Mental Health of Cambodian Refugees 2 Decades After Resettlement in the United States

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Context Little is known about the long-term mental health of trauma-exposed refugees years after permanent resettlement in host countries.

Objective To assess the prevalence, comorbidity, and correlates of psychiatric disorders in the US Cambodian refugee community.

Design, Setting, and Participants A cross-sectional, face-to-face interview conducted in Khmer language on a random sample of households from the Cambodian community in Long Beach, Calif, the largest such community in the United States, between October 2003 and February 2005. A total of 586 adults aged 35 to 75 years who lived in Cambodia during the Khmer Rouge reign and immigrated to the United States prior to 1993 were selected. One eligible individual was randomly sampled from each household, with an overall response rate (eligibility screening and interview) of 87% (n=490).

Main Outcome Measures Exposure to trauma and violence before and after immigration (using the Harvard Trauma Questionnaire and Survey of Exposure to Community Violence); weighted past-year prevalence rates of posttraumatic stress disorder (PTSD) and major depression (using the Composite International Diagnostic Interview version 2.1); and alcohol use disorder (by the Alcohol Use Disorders Identification Test).

Results All participants had been exposed to trauma before immigration. Ninety-nine percent (n=483) experienced near-death due to starvation and 90% (n=437) had a family member or friend murdered. Seventy percent (n=338) reported exposure to violence after settlement in the United States. High rates of PTSD (62%, weighted), major depression (51%, weighted), and low rates of alcohol use disorder were found (4%, weighted). PTSD and major depression were highly comorbid in this population (n=209; 42%, weighted) and each showed a strong dose-response relationship with measures of traumatic exposure. In bivariate analyses, older age, having poor English-speaking proficiency, unemployment, being retired or disabled, and living in poverty were also associated with higher rates of PTSD and major depression. Following multivariate analyses, premigration trauma remained associated with PTSD (odds ratio [OR], 2.08; 95% CI, 1.37-3.16) and major depression (OR, 1.56; 95% CI, 1.24-1.97); postmigration trauma with PTSD (OR, 1.65; 95% CI, 1.21-2.26) and major depression (OR, 1.45; 95% CI, 1.12-1.86); and older age with PTSD (OR, 1.76; 95% CI, 1.46-2.13) and major depression (OR, 1.47; 95% CI, 1.15-1.89).

Conclusion More than 2 decades have passed since the end of the Cambodian civil war and the subsequent resettlement of refugees in the United States; however, this population continues to have high rates of psychiatric disorders associated with trauma.

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POLITICAL INSTABILITY, CIVIL conflict, war, genocide, persecution, and the attendant violations of human rights are increasingly recognized as paramount public health concerns.[1-3] According to the United Nations High Commissioner on Refugees, there were approximately 19.2 million refugees, internally displaced persons, and asylum seekers worldwide in 2004.[4] Researchers studying these populations have found high levels of violence exposure, often involving multiple traumas, as well as significant mental health problems.[5-10] Empirical investigations generally conclude that depression and posttraumatic stress disorder (PTSD) constitute the most common psychiatric disorders in refugee populations. Inasmuch as depression is a key component of overall disease burden[11] and PTSD is a notable contributor to disease burden, especially in countries wracked by violence,[12] exposure to mass trauma is a significant source of psychiatric disability worldwide.

Although there is agreement that refugee populations experience high levels of psychiatric disability, most of the data for this conclusion come from studies that may overestimate the magnitude of the problem. Much of this research has focused on individuals seeking health or social services who may have more severe problems than the general population of refugees.[6,13,14]

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Other studies have assessed individuals petitioning for asylum who may be motivated to overreport trauma exposure and related psychiatric symptoms.[15,16]

Additionally, research is frequently conducted while refugees are housed in refugee camps or within a short time after resettlement in a host country.[7,9,17-19] It is difficult to determine if the psychiatric distress documented in these studies represents an acute condition, which might resolve spontaneously or with a change in circumstances, or whether it reflects a chronic condition that will persist in the absence of a therapeutic intervention.

Similarly, there are few published community-based studies of refugee populations after long-term resettlement in resource-rich countries like the United States, although existing research has examined the long-term health consequences for refugees resettled in resource-poor countries.[20,21] Health outcomes for refugees may vary as a function of the prosperity of the resettlement country, with persons resettled in poorer countries experiencing continued hardships that influence health. Finally, many studies of refugee mental health have relied on symptom screening instruments to assess probable diagnoses.[6,7,9,22,23] Although these measures are correlated with clinical diagnoses and provide useful data, they often fail to include the necessary information to make diagnostic assessments. Consequently, they typically err on the side of high sensitivity rather than high specificity and tend to overestimate prevalence.[24,25]

Cambodians constitute one of the largest refugee groups in the United States, with approximately 150 000 refugees admitted since 1975.[26] Although these refugees are now many years removed from their tribulations, they were subjected to one of the most brutal and traumatic periods of the past century. After a coup in 1970, a civil war began that led to a Khmer Rouge takeover from 1975 to 1979. A Vietnamese invasion in 1979 ended the Khmer Rouge reign, but civil war continued until United Nations troops enforced a cease-fire in late 1991. Of an estimated population of 7.1 million in 1975,[27] as many as 2 million Cambodians were killed during the 4-year Khmer Rouge reign. Approximately 1 million more were killed in the civil wars before and after this period.[28] The period from 1978 to 1991 also produced more than half a million refugees in Thailand refugee camps.

The goal of our study was to assess the population prevalence, comorbidity, and correlates of psychiatric disorders in the US Cambodian refugee community 25 years after the Khmer Rouge era, using research methods that should provide the most accurate available estimates. This knowledge should provide information concerning the current health status of this community, guiding health-policy decision makers to the needed services for this refugee community.

METHODS

Sample Design and Participants

Our sample was designed to represent the population of Cambodian immigrants residing in Long Beach, Calif. This city is home to the largest single concentration of Cambodian refugees in the United States. The sample size was determined by a desire to have relatively small confidence intervals (±5%) for estimates of prevalence of psychiatric disorder when the true population prevalence was 30% or 70%. This level of precision required an effective sample size of 333. With an expected design effect of 1.5 due to weights (actual design effect = 1.47), we aimed to interview 500 individuals.

Specifically, we derived our sample from a geographically contiguous area composed of the 4 census tracts with the largest proportion of Cambodians in Long Beach, Calif, containing approximately 15 000 total households. We used a 3-stage random sample of individuals within households within blocks (FIGURE). In the first stage, a simple random sample of census blocks was selected. A community expert then surveyed blocks with field staff and classified all 5555 households on selected blocks as either likely (18%) or unlikely (82%) to be Cambodian households. The second stage consisted of a stratified random sample of households (n = 2059) in which we oversampled households judged by the community expert as likely to contain Cambodian individuals. The community expert relied on common visual signs, such as plants favored by the community growing in the lawn or placed on the front porch (eg, lemon grass, bamboo), and Buddhist or other icons on the front porch or visible in the window to select households likely to contain Cambodian individuals. The likely/unlikely distinction was used to create sampling strata so that we could then draw random samples of households from within each of these subpopulations.

Selected households were then screened to determine whether they contained at least 1 eligible individual. Screening was successfully completed for 2001 (97%) of the sampled households. Five hundred eighty-six households (29%) contained 719 eligible Cambodians. In the third stage, a single eligible individual was selected at random from each household. Of selected individuals, 527 (90%) agreed to participate in the survey, resulting in an overall response rate of 87%. Of these, 37 were not refugees and were excluded from the analytic sample for this study, yielding an analytic sample of 490 participants. After weighting participants to create a sample representative of the desired population as described below, we had a weighted sample size of 482.

Individuals were determined to be eligible for interview if they were aged between 35 and 75 years and had lived in Cambodia during some portion of the Khmer Rouge regime (April 1975 to January 1979). In addition, our analyses were restricted to 490 of those individuals interviewed who immigrated during the years when the United States was accepting Cambodian refugees, which effectively ended in 1992 when the United States adopted poli-

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cies that favored repatriating displaced Cambodians. All participants in our analytic sample left Cambodia prior to the 1991 cease-fire and the subsequent deployment of a United Nations peacekeeping force to Cambodia, and all respondents had spent time in a refugee camp.

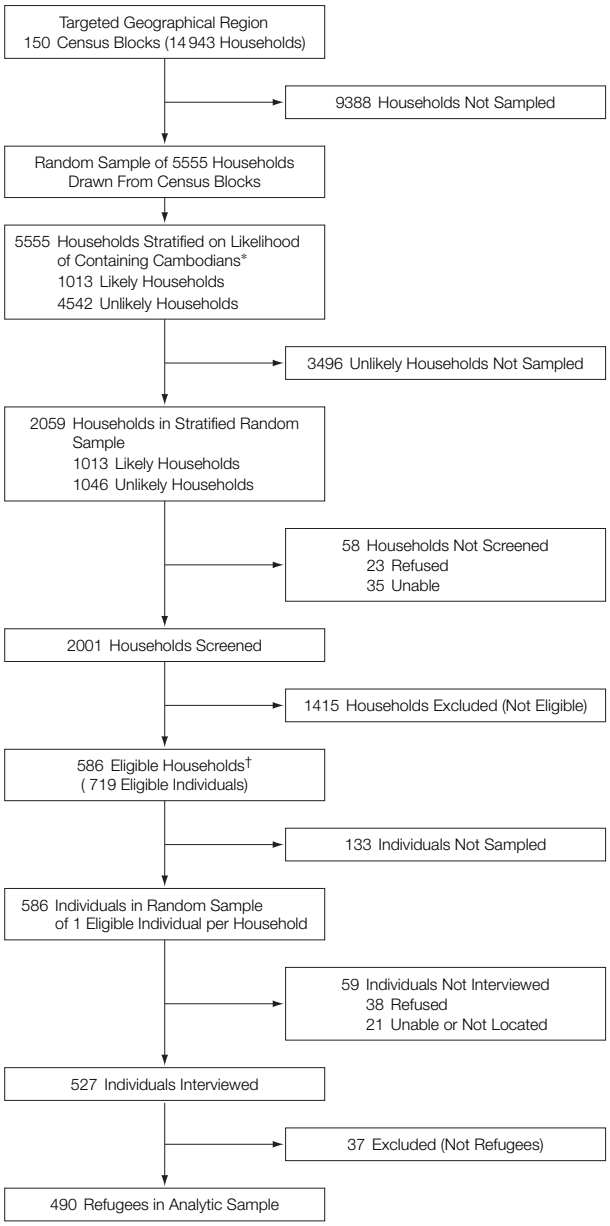
Interviewers and Procedures

The interview team was composed of 5 bilingual lay interviewers. Interviewers were themselves Cambodian refugees and were required to read, write, and speak fluently in Khmer and English. Interviewers received extensive training before conducting interviews and active supervision throughout data collection. Data were obtained via face-to-face, fully structured interviews that took place in participants' homes. Interviews were conducted in Khmer and took approximately 120 minutes to complete.

Informed Consent Procedures

As part of the informed consent process, potential participants were told that the purpose of the study was to learn about the life experiences of people who had come from Cambodia as refugees and that the researchers were interested in their current life situation, and their physical and emotional health. Potential participants were informed that participation was completely voluntary and that they were free to stop at any time. All persons were informed of the specific topics to be covered in the interview and were expressly advised that they would be reminded of traumatic incidents from the past, which may cause them to become emotionally upset. Potential participants were also advised that they might wish to talk with someone about these feelings or concerns and were given contact information for 2 mental health clinics that provide services to the Cambodian community. Both clinics were informed of the existence of the study in advance of data collection. All informed consent materials were read verbatim, questions were answered, and written informed consent was obtained. Following the interview, participants received a nominal incentive payment and were reminded that they had the option of availing themselves of services provided at either of the 2 aforementioned clinics. Interviewers also reviewed orally with participants a brochure containing the contact information for local health, mental health, and social service agencies, before giving them a copy of the brochure. The institutional review boards of RAND and the Califor-

Figure. Flow Diagram of Sample Design and Eligibility Requirements



The unweighted sample of 490 refugees was used for all analyses; however, a sample size of 482 refugees was realized after weighting.
*Strata membership was determined by a community expert who judged if the house was likely to contain a Cambodian based on features visible from the street (eg, shoes on porch, Buddhist icons, and Southeast Asian plants).
†A household was eligible if it contained at least 1 individual aged 35 to 75 years who had lived in Cambodia during some portion of the Khmer Rouge regime (April 1975 to January 1979).

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nia State University, Long Beach, approved the protocol.

Translation Procedures

All instruments were translated and back-translated following recommended procedures to ensure content, technical, criterion, conceptual, and semantic equivalence.[29] Two bilingual, bicultural Khmer translators translated all English measures into Khmer. The Khmer version of the survey was then back-translated into English by a third bilingual, bicultural Khmer translator to ensure equivalency and identify discrepancies between the 2 English versions. A small number of discrepancies were reconciled with the aid of the 3 original translators and 1 additional translator who had not been involved in either of the initial translations.

Focus Groups and Pretesting

Extensive development work preceded finalization of the instrument. Focus groups were held with community experts to identify topics of potential interest and to obtain feedback on initial versions of the instruments. The comments of expert advisors were integrated into successive versions of the interview in iterative fashion. The instruments were then pretested with multiple respondents in both English and Khmer to identify areas of possible confusion.

Instruments

Sociodemographic information, including age, marital status, education, employment, self-assessed English-speaking proficiency (not at all, poor, fair, or good), household size, and household income, was obtained. For analytic purposes, income was expressed as a proportion of the federal poverty level. Overseas trauma exposure was assessed by using a modified version of 17-item Cambodian Harvard Trauma Questionnaire.[30] Additional trauma items were taken from the 46-item Bosnian version of the Harvard Trauma Questionnaire.[31] The Harvard Trauma Questionnaire is the most widely used measure of its kind and has been translated into 35 languages.[32] In total, respondents were asked whether they had experienced each of 35 events before immigrating to the United States. To assess exposure to violence in the United States, a modified version of the Survey of Exposure to Community Violence[33] was used. Numerous studies document the reliability and validity of this instrument.[34-36] Respondents indicated whether they had witnessed or directly experienced each of 11 events since arriving in the United States. For descriptive purposes, the total number of endorsed trauma exposures is reported for both premigration and postmigration traumas.

Past 12-month diagnoses of PTSD and major depression were determined by using the PTSD and depression modules of the Composite International Diagnostic Interview (CIDI) version 2.1.[37] This instrument is keyed to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*)[38] criteria. The CIDI is intended to be administered by lay interviewers and its cross-cultural applicability has been well established.[20,39,40] The CIDI is designed to assess all criteria required for a *DSM-IV* diagnosis, including symptom profiles, severity, duration, and functional impairment, and, in the case of PTSD, the required peritraumatic reactions. Several studies attest to the reliability and validity of the CIDI.[40-43] The Alcohol Use Disorders Identification Test,[44] developed as part of an international World Health Organization collaborative project, was used to screen for possible alcohol use disorders (AUDs). Perhaps the most widely used and well-validated alcohol screener,[45] this instrument consists of 10 items. Responses to each question are scored from 0 to 4, with scores of 7 for women and 8 for men reflecting a probable AUD.[46]

Table 1. Demographic Characteristics of Participants (N = 490)*

Characteristics	Unweighted Sample Size, No.	Weighted % (Margin of Error)†
Age, mean (SD), y		52 (13.4)
Year of immigration, mean (SD)		1983 (3.8)
Women	319	61 (6)
English-speaking proficiency	137	28 (5)
Marital status		
Married or cohabitating	291	66 (5)
Widowed	138	23 (4)
Single, separated, or divorced	61	11 (3)
High school graduate or equivalent	87	19 (4)
Premigration education (≤3 y)	269	52 (7)
Work status		
Employed	132	28 (4)
Retired or disabled	221	46 (5)
Unemployed or not employed	137	26 (4)
Ever resided in refugee camp	490	100
Religious identifications		
Buddhism	423	87 (3)
Ancestor worship	325	68 (6)
Christianity	100	20 (4)
Currently receiving government assistance	353	72 (4)
Family income based on federal poverty level		
<100%	340	69 (5)
100%-200%	116	24 (4)
>200%	34	7 (2)

*See the "Methods" section of the text for explanations of all the characteristics.
†Data are presented as weighted % (margin of error) unless otherwise specified. The margin of error was computed as the 95% confidence interval half-width.

Statistical Analysis

Analyses used design weights and corrected for the design effects of both weighting and clustering. Inverse-

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probability design weights accounted for the underrepresentation of eligible persons in residences judged unlikely to house Cambodians and for individuals from households with more than 1 eligible resident. Nonresponse rates were low and there was no statistically significant ($P<.05$) evidence that nonresponse was associated with variables available for comparison (census tract, age, and sex). Thus, nonresponse weights were not constructed. Throughout the text and tables, we report weighted proportions as percentages and unweighted sample sizes. All statistical analyses were performed by using SAS/STAT software version 9.1 (SAS Institute, Cary, NC).

Proportions and margins of error (computed as half of the exact binomial 95% confidence intervals) were calculated for dichotomous variables, whereas means and SDs were calculated for continuous variables. Bivariate odds ratios and their 95% confidence intervals were calculated predicting dichotomous outcomes of major depression, PTSD, and probable AUD from age and year of immigration (both of which were scaled as number of years divided by 10, and treated as continuous), sex, the number of premigration and postmigration trauma types experienced (expressed as the *z* score of the sum of each type), English-speaking proficiency (good/fair vs not at all/poor), marital status, high school completion, employment status, and US federal poverty level (below poverty [<100%] vs above poverty level [≥100%]). Age, sex, year of immigration, premigration and postmigration trauma exposure were also included as independent variables in multivariate logistic regressions predicting the same 3 outcomes.

RESULTS

On average, participants arrived in the United States in 1983 and were aged 52 years at interview (TABLE 1). Sixty-one percent of the respondents were women and 87% indicated Buddhism as their religious affiliation. The majority of respondents were married and low in socioeconomic status, with low levels of education, English-speaking proficiency, and employment. Sixty-nine percent of the participants had household incomes of less than 100% of the federal poverty level and 72% indicated currently receiving government assistance.

Participants reported high rates of exposure to trauma and violence before their arrival to the United States (TABLE 2). Participants reported experiencing a mean of 15 of 35 premigration trauma types. For example, 99% of individuals (n=483) reported near-death due to starvation, 96% (n=466) reported forced labor (like animal or slave), 90% (n=437) reported having a family member or friend murdered, and 54% (n=241) reported having been tortured. Participants also reported exposure to violence in the United States, with a mean 1.7 of 11 types of postmigration trauma exposure. For example, 34% of individuals (n=160) reported seeing a dead body in their neighborhood, 28% (n=136) reported having been robbed, and 17% (n=83) reported having been threatened by a weapon and believing that they might be seriously hurt or killed.

Consistent with this high level of traumatic exposure, 62% of respondents (n=301) met *DSM-IV* diagnostic criteria for PTSD in the past year and 51% (n=248) met diagnostic criteria for major depression in the past year (TABLE 3). Comorbidity between these disorders was high. Seventy-one percent of persons with PTSD also met criteria for major depression and 86% of those with major depression met criteria for PTSD ($\phi=0.50$, $P<.001$). In contrast, low levels of probable AUD were found (4%; n=14). Moreover, AUD was not significantly associated with either PTSD ($\phi=0.02$, $P=.81$) or major depression ($\phi=0.01$, $P=.93$).

Several demographic variables, in addition to aggregate premigration and postmigration trauma exposure, showed bivariate associations with the 3 psychiatric disorders (TABLE 4). Specifically, poor English-speaking skills,

Table 2. Rates of Trauma Exposure (N = 490)*

Variable	Unweighted Sample Size, No.	Weighted % (Margin of Error)†
Premigration exposure		
Near-death due to starvation	483	99 (1)
Experienced a combat situation	480	98 (1)
Forced labor (like animal or slave)	466	96 (2)
Family member or friend murdered	437	90 (3)
Witnessed beatings	405	85 (3)
Witnessed killings	263	56 (6)
Tortured	241	54 (6)
Count of 35 premigration trauma types, mean (SD)	490‡	15.0 (7.6)
Postmigration exposure		
Saw a dead body in the neighborhood	160	34 (6)
Experienced home invasion robbery or other type of robbery	136	28 (5)
Chased by individual or group who were trying to hurt them	109	22 (5)
Verbally threatened with serious physical harm	105	22 (4)
Seriously threatened with a weapon	83	17 (4)
Experienced serious accident in which someone got hurt or died	67	14 (4)
Count of 11 postmigration trauma types, mean (SD)	338§	1.7 (2.1)

*Trauma items are illustrative rather than exhaustive of trauma experiences. Highly endorsed items are displayed as well as highly traumatic items. Some of the items shown are composites of several items (eg, separate questions were asked about murder of spouse, children, and friends; these items are combined as a single entry). Many items with low endorsement were omitted as were some items deemed by the researchers to be less severe.

†Data are presented as weighted % (margin of error) unless otherwise specified. The margin of error is computed as the 95% confidence interval half-width.

‡No. of participants who experienced at least 1 type of premigration trauma.

§No. of participants who experienced at least 1 type of postmigration trauma.

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unemployment, being in retirement or disabled, and living in poverty were associated with higher rates of PTSD and major depression. Older respondents showed higher rates of PTSD and depression than did younger participants. However, older respondents had lower rates of probable AUD than did younger respondents. Women were less likely than men to have either PTSD or AUD. PTSD and major depression were both associated with greater exposure to premigration and postmigration trauma. In contrast, AUD was significantly associated only with exposure to trauma after immigration to the United States. The interpretation of the nonsignificant odds ratio predicting AUD is limited by the large confidence intervals that result from the low prevalence of alcohol-related problems in this sample.

We selected a subset of these variables for further analysis in multivariate models aimed at predicting each of the 3 outcomes. We focused on constructs that were likely to be antecedent to the development of the psychiatric disorders. On this basis, age, sex, year of immigration, and premigration and postmigration trauma exposure were selected as potential multivariate predictors. We omitted several variables included as bivariate predictors due to concerns about direction of causality.

The odds ratios of these predictors, adjusted for age, sex, year of immigration, and premigration and postmigration trauma exposure, show a similar pattern across PTSD and major depression (TABLE 5). Participant age and the 2 trauma exposure variables were positively associated with these psychiatric disorders. Alcohol use disorder was negatively associated with age and positively related to extent of trauma exposure since arriving in the United States. The bivariate association between sex and psychiatric disorders was no longer significant after adjusting for the extent of trauma exposure. Overall, these multivariate models produced high concordances between actual and predicted disorder (*c* statistics of 0.77, 0.71, and 0.77 for PTSD, major depression, and AUD, respectively).

Table 3. Past-Year Prevalence and Comorbidity of Psychiatric Disorders (N = 490)

Psychiatric Disorder	Unweighted Sample Size, No.	Weighted % (Margin of Error)*
PTSD	301	62 (6)
Major depression	248	51 (6)
AUD	14	4 (2)
Co-occurrence of disorders		
No disorder	155	30 (5)
Only PTSD	81	17 (4)
Only major depression	31	7 (3)
Only AUD	2	1 (1)
PTSD and major depression	209	42 (6)
PTSD and AUD	4	1 (1)
Major depression and AUD	1	<1 (1)
PTSD, major depression, and AUD	7	1 (1)

Abbreviations: AUD, alcohol use disorder; PTSD, posttraumatic stress disorder.
*The margin of error is computed as the 95% confidence interval half-width.

Table 4. Bivariate Odds Ratios Predicting Psychiatric Disorders

	Odds Ratio (95% Confidence Interval)		
Predictor	Major Depression	Posttraumatic Stress Disorder	Alcohol Use Disorder
Age, y*	1.40 (1.11-1.75)	1.62 (1.31-2.01)	0.62 (0.44-0.86)
Women	0.63 (0.39-1.00)	0.47 (0.30-0.74)	0.24 (0.08-0.76)
Year of immigration*	1.48 (0.69-3.19)	0.96 (0.49-1.88)	5.20 (1.03-26.3)
Premigration trauma count†	1.82 (1.47-2.25)	2.47 (1.75-3.47)	1.71 (0.93-3.13)
Postmigration trauma count†	1.58 (1.25-2.00)	1.89 (1.45-2.46)	2.12 (1.35-3.31)
English-speaking proficiency	0.33 (0.20-0.55)	0.42 (0.27-0.66)	1.53 (0.52-4.53)
Marital status			
Married or cohabitating	1.00	1.00	1.00
Widowed	0.73 (0.44-1.19)	1.22 (0.78-1.91)	0.45 (0.08-2.42)
Single, separated, or divorced	0.63 (0.34-1.14)	0.56 (0.28-1.10)	1.00 (0.24-4.18)
High school graduate	0.61 (0.34-1.08)	0.59 (0.34-1.04)	0.81 (0.20-3.30)
Work status			
Employed	1.00	1.00	1.00
Retired or disabled	8.29 (4.72-14.50)	5.75 (3.49-9.46)	0.32 (0.06-1.64)
Unemployed or not employed	4.44 (2.51-7.87)	1.67 (0.99-2.81)	1.19 (0.30-4.76)
Below federal poverty level	1.98 (1.36-2.89)	2.33 (1.46-3.73)	1.78 (0.47-6.69)

*Scaled as number of years divided by 10 (a decade).
†Scaled as the trauma count divided by its SD.

COMMENT

Our study examined the trauma exposure and mental health of a stratified random sample of Cambodian refugees residing in the largest single Cambodian community in the United States. Although on average more than 2 decades had elapsed since arriving in the United States, our sample revealed high rates of past-year PTSD (62%) and depression (51%). In comparison with epidemiological studies of the general US population, these rates are extremely elevated.[47,48] At the same time, rates of AUDs in our sample were much lower than those reported in the general US population.[48] The concern that motivated this research is that certain features of previous studies of refugee samples may render them likely to overestimate the magnitude of mental health problems. We found evidence of pronounced mental health problems in previously traumatized refugees. Indeed, only approximately 30% of the sample was free of any of the 3 disorders as-

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sessed. These results indicate that members of refugee communities can have substantial need for mental health services even years removed from their tribulations.

These data also demonstrate a dose-response relationship between trauma exposure (both premigration and postmigration) and the likelihood of a current psychiatric disorder. Specifically, degree of exposure to each broad class of trauma is uniquely associated with both PTSD and major depression. This finding of a possible dose-response relationship involving both PTSD and depression has been found in related refugee research.[8] However, the relationship of trauma to depression has perhaps not been as widely appreciated. Many refugee studies focus solely on PTSD to the exclusion of major depression and other conditions likely to result from trauma exposure.[20,23] Moreover, in both bivariate and multivariate models, these findings identify a similar pattern of predictors for both depression and PTSD. This comparability in risk factors, along with the high comorbidity between PTSD and major depression following trauma exposure, raise questions as to whether PTSD and depression are empirically differentiable disorders or manifestations of a single continuum of posttraumatic distress.[49]

This study found low rates of probable AUD in Cambodian refugees. Although previous research using convenience samples has suggested that Cambodian refugees are at high risk for alcohol abuse,[50,51] to our knowledge, this study is the first to assess this in a representative community sample. These findings are consistent with other research indicating that Asian-American subgroups differ substantially in their drinking patterns, with some groups showing relatively high abstinence.[52] The absence of a relationship between PTSD and alcohol abuse is particularly striking inasmuch as numerous studies of US samples report high comorbidity between the 2 disorders,[53] with many theorists positing a causal link between PTSD and alcohol abuse.[54] Our findings suggest that researchers looking for biomedical explanations for the association between alcohol abuse and PTSD should pay attention to the cultural context in which drinking occurs, as this factor may moderate the relationship.

Table 5. Adjusted Odds Ratios Predicting Psychiatric Disorders*

Predictor	Odds Ratio (95% Confidence Interval)		
	Major Depression	Posttraumatic Stress Disorder	Alcohol Use Disorder
Age, y†	1.47 (1.15-1.89)	1.76 (1.46-2.13)	0.60 (0.41-0.89)
Women	0.91 (0.54-1.55)	0.78 (0.44-1.36)	0.28 (0.07-1.06)
Year of immigration†	1.88 (0.80-4.40)	1.20 (0.56-2.59)	6.15 (1.14-33.30)
Premigration trauma count‡	1.56 (1.24-1.97)	2.08 (1.37-3.16)	1.06 (0.56-1.99)
Postmigration trauma count‡	1.45 (1.12-1.86)	1.65 (1.21-2.26)	1.99 (1.23-3.23)

*Adjusted for age, sex, year of immigration, and premigration and postmigration trauma exposure using multivariate logistic regression.
†Scaled as number of years divided by 10 (a decade).
‡Scaled as the trauma count divided by its SD.

Unlike studies conducted on general US populations, we found that women were no more likely than men to develop PTSD[47] or depression.[55] One possible explanation is that the frequency or severity of the traumas differed for men and women in ways not captured by our trauma measure. It is also noteworthy that whereas these results differ from typical findings in western populations, they are consistent with research on sex differences in the prevalence of depression in Asian immigrants in the United States[56] as well as in developing countries.[55] Scant attention has been devoted to sex differences in the mental health of refugee samples, and available data have yielded mixed findings.[20,57] Thus, additional research is required.

Limitations

In interpreting these findings, certain limitations of our study design should be considered. Our study relied on cross-sectional data, restricting our ability to infer the causal directions underlying the observed associations. For example, the associations between socioeconomic status measures and psychiatric diagnosis may represent the economic burden of these diseases or it may reflect the impact of socioeconomic status on trauma recovery. Research using longitudinal methods is needed to assess these hypotheses. In addition, as is the case with most psychiatric epidemiology, the research design required retrospective recall of both trauma exposure and symptoms. Such recall may be vulnerable to bias.[58,59] Because our sample resided in a single Cambodian refugee community, it may not be representative of the broader population of Cambodian refugees in the United States. Nonetheless, it was a representative sample of the largest Cambodian community in the United States, and achieved a high response rate, factors that minimize the biases often found in research on refugee and immigrant populations.

Limitations may also exist with respect to the instruments used. Some researchers have expressed concern that the CIDI may overestimate prevalence relative to other lay-administered diagnostic tools.[60] However, research on the reporting of sensitive information suggests that individuals often underreport symptoms in epidemiological surveys.[61] Available data indicate that the CIDI produces prevalence estimates very similar to those derived from clinician-administered diagnostic assessments.[62] Although additional research into the use of the CIDI with Cambodians is clearly warranted, at present the CIDI constitutes the de facto standard for conducting large-scale psychiatric epidemiology research across languages and cultural settings. More generally, further investigation is needed to establish the reliability and validity of other instruments used in this study for use with Khmer-speaking Cambodians.

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This study did not collect information on the extent to which participants were being treated for mental health conditions or other health concerns. Future research is required to determine the degree to which high rates of PTSD and depression observed in this community are due to low service utilization or ineffective treatments.

Conclusion

Despite arriving in the United States approximately 2 decades ago, Cambodian refugees were beset by high rates of psychiatric disorders. The pervasiveness of these disorders raises questions about the adequacy of existing mental health resources in this community. Addressing this high level of need may require additional research to identify barriers to seeking services as well as efforts at improving treatment for this population. On a larger public policy level, these findings raise questions about governmental policies concerning refugee resettlement.

The lives of Cambodian refugees—and perhaps those of refugees from other developing countries—are fraught with difficulties for which they may have been inadequately prepared. In the case of Cambodian refugees, many were uneducated farmers, illiterate even in their native language,[63] who entered the United States with no marketable skills and significant mental health problems.[64] Even after 2 decades, the majority of this community speak little or no English, are at income levels below poverty, and rely on public assistance. Asylum policies for future refugees need to be evaluated not only with respect to their ability to remove vulnerable populations from life-threatening danger but also their capacity to promote the long-term health and well-being of the refugees. Our findings suggest that the US response to Cambodian refugees has not succeeded in this latter goal.

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Study concept and design: Marshall, Schell, Elliott, Berthold, Chun.
Acquisition of data: Marshall, Berthold, Chun.
Analysis and interpretation of data: Marshall, Schell, Elliott, Berthold, Chun.
Drafting of the manuscript: Marshall, Schell, Elliott, Berthold, Chun.
Critical revision of the manuscript for important intellectual content: Marshall, Schell, Elliott.
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