault

Incidence of symptoms at each time point



	Pre-assault, Baseline	1 week	6 weeks	6 months	1 year
—●— Difficulty concentrating	34.2%	78.3%	61.2%	52.8%	48.7%
—●— Fatigue	38.5%	77.5%	57.1%	50.6%	47.4%
—●— Restlessness	35.0%	74.9%	57.1%	46.9%	46.6%
—●— Taking longer to think	25.0%	74.6%	57.8%	50.2%	49.3%
—●— Insomnia	43.8%	74.3%	58.0%	48.8%	49.9%
—●— Nausea	20.8%	61.1%	37.4%	28.1%	30.4%
—●— Headache	43.4%	59.6%	44.1%	41.2%	37.6%
—●— Dizziness	17.0%	46.4%	29.3%	26.4%	26.7%
—●— Noise sensitivity	16.4%	44.4%	32.8%	33.0%	29.1%
—●— Light sensitivity	14.0%	33.6%	27.9%	26.4%	27.0%
—●— Blurred vision	12.3%	26.2%	21.2%	19.4%	19.6%
—●— Double vision	5.0%	13.3%	12.8%	8.3%	8.7%

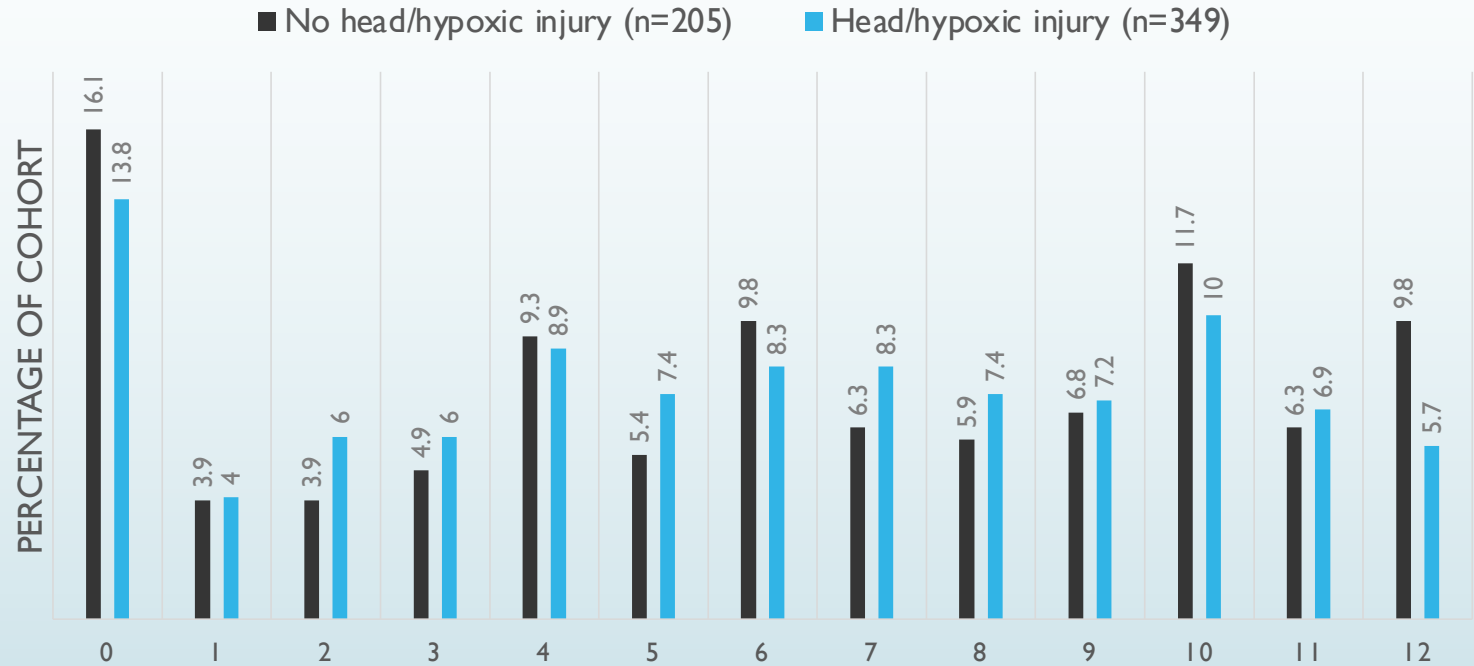
Time-matched correlations between mental health† and PCS somatic symptoms

	<u>1 Week</u>	<u>6 Week</u>	<u>6 Month</u>	<u>1 Year</u>
Posttraumatic stress	.62*	.70*	.70*	.69*
Anxiety	.19*	.63*	.62*	.64*
Depression	.15*	.58*	.59*	.60*
Global mental health	-.11*	-.52*	-.52*	-.47*
Global physical health	-.21*	-.66*	-.64*	-.61*

†At 1 Week, current posttraumatic stress symptoms were measured while all other outcomes inquired about the week before the assault. At all other timepoints, current mental health outcomes and perceptions about global health were measured.

* = $p < .001$

Number of PCS symptoms at 6 months



Predictors of PCS at 6 months

	Prevalence of index characteristic at 6mo	RR for PCS (Rivermead \geq 6) RR (95% CI)	t-test for PCS (continuous variables) * = $p < .05$
Demographic Characteristics			
Age \leq 20	24.35%	0.88 (0.67–1.15)	-1.6123
Non-white race	44.04%	0.90 (0.72–1.13)	1.4146
Hispanic ethnicity	26.30%	1.15 (0.91–1.47)	1.3105
High school education or less	30.87%	0.84 (0.65–1.08)	-1.9691*
Income < \$20,000	34.29%	1.06 (0.84–1.34)	-0.15269
Work full-time	32.67%	0.96 (0.76–1.22)	0.38882
Pre-SA health characteristics			
ACEs \geq 6	26.76%	1.14 (0.89–1.47)	1.7065
Childhood sexual assault	36.81%	1.32 (1.05–1.65)	1.8363
Adult traumas \geq 8	24.16%	1.37 (1.08–1.73)	2.3879*
Past SA	56.44%	1.33 (1.05–1.68)	3.0594*
Past PTSD	35.65%	1.12 (0.89–1.40)	1.0055
Anxiety	25.95%	1.17 (0.92–1.49)	1.6446
Depression	21.96%	1.21 (0.95–1.55)	1.2485
Mental health—poor to fair	27.31%	1.27 (1.01–1.60)	1.5215
Physical health—poor to fair	11.39%	1.30 (0.96–1.75)	2.2697*
Moderate/severe head/face pain	8.76%	0.73 (0.44–1.20)	-1.1592

Predictors of PCS at 6 months

	Prevalence of index characteristic at 6mo	RR for PCS (Rivermead ≥ 6) RR (95% CI)	t-test for PCS (continuous variables) * = $p < .05$
SA characteristics			
Any physical assault	76.81%	1.27 (0.95–1.69)	1.629
Head/face injury	28.26%	1.14 (0.90–1.45)	0.8928
Strangulation	26.49%	0.95 (0.71–1.29)	-0.68448
Other hypoxic injury	2.68%	1.42 (0.80–2.54)	1.5422
Head or hypoxic injury	37.00%	1.09 (0.87–1.36)	0.42467
Weapon present	15.87%	1.09 (0.73–1.63)	0.43655
Multiple assailants	18.95%	1.00 (0.76–1.33)	0.082868
Stranger assailant	20.94%	1.02 (0.78–1.33)	0.11836
No substance use prior to assault	17.62%	1.07 (0.76–1.52)	0.70433
Loss of consciousness	34.66%	0.99 (0.79–1.25)	-0.80878
ED characteristics			
Moderate/severe overall pain	69.82%	1.51 (1.14–2.00)	3.4225*
Moderate/severe head and face pain	36.28%	1.11 (0.88–1.39)	1.0182
Moderate/severe neck pain	29.78%	1.22 (0.97–1.53)	2.2613*

Answer: complex picture

- Somatic symptoms are very common after sexual assault and impose a significant burden on survivors as they recover after sexual assault.
- Somatic symptoms consistent with PCS are common regardless of injury to head or other areas of the body, and use of this set of somatic symptoms to constitute a brain injury diagnosis is problematic.
- While many sequelae of trauma are accepted and better understood, the pathophysiology of somatic symptoms remains a mystery and is likely quite complex.
- Future research should include analysis of non-cis-gendered female sexual assault survivors (i.e., including males and transgender patients), development of a predictive model and risk stratification tool for the peri-traumatic period, and attempts to better understand the physiology of these symptoms in trauma survivors to develop treatments.
 - Our team is working on a multivariate predictive model for publication with these data.

Acknowledgements

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Thank you!

Questions?