

Violence and PTSD in Mexico: Gender and regional differences

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Abstract:

Objective: We examined the lifetime prevalence of violence in Mexico and how different characteristics of the violent event effect the probability of meeting criteria for lifetime post-traumatic stress disorder (PTSD).

Method: We interviewed a probability sample of 2,509 adults from 4 cities in Mexico (Oaxaca, Guadalajara, Hermosillo, Mérida) using the Composite International Diagnostic Interview (CIDI).

Results: Lifetime prevalence of violence was 34%. Men reported more single-experience, recurrent, physical, adolescent, adulthood, and stranger violence; women more sexual, childhood, family, and intimate partner violence. Prevalence was generally higher in Guadalajara, though the impact was greater in Oaxaca compared to other cities. Of those exposed, 11.5% met DSM-IV criteria for PTSD. Probabilities were highest after sexual and intimate partner violence, higher for women than men, and higher in Oaxaca than other cities.

Conclusions: It is important to consider the characteristics and the context of violence in order to develop effective prevention and intervention programs to reduce the exposure to and impact of violence.

Keywords: Violence | Culture | Mexico | PTSD | CIDI

Article:

Introduction

Previous epidemiologic research has established that violence is quite prevalent and associated with a range of physical, sexual, reproductive, mental health and economic consequences

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]. This paper focuses on how violence affects mental health, or more specifically, the probability of meeting criteria for lifetime post-traumatic stress disorder (PTSD) given lifetime exposure to an event. In such an examination, it is important to consider that the prevalence and impact of violence may differ depending on survivor and event characteristics. For example, previous research indicates that men are more likely to be victims of physical assault, whereas women are more likely to be victims of sexual assault [13]. Although the prevalence of violence varies according to sex, findings suggest that women consistently have higher probabilities of PTSD after experiencing an event than men [6]. Several characteristics of the violent event have been studied as potential moderators, including recurrence, timing of survivor's exposure (i.e., childhood vs. adulthood), and its relationship context (i.e., stranger vs. acquaintance). In general, the impact of violence is more severe following sexual violence [7], childhood violence [14], and recurrent violence [15, 16, 17], but data are equivocal with regard to relationship context [18, 19, 20]. Recurrence and relationship context may be intertwined as women and children are often abused by someone known to them [21, 22].

The extent to which these findings are generalizable across diverse cultures and societies is unclear. Much of what we know about violence comes from research conducted in countries with Anglo-European traditions (e.g., United States). We know little about reactions to violence in countries such as Mexico, whose culture and histories are very different from that of the United States (e.g., Are there similarities in the specific characteristics, reactions to, and consequences of violence?). These questions are important with regard to increasing our knowledge about violence globally and cross-culturally.

Between 1999 and 2001, we conducted an epidemiological study of trauma and mental and physical health in Mexico. Findings from this study showed that, similar to the United States, men were more likely to report physical assault than women (27.8% and 13.5%, respectively), but were less likely to report sexual assault (1.1% and 3.9%, respectively) [23]. With regard to where violence is experienced, one study conducted with a convenience sample in Mexico City showed that women experienced intentional injury more often in the home, whereas men were most often injured in public places [24]. Studies on intimate partner violence in Mexico have reported high rates, ranging from 20 to 40% [25, 26, 27, 28].

As for the psychological consequences of violence, one qualitative study in Mexico City reported that survivors experienced dissociative behaviors, vulnerability, terror, sadness, and rage [29]. Similar to studies in the U. S. [7, 11], results from our epidemiologic study showed that survivors of sexual and nonsexual violence were more likely to meet PTSD criteria for any reason (34.4% and 19.3%, respectively) than those experiencing other types of traumatic events [e.g., traumatic bereavement (16.2%), witnessing someone killed or injured (15.7%), or being involved in a life-threatening accident (14.6%)].

It is important to note that before undertaking our epidemiologic study we conducted preliminary research to determine whether PTSD was a relevant construct for Mexican trauma survivors. Results from qualitative interviews determined that Mexican respondents mentioned 14 of the 17 specific PTSD criterion symptoms with little or no prompting [30]. In a subsequent quantitative study conducted with samples of disaster victims from the United States and Mexico, a four-

factor measurement model representing the accepted multi-criterion conceptualization of PTSD fit the data of the U. S. and Mexican samples equally well [31]. Both studies implied that PTSD is a relevant and measurable construct in Mexico.

Although we have previously reported on the prevalence of trauma and PTSD in Mexico [23, 32], we did not probe the particular characteristics associated with each traumatic experience. Therefore, in this paper, we focus on one set of traumatic experiences, interpersonal violence, and examine specifically the characteristics of the violent event and how these characteristics may be associated with an increased probability of meeting criteria for lifetime PTSD in Mexico. To date, there is abundant knowledge in some countries (e.g., the U. S.) about the experiences and responses of individuals who report violent victimization; however, little is known about survivors of violence in Mexico. To begin to fill this gap, in the present study we had three goals: (1) to present prevalence rates for violence exposure in four Mexican cities differentiated according to type, recurrence, age of occurrence, and relationship context; (2) to examine whether specific characteristics of violence-related events are associated with a higher probability for being diagnosed with PTSD (e.g., Do individuals who are victimized by an intimate partner have a higher probability of PTSD than those victimized by a stranger?); and (3) to test for differences in these frequencies and effects between men and women and among the four cities (Oaxaca, Guadalajara, Hermosillo, and Mérida).

Based on findings from previous studies, we hypothesized that, overall, men would report greater exposure to violence than women, and that exposure to sexual, recurrent, and childhood violence would be associated with a higher probability of PTSD. Further, we expected that women would be more impacted than men by their experiences of violence. Finally, we anticipated that the prevalence and impact of violence would vary within Mexico according to the context of these cities. In other words, the prevalence of violence would be higher in Guadalajara (the most urban), but the impact would be greater in Oaxaca (the poorest).

Subjects and methods

Sampling and interviewing procedures

A multi-stage probability sampling design was used to draw samples of adults representative of Oaxaca, Guadalajara, Hermosillo, and Mérida. Specifically, we were interested in obtaining a sample representative of urban Mexico, and these cities were chosen to provide regional as well as economic diversity. Oaxaca, population 500,000, is the capital of the state by the same name and is located in the southern mountains of Mexico. With an economy based in government service and tourism, Oaxaca is among the poorest cities in Mexico [33]. Guadalajara, population 1,646,000 (3 million in the metro area), is Mexico's second largest city. It is a modern, industrial city and, as such, represents the "Mexico of the future" where industrial employment is the primary source of income for the majority of the population [34, 35, 36]. Hermosillo, population 610,000, is the capital of the state of Sonora in northwestern Mexico. The economy of the region is based on government services, commercial agriculture, and industrial manufacturing for the United States market [37]. Merida, population 705,000, is located in the northwestern quadrant of the Yucatan Peninsula. It serves as the governmental and commercial center for the Yucatan Peninsula.

Because of the potential for our questions about violence exposure and subsequent symptoms to elicit requests for assistance, before data collection began in each city, the fieldwork manager and staff identified services and resources in that community that were available to survivors of violence (e.g., mental health services, domestic violence services, etc.). Then, pamphlets were created with information about these services and where they were located so that respondents would know where to go for help; pamphlets were distributed universally along with the local phone number of the project office so that respondents could contact the fieldwork manager if they needed additional information.

Using the Mexican equivalent of census data, 10% of the total number of census tracts in each city were randomly selected. Households were sampled proportionate to the tract's population size; that is, two times as many households would be sampled from a census tract that had 10,000 households than from one that had 5,000 households. We began data collection in Oaxaca, where we randomly selected 24 census tracts. From these areas, we randomly selected 903 household units and determined that 727 were eligible for the study. Non-eligible units were vacant lots or businesses. From the eligible household units, at the initial contact, the person who answered the door was asked to take part in an international study of health in Mexico. As such, their household would be asked to participate in two phases of the project: first, in a sociodemographic interview about the household and, then, one person would be randomly selected to participate in an in-depth interview about health issues they had faced in their lives. As interviewers described the study, they gave potential respondents a brochure that provided detailed information about the project and the collaborating institutions in Mexico and the U.S., and names of people they could contact locally if they had more questions. Interviewers also wore a badge with their name, the project's name, and their picture so respondents would know that they were official representatives of the project. If the person agreed to participate, the interviewer started with the sociodemographic interview where the respondent was asked about each member in the household in terms of age, education, income, type of employment, etc.; in Oaxaca, 584 agreed to participate in this phase of the project. Then, among residents in that household, the adult with the most recent birthday was selected and asked to participate in the in-depth psychological interview. For Oaxaca, the final sample size and response rate was 576 (79%). Sample size and response rates for the other cities were 713 (82%) in Guadalajara, 618 (76%) in Hermosillo, and 602 (70%) in Mérida.

Such high response rates may have been achieved because of the use of recruiting methods that increased the legitimacy of the project (i.e., identification badges and university affiliations) and because of convenience (i.e., interviews were conducted in the respondent's home by trained, local interviewers in each city). Also, fieldwork managers revisited each participating household to deliver a letter of thanks and to inquire about respondents' impressions of the interviewers and the interviews. In addition, they checked all interviews for accuracy of selection procedures, completeness, and quality. The Oaxaca and Guadalajara data were collected in 1999, the Hermosillo and Mérida data in 2001.

Measures

The conditional probability of lifetime PTSD, i.e., the probability of meeting criteria for PTSD given exposure to violence rather than to the overall prevalence of PTSD in the population, was measured by using Module K of Version 2.1 of the Composite International Diagnostic Interview (CIDI) developed and translated into Spanish by the World Health Organization (WHO) [38]. To our knowledge, no studies have documented the clinical validity of the Spanish version of the CIDI PTSD module; however, there has been good agreement between the English version and clinicians' evaluations [39]. To examine construct validity of the PTSD module, we administered to a subset of our sample a second measure of symptoms [Revised Civilian Mississippi Scale for PTSD (RCMS)] and obtained a correlation between the two measures of 0.80. This high agreement is meaningful because both the linguistic equivalence [40] and conceptual equivalence [31] have been empirically established between the English and Spanish versions of the RCMS.

Lifetime exposure to different *types* of violence was assessed by questions that asked about *sexual assault* ("Were you ever raped, that is someone had sexual intercourse with you when you did not want to, by threatening you, or using some degree of force?"), *sexual molestation* ("Were you ever sexually molested, that is someone touched or fondled your genitals when you did not want them to?"), *physical assault* ("Were you ever seriously physically attacked or assaulted?"), or *threatened with a weapon* ("Were you ever threatened with a weapon, held captive, or kidnapped?"). Variables were coded as (1) exposed or (0) unexposed; the experiences were not mutually exclusive.

With WHO's permission and assistance, we modified the event portion of Module K to collect additional information about each event. First, the respondent was asked if the event had happened *once* or *more than once*. If once, the respondent was then asked if the event had occurred *before the age of 12* (childhood), *between the ages of 12 and 15* (adolescence), or *after the age of 15* (considered adulthood in Mexico).

Respondents were also asked who perpetrated the violence. Verbatim responses were translated from Spanish to English, and then coded into five categories: *stranger*, *intimate partner*, *family*, *friends*, and *acquaintances*. One white, non-Hispanic American and one bilingual Mexican performed the coding separately. Interrater reliability was established at 95% ($\kappa=0.94$).

Answers to these secondary questions across the four types of violence yielded variables related to recurrence, age at occurrence, and relationship context. Respondents were categorized as having single-experience violence if they reported only one of the four event types and only a single occurrence of that event. Respondents were categorized as having recurrent violence if they reported either more than one event type or more than one occurrence of a specific type. Respondents could have also experienced violence at more than one age and in more than one relationship context. Therefore, we created separate indicator variables rather than categorical variables for age of occurrence and relationship context. For example, positive scores for childhood violence, adolescent violence, and adulthood violence indicate that at least one event occurred when the respondent was younger than 12, between the ages of 12 and 15, or older than 15, respectively.

For all persons who had reported experiencing one or more traumatic events from the set of events included in the CIDI (e.g., disaster, traumatic bereavement, threatened with a weapon, sexual assault), the CIDI assesses, in order, all DSM-IV criteria for PTSD, i.e., subjective trauma in the form of terror, horror, or helplessness; five intrusion symptoms, of which at least one must be present; seven avoidance or numbing symptoms, of which three must be present; five arousal symptoms, of which two must be present; duration of symptoms of at least one month, and impairment in functioning [41]. We modified the protocol slightly so that all questions were asked of anyone who had experienced an event. (The typical approach is to skip to the next section of the interview once a criterion is not met.)

The CIDI is structured so that people who experience more than one type of event are asked the symptom questions only for the one event judged by them to have been the most stressful. This is a common approach, but it does constitute a shortcoming of the present study. When PTSD related to an event is assessed only among respondents who consider that event to have been their worst, probabilities of PTSD are overestimated.

Our solution to this problem was to compute a measure of violence-related PTSD. Respondents received a positive value if they chose any one of the violence events as their worst and met all PTSD criteria. Respondents received a zero value if they did not meet all criteria or if they chose another trauma as their worst (even if they met PTSD criteria). Thus, probabilities are much reduced because they are based on all persons who experienced an event rather than only those who selected it as their worst. For example, in previous research, when computing PTSD rates related to an event (e.g., sexual assault) the numerator was comprised of those who had PTSD related to sexual assault, with the denominator as those who chose sexual assault as their worst event. In contrast, in our computation, the numerator is all those persons reporting a sexual assault who had PTSD related to any of the four violent event types (sexual assault, sexual molestation, physical assault, threat with a weapon), and the denominator is the total number of participants who had experienced a sexual assault.

Results

Study sample

The sample was composed of 1,602 women and 907 men who ranged in age from 18 to 92. Mean age was 39.3 ($SD=16.1$). Overall, respondents from Mérida were older than respondents from other cities ($p<0.001$); however, men and women did not differ. The sample averaged 9 years of education, which is slightly higher than the national average of 7.4 years. Respondents from Guadalajara were less educated than residents of other cities ($p<0.001$), and men were better educated than women ($p<0.001$). Mean bi-weekly household income (in pesos) of 3,384 ($SD=3,858$) (about \$330.00 U. S. dollars) was equivalent to the national average of 6,680 pesos per month. Respondents from Oaxaca reported lower bi-weekly household incomes than respondents in other cities ($p<0.001$), and men reported higher household incomes than women ($p<0.001$). The gender distribution was approximately the same in each city. Women were overrepresented in the sample (64%). According to the most recent Mexican census data, 55% of adult residents are women [42]. To derive a population estimate unbiased by gender, weights were applied to correct the gender distribution to a 55:45 ratio of women to men. These weights

were 0.861 for women and 1.245 for men. Weights were not applied for education and income as sample demographics were similar to the Mexican census data [42].

Event occurrence

Data were analyzed using SUDAAN, which adjusts standard errors for a clustered sampling design [43]. Pairwise comparisons to assess the effect of city on event variables were conducted only for those where the overall chi-square tests were significant at $p < 0.05$. To adjust for multiple comparisons (four cities=six comparisons), we applied a Bonferroni correction, so that tests with a p -value less than 0.008 were considered significant. We did not attempt to correct for the total number of tests.

Total sample

Overall, violence appeared to be quite common in Mexico, with 34% of the sample reporting at least one of the four types of violence over the course of their lives (Tables 1 and 2). The most prevalent event characteristics were single-experience, physical assault, adulthood, and stranger violence.

Table 1. Weight adjusted lifetime violence, reoccurrence, type, age at occurrence, and relationship context by sex

	Total			Men			Women		
	N	%	(SE)	N	%	(SE)	N	%	(SE)
Any violence	855	34.1	(1.2)	498	44.1 ^c	(1.8)	357	25.9	(1.3)
By reoccurrence									
One experience	545	21.7	(0.9)	291	25.8 ^c	(1.4)	254	18.4	(1.1)
Two or more	310	12.4	(0.8)	207	18.3 ^c	(1.3)	103	7.5	(0.7)
By type*									
Sexual assault	67	2.7	(0.3)	12	1.1	(0.3)	54	3.9 ^c	(0.5)
Sexual molest	247	9.8	(0.7)	102	9.0	(1.0)	145	10.5	(0.8)
Physical assault	499	19.9	(0.9)	312	27.7 ^c	(1.5)	186	13.5	(1.0)
Weapon	433	17.3	(1.0)	319	28.2 ^c	(1.5)	115	8.3	(0.8)
By age at occurrence*									
Childhood	135	5.4	(0.5)	49	4.3	(0.7)	86	6.2 ^a	(0.6)
Adolescence	195	7.8	(0.6)	108	9.6 ^b	(0.9)	87	6.3	(0.7)
Adulthood	734	29.2	(1.2)	461	40.8 ^c	(1.7)	273	19.8	(1.2)
By relationship context*									
Intimate	118	4.7	(0.4)	0	0.0	-	118	8.6 ^c	(0.8)
Family	99	3.9	(0.4)	19	1.7	(0.4)	80	5.8 ^c	(0.6)
Friend	43	1.7	(0.3)	34	3.0 ^b	(0.6)	9	0.7	(0.2)
Acquaintance	166	6.6	(0.6)	118	10.5 ^c	(1.1)	47	3.4	(0.4)
Stranger	590	23.5	(1.0)	426	37.7 ^c	(1.6)	165	11.9	(0.9)

*Categories are not mutually exclusive

^aSignificantly higher than its sex counterpart, $p < 0.05$

^bSignificantly higher than its sex counterpart, $p < 0.01$

^cSignificantly higher than its sex counterpart, $p < 0.001$

Table 2. Weight adjusted lifetime violence, reoccurrence, type, age at occurrence, and relationship context by city

	Total			Oaxaca			Guadalajara			Hermosillo			Mérida		
	N	%	(SE)	N	%	(SE)	N	%	(SE)	N	%	(SE)	N	%	(SE)
Any violence	855	34.1	(1.2)	192	33.7	(2.1)	279	38.9	(2.3)	205	33.1	(2.0)	179	29.8	(2.9)
By reoccurrence															
One experience	545	21.7	(0.9)	125	21.8	(1.8)	163	22.7	(1.8)	134	21.6	(1.2)	124	20.6	(2.0)
Two or more	310	12.4	(0.8)	68	11.9	(1.2)	116	16.2	(1.8)	71	11.5	(1.5)	55	9.2	(1.1)
By type*															
Sexual assault	67	2.7	(0.3)	19	3.4	(0.8)	24	3.3	(0.6)	13	2.1	(0.5)	11	1.9	(0.5)
Sexual molestation	247	9.8	(0.7)	49	8.6	(1.2)	85	11.9	(1.4)	57	9.2	(1.2)	55	9.2	(1.4)
Physical assault	499	19.9	(0.9)	122	21.4	(2.0)	159	22.1	(1.8)	108	17.4	(1.5)	110	18.3	(2.0)
Weapon	433	17.3	(1.0)	86	15.1 ^b	(1.4)	158	22.0 ^a	(1.7)	119	19.2 ^{a,b}	(2.0)	70	11.7 ^b	(2.0)
By age at occurrence*															
Childhood	135	5.4	(0.5)	27	4.7	(0.8)	50	7.0	(1.2)	30	4.8	(0.7)	28	4.6	(0.9)
Adolescence	195	7.8	(0.6)	39	6.9	(1.2)	72	10.0	(1.2)	42	6.8	(1.0)	42	7.0	(1.0)
Adulthood	734	29.2	(1.2)	171	29.9	(2.2)	239	33.3	(2.2)	181	29.2	(2.2)	143	23.9	(2.6)
By relationship context*															
Intimate	118	4.7	(0.4)	42	7.4 ^a	(1.5)	30	4.2 ^{a,b}	(0.6)	17	2.8 ^b	(0.6)	28	4.7 ^{a,b}	(0.7)
Family	99	3.9	(0.4)	26	4.6	(0.6)	29	4.1	(0.8)	18	3.0	(0.5)	25	4.1	(0.8)
Friend	43	1.7	(0.3)	12	2.0	(0.6)	15	2.0	(0.6)	10	1.7	(0.6)	6	1.1	(0.6)
Acquaintance	166	6.6	(0.6)	41	7.1	(1.2)	43	6.0	(1.2)	35	5.6	(0.8)	47	7.8	(1.2)
Stranger	590	23.5	(1.0)	123	21.5 ^b	(1.5)	210	29.2 ^a	(2.0)	154	24.8 ^{a,b}	(2.1)	103	17.3 ^b	(2.0)

*Categories are not mutually exclusive

Superscripts represent significant city differences at the $p < 0.008$ level. Percentages that do not share superscripts are different

Sex and city differences

Sex was significantly associated with the number of violent events, $\chi^2(2, N=2509)=66.37, p < 0.001$. Specifically, men reported single and recurrent violence more often than women, $t(1, 2509)=4.28, p < 0.001$ and $t(1, 2509)=8.17, p < 0.001$, respectively. Women reported more sexual assaults, $\chi^2(1, N=2509)=21.53, p < 0.001$; men reported more physical assaults, $\chi^2(1, N=2509)=51.69, p < 0.001$, and threats with a weapon, $\chi^2(1, N=2509)=97.24, p < 0.001$. There were no sex differences in sexual molestation. Men were more likely than women to experience violence in both adolescence, $\chi^2(1, N=2509)=8.08, p < 0.01$, and adulthood, $\chi^2(1, N=2509)=77.05, p < 0.001$, while women were more likely to report violence in childhood, $\chi^2(1, N=2509)=5.05, p < 0.05$. Women were also more likely to report intimate partner, $\chi^2(1, N=2509)=85.31, p < 0.001$, and family violence, $\chi^2(1, N=2509)=27.95, p < 0.001$, whereas men most often reported violence perpetrated by friends, $\chi^2(1, N=2509)=13.03, p < 0.01$, acquaintances, $\chi^2(1, N=2509)=31.84, p < 0.001$, or strangers, $\chi^2(1, N=2509)=103.04, p < 0.001$.

City differences emerged for weapon threat, $\chi^2(3, N=2509)=16.19, p < 0.001$, stranger violence, $\chi^2(3, N=2509)=16.49, p < 0.01$, and intimate partner violence, $\chi^2(3, N=2509)=10.38, p < 0.05$. Pairwise comparisons showed that respondents from Guadalajara reported higher rates of weapon threat and stranger violence than respondents from Oaxaca and Mérida. For intimate partner violence, respondents in Oaxaca reported higher rates than respondents in Hermosillo.

Event impact

Total sample

For those who reported at least one violent event ($N=855$), 11.5% met criteria for violence-related PTSD (Tables 3 and 4). Recurrent, sexual, childhood, intimate partner, and family violence were all associated with higher probabilities of PTSD.

Sex and city differences

Of men who experienced any violence, 3.7% met criteria for violence-related PTSD compared to 22.4% of women, a significant difference, $\chi^2(1, N=855)=40.22, p < 0.001$. Regarding the specific characteristics of violence, women had a higher probability of meeting criteria than men for single-experience, $\chi^2(1, N=545)=33.96, p < 0.001$, recurrent, $\chi^2(1, N=310)=19.27, p < 0.001$, sexual molestation, $\chi^2(1, N=247)=21.81, p < 0.001$, physical assault, $\chi^2(1, N=499)=24.20, p < 0.001$, weapon threat, $\chi^2(1, N=433)=9.01, p < 0.01$, childhood, $\chi^2(1, N=135)=22.35, p < 0.001$, adolescent, $\chi^2(1, N=195)=16.05, p < 0.001$, adulthood, $\chi^2(1, N=734)=28.51, p < 0.001$, acquaintance, $\chi^2(1, N=166)=7.73, p < 0.01$, and stranger violence, $\chi^2(1, N=590)=13.50, p < 0.001$. Sex differences could not be tested for intimate partner violence because men did not report this event. For sexual assault and violence perpetrated by family and friends, tests could not be conducted as assumptions for chi-square testing were violated (i.e., one or more cells had an expected value of less than 5).

Table 3. Weight adjusted conditional probabilities (n and % of groups with violence-related PTSD)

	Total			Men			Women		
	N	%	(SE)	N	%	(SE)	N	%	(SE)
Any violence	99	11.5	(1.2)	19	3.7	(1.0)	80	22.4 ^c	(2.3)
By reoccurrence									
One experience	51	9.4	(1.2)	5	1.7	(0.8)	47	18.3 ^c	(2.2)
Two or more	47	15.3	(2.4)	14	6.6	(2.3)	34	32.5 ^c	(5.1)
By type*									
Sexual assault	27	40.6	(6.7)	1	10.0	(9.6)	26	47.6	(7.4)
Sexual molest	48	19.3	(2.6)	6	6.1	(2.6)	41	28.6 ^c	(3.7)
Physical assault	60	12.0	(1.6)	15	4.8	(1.6)	45	24.1 ^c	(3.1)
Weapon	31	7.2	(1.4)	12	3.9	(1.4)	19	16.5 ^b	(3.8)
By age at occurrence*									
Childhood	31	22.7	(3.6)	1	2.6	(2.5)	29	34.0 ^c	(5.0)
Adolescence	29	15.1	(2.4)	6	5.7	(2.4)	23	26.7 ^c	(4.2)
Adulthood	77	10.5	(1.3)	17	3.8	(1.1)	59	21.8 ^c	(2.8)
By relationship context*									
Intimate	36	30.7	(3.9)	0	0.0	–	36	30.7	(3.9)
Family	30	30.0	(4.5)	1	6.7	(6.50)	28	35.5	(5.1)
Friend	1	2.0	(2.0)	0	0.0	(0.0)	1	9.1	(8.8)
Acquaintance	17	10.0	(2.2)	6	5.3	(2.2)	10	21.8 ^b	(5.3)
Stranger	41	7.0	(1.2)	16	3.8	(1.2)	25	15.2 ^b	(2.9)

*Categories are not mutually exclusive

^aSignificantly higher than its sex counterpart, $p < 0.05$

^bSignificantly higher than its sex counterpart, $p < 0.01$

^cSignificantly higher than its sex counterpart, $p < 0.001$

The prevalence of violence-related PTSD was higher in Oaxaca (19%) compared to 9% in Guadalajara, 11% in Hermosillo, and 8% in Mérida. Specifically, city differences were found for any violence, $\chi^2(3, N=855)=9.43, p < 0.05$, sexual molestation, $\chi^2(3, N=247)=10.71, p < 0.05$, and adulthood violence, $\chi^2(3, N=734)=7.79, p < 0.05$. For any violence, respondents in Oaxaca met criteria more often than respondents in Guadalajara and Mérida. Respondents in Hermosillo had higher probabilities of violence-related PTSD after sexual molestation than respondents in Mérida. After experiences of adulthood violence, the prevalence of violence-related PTSD was higher among respondents in Oaxaca than those in Mérida. For recurrent and adolescent violence, overall chi-square tests approached significance, $\chi^2(3, N=310)=7.17, p < 0.07$ and $\chi^2(3, N=195)=7.53, p < 0.06$, respectively. Pairwise comparisons showed that respondents in Oaxaca met criteria more often for recurrent violence than respondents in Mérida, and more often for adolescent violence than respondents in Guadalajara. Chi-square tests could not be conducted for violence perpetrated by friends and acquaintances, as expected cell counts were less than 5.

Table 4. Weight adjusted conditional probabilities (n and % of groups with violence-related PTSD)

	Total			Qaxaca			Guadalajara			Hermosillo			Mérida		
	N	%	(SE)	N	%	(SE)	N	%	(SE)	N	%	(SE)	N	%	(SE)
Any violence	99	11.5	(1.2)	36	18.9 ^a	(2.8)	26	9.2 ^b	(2.0)	23	11.0 ^{a,b}	(2.2)	14	7.9 ^b	(2.2)
By reoccurrence															
One experience	51	9.4	(1.2)	20	15.8	(3.3)	11	6.6	(2.0)	11	8.4	(1.6)	10	8.0	(2.5)
Two or more	47	15.3	(2.4)	17	24.6 ^a	(5.1)	15	12.9 ^{a,b}	(4.2)	11	16.0 ^{a,b}	(5.1)	4	7.8 ^b	(3.2)
By type*															
Sexual assault	27	40.6	(6.7)	9	44.6	(11.7)	9	36.6	(12.1)	6	43.6	(16.9)	4	38.8	(11.4)
Sexual molest	48	19.3	(2.6)	12	24.5 ^{a,b}	(5.7)	16	19.1 ^{a,b}	(4.8)	15	26.1 ^a	(5.8)	4	7.8 ^b	(3.0)
Physical assault	60	12.0	(1.6)	24	19.6	(3.3)	14	8.9	(2.6)	12	11.0	(3.6)	10	9.0	(3.2)
Weapon	31	7.2	(1.4)	13	14.8	(4.1)	11	6.7	(2.3)	5	4.6	(2.2)	3	3.7	(2.1)
By age at occurrence*															
Childhood	31	22.7	(3.6)	9	35.2	(7.6)	8	15.4	(5.2)	9	30.2	(9.0)	4	15.6	(5.7)
Adolescence	29	15.1	(2.4)	10	25.0 ^a	(4.1)	7	9.5 ^b	(3.7)	8	18.2 ^{a,b}	(5.9)	5	12.2 ^{a,b}	(5.2)
Adulthood	77	10.5	(1.3)	30	17.8 ^a	(3.0)	20	8.4 ^{a,b}	(2.2)	17	9.2 ^{a,b}	(2.2)	10	6.9 ^b	(2.3)
By relationship context*															
Intimate	36	30.7	(3.9)	16	38.8	(5.4)	9	28.6	(8.3)	6	35.0	(9.1)	5	18.2	(8.0)
Family	30	30.0	(4.5)	11	40.6	(10.0)	8	26.6	(8.2)	7	37.3	(7.5)	4	17.4	(7.8)
Friend	1	2.0	(2.0)	0	0.0	(0.0)	0	0.0	(0.0)	1	8.3	(8.6)	0	0.0	(0.0)
Acquaintance	17	10.0	(2.2)	8	18.8	(4.3)	5	10.6	(5.1)	2	4.9	(3.6)	3	5.5	(3.2)
Stranger	41	7.0	(1.2)	16	12.8	(3.0)	13	6.3	(1.8)	8	5.5	(2.9)	4	3.7	(1.7)

*Categories are not mutually exclusive

Superscripts represent significant city differences at the $p < 0.008$ level. Percentages that do not share superscripts are different

A multivariate analysis of women's probability of PTSD

To summarize, recurrent, sexual, childhood, intimate partner, and family violence were associated with higher probabilities of lifetime violence-related PTSD. Moreover, women and Oaxacans met criteria more often compared with men and those in one or more of the other cities. We examined the unique contributions of these variables to PTSD by conducting a logistic regression with only those persons who experienced violence. A new variable—sexual violence—was created such that respondents who had reported sexual assault or sexual molestation were coded as (1), and respondents who reported either being physically assaulted or threatened with a weapon were coded as (0). Multiple violence was coded (1) if the respondent reported being victimized more than once or reported more than one type, and (0) for one type experienced one time. Childhood violence was coded as (1), with the other age categories coded (0). Domestic violence (being assaulted by an intimate partner or family member) was coded as (1), with the other contexts coded as (0). City was coded as Oaxaca (1) and other cities (0).

The analysis was conducted only for women ($N=357$), as the majority of men did not meet criteria necessary for a PTSD diagnosis given exposure to violent events. To control for differences in socio-economic status (SES), we included household income in the initial analysis; however, it was not statistically significant and, therefore, was dropped in the subsequent model. Women experiencing sexual violence were 2.5 times more likely to report PTSD symptoms compared to those who experienced physical violence [95% confidence interval (CI)=1.3, 4.7]. Women who reported intimate partner or family violence were 3.0 times more likely to have PTSD symptoms than women who experienced violence by friends, acquaintances, or strangers (95 % CI=1.7, 5.2). Women in Oaxaca were 2.5 times more likely to meet criteria for PTSD after a violent incident than women in Guadalajara (95% CI=1.2, 5.3), and 2.4 times more likely to meet criteria than women in Mérida (95% CI=1.2, 5.3).

Discussion

A large percentage of Mexicans had experienced violence at least once during their lives. Physical assault and threat by weapon were the most frequent types of violence, but prevalence rates of sexual assault and molestation were not trivial. Direct exposure to violence was most common during adulthood, and almost one in four Mexicans experienced stranger assault. Almost all forms of violence were associated with a moderate to high probability of PTSD, but victims of sexual and domestic violence may be particularly vulnerable to developing symptoms associated with PTSD.

As anticipated, compared to women, men were more likely to experience any violence, single-experience and recurrent violence, physical attack, threat by weapon, violence in adolescence and adulthood, and violence perpetrated by friends, acquaintances, and strangers. These differences largely conform to findings from previous studies in the United States [6, 7, 44] and Canada [45], suggesting that there may be universals in the sex distribution of violence cross-culturally. Also, in Mexico, men are more likely than women to be in public [24] and, therefore, may be more vulnerable to recurrent, physical and non-domestic violence.

It is noteworthy that although the sex distribution is similar, there are differences in the actual prevalence of violence between U. S. and Mexico samples. Overall, rates of interpersonal violence are much lower in this sample (44% and 26% of men and women, respectively) compared to a national study in the U. S. (67% and 55% of men and women, respectively) [22]. One possibility for this discrepancy is that for the Mexico study we included only serious physical attacks and threats with a weapon, whereas the U. S. study included other less serious forms of physical violence (e.g., threw something that could hurt, grabbed, pushed). However, a different story emerges when we compare rates of a specific type of interpersonal violence (physical attack) between the U. S. and Mexico using data from the National Comorbidity Study (which included victimization questions similar to those used in the current study) [7]. Results showed that 11% of men and almost 7% of women report a physical attack, compared to 28% of men and 14% of women in our study. In contrast, rates of sexual assault are lower (3%) in this Mexican sample than those found in either of the U. S. national studies (9% and 15%) [7, 22]. Clearly, the comparability between the current study and previous studies conducted in the U. S. is constrained by differences in how violence was measured [46]. In other words, it is difficult to know if rates of physical assault are higher and rates of sexual assault are lower in Mexico or whether measurement issues (e.g., number and wording of questions) played a role. Although comparisons are difficult, these data serve to illustrate that, in absolute terms, severe forms of physical violence are quite prevalent in these four Mexican cities.

In addition to questions of measurement, reporting bias may have also been a factor in our findings. Compared to men, women were more likely to report sexual, childhood, and family violence, and only women reported intimate partner violence. It is unclear in the current study, as well as in previous research, whether the differential rates between men and women are due to men's unwillingness to disclose these events to interviewers or whether they do, in fact, experience them with less frequency. These data also suggest that women may be underreporting as well, a finding that is consistent with previous studies with women of Mexican ancestry, some of whom were U. S. born and others Mexican born [47]. It may be that Mexican women born in Mexico are more traditional than those born in the U. S. and, therefore, more hesitant to discuss unwanted sexual contact [48].

Altogether, 11.5% of those who experienced violence met DSM-IV criteria for lifetime violence-related PTSD. Women had a higher probability of meeting criteria than men. This finding is consistent with previous studies, but the magnitude of the difference is not. In the United States and Canada, women have been found to be approximately twice as likely as men to develop PTSD after exposure to violence or trauma [13]. In the present study, nearly a quarter of exposed women reported symptoms consistent with PTSD—a rate more than five times greater than men's. One reason for this difference is that, in general, cognitions related to trauma, such as helplessness and emotional distress, may be more dissonant with men's self-concepts than with women's. This dissonance may be even greater in cultures that foster more traditional views of men and women. Thus, traditional gender role socialization may cause men in Mexico to suppress symptom experiences more so than men in the United States [49, 50, 51]. Conversely, poverty, discrimination, and oppression have been thought to be related to women's capacities to cope with traumatic stressors [50]. These socioeconomic and sociocultural explanations may be especially relevant for Mexican women because so many live in poverty, and all live in the context of a culture that fosters traditional views of men and women [52, 53]. Therefore, women

in Mexico may be more likely to experience and report symptoms after a stressful event than women in the U. S.

Differences among respondents living in the four cities were found for weapon threat, stranger, and intimate partner violence, with the former two more prevalent among respondents in Guadalajara compared to Oaxaca and Mérida. Differences may stem from the realities of life in large urban areas and where people travel greater distances to industrial/commercial employment. By contrast, intimate partner violence was more prevalent among respondents in Oaxaca than those in Hermosillo. This finding is difficult to interpret; however, one explanation may come from examining the characteristics of these two cities. Oaxaca is a more conservative city, retaining many of Mexico's traditional values and attitudes towards family and gender relations. In addition, it is among the poorest cities in Mexico. By contrast, Hermosillo has a strong economy based on commercial agriculture and industrial manufacturing for the United States market. Because of its close proximity to the U. S. (4 hours by car from Tucson), it has taken on many North American values. Thus, these cities represent ends of a cultural and economic continuum, which may, in turn, influence their rates of intimate partner violence.

The probability of PTSD was significantly higher in Oaxaca than in one or more comparison cities. Poverty level differences between cities could be one explanation, but income was not a significant predictor of PTSD. Future studies may want to examine whether differences exist in the availability of psychological resources for victims of violence, as this may partially account for city effects.

This study has several limitations. Men were underrepresented proportionally. There were also issues of measurement. In an attempt to minimize the misinterpretation of words such as rape and sexual molestation, we did provide a general definition of what we meant by each question. However, our definitions did not include specific behaviors, and, therefore, some cases may have been missed, resulting in lower rates of violence in our sample. Furthermore, by including only one question for each type of violence, and asking only about the most severe forms of violence, estimates of prevalence rates may have been effected—most likely producing an underestimate of violence [46]. Another limitation is our use of retrospective reports. There are inherent issues with assessing psychiatric conditions over the lifetime as it is difficult to determine how accurately events and symptoms are remembered from the distant past. For example, data on childhood events may be particularly biased. Adults may be most likely to remember and report events from childhood that were experienced as traumatic, thereby explaining the finding that childhood violence was associated with a higher probability of PTSD than was later violence. Although data suggest the reliability and validity of the CIDI, it is unclear how well the CIDI measures PTSD where there are significant lapses in time between the event and when symptoms are assessed [6, 7, 39]. Finally, small sample sizes, combined with our complex sampling design, prevented us from conducting analyses to examine how some characteristics of violence-related events were associated with a higher probability of PTSD.

Notwithstanding these shortcomings, this study increases knowledge of violence and its consequences in Mexico. In response, it will be important to establish collaborative partnerships among professionals, community agencies, and medical clinics to raise awareness of these consequences. From these partnerships, effective interventions can be developed to address the

needs of survivors of violence. Not only are interventions needed to treat survivors after an event, but just as important will be the development of prevention efforts to reduce the numbers of Mexicans exposed to violence. As a foundation for these efforts, we view this research as an initial step toward understanding and documenting the violence-related experiences of people in Mexico.

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