

Previous Violent Events and Mental Health Outcomes in Guatemala

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For 36 years Guatemala experienced a violent civil war in which over 200 000 civilians were killed, 440 villages destroyed, and more than 1 million Guatemalans displaced, both internally and into southern Mexico.¹⁻³ Those killed included indigenous persons, laborers, academics, religious leaders, and others who were clearly noncombatants.^{3,4} In 1996, peace accords were signed between a number of rurally based guerrilla forces and Guatemala's national army.

Nearly three quarters of the people in the world's poorest societies have recently been through a civil war or are still in one. The average civil war lasts approximately 5 years and can be embedded in a societal context that fuels the longevity of the conflict itself by marking it as culturally "normal."⁵⁻⁷ Because of cultural normalization and numerous other factors, both within and outside of Guatemala, the Guatemalan Civil War far exceeded the length of the average national civil war and might have long-standing implications for the safety and health of Guatemalans today.

Civil wars produce a legacy of postconflict violence and disease,⁷⁻¹² and Guatemala is no exception. Today, the northern triangle of Central America, which includes Guatemala, Honduras, and El Salvador, is described as the most violent area of the world outside of active theaters of war.^{3,13} Less than a decade after the civil war peace accords were signed in Guatemala, persistent violence reportedly resulted in the second highest rates of fear from armed crime in the world and the proliferation of more private security personnel than members of the regular army.^{3,14} Approximately at the same time, some 1500 Guatemalan Civil War refugees living in Mexico reported alarmingly high levels of depression, anxiety, and post-traumatic stress disorder (PTSD).¹⁵ The World Health Organization (WHO) also reported elevated alcohol use disorders in Guatemala in the years following the civil war.¹⁶ These indicators occurred alongside reports that 40% of the

Objectives. We analyzed a probability sample of Guatemalans to determine if a relationship exists between previous violent events and development of mental health outcomes in various sociodemographic groups, as well as during and after the Guatemalan Civil War.

Methods. We used regression modeling, an interaction test, and complex survey design adjustments to estimate prevalences and test potential relationships between previous violent events and mental health.

Results. Many (20.6%) participants experienced at least 1 previous serious violent event. Witnessing someone severely injured or killed was the most common event. Depression was experienced by 4.2% of participants, with 6.5% experiencing anxiety, 6.4% an alcohol-related disorder, and 1.9% posttraumatic stress disorder (PTSD). Persons who experienced violence during the war had 4.3 times the adjusted odds of alcohol-related disorders ($P < .05$) and 4.0 times the adjusted odds of PTSD ($P < .05$) compared with the postwar period. Women, indigenous Maya, and urban dwellers had greater odds of experiencing post-violence mental health outcomes.

Conclusions. Violence that began during the civil war and continues today has had a significant effect on the mental health of Guatemalans. However, mental health outcomes resulting from violent events decreased in the postwar period, suggesting a nation in recovery. (*Am J Public Health.* 2015;105:764-771. doi:10.2105/AJPH.2014.302328)

country continued to have no mental health services, leaving many Guatemalans, repatriated refugees, and affected citizens, who remained throughout the civil war without a key aspect of care on the road to national recovery.¹⁷

In dealing with the effects of civil conflicts, such as recurring violence, PTSD, depression, anxiety, alcohol abuse, and other mental health issues, postconflict societies like Guatemala face difficult decisions between enacting extraordinary military spending^{3,5} or provisions of enhanced social and public health services.^{7,18} However, policymakers in Guatemala (and internationally) have limited population-level and epidemiologic evidence¹⁹ with which to make such decisions. With this in mind, we completed the first national probability sample of the mental health of Guatemalans still living in Guatemala. We analyzed these survey data to obtain nationally representative estimates of the prevalence of select mental health problems in Guatemala,^{9,11,15} and to determine if

a relationship existed between previous violent events and the development of subsequent mental health outcomes. We compared different sociodemographic groups,²⁰⁻²⁵ as well as the periods before and after the signing of the 1996 civil war peace accords.

METHODS

We used data collected from a sample of adult Guatemalan residents randomly chosen throughout the country. This data collection effort, the 2009 Guatemalan National Mental Health Survey (GNMHS),²⁶ was the first large population-based mental health survey completed countrywide. The survey was designed to produce a representative sample of the adult general population in Guatemala. Excluded participants were less than 18 years of age or older than 65 years of age, not Guatemalan citizens, people with any serious cognitive deficits in communication, and people who did not permanently reside at the sampled

households. All survey respondents were born and lived in Guatemala before the signing of the December 1996 civil war peace accords.

We selected the respondent sample using a 3-stage clustered design from May through July 2009 (data available as a supplement to the online version of this article at <http://www.ajph.org>). A first-stage sampling strategy was designed and implemented by statisticians at the Guatemalan National Census Bureau (the *Instituto Nacional de Estadística* [INE]). Based on the INE integrated system of household surveys, Guatemala is divided into 15 511 clusters as part of a countrywide master sampling framework. From this master sampling framework, the INE created a reduced master sample of 4020 randomly selected clusters, and a random sample of 56 field clusters were drawn from this reduced sample. The probability of selection for each field cluster was determined by its population size, socioeconomic status, and urban/rural location based on the 2002 Guatemalan national census.²⁷ To have an appropriate sample distribution representing each of the strata from the master sampling framework and the reduced master sample, the final sample was proportionally adjusted according to stratum weights. The 56 randomly selected field clusters were located throughout the country, representing 16 of the 22 (72.7%) Guatemalan provinces, or *departamentos* (Figure 1). The INE defined each cluster according to population size and not by geographic size; the range was between 500 and 1500 inhabitants per cluster. For the mental health survey, the average population size was 797 inhabitants per cluster.

In the second stage, we selected a random sample of 25 buildings within each field cluster. We obtained survey maps for each field cluster from the INE. Each map contained the geographic location of all residential buildings that had been collected in 2002, the year of the last national census in Guatemala at the time. We re-audited and updated the list of buildings on these maps 1 day before our survey with an in-person walking assessment of each field cluster. We used a random number from 1 to 25 to select the first building, and we then sampled subsequent buildings using an interval.

In the third stage, we enumerated households within each building, and we randomly

chose the respondents within each household using the Kish algorithm and grid.²⁸ For buildings with multiple households, we selected 1 person to interview per household, also applying the Kish algorithm and grid. We calculated an overall response rate of 87.3% for our survey using the American Association for Public Opinion Research standard tables.²⁹ Our response rate was consistent with previous response rates reported as part of the 2002 to 2004 WHO World Mental Health Surveys (WMHS) and 1990 to 1999 International Consortium of Psychiatric Epidemiology (ICPE) surveys, including 6 countries in the Americas where response rates were between 62.4% and 90.3%.^{30–32}

Interviews and Data Preparation

Face-to-face surveys were administered by 138 interviewers completing their final year of medical school at the University of San Carlos of Guatemala (USAC). Interviewers had to qualify via a training regimen to perform field interviews. Interviewer training was led by teams of experts from USAC, Brown University, and the INE in Guatemala City from March to June 2009. During a survey pretesting period that was held 2 weeks before the full survey began, every interviewer administered at least 2 pilot surveys to pilot respondents. Survey operations were assessed and fine-tuned during this pilot period. The training of interviewers occurred over 4 weeks using systematic procedures that were implemented in other countries.^{30,31}

Interviewers traveled in 22 groups with a field supervisor who implemented daily quality control and data collection procedures. All interviews were completed from June to July 2009. The mean (\pm SD) interview duration was 65 (\pm 23) minutes. Eligible individuals were not offered a monetary incentive for participation. Written informed consent was obtained from every survey participant. For people who were not able to write and read, the interviewer read and explained the survey and the informed consent procedure. People who were not able to provide informed consent because of mental impairment were excluded from our sample. Our interviewers did not previously work or perform clinical training duties in the selected sample areas. However, rapport was facilitated by the previous

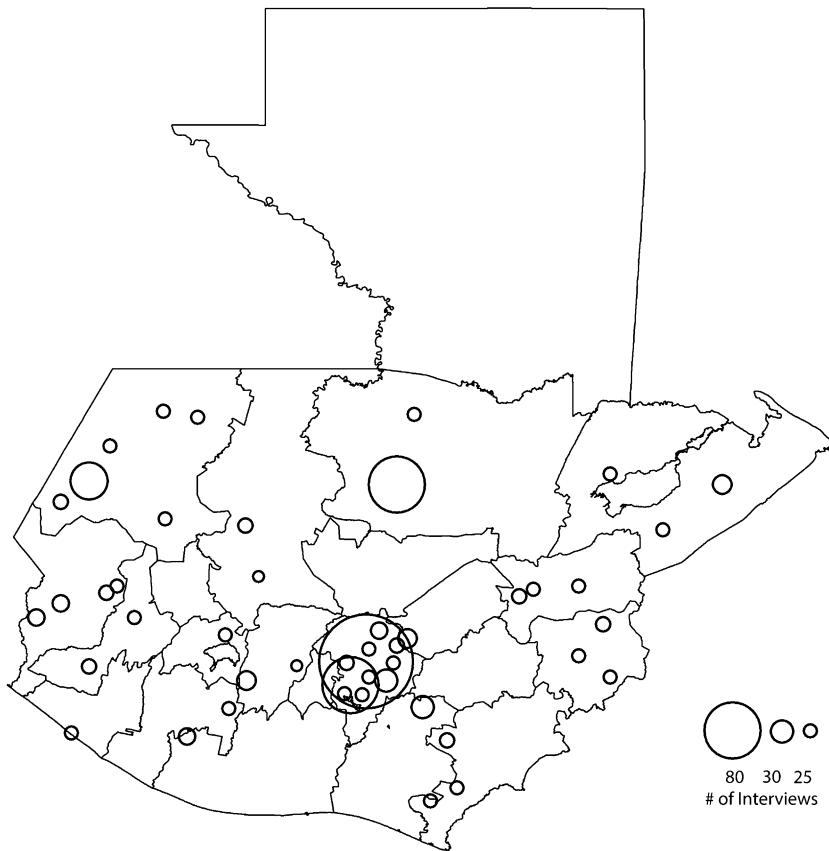
experiences all our interviewers had in local Guatemalan communities, in both cities and rural villages, in addition to preliminary contact with all the families living in each cluster in establishing the foundations for our interviews.

We used the paper form of the Spanish-language Composite International Diagnostic Interview (CIDI) version 2.1³³ as our survey instrument. The CIDI is a comprehensive, structured, and validated interview primarily used to assess mental health disorders classified as axis I (psychological diagnoses). We used a diagnostic algorithm that produced lifetime prevalence estimates of mental health disorders. We also explored analyses of 6- and 12-month prevalence estimates, although these estimates were often too small to conduct association tests.

Because Guatemala is a multiethnic country with more than 20 different Mayan languages, when we encountered individuals who only spoke 1 of several distinct, local Mayan languages, we employed local translators who were part of local health centers to translate every question into the local Mayan language and accompany our interviewers for the administration of the survey. Local translators were prepared well in advance with respect to the survey—its sections, question order, and translation—to minimize potentially problematic aspects of the survey instrument before it was fielded in their local dialect. We used this approach for 125 survey participants (8.6%) who spoke only local Mayan dialects. A sub-analysis comparing languages spoken by our participants (Mayan dialect subgroups and Spanish) showed no significant differences within the mental health outcomes under study.

We also employed a double data entry process in which completed survey data were cross-checked for errors, electronically entered into computers, and then centrally archived at USAC. Our survey collected respondent information on exposure to violence, mental health outcomes, and various sociodemographic characteristics. From a total of 535 variables used for this analysis for all 1452 survey respondents, data were missing 0.02% of the time.

In our random sample of respondents, exposure to a violent event was determined using answers to the question, “Now I would like to



Note. The largest circle represents approximately 180 interviews.

FIGURE 1—Departamento (province) boundaries overlaid with locations and numbers of interviews within 56 randomly selected survey clusters: Guatemala, 2009.

ask you about extremely stressful or upsetting events that sometimes occur to people,” with the following response options: direct war experience; life-threatening accident; witness to severe injury or death, rape or sexual molestation; serious physical attack or assault; threatened with a weapon; held captive; or kidnapped, tortured, or the victim of terrorism. We defined respondents reporting at least 1 type of extremely stressful or upsetting event as having “any exposure to previous violence.” Respondents were then asked to report the 1 most serious event and its date of occurrence, from among the list of extremely stressful or upsetting events that they might have reported. We later analyzed the date of occurrence of the 1 most serious event with respect to the timing of the civil war peace accords in December 1996. This month was the demarcation period between the period during the war and the period after the war.

We analyzed respondent lifetime prevalence estimates for the mental health outcomes of depression (major depressive disorder and related symptoms), anxiety (panic disorder, generalized anxiety disorder, and agoraphobia without panic), alcohol-related disorders (alcohol abuse and alcohol dependence), and PTSD based on *Diagnostic and Statistical Manual of Mental Disorders—version IV* criteria.³⁴ We considered other substance use or abuse disorders, but their numbers were too small to conduct statistically robust analyses. Our survey also asked about the age of onset when respondents with positive diagnoses for depression, anxiety, alcohol-related disorders, and PTSD started developing symptoms. Based on this age of onset symptom start date, we were able to distinguish whether each respondent’s exposure to violence (defined as their 1 most serious violent event) occurred before the onset

of their symptoms. This permitted analyses of reported violent events that were antecedent to the mental health outcomes in our analyses.

Although trauma, including violence, is a necessary condition for the development of PTSD, we included PTSD as a mental health outcome to complete a number of useful supplementary analyses. These included describing the overall prevalence of PTSD in Guatemala and benchmarking this prevalence with that used in other countries, analyzing the relative magnitude of PTSD among different subsets of violence, and investigating the relative magnitude of PTSD among different sociodemographic subgroups, as well as during and after the civil war.

Statistical Analysis

We constructed survey weights in 2 steps. First, we calculated design weights as the inverse of the sampling probability, which was the product of the sampling probability in the 3 stages. Second, to account for nonresponse, we developed poststratification weights after applying the design weights and compared these to the national census distributions of sociodemographic characteristics, such as gender, age groups (18–24, 25–34, 35–44, 45–65 years), ethnicity (indigenous, nonindigenous), marital status, and literacy. We calculated the final weights as the product of the design weights and poststratification weights. After applying the final weights, distributions of sociodemographic characteristics were statistically compared with those reported by the national census using a critical ratio test for proportions.³⁵

Exposure to violence and mental health outcomes were dichotomized as yes/no variables. Using statistical models for complex survey data and our final survey weights, we used logistic regression to test the associations between exposure to individual violent events and mental health outcomes. We calculated both unadjusted regression models and regression models adjusted for various sociodemographic characteristics that could have confounded the violence–mental health relationships. These confounding characteristics were gender, age, marital status, ethnicity (indigenous, nonindigenous), location of home (urban, rural), literacy, and employment. As a screen for multicollinearity, we tested these characteristics for pairwise cross correlations

TABLE 1—Unweighted and Weighted Survey Distributions Compared With Those From the 2002 Guatemalan National Census: Guatemala, 2009

Characteristic	No. (n = 1452)	Unweighted %	Weighted %	2002 Census %
Gender				
Females	911	62.7	52.7	52.7
Males	541	37.3	47.3	47.3
Age, y				
18–24	302	20.8	26.4	28.0
25–34	428	29.5	27.9	27.0
35–44	324	22.3	21.0	20.6
45–65	398	27.4	24.7	24.5
Marital status				
Married	725	49.9	69.3	69.3
Widowed	90	6.2	2.3	2.9
Separated/divorced	85	5.9	2.9	2.2
Never married	552	38.0	25.5	25.6
Ethnicity				
Indigenous	409	28.2	37.6	38.2
Nonindigenous	1043	71.8	62.4	61.8
Urbanicity				
Urban home	699	48.1	46.8	51.0
Rural home	753	51.9	53.2	49.0
Literacy				
Literate	1180	81.3	69.2	69.2
Illiterate	272	18.7	30.8	30.8
Employment				
Employed	659	45.4	48.6	49.5
Unemployed	793	54.6	51.4	50.5

Note. Percentages may not add to 100 because of rounding.

using Spearman nonparametric test statistics; no large correlations (>0.8) were found.³⁶

We also completed unadjusted and adjusted logistic regression models, which were restricted to various sociodemographic characteristics and the periods during and after the civil war, together with accompanying statistical interaction tests. Two-way interaction terms tested between the variable any exposure to previous violence and each of the following: gender (male/female), ethnicity (indigenous/nonindigenous), urbanicity (urban/rural), and the timing of the civil war (during/after). These models allowed ratio comparisons of different strata within and between the various characteristics and the periods during and after the civil war and included the same model specifications as the unrestricted models in terms of adjustments for complex survey data and inclusion of survey weights.

We reported odds ratios (ORs) and adjusted ORs (AORs) and their 95% confidence intervals (CIs). All statistical analyses were completed and tracked using Stata version 12.1 (StataCorp, 2012, College Station, TX). We used commands in Stata to account for the complex design (such as survey weights, stratification, and clustering) in the survey. For variance estimates, Stata computes SEs using the linearized variance estimator, because it is based on a first-order Taylor series linear approximation. Thus, appropriate commands for complex survey data were used, and the variances were estimated using the Taylor series linearization technique.^{37,38}

RESULTS

A total of 1452 Guatemalans completed the mental health survey and were included

in our analysis. Weighted distributions of sociodemographic characteristics were not statistically different from those reported by the Guatemalan national census (Table 1).

When considering all previous exposures to violence combined, more than one fifth of survey participants reported experiencing at least 1 violent event in their lifetimes, with witnessing severe injury or death being the most common event and having direct combat experience being the least common event (Table 2). A breakdown of this figure according to gender showed 26.1% of male and 19.3% of female survey participants experienced at least 1 violent event; a breakdown according to ethnicity showed that 20.8% of indigenous Maya and 23.6% of nonindigenous survey participants experienced at least 1 violent event. Of the 338 survey participants who experienced any previous violence, 61.1% reported experiencing 1 violent event, 24.8% experienced 2 violent events, 9.8% experienced 3 violent events, and 4.4% experienced 4 or more violent events in their lifetime. A further analysis of these 338 survey participants demonstrated that 31.8% were exposed to their most serious violent event during the civil war and 65.4% after (9 participants did not report a date of exposure).

From among all 1452 participants, survey-weighted calculations showed that 4.2% were positive for depression, 6.5% were positive for anxiety, 6.4% were positive for alcohol-related disorders, and 1.9% were positive for PTSD (Table 2). A stratified analysis showed significant differences for depression, anxiety, alcoholism, and PTSD by gender. It also showed that alcohol-related disorders were significantly different between indigenous and nonindigenous Guatemalans (data available as a supplement to the online version of this article at <http://www.ajph.org>).

Regression-adjusted associations among exposure to previous violence and depression, anxiety, and alcohol-related disorders were not statistically significant. As expected, being exposed to any previous violent event showed a large and statistically significant adjusted association with PTSD (AOR = 20.0; 95% CI = 5.9, 67.0). PTSD was also shown to be significantly associated with all subsets of previous violence exposure, although serious physical assault showed the largest AOR

TABLE 2—Prevalence Estimates of Different Types of Previous Violence and Lifetime Prevalence Estimates of Mental Health Outcomes: Guatemala, 2009

Characteristic	No. (n = 1452)	Unweighted % (95% CI)	Weighted % (95% CI)
Previous violent event			
Any exposure to previous violence	338	23.3 (21.1, 25.5)	20.8 (18.6, 22.8)
Witnessing severe injury or death	111	7.7 (6.3, 9.1)	7.2 (6.0, 8.7)
Life-threatening accident	106	7.3 (6.0, 8.8)	6.9 (5.6, 8.3)
Serious physical assault	78	5.4 (4.3, 6.7)	4.8 (3.7, 6.0)
Rape or sexual molestation	28	1.9 (1.3, 2.8)	1.2 (0.7, 1.9)
Direct combat experience	15	1.0 (0.6, 1.7)	0.7 (0.3, 1.2)
Mental health outcomes			
Depression	79	5.4 (4.4, 6.8)	4.2 ^a (3.2, 5.3)
Anxiety	115	7.9 (6.7, 9.6)	6.5 ^b (5.2, 7.9)
Alcohol-related disorders	82	5.7 (4.6, 7.1)	6.4 ^c (5.2, 7.8)
PTSD	45	3.1 (2.3, 4.1)	1.9 (1.2, 2.7)

Note. CI = confidence interval; PTSD = posttraumatic stress disorder. Mental health outcomes were classified using *Diagnostic and Statistical Manual of Mental Disorders—version IV*.³⁴ Percentages calculated using total n = 1452, except as noted.

^aThe sample size was n = 1439 and included only nonmissing data.

^bThe sample size was n = 1425 and included only nonmissing data.

^cThe sample size was n = 1418, and included only nonmissing data.

(AOR = 22.6; 95% CI = 5.1, 99.8), and life-threatening accident had the smallest AOR (AOR = 11.6; 95% CI = 2.2, 60.1; data available as a supplement to the online version of this article at <http://www.ajph.org>).

Subcategory analyses demonstrated large and significant AORs between previous violence and depression among indigenous Maya (AOR = 6.0; 95% CI = 1.1, 32.3) and urban residents (AOR = 4.4; 95% CI = 1.3, 14.7). Subcategory analyses demonstrated a significantly reduced AOR between previous violence and anxiety among men (AOR = 0.3; 95% CI = 0.1, 0.8). Adjusted analyses restricted to gender, ethnicity, urbanicity, and during and after the civil war subcategories demonstrated large and significant AORs between previous violence and PTSD in all subcategories except men (AOR = 3.6; 95% CI = 0.6, 20.1; Table 3).

Interaction analyses of the ORs between previous violence and mental health outcomes by subcategory produced consistent (although not always statistically significant) findings for depression, anxiety, and PTSD. That is, with the exception of alcohol-related disorders in men, all other mental health outcomes showed that women had consistently higher ORs than men, the indigenous population had consistently higher ORs than the nonindigenous population,

urban respondents consistently had higher ORs than rural respondents, and that ORs before the peace accords were consistently higher than those after the civil war. Participants who experienced violence during the civil war had 4.3 times the adjusted odds of alcohol-related disorders ($P < .05$) and 4.0 times the adjusted odds of PTSD ($P < .05$) compared with those who experienced violence after the civil war (Table 3).

DISCUSSION

This first national probability sample of the mental health of Guatemalans in their home country suggested a country in recovery. The period after the civil war showed a reduction in the relationship between violence and subsequent mental health problems. Despite this, 1 of 5 Guatemalans reported having experienced serious violent events, and violence was significantly associated with subsequent mental health problems for vulnerable groups such as women, indigenous Guatemalans, and urban Guatemalans.

Cross-National Estimates of Mental Health Outcomes

Across 9 developing nations in the WMHS and the ICPE (Brazil, Chile, China, Colombia, Lebanon, Mexico, Nigeria, South Africa, and

Ukraine), there were average lifetime prevalence estimates of 9.1% for depression, 5.8% for anxiety, and 2.3% for PTSD. The Latin American countries in this group averaged lifetime prevalence estimates of 10.2% for depression, 7.7% for anxiety, 5.5% for alcohol-related disorders, and 2.5% for PTSD.^{32,39–47} Thus, compared with other nationally representative mental health surveys in developing nations, including those conducted in Latin America, the lifetime prevalence estimates from Guatemala were lower for depression, approximately the same for anxiety, higher for alcohol-related disorders, and lower for PTSD.

Nonetheless, few of the developing nations represented in the WMHS or the ICPE had a history of significant and relatively recent civil conflict. A meta-analysis of 181 surveys of conflict-affected persons from 40 countries was more germane to our analysis; this meta-analysis showed that, when only considering statistically representative surveys, the average reported prevalence estimates were 20.7% for PTSD and 21.2% for depression (anxiety and alcohol were not analyzed).⁹ By comparison, our nationally representative estimates for Guatemala were lower for PTSD and depression. The same meta-analysis also reported average prevalence estimates for PTSD and depression from nonrepresentative surveys, although these were found to be approximately twice as large.

From within Guatemala itself, a previous, nonrandom survey of 86 Guatemalans found a prevalence estimate of 40.7% for depression, 23.3% for alcohol-related disorders, and 50% for PTSD.³ Another nonrandom survey of 170 Guatemalan war refugees in Mexico found prevalence estimates of 38.8%, 54.3%, and 11.8% for depression, anxiety, and PTSD, respectively.¹⁵ A follow-up sampling of refugees that had returned to Guatemala found approximately the same levels of depression and PTSD (47.8% and 8.9%, respectively), although significantly less anxiety (17.3%).¹⁵ As was previously demonstrated, these earlier surveys of Guatemalans produced larger prevalence estimates than the GNMHS, which was likely the result of small numbers and nonrandom sampling.⁹ In addition, in the Guatemalan refugee cohort, all respondents reported experiencing at least 1 previous traumatic

TABLE 3—Subcategory Associations and Interaction Ratio Tests Between Any Exposure to Previous Violence and Lifetime Prevalence Estimates of Subsequent Mental Health Outcomes: Guatemala, 2009

Characteristic and Any Exposure to Previous Violence	Depression, AOR (95% CI)	Anxiety, AOR (95% CI)	Alcohol-Related Disorders, AOR (95% CI)	PTSD, AOR (95% CI)
Females	2.0 (0.8, 5.2)	1.5 (0.5, 4.4)	0.8 (0.2, 4.4)	36.5* (9.2, 144.9)
Males	0.6 (0.1, 3.2)	0.3* (0.1, 0.8)	1.0 (0.3, 3.0)	3.6 (0.6, 20.1)
Female/male ratio	2.1 (0.4, 10.3)	5.2* (1.1, 24.4)	0.5 (0.1, 4.0)	8.6 (0.8, 87.8)
Indigenous	6.0* (1.1, 32.3)	2.1 (0.5, 10.1)	2.4 (0.3, 20.1)	52.7*** (20.0, 138)
Nonindigenous	1.0 (0.4, 2.5)	0.5 (0.2, 1.2)	0.8 (0.3, 1.8)	16.0*** (3.5, 73.5)
Indigenous/nonindigenous ratio	2.9 (0.4, 19.4)	4.5 (0.8, 25.0)	2.0 (0.2, 18.6)	2.0 (0.5, 7.8)
Urban areas	4.4* (1.3, 14.7)	1.3 (0.2, 8.7)	2.4 (0.5, 11.3)	37.5*** (5.5, 256)
Rural areas	0.8 (0.3, 2.2)	0.8 (0.3, 1.8)	0.6 (0.2, 1.8)	15.3** (3.0, 77.4)
Urban/rural ratio	3.5 (0.8, 16.5)	1.6 (0.2, 11.9)	3.5 (0.6, 22.1)	1.6 (0.2, 13.0)
Period during the war	1.9 (0.6, 6.2)	1.4 (0.5, 4.0)	2.0 (0.6, 7.1)	39.4*** (9.1, 170.2)
Period after the war	1.3 (0.6, 3.1)	0.8 (0.2, 3.7)	0.4 (0.1, 1.4)	10.0** (2.5, 40.3)
During/after war ratio	1.6 (0.5, 4.8)	1.7 (0.3, 9.4)	4.3* (1.0, 19.0)	4.0* (1.0, 15.2)

Note. AOR = adjusted odds ratio; CI = confidence interval; PTSD = posttraumatic stress disorder. Regression models adjusted for gender, age, marital status, ethnicity, urbanicity, literacy, and employment. Mental health outcomes were classified using *Diagnostic and Statistical Manual of Mental Disorders—version IV*.³⁴

* $P \leq .05$; ** $P \leq .01$; *** $P \leq .001$.

event, whereas only approximately 1 of 5 of the respondents from the GNMHS, a general population survey, reported being exposed to a previous traumatic event.¹⁵ These previous nonprobability surveys provided useful comparative information, but they also justified the need for a nationally representative mental health survey, such as the GNMHS, to inform countrywide policy.

Previous Violence and Mental Health Outcomes

Exposure to violence was strongly associated with subsequent mental health outcomes for specific high-risk populations. Indigenous Guatemalans were a concern in this regard, because they represented roughly half of Guatemala's population and were particularly targeted in the 36-year civil war.¹⁷ The historic violence experienced by indigenous Guatemalans also drove many to relocate to urban areas, where the majority of Guatemala's violence currently occurs. Although an accord on indigenous rights was signed in 1995, long-term mental health consequences of the conflict remain among indigenous Maya in Guatemala. It has been argued that indigenous people in Guatemala continue to live in fear of their state, their neighbors and, at some level, their own culture. A re-energized mental health system could greatly contribute to rebuilding

indigenous peoples' confidence in themselves, their government, and their Mayan beliefs.⁴⁸

The strong relationship of violence and subsequent mental health outcomes among women was also notable. This might relate to a rape–mental disorder relationship in our data, although the numbers of respondents who reported rape or sexual molestation might be too small to determine this in any conclusive way. It was clear, however, that the disparate findings among Guatemalan women is worthy of continued consideration and of programs that specifically focus on women's mental health and safety.

The relationships between previous violence and all 4 of the outcomes we investigated (depression, anxiety, alcohol, and PTSD) were larger during the civil war than in the postwar period. These differences were approximately 4 times higher and statistically significant for alcohol-related disorders and PTSD during the war than after the war. This spoke to the major disruptions in family and personal situations that the war thrust on the lives of many Guatemalans. Reports existed of displacement from homes and workplaces, sometimes permanently, whole regions in economic stasis, the destruction of crops and fields, the elimination of local leaders and authorities and, in the worst cases, torture, rape, and collective extermination of entire families and communities.⁴⁹

Similar findings of mental health problems being higher during periods of war, as opposed to postwar periods, were reported in other nations. Many episodes of war-related PTSD could dwindle within a few months and could be difficult for respondents to remember years later. This is especially true in war environments where intrusive ideation and decreased hope are common and tied to specific, but somewhat expected, acts of wartime violence, making them somewhat normal parts of life at the time, and thus, more forgettable.⁴³ For instance, 1 analysis of the Israeli WMHS showed that Holocaust survivors did not have higher lifetime prevalence rates of PTSD than nonsurvivors.⁵⁰ By comparison, bouts of depression and anxiety could be less fleeting and less routine during war, and therefore, these could both be more memorable years later. It follows then that Guatemalans would more often report depression and anxiety secondary to violence during, as opposed to after, the exceptionally protracted 36-year Guatemalan civil war.

Stressful events have had a variety of mental health effects in different national conflict settings.^{20–25} The association between violence and PTSD was significant both during and after the civil war in Guatemala, although this association was significantly larger during the war. The previous civil war was a factor in the

unrelenting day-to-day violence that permeated the contemporary Guatemala experience. According to the US Agency for International Development, this legacy of violence manifests itself as organized crime, youth gangs or *maras*, extrajudicial killings, and very high levels of intrafamilial abuse.⁵¹ The continued risk of PTSD that we found was therefore not especially surprising because of the persistent violence that occurred during the war and then continued, essentially uninterrupted, into the postwar period.

Limitations

Some study limitations deserve mention. As with other national mental health surveys, self-reported data might have recall and other information biases. Although this might have affected our results, our interviewers and the rapport they established with respondents served to counter this. In addition, recall by people exposed to significant life events, like serious acts of violence, was generally better.^{18,52} A second limitation involved the calculation of our response rates, which might have been affected by difficulties in household enumeration inherent to developing nations such as Guatemala.⁵³ This was a concern, although one that likely did not affect our estimated response rate enough to significantly erode the representativeness of our findings.

Although local translators were used for respondents who spoke Mayan dialects, the potential for underestimation or overestimation of our mental health disorders could be the result of translation effects. Some of our mental health prevalence estimates, which were lower than those of comparable countries, might have resulted partly from these translation issues. The cost for implementing full translation or back translation from English and Spanish to some 20 Mayan languages was not economically feasible for our survey, but such translations might be considered in future mental health surveys in Guatemala. Conversely, it might simply be the case that aspects of Mayan culture protect mental health, making these potential biases of lesser concern. Furthermore, only 8.6% of the interviews were conducted with the help of local translators, which further decreased the likelihood of such biases. Future work could better identify these cultural strengths and potential sources of resilience, drawing upon them for enhanced mental

health promotion. Future work might also entail larger random sample surveys, with oversampling of select subpopulations, including indigenous Maya, to perhaps obtain more accurate estimates and smaller CIs.

Conclusions

Representative population-based epidemiological analyses to determine the downstream effects of violence on mental health in Guatemala are lacking. Our study responded to this need for an advanced epidemiological study of these relationships in Guatemala, as well as more generally, by carrying out and then analyzing the country's first nationally representative mental health survey.

The routinization of violence, which began during the civil war and is still carried out today, has had a significant effect on the mental health of the Guatemalan public. As is common during and after civil conflict, violence and repression become embedded in daily interactions that normalized interpersonal brutality, forcing people to live in a long-term state of fear, albeit behind a façade of normalcy.^{6,54} This routinization of violence as a way of life in Guatemala continues more than a decade after the country's exceptionally long civil war officially concluded, although our findings suggested that the Guatemalan public might be adapting to the routine of violence with respect to their national mental health outcomes. Our results invite further investigation into the mental health effects of civil conflict and violence, and provide a basis for greater investment in public health intervention programs for Guatemala and other postconflict countries. ■

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This article was accepted September 13, 2014.

Contributors

V. D. Puac-Polanco, R. Kohn, D. Xie, and C. C. Branas made substantial contributions to the design of the study, data preparation, analysis, interpretation, revisions, and final approval of the article. V. A. Lopez-Soto made substantial contributions to the design of the study, data preparation, analysis, interpretation, and revisions of the article. T. S. Richmond made substantial contributions to the analysis, interpretation, revisions, and final approval of the article.

Acknowledgments

This work was funded in part through grants from the US National Institutes of Health Fogarty International Center (grant numbers D43TW008317 and D43TW008972). The Guatemalan National Mental Health Survey (GNMHS) was also partially supported by the Trauma and Global Health Program, from the Global Health Research Initiative, a collaborative research funding partnership of the Canadian Institutes of Health Research, the Canadian International Development Agency, Health Canada, the International Development Research Centre, and the Public Health Agency of Canada.

We express our admiration and thanks to the 138 dedicated Guatemalan medical students that made the 2009 GNMHS possible through their hard work, as well as the guidance and direction of César García, MD, and Erwin Calgua, MD, at the School of Medicine University of San Carlos of Guatemala (USAC). We also thank the Guatemalan *Instituto Nacional de Estadística* for their invaluable support with the national sampling strategy used herein. We also thank the editors and 3 anonymous reviewers for their helpful comments.

Note. The study sponsor had no role in the study's design; in the collection, analysis, or interpretation of study data; in the writing of this article; or in the decision to submit this article for publication. C. C. Branas, as the corresponding author, had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. However, this decision was shared with his coauthors, and their institutions appropriately maintained master data access and led the data analysis and interpretation for the article. The study authors have no financial or personal relationships with other people or organizations that could inappropriately influence this work.

Human Participant Protection

The USAC bioethics committee and the Guatemalan Ministry of Health ethics committee approved the 2009 GNMHS. This study was approved by the USAC bioethics committee and the University of Pennsylvania institutional review board.

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