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Trauma-related symptoms and severity among women in the Pacific Rim

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ABSTRACT

Current understandings of the effects trauma exposure on women's health are limited because prior research has largely focused on intimate partner and sexual violence in homogenous samples. In this descriptive study, the authors examined the relationships between lifetime trauma exposure and psychological well-being among women across the Pacific Rim. Psychological well-being differed significantly between the four locations and increased trauma exposures were related to poorer psychological well-being across and within locations. The authors report relevant findings on the relationship between trauma exposure and psychological well-being and provide evidence for future research to enhance knowledge on the effects of trauma in women's lives.

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Links between trauma exposure and adverse health effects have been clearly established in empirical research (e.g. Lopez-Martinez et al., 2016; Scioli-Salter et al., 2016). Trauma is typically defined as witnessing or experiencing an event of threatened or actual death, serious injury, or emotional, physical, or sexual violence (American Psychiatric Association, 2013), and survivors are at disproportionate risk for health problems (Lopez-Martinez et al., 2016). Traumatic life events encompass such diverse situations as natural disasters, combat, violence, abuse, unexpected deaths, and muggings. However, existing research on trauma exposure among women is largely focused on sexual and intimate partner violence (IPV). Research is often further limited by the use of homogeneous samples—for instance, incarcerated women (Green et al., 2016). This exclusivity fails to capture the full spectrum of trauma and resulting health consequences that women

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experience (Reeves et al., 2017). Further, although experts assert that trauma is culturally defined (Green & Kimerling, 2004), cross-national research on trauma exposure and health among diverse populations of women is still limited. Women's health care providers should understand how a range of varied traumatic life events affect women's health and well-being. To address these gaps in current knowledge, we collected and analyzed data to explore the relationship between trauma exposure and psychological symptoms among diverse women from four international, community-based samples across the Pacific Rim. The findings reported are relevant for providers and researchers seeking to understand the effects of trauma in the lives of women across diverse locations.

The Pacific Rim encompasses diverse nations that are connected by geography, trade, and commerce (Nemetz, 2011). The simultaneous connectivity and diversity of the Pacific Rim make it a valuable starting place for assessing and comparing trauma exposure and health among international samples of diverse women (Reeves et al., 2017). Variation in patterns and types of trauma exposure can result from diversity in government, politics, social structure, climate, and other factors. In brief, women in Colombia have experienced violence resulting from internal conflict between the Colombian government and rebel organizations; women in Hong Kong have experienced political and civil unrest, and immigrants from China have likely also experienced violence and lack of access to needed services; and, women in San Francisco are exposed to increasing population density, crime, and poverty as well as disaster-level earthquakes. These nation- and region- specific contexts for trauma-exposure exist within a global context of economic inequality and pervasive violence against women.

Findings from the first phase of our analysis indicated that despite geographic, national, and cultural differences, trauma exposure among the diverse women surveyed was more similar than different. However, even traumatic life events experienced with identical frequency are likely to have different consequences, meaning, and significance for women across cultures and locations (Reeves et al., 2017) and, therefore, may also have different effects on psychological well-being. Psychological symptoms are some of the most notable consequences of trauma exposure, and can include: intrusive memories, dissociation, hypervigilance, amnesia, and depression (American Psychiatric Association, 2013). How people evaluate and respond to health concerns is mediated by culture; for instance, traditional Chinese medicine is an integral component of health care in Hong Kong. Culture and location also affect whether and how trauma-exposed women are able to access psychological health services.

Current literature on trauma and health

Research provides evidence for gender-based differences in the health consequences of trauma, indicating that, despite less trauma exposure as compared to men, women are at higher risk for developing post-traumatic stress disorder (PTSD, Stevanovic, Franciskovic, & Vermetten, 2016) and other psychological symptoms (Morina et al., 2016). Psychological symptoms and severity may also vary based on culture, location, and the type of traumatic event experienced. In preliminary analysis of data from this study from Medellín, we noted that interpersonal violence was strongly correlated with psychological symptom severity, as compared to other traumatic events (Reeves et al., 2017). However, Kastello and colleagues (2016) found that more than 65% of the pregnant women surveyed reported an event other than IPV as their most distressing traumatic life event. Therefore, the relationships between culture, trauma, and symptoms warrant further exploration.

Current research on trauma and health shares many of the same limitations as that on trauma exposure noted in our previous paper (Reeves et al., 2017). In brief, many examples of current literature on trauma exposure and health focus on IPV and sexual violence and exclude other types of trauma (e.g. Dovran et al., 2016; Ferrari et al., 2016; Scioli-Salter et al., 2016). Other examples of current research are limited in their assessment of health and trauma because they only account for events that occurred before or after a certain age (e.g. Khan et al., 2015; Stevanovic et al., 2016). For instance, authors of a cross-sectional study of adult women in Croatia who had or had not experienced war used a community-based "snowball" sample but limited their analysis to war-related events and traumatic life events before age 18, rather than events across the lifespan (Stevanovic et al., 2016). However, the authors did find that older age and exposure to war-related trauma *and* childhood trauma were associated with higher levels of PTSD symptoms, suggesting that traumatic events across the lifespan cumulatively affected women's psychological well-being. Many current studies on health and trauma in the lives of women have used homogenous, rather than more diverse community-based, samples of women. For example, Green et al. (2016) recruited women incarcerated in prisons across the United States to assess the relationship between exposure to diverse traumatic events and PTSD, major depression, bipolar disorder, and addiction. They found that interpersonal violence and family dysfunction each contributed independently to increased odds of having each of the above mental health concerns (Green et al., 2016).

Maternal–child health outcomes are an emerging trend in the current literature on trauma exposure and health (e.g. Blackmore et al., 2016; Hauff, Fry-McComish, & Chiodo, 2016). For example, Blackmore and colleagues

(2016) found that childhood trauma exposure magnified the negative effects of maternal prenatal mood on infant birth weight among women who received hospital-based obstetric care. While they are valuable indicators of population health, exclusively focusing on maternal, birth, and infant health outcomes limits understanding of the consequences of trauma in womens' daily lives. Each of the aforementioned studies has contributed valuable knowledge with regard to trauma exposure and women's health. However, their focus on IPV and sexual violence, focus on traumatic life events before or after a certain age, use of homogenous samples, and focus on maternal–child health limits the diversity of women, experiences, and outcomes included in research. Further, no study to date has assessed the relationship between trauma exposure and psychological well-being among diverse, international samples of community-based women using the same, validated instruments to allow direct statistical comparisons. The purpose of this descriptive study was to explore the relationship between lifetime trauma exposure and psychological well-being, as measured by psychological symptoms and symptom severity, among and between international samples of community-based women in Medellín and Calí, Colombia; Hong Kong; and San Francisco.

Materials and methods

Women living in the Pacific Rim were the focal population of this descriptive study. This analysis is part of a long-term collaboration between faculty at the University of California at San Francisco School of Nursing; La Universidad de Antioquia School of Nursing in Medellín, Colombia; Instituto Nacional de Perinatologia in Mexico City, Mexico; and the University of Hong Kong Department of Nursing Studies. Ethics committees at each of the involved institutions approved the study protocol. Collecting data at each of these locations allowed us to assess connections between trauma exposure and psychological well-being on three of the four Pacific Rim continents. During initial analysis, we identified and summarized trauma exposure among women at each of the four locations described above. In the current analysis, we focus on the relationships between trauma exposure and psychological well-being among women located in these Pacific Rim communities. As such, study recruitment methods, eligibility criteria, data collection procedures, and measures have been detailed in our previous report (Reeves et al., 2017).

Sample

Members of the research team used posted notices at community health sites, advertisements online and in newspapers (in San Francisco only), and

snowball sampling to recruit convenience samples of community-based women over the age of 18 who spoke the dominant language of the area and did not have obvious alterations in cognitive functioning.

Procedures

Data for the study were collected from 2006 to 2010. Members of the research team who spoke the primary language at each location were trained in recruitment and the administration of the Life Stressors Checklist-Revised (Wolfe, Rachel, Brown, Chrestman, & Levin, 1996) and Brief Symptom Inventory (BSI; Derogatis, 1993). Each participant provided verbal informed consent and independently completed the inventory after enrollment.

Measures

The Life Stressors Checklist-Revised (LSC-R, Wolfe et al., 1996), which is comprised of 30 items with each inquiring about a different stressful or traumatic event, was used to assess trauma exposure, defined as the number of different traumatic events experienced throughout the participant's lifetime (range: 0–30). This instrument and the translation procedures used have been previously described (Reeves et al., 2017). The content validity of the LSC-R was established through a review of literature (Wolfe et al., 1996), and test–retest reliability was established for each item, with a range of 0.52 to 0.95, exceeding acceptability criteria of 0.40 (McHugo et al., 2005).

The BSI, a self-report symptom inventory containing 53 items, was used to assess psychological well-being. For each item, participants were asked to indicate how much they were distressed or bothered by the psychological symptom during the past (severity) on a Likert-type scale from 0 (Not at all) to 4 (Extremely). Three BSI summary scores were calculated, with higher scores representing poorer psychological well-being. The Global Severity Index (GSI, overall psychological well-being) was the sum value of all endorsed items divided by the total number of endorsed items; the Positive Symptom Total (PST, total number of symptoms reported) was the number of items endorsed with a value greater than zero, and the Positive Symptom Distress Index (PSDI, distress associated with endorsed symptoms) was the sum of all item values divided by the PST (Derogatis, 1993). The BSI has been used to measure psychological well-being among diverse respondent populations, including cancer patients, chronic pain patients, HIV-positive patients, the elderly, college students, and community-based non-patient men and women. Previous research has documented predictive

validity of the BSI for measuring changes in psychological well-being from 84% to 87% among orthopedic patients and outpatient cancer patients, respectively, and the BSI's internal consistency reliability as ranging from 0.78 to 0.83 and test–retest reliability as ranging from 0.68 to 0.91 (Derogatis, 1993).

Data analysis

Descriptive statistics were used to summarize the demographic factors (age, education, and employment), trauma exposure, and BSI summary scores (GSI, PST, and PSDI) for the total sample as well as each community-based sample (location). Non-directional statistical tests were conducted with the level of significance set at .05 for all tests. For this descriptive study, the significance level was not adjusted for multiple outcomes.

Sample characteristics

One-way analysis of variance procedures applying a general linear model (GLM) approach due to unequal sample sizes along with *a posteriori* pairwise comparisons (least squares means t-tests) were conducted to test for location differences in the mean age, years of education, and number of trauma exposures. Chi-square tests were used to test for location differences in employment status.

Psychological well-being

A GLM with *a posteriori* pairwise comparisons were first conducted to test for location differences in PST scores. Due to severe skewness, Kruskal–Wallis Tests with *a posteriori* Wilcoxon two-sample tests were used to test for location differences in GSI and PSDI scores.

Trauma and psychological well-being

Partial Spearman correlations were performed to examine the association between the number of trauma exposures and BSI measures in the total sample and per location, after controlling demographic factors. Despite sample sizes of 100 or greater, a non-parametric approach was applied due to the severe non-normality of the GSI and PDSI scores. Analysis of covariance procedures were then conducted using GLMs to identify the types of trauma exposure that were related to PST scores for each location and total sample, after controlling for demographic factors. The GSI and PSDI scores were not evaluated due to the limited range of these scores. The initial GLM included demographic factors and each type of trauma (LSC-R items 1–30, with each trauma type coded as 0 = no, 1 = yes) as explanatory

variables. The model for the total sample also included location as a demographic factor. Each initial model was reduced to a pragmatic model that included demographic factors regardless of statistical signficance but only those trauma exposures that were signficant at the .05 level. A manual iterative backward elimination was applied to reduce the initial model to a final model. The final model indicated the effects of each demographic factor and retained trauma exposures on PST scores, controlling for other variables in the model.

Results

Sample characteristics

Demographic characteristics and trauma exposure for the total sample and each location are presented in Table 1 and have been detailed in our previous paper (Reeves et al., 2017). In brief, women in Cali were significantly younger; women in San Francisco were significantly more educated; and women in Hong Kong were significantly less employed. One percent or less of women in each location reported no trauma exposure, while the percent of women who reported nine or more types of traumatic events was 43% for San Francisco, 33% for Medellín, 26% for Cali, 15% Hong Kong, and 29% for the total sample. Women in San Francisco reported the highest mean trauma exposures, followed by women in Medellín, Calí, and Hong Kong, although trauma exposure in Medellín and Cali did not differ significantly.

Psychological well-being

BSI summary measures for the total sample and each location are also reported in Table 1. There was a significant location effect on GSI, PSDI, and PST scores. Women in Medellín had significantly higher GSI and PSDI scores when compared to Cali, San Francisco, and Hong Kong. Although Cali and San Francisco did not significantly differ on these measures, each location had a significantly higher GSI and PSDI scores relative to Hong Kong. Women in Medellín also had the highest mean PST scores, while Hong Kong had the lowest mean scores. The mean PST score for Medellín was significantly greater than the mean scores for Cali and Hong Kong. San Francisco did not differ from Medellín or Cali with regard to PST scores, but had significantly higher mean scores than Hong Kong.

Trauma and psychological well-being

Partial Spearman correlation results examining the positive association between number of trauma exposures and BSI summary scores for the total

Table 1. Demographic factors, trauma exposure, and psychological well-being.

Characteristic/measures	Medellín ($N = 217$)	Cali ($N = 159$)	Hong Kong ($N = 100$)	San Francisco ($N = 100$)	Statistical results	Total sample ($N = 576$)
Age						
Mean (SD)	37.5 (15.5)	31.0 (13.4)	40.2 (7.1)	38.0 (13.9)	$F_{3,\ 570} = 12.3$	36.3 (13.9)
Range	18–79	18–74	27–59	18–75	$p < .0001$	18–79
					HK = SF = M > C	
Last grade in school						
Mean (SD)	12.1 (3.9)	13.3 (3.3)	9.7 (3.1)	14.6 (2.7)	$F_{3,\ 565} = 38.8$	12.5 (3.8)
Range	5–18	5–18	0–17	8–22	$p < .0001$	0–22
					SF > C > M > HK	
Employed						
Number (%)	129 (61.7)	95 (61.7)	28 (28.0)	52 (52.0)	$\chi^2_3 = 36.1$	304 (54.0)
					$p < .0001$	
					M = C = SF > HK	
Trauma exposure						
Mean (SD)	7.2 (4.0)	6.5 (3.2)	5.2 (3.1)	9.2 (5.0)	$F_{3,\ 572} = 20.1$	7.0 (4.0)
Range	0–20	1–15	0–15	0–24	$p < .0001$	0–24
					SF > M = C > HK	
Global Symptom Index (GSI)						
Median (25^{th}, 75^{th} percentile)	1.1 (0.6, 1.7)	0.8 (0.5, 1.3)	0.3 (0.1, 0.7)	0.8 (0.4, 1.4)	KW $\chi^2_3 = 77.1$	0.8 (0.4, 1.4)
Range	0–4.0	0–3.1	0–2.5	0–3.6	$p < .0001$	0–4.0
					M > C = SF > HK	
Positive Symptom Distress Index (PSDI)						
Median (25^{th}, 75^{th} percentile)	2.0 (1.6, 2.5)	1.8 (1.3, 2.4)	1.2 (1.0, 1.5)	1.7 (1.2, 2.3)	KW $\chi^2_3 = 102.5$	1.8 (1.3, 2.3)
Range	0–4.0	1.0–4.0	0–2.8	1.0–3.6	$p < .0001$	0–4.0
					M > C = SF > HK	
Positive Symptom Total (PST)						
Mean (SD)	29.6 (13.5)	25.6 (11.9)	18.4 (13.98)	26.7 (13.8)	$F_{3,\ 569} = 16.5$	26.0 (13.7)
Range	3–53	0–53	0–52	1–53	$p < .0001$	0–53
					M > C > HK; SF > HK	

Trauma exposure is defined as the number of different traumatic events experienced throughout the participant's lifetime (possible range: 0–30); Statistical results = Overall statistical test for main effect of location and its *p*-value, followed by pairwise comparison results. Pairwise results: M = Medellín, C = Cali, HF = Hong Kong, and SF = San Francisco with greater (>) sign indicating significantly higher values ($p \leq .05$). KW = non-parametric Kruskal–Wallis test.

Table 2. Partial Spearman correlations between number of trauma exposures and psychological well-being.

Psychological well-being measure	Medellín ($N = 217$)	Cali ($N = 159$)	San Francisco ($N = 100$)	Hong Kong ($N = 100$)	Total sample ($N = 576$)
Positive symptom total (PST)	.29**	.29***	.40**	.34***	.49**
Positive symptom distress index (PSDI)	.23***	.24*	.27*	.58**	.53**
Global symptom index (GSI)	.32**	.33**	.33***	.61**	.55**

Partial spearman correlation coefficients (r_s), after partially out the effects of demographic factors (age, education level, and employment status); one asterisk indicates $p > .5$; $^{**}p < .0001$, $^{***}p < .001$; Strength of relationship guidelines applied for Spearman r_s coefficients: weak =0.10 to 0.29; moderate =0.30 to 0.59; strong =0.60 to 1.0.

sample and each location, after controlling for demographic factors, are presented in Table 2. Higher BSI summary scores (poorer psychological well-being) were significantly associated with a greater number of trauma exposures ($r_s = 0.23$–0.61), with moderate to strong positive relationships often observed ($r_s = 0.30$ or higher). Although the mean number of trauma exposures was less among the Hong Kong women, trauma exposure had a stronger association with PSDI ($r_s = 0.58$) and GSI ($r_s = 0.61$) scores in this location compared to other locations. Within the total sample, higher scores on all three BSI summary measures were associated with increased trauma exposures ($r_s = 0.49$–0.55) and explained (a) 24% of the variability of the PST scores; (b) 28% of the variability of the PSDI scores; and (c) 30% of the variability of the GSI scores. In terms of PST scores, the percent of variability explained by trauma exposure was 8% for Medellín and Cali, 16% for San Francisco, and 12% for Hong Kong.

The results of the final (reduced) analysis of covariance models testing for an association between type of trauma exposure and PST scores are presented in Table 3. Women exposed to each trauma retained in the model had higher mean PST scores when compared to those not exposed. The final model for the total sample indicated significant location differences in PST scores, after adjusting for demographic factors and significant trauma exposures. *A posteriori* pairwise comparisons of the adjusted means indicated that women in Medellín had the highest mean PST severity scores, followed in descending order by women in San Francisco, Cali and Hong Kong, although mean PST did not differ significantly between Medellín and San Francisco. Higher PST scores were observed in women who were younger, less educated, and unemployed at each location and for the total sample. Final models explained variability of the PST scores as follows: 32% for Medellín, 21% for Cali, 51% for San Francisco, 40% for Hong Kong, and 31% for the total sample. Table 4 highlights location similarities and differences with regard to type of trauma exposures significantly associated with PST scores. Interestingly, 20% (Cali, 1 of 5 exposures) to 43% (total sample, 3 of 7 exposures) of the trauma exposures associated with PST scores were events involving interpersonal violence, neglect, and/or abuse.

Table 3. Final analysis of covariance models: effects of trauma type on psychological well-being (positive symptom total scores).

Location	Demographic factors and type of trauma exposure	F	DF	*p*
Medellín	Age	11.58	1, 182	.0008
	Education	3.16	1, 182	.7700
	Employment	0.07	1, 182	.7919
	5. Sent to jail	7.32	1, 182	.0075
	10. Serious illness	9.02	1, 182	.0031
	11. Emotional abuse/neglect	10.02	1, 182	.0018
	15. Child with serious physical handicap	6.38	1, 182	.0124
	18. Someone close died, not suddenly	4.10	1, 182	.0444
	23. Physical abuse after age 16	4.55	1, 182	.0343
Cali	Age	1.07	1, 142	.3019
	Education	0.04	1, 142	.8466
	Employment	0.01	1, 142	.9035
	1. Been in a serious disaster	6.94	1, 142	.0093
	7. Parents separated/divorced	5.53	1, 142	.0201
	9. Serious money problems	14.72	1, 142	.0002
	15. Child with serious physical handicap	6.88	1, 142	.0097
	21. Robbed, mugged, or attacked.	4.11	1, 142	.0445
San Francisco	Age	1.93	1, 92	.1677
	Education	26.24	1, 92	<.0001
	Employment	0.02	1, 92	.8808
	9. Serious money problems	8.62	1, 92	.0042
	10. Serious illness	11.53	1, 92	.0010
	26. Sexually touched after age 16	16.23	1, 92	.0001
	29. Other events	5.57	1, 92	.0203
Hong Kong	Age	7.40	1, 93	.0078
	Education	2.04	1, 93	.1564
	Employment	1.67	1, 93	.1988
	1. Been in a serious disaster	7.91	1, 93	.0060
	11. Emotional abuse/neglect	21.71	1, 93	<.0001
	20. Seen a robbery/mugging/attack	9.79	1, 93	.0023
Total Sample	Location (city)	18.73	3, 530	<.0001
	Age	9.80	1, 530	.0018
	Education	10.62	1, 530	.0012
	Employment	4.56	1, 530	.0333
	5. Sent to jail	4.17	1, 530	.0416
	9. Serious money problems	8.48	1, 530	.0037
	10. Serious illness	21.09	1, 530	<.0001
	11. Emotional abuse/neglect	16.59	1, 530	<.0001
	12. Physical neglect	4.23	1, 530	.0401
	20. Seen a robbery/mugging/attack	5.45	1, 530	.0199
	26. Sexually touched after age 16	6.11	1, 530	.0137

Higher positive symptom total (PST) score = poorer psychological well-being; Final analysis of covariance procedures conducted using a General Linear Model (GLM); Results from Type III sum of squares representing the effects of each variable after controlling for the effects of the other explanatory variables in the final model; Final model = Reduced models that included demographic factors regardless of statistical significance and traumatic events significant at the .05 level retained in the models for each location and the total sample.

Discussion

Our utilization of community-based samples in four different cities across three nations to examine associations between trauma exposure and psychological well-being among women is, to our knowledge, novel. Using these data, we were able to consider the relationship between trauma exposure and psychological well-being within each location and to compare the strength of that relationship across the four locations. Green et al. (2016) reported that family dysfunction and interpersonal violence each

Table 4. Profile of trauma exposures associated with higher positive symptoms total scores.

Medellín $N = 217$	Cali $N = 159$	San Francisco $N = 100$	Hong Kong $N = 100$	Total sample $N = 576$
	1. Been in a serious disaster		1. Been in a serious disaster	
5. Sent to jail				5. Sent to jail
	7. Parents separated/divorced			
	9. Serious money problems	9. Serious money problems		9. Serious money problems
10. Serious illness		10. Serious illness		10. Serious illness
11. Emotional abuse/neglect			11. Emotional abuse/neglect	11. Emotional abuse/neglect
				12. Physical neglect
15. Child with a serious physical handicap	15. Child with a serious physical handicap			
18. Someone close died, not suddenly				
			20. Seen a robbery, mugging, or attack	20. Seen a robbery, mugging, or attack
	21. Robbed, mugged, or attacked			
23. Physical abuse after age 16				
		26. Sexually touched after age 16		26. Sexually touched after age 16
		29. Other events		

Summary of type of trauma exposure significantly associated with positive symptom total (PST) scores in the final analysis of covariance models in Table 3.
Higher PST score = poorer psychological well-being.

contribute independently to the increased odds of being diagnosed with PTSD, major depression, bipolar disorder, and/or substance-use disorder when compared to other traumas. Our results further indicate that the total number of psychological symptoms (PST scores) is associated with events of interpersonal violence, neglect, or abuse, although the strength of this relationship varied between locations.

Our findings are also aligned with previous research that indicated that trauma exposure and lower levels of education are associated with increased symptomology and that traumatic life events are cumulatively associated with symptoms (Hauff et al., 2016). For instance, Khan et al. (2015) found that experiencing three or more traumatic events was significantly associated with psychological distress among pregnant women who had experienced armed conflict in Pakistan. These examples of previous research are particularly relevant when considering findings from the Medellín and Cali samples, given Colombia's ongoing internal conflict. Although the types of traumatic events most frequently reported were more similar than different across locations (Reeves et al., 2017), we found significant differences in psychological well-being among women in the four cities in the current analysis. Further, the trauma exposures that were significantly associated with PST scores varied widely between locations. These findings echo previous conclusions that trauma is culturally defined (e.g. Green & Kimerling, 2004), and further suggest that the relationship between trauma and psychological well-being may be defined by cultural and political contexts.

Just as geographic, historical, political, and cultural factors may explain differences in reported trauma exposure among women in this study, these factors may also explain differences in psychological well-being across these locations. For instance, Barrera, Wilson, and Norton (2010) found that, although panic was experienced across racial and ethnic groups, Asian participants endorsed somatic symptoms, such as dizziness, more frequently than white or African American participants. Of note, previous research has noted that traditional Chinese health beliefs do not distinguish clearly between physical and mental disorders such that Chinese patients with mental health problems often present with physical symptoms (Chan, Tiwari, Fong, & Ho, 2010). This may help explain why trauma exposure and PST scores were more highly correlated among women from Hong Kong, despite their significantly lower trauma exposure and PST scores.

However, caution should be exercised when proposing that culture explains some differences in post-trauma symptoms. First, especially in ethnically and racially diverse locations such as San Francisco, cultural beliefs and social stigma may affect symptom reporting. Carpenter-Song et al. (2010) found that stigma was a prominent theme in narratives of mental

illness and treatment among African-American and Latino-American participants, but not among white participants. Women in marginalized racial and/or ethnic groups likely experience more intense and deleterious stigmatization associated with mental illness, as well racial/ethnic disparities in health and health care access that may affect both psychological symptom experiences and reporting. Additionally, neither racial/ethnic groups nor location-based populations are necessarily culturally homogenous. For example, Xu et al. (2011) found significant differences in post-earthquake acute stress symptom responses among the Han and Tibetan Chinese ethnic groups. Therefore, although cultural differences and/or racial and ethnic diversity may explain differences in psychological well-being between locations, it is impossible to know whether differences are truly due to cultural or demographic differences. Additionally, differences among women *within* each location will further determine the significance, meaning, and consequences of trauma-associated psychological symptoms.

Limitations and strengths

Limitations of this study include inconsistent collection of data on race, ethnicity, and socioeconomic status; lack of clarity as to whether differences in reported symptoms and severity are differences in interpretation of instrument items, differences in cultural beliefs and values, or actual differences in prevalence; and the use of snowball sampling, which may have contributed to sample homogeneity. Additionally, no data were collected on co-morbidities or health care access, and accounting for these factors might have further clarified the relationship between trauma exposure and psychological well-being. Collecting data on less-researched traumatic events, using comprehensive and validated instruments, and recruiting community-based women in diverse locations are study strengths that support our novel contributions to existing knowledge on trauma exposure and health.

Implications for practice, policy, and research

Health care providers must be aware of cultural, political, and other differences that inform how women respond to and make meaning of their experiences. Asking open-ended questions (Crosby, 2013) about diverse traumatic events and how they have affected women's lives can help providers assess the intertwined effects of multiple traumatic life events. Routinizing such trauma screening is especially important, as most women experience multiple traumatic life events that impact health in ways that can vary within and between different regions and cultural groups.

Ferrari and colleagues (2016) assert that patients presenting with psychological conditions and/or symptoms may have experienced violence or abuse, echoing our findings that symptoms are highly correlated with experiences of violence and other traumatic events, and that trauma exposure explains significant variance in psychological symptoms even when controlling for other demographic factors. Therefore, providers noting psychological symptoms in the absence of disclosure could still make efforts to implement sensitive, trauma-informed practices. Broadening screening could help providers identify and provide appropriate services for trauma-exposed women. Expanding mental health and trauma-related services is essential, as access to mental health services that might mitigate or resolve trauma-related psychological symptoms seems inconsistent across the locations studied. Finally, authors of a 2016 systematic review found that, as compared to men, women generally experience more severe symptoms and prevalence of PTSD, but also respond better to PTSD interventions (Wade et al., 2016). Implementing universal screening and trauma-informed responses and expanding existing services would help ensure the efficient allocation of health care resources to more quickly and effectively meet the needs of trauma-exposed women.

Future research on the health consequences of trauma exposure among women should continue to recruit diverse samples and use validated instruments to broaden knowledge on how the relationship between trauma exposure and health varies based on location and culture. Replicating this study in different locations would further develop knowledge on the relationship between trauma exposure and psychological well-being, and specifically, provide clarity on which types of traumatic events most consistently and significantly impact psychological well-being; the latter is still unclear. Implementing longitudinal methods would provide knowledge on the relationship between trauma exposure and health for women across the lifespan and on the short- and long-term, multi-level effects of trauma and enhance knowledge on the relationships between location, culture, trauma exposure, and health. Future research that accounts for a larger array of demographic factors could analyze the relationships between trauma exposure and these characteristics, and could shed more light on within location or within community differences.

Conclusions

Trauma exposure significantly impacted women's psychological well-being across four diverse locations in the Pacific Rim, as evidenced by the strong correlations between trauma exposure and psychological symptoms and severity. Although trauma exposure explained variance in symptoms and

severity, differences in these correlations and models were observed between the locations studied. Routinizing effective trauma exposure screening practices and responses, as well as broadening existing mental health services, could help mitigate the pervasive trauma-related psychological symptoms observed in this large sample of community-based women. Future research should include longitudinal methodologies and inquire further into the relationship between trauma exposure and health. Findings from this study are relevant for providers and researchers seeking to understand the effects of trauma in the lives of women across diverse locations.

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