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ORIGINAL PAPER

Trauma and conditional risk of posttraumatic stress disorder in two American Indian reservation communities

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Abstract
Purpose To determine conditional risk of posttraumatic stress disorder (PTSD) in two culturally distinct American Indian reservation communities.
Method Data derived from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project, a cross-sectional population-based survey that was completed between 1997 and 2000. This study focused on 1,967 participants meeting the DSM-IV criteria for trauma exposure. Traumas were grouped into interpersonal, non-interpersonal, witnessed, and "trauma to close others" categories. Analyses examined distribution of worst traumas, conditional rates of PTSD following exposure, and distributions of PTSD cases deriving from these events. Bivariate and multivariate logistic regressions estimated associations of lifetime PTSD with trauma type.
Results Overall, 15.9 % of those exposed to DSM-IV trauma qualified for lifetime PTSD, a rate comparable to similar US studies. Women were more likely to develop PTSD than were men. The majority (60 %) of cases of PTSD among women derived from interpersonal trauma exposure (in particular, sexual and physical abuse); among men, cases were more evenly distributed across trauma categories.
Conclusions Previous research has demonstrated higher rates of both trauma exposure and PTSD in American Indian samples compared to other Americans. This study shows that conditional rates of PTSD are similar to those reported elsewhere, suggesting that the elevated prevalence of this disorder in American Indian populations is largely due to higher rates of trauma exposure.

Keywords Posttraumatic stress disorder · Trauma · American Indians · Epidemiology · Conditional risk

The members of the AI-SUPERPFP Team are given in Appendix.

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Introduction

The conditional nature of posttraumatic stress disorder (PTSD) is unusual among the more common psychiatric disorders. By definition, PTSD can only be diagnosed in those exposed to a DSM-qualifying trauma [1].[1] Traumas

[1] DSM-IV defines a trauma as an event or events that (1) "involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others" AND "the person's response involved intense fear, helplessness, or horror." (pp. 427–428 [1]). The literature does not always conform to this full definition (e.g., in non-psychiatric literature or in studies predating DSM-IV). Here, "qualifying trauma" is used when the full DSM-IV definition was applied. This was the case for the AI-SUPERPFP trauma assessments described here.

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include profoundly stressful experiences, such as suffering violence to self or witnessing it in loved ones. Population-based prevalence statistics, then, can be considered the product of two probabilities: first, exposure to a DSM-qualifying trauma and second, development of PTSD given such exposure (conditional risk). While population-based prevalence statistics are critical for understanding overall mental health, investigations of conditional risk and associated demographic correlates help target prevention and treatment efforts more precisely by focusing, for instance, on those traumas most likely to lead to PTSD. Here, we investigated conditional risk for PTSD in two well-defined American Indian samples.

Lifetime trauma exposure is common [2–5]. It is even more prevalent in American Indian populations, where such exposure rises to the level of a significant public health concern [6, 7]. For example, American Indians are more likely to die as a result of accidental injuries, homicide, and motor vehicle accidents than those in the general population [8]. Their rates of criminally violent victimization are twice those of African Americans and 2.5 times those of Whites [9]. The results reported in the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP), a unique population-based survey of two large American Indian reservation communities [10, 11], corroborate these earlier findings. Participants more often experienced physical assaults and witnessed traumatic events, or reported that loved ones had experienced such events, than did their counterparts in the baseline National Comorbidity Survey (NCS) [3].

Disparities in PTSD among American Indians parallel similar differences in trauma exposure. While this disorder affects an estimated 7–8 % of Americans during their lifetimes [4, 12–14], the handful of studies of American Indian populations that allow comparisons to national data show higher rates. For instance, a study of Vietnam veterans using the Structured Clinical Interview for DSM-III-R (SCID) [15] found lifetime PTSD rates significantly higher for the two American Indian samples than for Whites. Data from the AI-SUPERPFP, which used methods comparable to those of the baseline NCS, likewise showed lifetime PTSD rates significantly higher for both men and women in tribal samples than among other Americans [16].

Published estimates of conditional risk for PTSD suggest that about 14 % of those in the general population who experience trauma develop PTSD [17]. They also reveal that rates vary across types of exposure; for instance, Breslau and colleagues [17] reported conditional rates of PTSD ranging from 28.8 % for interpersonal violence to 2.7 % for trauma to someone close.

We drew upon AI-SUPERPFP data to determine the distribution of four commonly used categories of qualifying traumatic events [2, 6]: interpersonal, non-interpersonal, witnessed traumas, and trauma to close others. We described conditional risk of PTSD by both trauma category and specific events. Finally, we examined the distribution of PTSD cases by trauma type and event. Embarking on this work, we expected conditional risk of PTSD to reflect patterns similar to those observed in the general population; in particular, we anticipated that risk would vary across trauma categories and events and by gender. Given earlier AI-SUPERPFP reports of similar distributions of traumas and overall prevalence of PTSD [6, 11, 16] by tribe, we did not foresee significant tribal variation.

Methods

Sample

AI-SUPERPFP estimated the prevalence of psychiatric disorders and associated service use in two large culturally distinct, reservation populations. Populations of inference were 15- to 54-year-old enrolled members of two closely related Northern Plains (NP) tribes and a Southwest (SW) tribe. Under formal agreements to preserve confidentiality, we use general descriptors in place of specific tribal names [18].

The two tribal groups differ in language, creation stories, migratory histories, principles of reckoning descent, and historical forms of subsistence. They share similar histories of colonization including dramatic military resistance and externally imposed forms of governance. Although the tribes vary considerably in education, income, and integration into the larger society, unemployment and poverty are widespread in both.

All participants included in AI-SUPERPFP lived on or within 20 miles of their reservations at time of sampling (1997). Stratified random sampling procedures were used, with strata defined by tribe, gender, and age. Official enumerations of tribal members known as tribal rolls were used to define the target population. Records were selected randomly from these rolls for inclusion in replicates, which were then released as needed to allow approximately 1,500 completed interviews per tribe. In the SW and NP, respectively, 46.6 and 39.2 % of persons on tribal rolls lived on or near their reservations; of those located and found eligible, 76.8 % in the NP ($N = 1{,}638$) and 73.7 % in the SW ($N = 1{,}446$) participated. Sample weights accounted for differential selection probabilities across strata and for varying rates of non-response by strata. AI-SUPERPFP methods are described in greater detail elsewhere [10].

Data collection procedure

Before AI-SUPERPFP began, research approvals were obtained from all participating tribes and from the

Colorado Multiple Institutional Review Board. After providing a complete description of the study, written informed consent was obtained from all adult participants; for minors, parental/guardian consent was acquired prior to adolescent assent. Participants were interviewed individually by tribal members who received intensive training on data collection methods; interviews were computer-assisted, with responses entered directly into laptops. Extensive quality control procedures verified that location, recruitment, and interview procedures were conducted in a standardized, reliable manner.

Measures

AI-SUPERPFP interview questions assessing trauma exposure and PTSD diagnostic status derived from multiple sources [3, 19, 20]. The PTSD module was a modified version of the Composite International Diagnostic Interview [21, 22] based on DSM-IV [1] criteria. The instrument included 15 common traumas most often linked to a diagnostic assessment of PTSD in American Indian and other populations. Types of trauma were aggregated into four common domains: *interpersonal* traumas, such as sexual or physical assaults and domestic, spousal, or child abuse (7 items); *non-interpersonal* trauma, specifically disasters or accidents (2 items); *witnessed* trauma, such as observed assaults or accidents (3 items); and significant *trauma, experienced by close friends or family* (3 items) [3, 19, 20]. A final question asked about *other* traumas. Assessment of the worst event was obtained as follows: "You told me you had been in several extremely stressful situations. I'll repeat the situations you told me about. I'd like you to think about the 3 times that were the worst." The analyses that follow focused on the trauma that each participant prioritized *first* in his or her list of worst experiences.

Full compliance with the DSM-IV definition of trauma was assessed by asking the following questions of each of the three worst events: (1a) at the time, did you believe that you or someone else could be killed or seriously harmed? (1b) At the time, were you seriously harmed or was anyone else killed or seriously harmed? (2a) When this happened, did you experience feelings of intense helplessness? (2b) Did you experience intense fear? (2c) At the time, did you feel horrified? In order to be a qualifying trauma, a "yes" response was required for either 1a or 1b (actual or threatened death or injury) *and* 2a, 2b, or 2c (a personal response of helplessness, fear, or horror).

Analyses

Variable construction was completed using SAS [23] and SPSS [24]. All inferential analyses were conducted in Stata [25]. We estimated both exposure to DSM-IV qualifying traumas and lifetime conditional risk of PTSD among those reporting trauma, stratifying by gender within each tribe. Employing Stata's "svy: tab" procedure, with Pearson χ^2 values corrected for survey design and converted to F values, we determined significant differences across groups. Post hoc analyses of non-overlapping confidence intervals permitted for specific group contrasts; in light of multiple comparisons, we only discuss comparisons significant at $p < 0.01$. The percentages of PTSD cases due to specific qualifying trauma categories and events were calculated and contrasted across gender using parallel methods. Logistic regression methods were used to estimate bivariate and multivariate associations of lifetime PTSD with trauma type and demographic variables. Since witnessed trauma exhibited the weakest conditional risk of PTSD, it was selected as primary referent. We assessed interactions among gender, tribe, and worst trauma type; only the interaction between tribe and non-interpersonal events was significant. Adjusted odds ratios are reported separately for this interaction.

Results

Sample demographics

The sample was restricted to participants reporting at least one qualifying trauma. These 1,967 participants made up 64 % of the total sample, ranging from 59 % for SW males to 67 % for NP females. Trauma-exposed participants were more likely than their non-exposed counterparts to be from the NP tribe, to report a post-secondary education, to work for pay, and to be married/living as married. Table 1 presents demographic characteristics for the trauma-exposed sample.

Trauma prevalence

Table 2 summarizes the events identified as participants' worst qualifying trauma. Although between-group differences are highlighted there, comparisons of confidence intervals within samples also allow inferences within four tribe-by-gender groups. Interpersonal traumas were more commonly reported among women than among men for both tribes. By contrast, SW men reported higher prevalence of non-interpersonal trauma than did their female counterparts in the same tribe, while NP men were more likely to report non-interpersonal traumas than were both groups of women. Within-group comparisons show that, among both groups of men, witnessed traumas were more common than either interpersonal traumas or traumas to someone close. For women, interpersonal traumas were

Table 1 Demographic characteristics of the AI-SUPERPFP samples exposed to trauma, by tribe and gender

	Southwest						Northern Plains					
	Males (SM)			Females (SF)			Males (NM)			Females (NF)		
n:	362			513			521			571		
% trauma exposed sample[a]:	18.4			26.1			26.5			29.0		
% population sample[b]:	58.7			61.9			65.9			67.3		
	%	99 % CI	Tribe by gender[c]	%	99 % CI	Tribe by gender[c]	%	99 % CI	Tribe by gender[c]	%	99 % CI	Tribe by gender[c]
Age												
15–24	26.8	22.7–31.2		21.6	18.4–25.2		20.0	17.0–23.3		23.6	20.7–26.8	
25–34	27.9	23.3–33.1		27.9	240–322		27.7	23.7–32.2		29.3	255–33.4	
35–44	24.6	20.0–30.0		31.5	27.4–36.0		32.7	28.5–37.3		27.8	24.0–31.8	
45+[d]	20.7	17.1–24.8		19.0	16.0–22.4		19.6	16.7–22.9		19.3	16.6–22.2	
Education												
<12 years	22.4	77.2–28.5		21.5	17.1–26.7		20.8	76.5–258		24.9	20.4–30.0	
HS Grad or GED	48.5	41.7–55.4		40.0	344–45.9	NM	52.7	46.7–58.6	SF,NF	39.0	33.6–44.6	NM
Post-secondary	29.1	23.3–35.7		38.5	330–44.3	NM	26.5	27.5–32.7	SF	36.1	30.8–41.8	
Employment												
Student	10.6	7.1–15.5		10.9	79–74.8		8.2	57–77.7		13.5	10.3–17.4	
Working for pay	64.8	58.0–71.0		61.9	56.2–67.2		63.4	57.5–68.9		53.6	47.9–59.1	
Not working for pay[e]	24.7	19.2–31.0		27.3	224–32.7		28.4	23.3–34.7		33.0	27.8–38.6	
Marital status												
Married	42.5	36.7–49.7	NF	43.4	37.8–49.7	NM,NF	30.4	25.2–362	SF	28.7	23.9–34.2	SM,SF
Separated, divorced, widowed	8.5	5.5–73.0	NF	12.2	90–76.4		14.7	10.9–19.4		19.4	15.4–24.2	SM
Never married	32.0	26.1–38.5		24.1	19.6–29.1		29.4	24.4–34.9		26.3	21.9–31.2	
Cohabitating or living as married	17.0	724–228		20.3	760–255		25.6	20.7–31.2		25.6	20.9–30.9	

CI confidence interval (CI)

[a] Percentage of the 1,967 AI-SUPERPFP participants reporting exposure to a DSM-IV qualifying trauma

[b] Percentage of the full tribe by gender samples (SM = 617, SF = 829, NM = 790, NF = 848)

[c] Pairwise comparisons between groups significantly different at $p \leq 0.01$ denoted with superscripts: *SM* Southwest males, *SF* Southwest females, *NM* Northern Plains males, NF Northern Plains females

[d] While at time of sample selection (1997) the maximum age was 54, some persons were older at time of interview (1997–1999)

[e] Includes homemaker, looking for work, unemployed, retired, permanently disabled, other

Table 2 Worst qualifying trauma experienced in AI-SUPERPFP trauma exposed sample, by tribe and gender

	Southwest						Northern Plains					
	Males (SM)			Females (SF)			Males (NM)			Females (NF)		
n:	362			513			521			571		
	%[a]	99 % CI	Tribe by gender[b]	%	99 % CI	Tribe by gender[b]	%	99 % CI[b]	Tribe by gender[b]	%	99 % CI	Tribe by gender[b]
DSM-IV qualifying trauma												
Interpersonal trauma	21.2	16.1–27.3	SF,NF	42.5	36.9–48.4	SM,NM	18.8	14.6–23.8	SF,NF	35.4	30.1–41.0	SM,NM
Served in direct combat	3.1	15–6.3	SF,NF	0.0	0.0–1.3	SM,NM	3.8	2.2–6.5	SF,NF	0.1	0.0–1.4	SM,NM
Raped	1.3	0.4–4.7	SF,NF	11.2	8.0–75.5	SM,NM	1.3	0.5–3.5	SF,NF	11.0	8.0–15.1	SM,NM
Molested	1.2	0.3–4.3		3.9	2.7–7.7	NM	0.5	0.1–2.1	SF	2.6	1.3–5.3	
Physically abused/hurt by parent/caregiver	3.3	15–6.8		2.7	7.3–5.5		3.7	2.1–6.6		3.1	1.7–5.7	
Physically abused/hurt by spouse or partner	1.9	0.7–4.9	SF,NF	20.5	76.2–25.6	SM,NM	3.7	1.9–6.9	SF,NF	15.0	11.3–19.8	SM,NM
Physically abused/hurt by someone else	2.3	0.9–5.7		3.6	7.9–6.5		1.7	0.7–4.3		1.7	0.8–3.8	
Robbed, mugged, physically attacked	8.2	5.0–72.9	SF,NF	0.7	0.1–2.9	SM	4.1	2.3–7.3		1.8	0.7–4.5	SM
Non-interpersonal trauma	23.9	18.6–30.2	SF	13.2	9.7–17.6	SM,NM	29.2	24.0–35.0	SF,NF	17.8	13.8–22.7	NM
Natural disaster	6.2	3.6–70.5		3.7	2.0–6.5	NM	11.1	7.8–15.7	SF	5.6	3.5–8.9	
Life-threatening accident	17.7	13.1–23.5		9.5	6.6–13.6	NM	18.1	13.9–23.2	SF	12.2	8.8–16.6	
Witness trauma	36.5	30.1–43.4		29.7	24.7–35.3		34.0	28.6–40.0		28.0	23.2–33.3	
Witnessed violence between family members	13.4	9.3–78.9		19.3	15.1–24.3	NM	10.3	7.2–14.5	SF	16.2	12.5–20.8	
Witnessed others raped, injured, or killed	2.9	7.3–6.4		1.3	0.5–3.7		3.3	1.6–6.6		2.2	1.0–4.9	
Witnessed serious accident or disaster	20.2	75.3–26.3	SF,NF	9.1	6.3–13.0	SM,NM	20.4	15.9–25.7	SF,NF	9.5	6.7–13.4	SM,NM
Trauma to someone close	16.8	12.2–22.6		13.5	10.0–18.0		16.8	12.8–21.6		17.4	13.6–22.0	
Someone close in life-threatening situation	5.6	3.7–9.6		3.7	2.0–6.7		5.5	3.4–8.8		4.0	2.3–6.7	
Someone close raped/ sexually abused	2.2	0.9–5.5		3.5	1.9–6.4		2.3	1.1–4.6		5.7	3.6–8.9	
Family member or someone close committed suicide	9.0	5.7–73.8		6.3	4.0–9.7		9.0	6.1–13.0		7.7	5.2–11.3	
Other traumatic experiences	1.6	0.6–4.3		1.1	0.4–3.2		1.2	0.4–3.8		1.4	0.5–4.0	

CI confidence interval

[a] Percentages derived as follows: (number of participants choosing specific trauma as their worst/number of participants indicating lifetime experience of any qualifying trauma)

[b] Pairwise comparisons between tribe-gender groups significantly different at $p \leq 0.01$ are denoted with superscripts: *SM* Southwest males, *SF* Southwest females, *NM* Northern Plains males, *NF* Northern Plains females

most common (compared to all other types of events for SW women, and compared to all but witnessed trauma among NP women).

Turning to specific events, gender differences continued to predominate. Among interpersonal events, combat exposure was identified as the worst event only among men, while women more often identified rape and spousal abuse. Among witnessed traumas, men were more likely than women to name seeing a serious accident or disaster as their worst event.

Table 3 Prevalence of DSM-IV lifetime PTSD within each category of trauma exposure, by tribe and gender

	Southwest						Northern Plains					
	Males				Females							
	n[a]	%	99 % CI	Tribe by gender[b]	n	%	99 % CI	Tribe by gender[b]	n	%	99 % CI	Tribe by gender[b]	n	%	99 % CI	Tribe by gender[b]
DSM-IV qualifying trauma																
Interpersonal trauma	76	21.0	11.2–35.8		211	33.1	25.1–42.2		101	16.1	8.4–28.5		198	30.3	22.2–39.8	
Non-interpersonal trauma	87	16.5	8.4–29.9		68	18.7	9.0–34.8		148	4.8	1.7–12.8		97	10.6	4.8–21.7	
Witness trauma	130	7.5	3.2–16.6		151	9.6	4.8–18.3		172	6.9	3.3–13.8		161	13.3	7.7–21.9	
Trauma to someone close	61	13.2	5.3–29.3		72	20.7	11.0–35.4		93	11.5	5.3–23.0		106	13.7	6.9–25.4	
Any trauma[c]	361	13.3	9.2–18.8		508	22.2	17.7–27.5	NM	519	8.7	5.9–12.5	SF,NF	569	18.8	14.8–23.5	NM

CI confidence interval

[a] Unweighted sample size of participants reporting this type of qualifying trauma as their worst whose PTSD status is known

[b] Pairwise comparisons between groups significantly different at $p \leq 0.01$ denoted with superscripts: *SM* Southwest males, *SF* Southwest females, *NM* Northern Plains males, *NF* Northern Plains females

[c] Includes other trauma category

Conditional rates of PTSD

Overall, 15.9 % of those reporting a qualifying trauma received a lifetime PTSD diagnosis. Participants prioritizing an interpersonal event as their worst trauma had a conditional rate of PTSD of 27.8 %—higher than those who suffered witnessed trauma (9.3 %), non-interpersonal trauma (11.0 %), or trauma to someone close (14.5 %). Table 3 shows that, when considering all traumas, conditional rates of PTSD were lower for NP men than for either sample of women. In both tribes, women with an interpersonal "worst event" had higher conditional rates of PTSD than did those whose worst event was witnessed trauma. NP women with an interpersonal worst event also had higher rates than did those whose worst event was non-interpersonal. No within-sample differences emerged for men.

Correlates of lifetime PTSD

We investigated relationships between PTSD and type of qualifying trauma, gender, tribe, education, age, employment, and marital status (Table 4). Turning first to unadjusted bivariate results, individuals experiencing either interpersonal traumas or trauma to close others were more likely to qualify for lifetime PTSD than were those who witnessed a traumatic experience. In addition, women, SW participants, and participants aged 25 or older were more likely to exhibit PTSD in unadjusted analyses.

Interpersonal traumas, traumas to someone close, female gender, and older age persisted as significant correlates when odds ratios were adjusted for other correlates. Controlling for other variables, those who were employed at time of interview were less likely to qualify for lifetime PTSD. Of special interest, an interaction (interpersonal trauma by tribe) showed that the odds of lifetime PTSD related to exposure to interpersonal trauma were significantly greater in the SW than in the NP.

Distribution of PTSD cases by trauma

Table 5 presents distribution of PTSD cases by trauma type and event, both overall and by gender. In general, more than half of PTSD cases were associated with interpersonal trauma; rates related to witnessed trauma, trauma to someone close, and non-interpersonal trauma were significantly lower and comparable to one another. Among women, 60.5 % of the PTSD cases were due to interpersonal trauma; however, this was true for only 33.7 % of men.

Discussion

These results provide a critical link between two previous AI-SUPERPFP reports, each of which compared this

Table 4 Correlates of DSM-IV lifetime PTSD among AI-SUPERPFP participants exposed to a qualifying trauma

	Unadjusted		Adjusted	
	OR	95 % CI	OR	95 % CI
Qualifying trauma type				
Witnessed	1.00		1.00	
Interpersonal	3.75***	**2.68–5.25**	3.34***	**2.37–4.71**
Non-interpersonal[a]	1.21	0.79–1.85		
Southwest	–	–	1.94*	**1.13–3.31**
Northern Plains	–	–	0.81	0.44–1.49
Trauma to close other	1.66*	**1.09–2.52**	1.68*	**1.09–2.57**
Gender				
Male	1.00		1.00	
Female	2.16***	**1.66–2.83**	1.68***	**1.26–2.23**
Tribe				
Northern Plains	1.00		1.00	
Southwest[a]	1.40**	**1.09–1.80**		
Non-interpersonal trauma	–	–	2.81**	**1.44–5.47**
Trauma other than non-interpersonal	–	–	1.18	0.88–1.57
Education				
<12 years	1.00		1.00	
12th grade	0.91	0.65–1.26	0.89	0.62–1.28
Post HS	1.30	0.93–1.82	1.15	0.79–1.67
Age				
15–24	1.00		1.00	
25–34	1.90***	**1.28–2.80**	1.92**	**1.26–2.92**
35–44	1.91***	**1.30–2.81**	1.91**	**1.24–2.95**
45+[b]	2.41***	**1.65–3.52**	2.49***	**1.63–3.82**
Employment				
Not working for pay	1.00		1.00	
Employed	0.84	0.65–1.08	0.69**	**0.52–0.91**
Marital status				
Not married	1.00		1.00	
Married or cohabiting	1.14	0.89–1.47	1.04	0.79–1.37

OR odds ratio, *CI* confidence interval

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

[a] The three-way interaction between trauma type, tribe, and gender was not significant at $p < 0.05$. The only significant two-way interaction between trauma type, tribe, and gender was between experience of non-interpersonal trauma and tribe. We consequently report how the effect of exposure to non-interpersonal trauma varies by tribe, and how the effect of tribal membership varies according to whether the experienced trauma was non-interpersonal or another type

[b] While at time of sample selection (1997) the maximum age was 54, some persons were older at time of interview (1997–1999)

study's findings to the NCS baseline study. Manson and colleagues [6] showed that trauma exposure for these tribal samples was relatively high when compared to others in the US, especially for women; Beals et al. [16] demonstrated that rates of lifetime PTSD surpassed those reported in NCS. Given that PTSD is the product of the probability of exposure and, given exposure, the conditional risk for PTSD, the current study supplies essential insights that help to explain elevated rates of PTSD in the AI-SUPERPFP samples.

Trauma exposure

An earlier report compared AI-SUPERPFP trauma rates to those of the baseline NCS [6]. Since NCS predated DSM-IV, that analysis did not focus solely on qualifying traumas but rather general trauma exposure. Almost two-thirds of the AI-SUPERPFP sample reported lifetime trauma exposure, with these rates falling in the upper range reported for US men and being higher than for US women [6]. With respect to specific traumas, AI-SUPERPFP participants

Table 5 Distribution of AI-SUPERPFP lifetime PTSD cases due to specific qualifying traumas, overall and by gender

n with lifetime PTSD:	Total			Males			Females			Gender difference[a]
	318			96			222			
	n[b]	%	99 % CI[c]	*n*[b]	%	99 % CI[c]	*n*[b]	%	99 % CI[c]	
DSM-IV qualifying trauma										
Interpersonal trauma	164	52.4	45.0–59.8	33	33.7	22.2–47.7	131	60.5	51.6–68.8	$F = 17.9050$, $p < 0.0001$
Served in direct combat	10	2.3	1.0–5.2	10	7.8	3.4–16.7	0	0.0	0.0–2.9[d]	$F = 22.4663$, $p < 0.0001$
Raped	48	14.7	10.2–20.7	1	1.3	0.1–14.9	47	20.5	14.2–28.6	$F = 16.0103$, $p = 0.0001$
Molested	18	6.1	3.3–11.1	2	2.2	0.3–12.7	16	7.8	4.1–14.6	
Physically abused/hurt by parent/caregiver	14	4.8	2.4–9.6	8	9.4	3.7–22.2	6	2.8	0.9–8.1	$F = 5.5920$, $p = 0.0181$
Physically abused/hurt by spouse or partner	59	19.7	14.3–26.4	3	3.3	0.7–14.6	56	26.7	19.5–35.5	$F = 19.4989$, $p < 0.0001$
Physically abused/hurt by someone else	4	0.9	0.2–3.2	2	1.4	0.2–8.4	2	0.7	0.1–4.0	
Robbed, mugged, physically attacked	11	3.9	1.8–8.4	7	8.3	3.2–20.2	4	2.0	0.5–7.3	$F = 6.0993$, $p = 0.0136$
Non-interpersonal trauma	44	14.4	9.8–20.5	21	23.3	13.6–37.0	23	10.5	6.1–17.4	$F = 8.1061$, $p = 0.0044$
Natural disaster	8	2.6	1.0–6.4	7	7.3	2.6–18.5	1	0.5	0.0–6.5	$F = 10.6992$, $p = 0.0011$
Life-threatening accident	36	11.8	7.7–17.6	14	16.0	8.2–29.1	22	10.0	5.8–16.8	ns[e]
Witness to trauma	58	18.4	13.3–25.0	22	23.7	14.0–37.3	36	16.2	10.7–23.8	ns
Witnessed violence between family members	28	9.1	5.6–14.4	10	10.6	4.7–22.2	18	8.5	4.7–15.0	ns
Witnessed others raped, injured, or killed	8	2.8	1.1–7.1	3	3.4	0.7–15.0	5	2.5	0.8–8.1	ns
Witnessed serious accident or disaster	22	6.5	3.7–11.2	9	9.7	4.0–21.5	13	5.2	2.5–10.5	ns
Trauma to someone close	52	14.8	10.3–20.6	20	19.3	10.8–31.9	32	12.8	8.0–19.6	ns
Someone close in life-threatening situation	13	3.8	1.8–7.8	5	5.1	1.5–15.8	8	3.2	1.2–8.0	ns
Someone close raped/sexually abused	16	4.9	2.5–9.3	3	2.7	0.6–11.3	13	5.9	2.8–11.8	ns
Family member or someone close committed suicide	23	6.1	3.5–10.3	12	11.5	5.4–22.9	11	3.7	1.7–8.0	$F = 8.0474$, $p = 0.0046$
Other traumatic experiences	0	0.0	0.0–2.0[d]	0	0.0	0.0–6.4[d]	0	0.0	0.0–2.9[d]	ns

[a] Test results of gender difference. Only differences significant at $p \leq 0.05$ are reported. Design-based F with $df = 1, 2792$ and p value reported

[b] Unweighted N reporting trauma as worst

[c] 99 % confidence intervals

[d] 99 % one-sided confidence interval

[e] Non-significant at $p < 0.05$

exhibited higher rates of exposure for witnessed trauma, trauma to someone close, and interpersonal trauma; among American Indian women, rates of sexual assault also were higher than those of their NCS counterparts. Both AI-SUPERPFP and NCS results contrast with those of Breslau and colleagues, who reported trauma exposure rates of 90 % in the Detroit Area Study of Trauma (DAST) [2]. The difference in observed rates is likely entirely due to Breslau's inclusion of the sudden unexpected death of a close other in the list of potential traumas, as is allowed under DSM-IV [1]. Over 60 % of their sample endorsed this trauma alone [2]. Had AI-SUPERPFP included this event among traumas, no doubt both the trauma and PTSD prevalence rates would have been higher.

In contrast to the above, here we focus on DSM-IV qualifying traumas, that is, those that involved real or threatened injury or death as well as intense personal reactions. When AI-SUPERPFP participants were asked to identify their worst qualifying trauma, witnessed (31.6 %) and interpersonal (30.1 %) traumas were named most often, followed by non-interpersonal traumas (20.8 %) and traumas to someone close (16.1 %). Gender differences were common. Among event categories, interpersonal trauma was the most frequent type of trauma reported by women; witnessed trauma was named most frequently by men. In regard to specific events, accidents (either experienced or witnessed) were most commonly identified as the worst event by men; spousal abuse, witnessed familial violence, and rape/molestation were most frequently listed by women.

Although comparable data about worst event have not been published using the baseline NCS, the DAST findings provide important context. In particular, interpersonal and witnessed traumas appear to be more commonly identified as worst among AI-SUPERPFP participants than in that population-based study of Detroit residents [17]. Although the degree to which methodological differences between these studies influence such comparisons is undeterminable, AI-SUPERPFP patterns are consistent with official statistics suggesting that trauma exposure is a significant public health concern among American Indians, especially exposure to violence [6–9].

Conditional risk for lifetime PTSD

Overall, conditional risk of PTSD, given exposure to a trauma, was 15.9 %, ranging between 8.7 % for NP males and 22.2 % for SW females. Comparable figures from DAST were 13.8 % overall, 9.2 % for men, and 16.5 % for women [17]. Baseline NCS rates were 8.1 % for men and 20.4 % for women [3]. Generally, then, conditional rates of PTSD among these three studies were similar, both overall and by gender.

Indeed, gender is critical for understanding PTSD prevalence. Breslau and colleagues [26, 27] have written extensively about the gender differentials in PTSD prevalence found in DAST and other studies. Typically, men have reported higher levels of trauma than women, accompanied by lower rates of PTSD. In contrast, in AI-SUPERPFP, men and women reported comparable levels of trauma exposure [6]. Furthermore, although a gender differential existed in conditional rates of PTSD, the odds ratios for gender were considerably smaller among AI-SUPERPFP participants than in either NCS or DAST [2, 3]. When we parse the findings by event category, an interesting difference emerges between DAST and AI-SUPERPFP. In both instances, conditional rates of PTSD associated with interpersonal trauma were typically twice those of other trauma types [2]. However, DAST reported a strong gender differential in conditional PTSD for interpersonal trauma [26]; this gender difference was not statistically significant in the American Indian samples as seen in Table 3, nor were the interactions between gender and event type significant when examined in preparation for Table 4. This finding may be interpretable in view of documented, high average levels of violence in many American Indian communities [9]. This reality arguably puts American Indians of both genders at greater risk for exposure to trauma and thus, PTSD than other Americans [16].

We did not anticipate, and rarely found, significant differences in conditional PTSD by tribe. Although such patterns have appeared for other diagnoses represented in AI-SUPERPFP data [11, 16, 28–30], their absence here may reflect the ubiquity of trauma exposure in the participating communities. Our ethnographic work has also suggested that PTSD diagnosis has considerable cultural validity across both tribes [31–33]. We did observe a significant relationship between trauma type and tribe for one category of event: SW participants experiencing non-interpersonal trauma confronted greater risk of PTSD than did their NP counterparts. Non-interpersonal events tended to be less frequent in the SW than in the NP (see Table 2). Whether the relative uniqueness of non-interpersonal events was important or the non-interpersonal events differed in severity across tribes merits future consideration.

Limitations

This study shares the limitations of all cross-sectional efforts. First, observed associations do not imply causal relationships. Second, sampling issues bear upon interpretation of findings. Our project collected data from only two American Indian reservation populations, and the extent to which these findings can be generalized beyond these communities is unknown. Likewise, our analyses included

only participants reporting at least one significant trauma. Analyzing only exposed individuals maximized the clinical relevance and appropriateness of our conclusions about conditional risk together with our ability to compare groups by exposure type. However, populations of inference were thereby further limited. In addition, our reliance upon self-report may have allowed participants to underreport stigmatizing traumas or symptoms. Finally, these findings represent the mental health status of two reservation communities between 1997 and 2000. We have compensated for the age of the dataset by restricting comparisons to the baseline NCS and DAST studies, both conducted close in time to AI-SUPERPFP. More importantly, AI-SUPERPFP's status as a large, landmark study—and one that is unlikely to be soon replicated—continues to recommend it as an important data source on PTSD among American Indians.

Conclusions

This study examined the life experiences of two American Indian reservation populations. The overall risk of PTSD, given trauma exposure, was comparable to that of other US populations studied using similar methods. We conclude that greater prevalence of PTSD reported for these samples [16] compared to other Americans is largely due to higher rates of trauma exposure [6], not to differential rates of conditional PTSD across populations. The most remarkable difference, compared to other studies, is the relative muting of gender differences in conditional risk in these tribal samples. In contrast to the commonly observed pattern of higher rates of trauma exposure among males nationally, men and women in our sample were equally likely to report trauma exposure. Similarly, although data from both the NCS and the DAST found traumatized women more often developed PTSD than did traumatized men, our findings showed a less marked gender differential. This was especially true for interpersonal traumas.

Epidemiological studies of PTSD supplement clinical understandings of the disorder in important ways [5]. In this case, our findings highlight the importance of preventing trauma exposure in American Indian communities—these high rates of trauma that are likely responsible for the relative pervasiveness of PTSD. Further, once exposure occurs, given the varying conditional rates of PTSD, careful targeting of scarce screening and intervention resources is possible. Among women, those experiencing interpersonal traumas deserve special attention but, more generally, these results offer clear justification for extending programs to both women and men. Rather than assuming that all, or even most, experiencing a qualifying trauma will develop PTSD, the use of screening, brief intervention, and referral techniques in common settings such as primary care show considerable promise [34–36]. It is to such efforts that we plan to turn our attention in the coming years.

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Conflict of interest The authors declare that they have no conflict of interest.

Appendix

In addition to those named, the AI-SUPERPFP team includes Cecelia K. Big Crow, Dedra Buchwald, Buck Chambers, Michelle L. Christensen, Denise A. Dillard, Karen DuBray, Paula A. Espinoza, Candace M. Fleming, Ann Wilson Frederick, Joseph Gone, Diana Gurley, Shirlene M. Jim, Carol M. Kaufman, Ellen M. Keane, Suzell A. Klein, Denise Lee, Monica C. McNulty, Denise L. Middlebrook, Christina M. Mitchell, Laurie A. Moore, Tilda D. Nez, Ilena M. Norton, Douglas K. Novins, Theresa O'Nell, Heather D. Orton, Carlette J. Randall, Angela Sam, James H. Shore, Sylvia G. Simpson, Paul Spicer, and Lorette Yazzie.

References

1. American Psychiatric Association (1994) Diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV). American Psychiatric Association, Washington, DC
2. Breslau N, Kessler RC, Chilcoat HD, Schultz LR, Davis GC, Andreski P (1998) Trauma and posttraumatic stress disorder in

the community: the 1996 Detroit Area Survey of Trauma. Arch Gen Psychiatry 55:626–632
3. Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB (1995) Posttraumatic stress disorder in the National Comorbidity Survey. Arch Gen Psychiatry 52:1048–1060
4. Keane TM, Marshall AD, Taft CT (2006) Posttraumatic stress disorder: etiology, epidemiology, and treatment outcome. Annu Rev Clin Psychol 2:161–197
5. McFarlane A (2004) The contribution of epidemiology to the study of traumatic stress. Soc Psychiatry Psychiatr Epidemiol 39:874–882
6. Manson SM, Beals J, Klein S, Croy CD, the AI-SUPERPFP Team (2005) The social epidemiology of trauma in two American Indian reservation populations. Am J Public Health 95:851–859
7. Robin RW, Chester B, Rasmussen JK, Jaranson JM, Goldman D (1997) Prevalence and characteristics of trauma and posttraumatic stress disorder in a southwestern American Indian community. Am J Psychiatry 154:1582–1588
8. US Department of Health and Human Services (2010) Trends in Indian health: 2002–2003. Department of Health and Human Services, Rockville
9. Bureau of Justice Statistics (2004) American Indians and crime. US Department of Justice, Washington, DC
10. Beals J, Manson SM, Mitchell CM, Spicer P, the AI-SUPERPFP Team (2003) Cultural specificity and comparison in psychiatric epidemiology: walking the tightrope in American Indian research. Cult Med Psychiatry 27:259–289
11. Beals J, Manson SM, Whitesell NR, Spicer P, Novins DK, Mitchell CM, for the AI-SUPERPFP Team (2005) Prevalence of DSM-IV disorders and attendant help-seeking in 2 American Indian reservation populations. Arch Gen Psychiatry 62:99–108
12. Kessler RC, Berglund P, Demler O, Jin R, Walters EE (2005) Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey-Replication. Arch Gen Psychiatry 62:593–602
13. Kessler RC, Chiu WT, Demler O, Walters EE (2005) Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 62:617–627
14. Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen H-U, Kendler KS (1994) Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. Arch Gen Psychiatry 51:8–19
15. Spitzer RL, Williams J, Gibbon M (1987) Structured clinical interview for DSM-III-R, version NP. New York Psychiatric Institute, Biometrics Research Department, New York
16. Beals J, Novins DK, Whitesell NR, Spicer P, Mitchell CM, Manson SM, the AI-SUPERPFP Team (2005) Prevalence of mental disorders and utilization of mental health services in two American Indian reservation populations: mental health disparities in a national context. Am J Psychiatry 162:1723–1732
17. Breslau N, Peterson EL, Poisson LM, Schultz LR, Lucia VC (2004) Estimating post-traumatic stress disorder in the community: lifetime perspective and the impact of typical events. Psychol Med 34:889–898
18. Norton IM, Manson SM (1996) Research in American Indian and Alaska Native communities: navigating the cultural universe of values and process. J Consult Clin Psychol 64:856–860
19. National Center for Posttraumatic Stress Disorder and the National Center for American Indian and Alaska Native Mental Health Research (1996) Matsunaga Vietnam Veterans Project. National Center for PTSD, White River Junction
20. Turner RJ, Lloyd DA (2002) Lifetime traumas and mental health: the significance of cumulative adversity. J Health Soc Behav 36:360–376
21. World Health Organization (1990) Composite international diagnostic interview (CIDI), version 1.0. Work Health Organization, Geneva, Switzerland
22. Andrews G, Peters L (1998) The psychometric properties of the Composite International Diagnostic Interview. Soc Psychiatry Psychiatr Epidemiol 33:80–88
23. SAS Institute Inc. (2008) SAS language. 9.2 edn. SAS Institute, Cary
24. SPSS (2010) IBM SPSS statistics. 19.0 edn. IBM, Somers
25. Stata (2010) Stata Statistical Software. 10.1 edn. Stata Corporation, College Station, TX
26. Breslau N (2009) The epidemiology of trauma, PTSD, and other posttrauma disorders. Trauma Violence Abuse 10:198–210
27. Breslau N, Chilcoat HD, Kessler RC, Peterson EL, Lucia VC (1999) Vulnerability to assaultive violence, further specification of the sex difference in post-traumatic stress disorder. Psychol Med 29:813–821
28. Beals J, Manson SM, Whitesell NR, Mitchell CM, Novins DK, Simpson S, Spicer P, the AI-SUPERPFP Team (2005) Prevalence of Major Depressive Episode in two American Indian reservation populations: unexpected findings with a structured interview. Am J Psychiatry 162:1713–1722
29. Mitchell CM, Beals J, Novins DK, Spicer P, the AI-SUPERPFP Team (2003) Drug use among two American Indian populations: prevalence of lifetime use and DSM-IV substance use disorders. Drug Alcohol Depend 69:29–41
30. Spicer P, Beals J, Mitchell CM, Novins DK, Croy CD, Manson SM, the AI-SUPERPFP Team (2003) The prevalence of DSM-III-R alcohol dependence in two American Indian populations. Alcohol Clin Exp Res 27:1785–1797
31. Manson SM, Beals J, O'Nell TD, Piasecki J, Bechtold DW, Keane E, Jones M (1996) Wounded spirits, ailing hearts: PTSD and related disorders among American Indians. In: Marsella AJ, Friedman MJ, Gerrity ET, Scurfield RM (eds) Ethnocultural aspects of posttraumatic stress disorder: issues, research, and clinical applications. American Psychological Association, Washington, DC, pp 255–284
32. Manson SM (1996) The wounded spirit: a cultural formulation of post-traumatic stress disorder. Cult Med Psychiatry 20:489–498
33. O'Nell TD (2000) "Coming home" among Northern Plains Vietnam veterans: psychological transformations in pragmatic perspective. Ethos 27:441–465
34. Sijbrandij M, Olff M, Reitsma JB, Carlier IV, de Vries MH, Gersons BP (2007) Treatment of acute posttraumatic stress disorder with brief cognitive behavioral therapy: a randomized controlled trial. Am J Psychiatry 164:82–90
35. Sijbrandij M, Olff M, Reitsma JB, Carlier IV, Gersons BP (2006) Emotional or educational debriefing after psychological trauma. Randomised controlled trial. Br J Psychiatry J Mental Sci 189:150–155
36. Thoresen S, Tambs K, Hussain A, Heir T, Johansen V, Bisson J (2010) Brief measure of posttraumatic stress reactions: impact of Event Scale-6. Soc Psychiatry Psychiatr Epidemiol 45:405–412