

# Strangulation during sexual assault predicts increased posttraumatic stress symptoms six weeks after assault

Sullivan J<sup>1,2</sup>, Maltez B<sup>1,2</sup>, Bhatt K<sup>1,2</sup>, Soward A<sup>1,2</sup>, D'Anza T<sup>4</sup>, Bell K<sup>5</sup>, Lechner M<sup>6</sup>, Gieger-Sedgwick A<sup>7</sup>, Metz M<sup>8</sup>, Ho J<sup>9</sup>, Rossi C<sup>13</sup>, Riviello R<sup>10</sup>, Nouhan P<sup>11</sup>, Phillips C<sup>12</sup>, Platt M<sup>14</sup>, McLean SA<sup>1,2,3</sup>

From the <sup>1</sup>Institute for Trauma Recovery; <sup>2</sup>Department of Anesthesiology, University of North Carolina, Chapel Hill, NC; <sup>3</sup>Department of Emergency Medicine, University of North Carolina, Chapel Hill, NC; <sup>4</sup>SANE Program, Albuquerque SANE Collaborative, Albuquerque, NM; <sup>5</sup>SANE Program, Tulsa Forensic Nursing Services, Tulsa, OK; <sup>6</sup>SANE Program, UHealth, Colorado Springs, CO; <sup>7</sup>SANE Program, Crisis Center of Birmingham, Birmingham, AL; <sup>8</sup>SANE Program, Denver Health, Denver, CO; <sup>9</sup>SANE Program, Hennepin County Medical Center, Minneapolis, MN; <sup>10</sup>SANE Program, Drexel University College of Medicine, Philadelphia, PA; <sup>11</sup>SANE Program Wayne County SAFE, Detroit, MI; <sup>12</sup>SANE Program, MedStar Health, Washington, DC; <sup>13</sup>SANE Program, Cone Health, Greensboro, NC; <sup>14</sup>SANE Program, KentuckyOne Health- University of Louisville Hospital, Louisville, KY



## Introduction

- Worldwide, an estimated 10–27% of women are sexually assaulted during their lifetime.<sup>1</sup>
- Data from a previous pilot study indicate that acute and chronic musculoskeletal pain, and other adverse health outcomes, are common after sexual assault.<sup>2,3</sup>
- Sexual assault (SA) is associated with higher prevalence of posttraumatic stress symptoms in women than other forms of trauma; however, to date, few studies have evaluated assault characteristics associated with posttraumatic stress (PTS)<sup>4</sup>.

## Methods

- Data for this analysis came from the ongoing Women's Health Study (R01 AR064700), the first large-scale, multisite prospective study of sexual assault survivors.
- When a potentially eligible adult woman sexual assault survivor ≥ 18 years of age presents to a network study site ("Better Tomorrow Network", Figure 1) to receive care from a sexual assault nurse examiner (SANE), a research assistant (RA) is paged.
- The RA approaches the survivor for consent to contact the participant in 48-72 hours, collect blood samples, and access medical records. These records include SANE detailed forensic records regarding the assault history and medical services provided to the patient.
- Follow-up evaluation of enrolled participants is performed at 1 week, 6 weeks, 6 months, and 1 year. These evaluations include an assessment of PTS symptoms (PCL-S), anxiety symptoms (PROMIS), and somatic symptoms (0-10 NRS).
- Substantial PT symptoms* were defined by a PCL-S score of ≥ 30.
- Strangulation* was defined as application of external pressure on the neck either by bare hands, a ligature, or other material.
- Multiple forms of assault* was defined as two or more of the following methods of penetration: penile-vaginal, penile-anal, penile-oral, oral-vaginal, digital, and/or foreign object.
- Drug facilitated sexual assault (DFSA)* was defined as sexual assault after the patient became incapacitated due to having consumed alcohol and/or drugs or been intentionally administered another date rape drug.

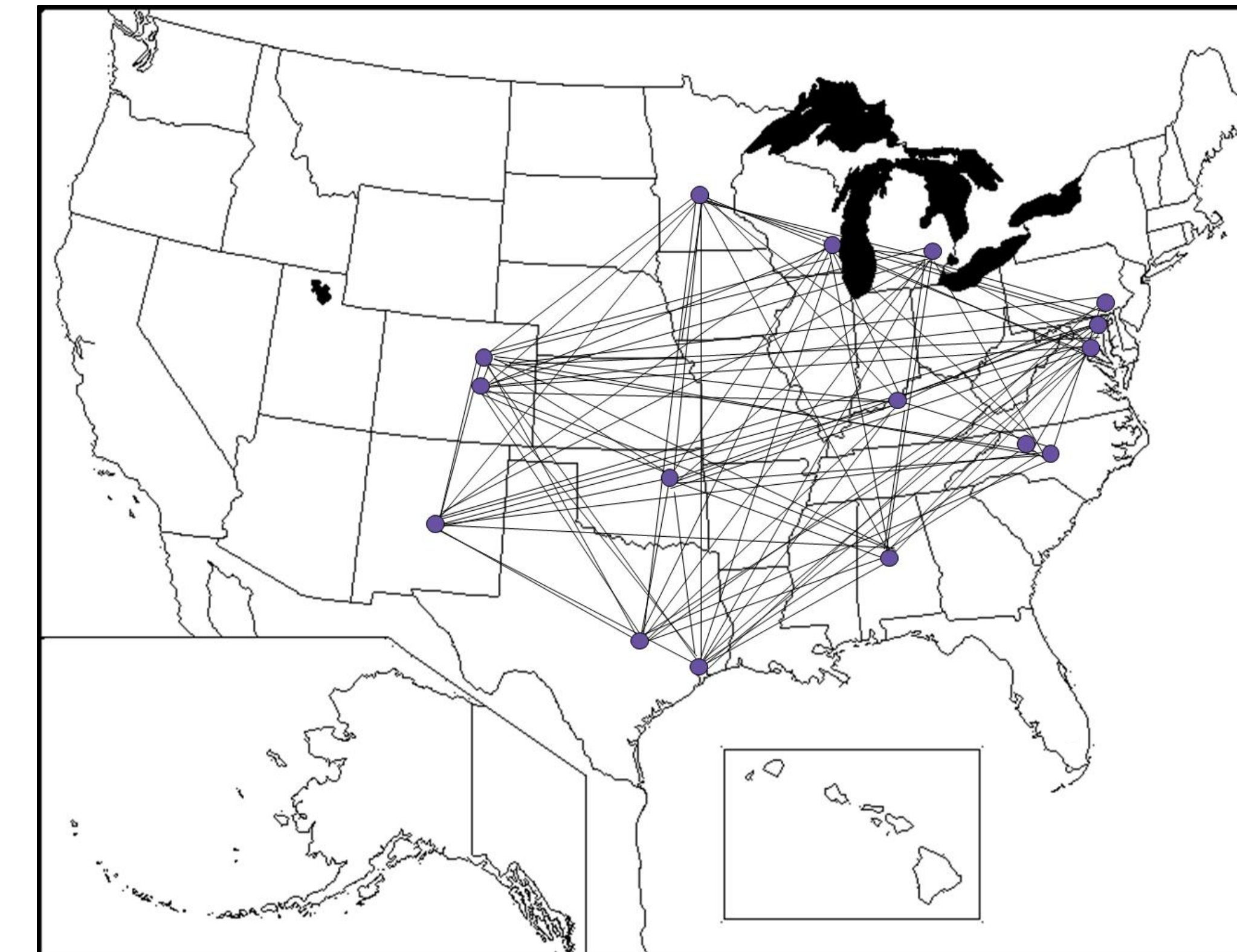
**Table 1. Sexual Assault Survivor Characteristics (n=228)**

Age, mean (SD)	28 (10)
Ethnicity, n (%)	
African American	34 (15)
European American	126 (55)
Multi-ethnic/other	68 (30)
Highest level of education completed, n (%)	
High school or less	75 (33)
Some college or other training	110 (48)
College grad or post-grad	43 (19)
Relationship status, n (%)	
Not in a serious relationship	132 (58)
Serious relationship	54 (24)
Separated/Divorced/Widowed	42 (18)
Number of children, n (%)	
None	126 (55)
1-2	70 (31)
3 or more	32 (14)

**Table 2. PTS scores at 6 weeks according to selected assault-related and participant characteristics**

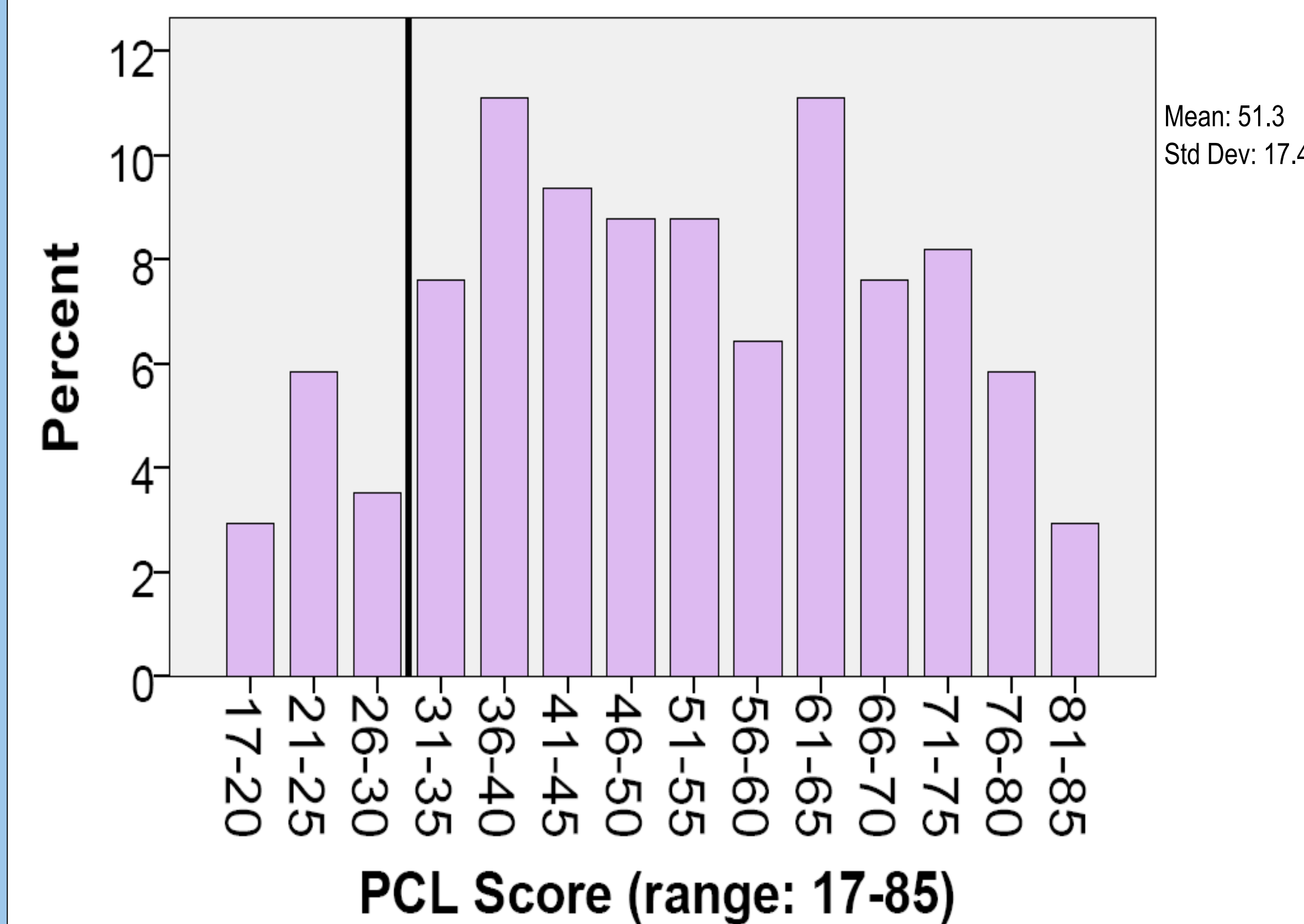
Characteristic	Prevalence (%)	Mean (SD) PCL-S Score in those with characteristic present vs. absent	t value	p value
Threat of physical injury to the patient or patient's loved one	21%	51 (19) vs. 51 (18)	-0.06	0.95
Possession of weapon	16%	54 (18) vs. 50 (18)	-0.9	0.37
Assailant known (includes relative)	72%	52 (18) vs. 51 (17)	-0.28	0.78
Strangulation reported	28%	59 (15) vs. 49 (18)	-3.15	0.002
Multiple Assailants	9%	57 (17) vs. 51 (18)	-1.03	0.31
Penile-Vaginal Penetration	92%	52 (18) vs. 51 (21)	-0.06	0.95
Multiple forms of assault	76%	52 (18) vs. 46 (19)	-1.32	0.19
Drug facilitated	35%	51 (16) vs. 52 (18)	0.15	0.88
European American	62%	54 (17) vs. 47 (18)	-2.29	0.02
Hispanic	28%	55 (16) vs. 50 (18)	-1.82	0.07
>30 years of age	27%	52 (21) vs. 51 (16)	-0.3	0.76
Earn > \$20,000 annually	56%	50 (16) vs. 54 (19)	1.3	0.2
Post-High School Education or higher	93%	51 (17) vs. 56 (22)	1.0	0.32

\*The prevalence of these assault characteristics exclude "don't know" responses and are presented out of the total number of Y/N responses received.



**Figure 1. Better Tomorrow Network**

**Week 6 PCL Score**



**Figure 2. Distribution of PTS severity in sample at 6 weeks (n=165)**

*"My day to day life has changed. I no longer feel comfortable doing things I once did. Such as hanging out with friends and doing normal things. I now just prefer to be alone."*

*"I rarely personally feel clean, even after dozens of showers."*

*"I've been trying to avoid anything related to the assault, at the same time I felt less sensitive to any emotions, either good ones or bad ones."*

*"My life was changed forever. I will never be the same person no matter how hard I try."*

**Figure 3. Example participant qualitative comments**

## Results

- Characteristics of initial participants enrolled are shown in Table 1.
- Posttraumatic stress symptoms were universal 6 weeks after sexual assault; with 150/181 (83%) women meeting criteria for substantial posttraumatic stress symptoms.
- Strangulation during assault and European American ethnicity (vs. other) predicted greater posttraumatic stress symptoms at six weeks (Table 2).
- Strangulation during assault was also associated with more severe anxiety symptoms [27 (8) vs. 22 (10),  $p < 0.05$ ] and a greater number of worsening somatic symptoms [7 (3) vs. 5 (4),  $p < 0.05$ ].
- Example qualitative comments from enrolled participants are shown in Figure 3.

## Conclusion

- In general, among SA survivors there was little association between posttraumatic stress symptom severity at 6 weeks and the presence or absence of specific assault-related characteristics. This may in part be due to the high burden of posttraumatic stress symptoms among all survivors.
- Strangulation-associated sexual assault, but not other sexual assault-related characteristics, predicted increased posttraumatic stress, anxiety, and worsening somatic symptoms 6 weeks after assault.
- Further analyses will evaluate the association between assault characteristics and outcomes in the full cohort at later time points.

## References

- García-Moreno, C.; World Health Organization, Department of Gender and Women's Health. (2005). WHO Multi-Country Study on Women's Health and Domestic Violence against Women: Initial Results on Prevalence, Health Outcomes and Women's Responses (Geneva: World Health Organization).
- Ulirsch JC, Ballina LE, Soward AC, Rossi C, Hauda WE, Holbrook D, Wheeler R, Foley KA, Batts J, Collette R, Goodman E, McLean SA. Pain and somatic symptoms are sequelae of sexual assault: results of a prospective longitudinal study. *Eur J Pain*. 18(4):559-66, 2014.
- McLean SA, Soward AC, Ballina LE, Rossi C, Rotolo S, Wheeler R, Foley KA, Batts J, Casto T, Collette R, Holbrook D, Goodman E, Rauch SA, Liberzon I. Acute severe pain is a common consequence of sexual assault. *J Pain* 13(8):436-41, 2012.
- Yehuda R. Post-Traumatic Stress Disorder. *New England Journal of Medicine* 346(2):108-14, 2002.

## Funding

Research reported in this publication was supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases of the National Institutes of Health under Award Number R01 AR064700. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.