

Longitudinal Study of Psychiatric Symptoms, Disability, Mortality, and Emigration Among Bosnian Refugees

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THE HIGH PREVALENCE OF PSYCHIATRIC morbidity in traumatized refugee and civilian populations is no longer invisible.¹ Large-scale community studies using culturally validated instruments have been able to assess the psychiatric distress and disability associated with mass violence.²⁻⁴ Most of these studies have been limited by their cross-sectional design. Longitudinal studies are necessary to determine whether psychiatric disorders and their relationship to individual and environmental risk factors continue unabated or resolve themselves. Such studies can test the validity of the widely held hypothesis that psychiatric symptoms in refugee and civilian populations traumatized by mass violence are “normal” reactions to violence that spontaneously remit over time.⁵ Prospective studies can also help define the goals of prevention and treatment interventions aimed at reducing psychological distress and disability caused by war and ethnic conflict.

Our previous report⁶ of the initial findings of a 1996 study of Bosnian refu-

Context Evidence is emerging that psychiatric disorders are common in populations affected by mass violence. Previously, we found associations among depression, post-traumatic stress disorder (PTSD), and disability in a Bosnian refugee cohort.

Objective To investigate whether previously observed associations continue over time and are associated with mortality emigration to another region.

Design, Setting, and Participants Three-year follow-up study conducted in 1999 among 534 adult Bosnian refugees originally living in a refugee camp in Croatia. At follow-up, 376 (70.4%) remained living in the region, 39 (7.3%) were deceased, 114 (21.3%) had emigrated, and 5 (1%) were lost to follow-up. Those still living in the region and the families of the deceased were reinterviewed (77.7% of the original participants).

Main Outcome Measures Depression and PTSD diagnoses, based on *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* criteria and measured by the Hopkins Symptom Checklist-25 and the Harvard Trauma Questionnaire, respectively; disability, measured by the Medical Outcomes Study Short-Form 20; and cause of death, determined by family interviews with review of death certificates, if available.

Results In 1999, 45% of the original respondents who met the *DSM-IV* criteria for depression, PTSD, or both continued to have these disorders and 16% of respondents who were asymptomatic in 1996 developed 1 or both disorders. Forty-six percent of those who initially met disability criteria remained disabled. Log-linear analysis revealed that disability and psychiatric disorder were related at both times. Male sex, isolation from family, and older age were associated with increased mortality after adjusting for demographic characteristics, trauma history, and health status (for male sex, adjusted odds ratio [OR], 2.63; 95% confidence interval [CI], 1.17-5.92; living alone, OR, 2.40; 95% CI, 1.07-5.38; and each 10-year increase in age, OR, 1.91; 95% CI, 1.34-2.71). Depression was associated with higher mortality in unadjusted analysis but was not after statistical adjustment (unadjusted OR, 3.12; 95% CI, 1.55-6.26; adjusted OR, 1.85; 95% CI, 0.82-4.16). Posttraumatic stress disorder was not associated with mortality or emigration. Spending less than 12 months in the refugee camp (OR, 11.30; 95% CI, 6.55-19.50), experiencing 6 or more trauma events (OR, 3.34; 95% CI, 1.89-5.91), having higher education (OR, 1.90; 95% CI, 1.10-3.29), and not having an observed handicap (OR, 0.11; 95% CI, 0.02-0.52) were associated with higher likelihood of emigration. Depression was not associated with emigration status.

Conclusions Former Bosnian refugees who remained living in the region continued to exhibit psychiatric disorder and disability 3 years after initial assessment. Social isolation, male sex, and older age were associated with mortality. Healthier, better educated refugees were more likely to emigrate. Further research is necessary to understand the associations among depression, emigration status, and mortality over time.

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See also p 584.

gees demonstrated an association between psychiatric disorders (depression and posttraumatic stress disorder [PTSD]) and disability in a refugee community. In this 3-year follow-up study, the status of virtually all of that sample's original respondents was ascertained; most were living in the region, some had emigrated to western Europe or North America, and some had died. Those still living in the region and the families of those who died were reinterviewed in 1999. This report investigates the (1) simple association between psychiatric disorders (depression and PTSD), disability, and other baseline risk factors with follow-up status; (2) chronicity of psychiatric disorders and disability and their relationship at both points in time; and (3) risk-adjusted association of psychiatric disorders and disability with the likelihood of mortality and emigration.

METHODS

In 1996, Ruke, a private social service agency based in Croatia, and the Harvard Program in Refugee Trauma interviewed a random sample of 534 adults from families living in the Varazdin Bosnian refugee camps in northeastern Croatia.⁶ In 1999, the Harvard Program in Refugee Trauma and 9 members of the original interviewing staff located and reinterviewed all the original respondents still living in the region and the families of the deceased. The reinterview followed procedures established in the baseline study.⁶ The interviews, conducted in Bosnian, took an average of 90 minutes. Informed consent procedures and the study design were approved by the human subjects committee of the Harvard Medical School. The interviewer explained the purpose of the study and read text that explained that responses would be treated confidentially, that an individual's responses could not be identified in any summary reports, and that participation was voluntary. They were also told that they could choose not to answer specific questions.

The reinterview survey questionnaire for those living in the region was

adapted from the baseline study, with replication of core measures of physical and mental health status (including disability, the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition [DSM-IV]*)⁷ symptoms of major depression and PTSD, and self-reported health status. Translation to construct the final questionnaire used standard methods of cross-cultural research.^{8,9} Family interviews determined cause of death. Causes of death were confirmed by reviewing official camp documents for respondents who died in Varazdin (21 of 39 deaths).

The trauma history was derived from the Bosnian version of the Harvard Trauma Questionnaire (HTQ).¹⁰ Measures of cumulative trauma were constructed from responses to questions about trauma events, before and after leaving home (the refugee experience), that were related to the conflict. Affirmative responses were summed for 38 trauma events and 19 torture events. The torture experiences conformed to international definitions of torture.¹¹

Categorical measures of depression, PTSD, and disability were constructed for this analysis as described in our report of the baseline status of this cohort.⁶ Each interview included the Hopkins Symptom Checklist-25 (HSCL-25)¹² and the HTQ.¹⁰ The HSCL-25 includes a 15-item scale of depressive symptoms, and the HTQ contains a scale consisting of 16 of the 17 diagnostic criteria for PTSD as defined in the *DSM-III-R* and *DSM-IV*. Both instruments have been widely translated and used in several studies among diverse cultural groups,^{3,4} validated against clinical diagnoses¹³ and have demonstrated high internal consistency reliability in studies of Russian-, Arabic-, Farsi-, English-, Bosnian-, and Croatian-speaking patients.¹⁴ Disability was measured using the 6-item physical functioning scale of the Medical Outcomes Study 20-Item Short-Form (SF-20), which has been tested for its reliability and validity in a large number of disease settings, countries, and languages.¹⁵⁻¹⁷

As noted in our previous report, our survey questionnaire also contained

other measures of disability, including a World Health Organization functional disability scale, a measure of perceived energy level, and a measure of self-perceived health. The SF-20 physical functioning scale correlated highly with these measures. In addition, as part of the overall health assessment, respondents were either asked about or observed to have any 1 of the following 5 observed handicaps: blind in one or both eyes, deaf, need or use of a hearing aid, missing a limb, and use of crutches or cane.

The Cronbach α ,¹⁸ a measure of internal-consistency reliability, was estimated at .89 for both the depression and the PTSD scales in the baseline interview, and .87 for both scales at follow-up. It was estimated at .80 for the 6-item physical functioning scale of the SF-20 at the baseline interview and .82 at follow-up.

Interrater reliability was computed for all survey items in 48 quality control interviews that were conducted in the presence of an independent observer. We found perfect agreement for most items, and the κ statistic¹⁹ exceeded 0.93 for all items in the scales.

As described in our earlier report,⁶ scale cutoff points have not been established in this population, and an algorithm method was selected that replicated *DSM-IV* criteria for diagnosis of major depression (HSCL-25) and PTSD (HTQ).^{20,21} To be classified as symptomatic for depression a respondent required a positive response (3 or 4 on the HSCL-25) on either depressed mood or diminished interest or pleasure, and at least 4 of the following 6 *DSM-IV* Criterion A symptoms: significant weight loss or change in appetite, insomnia or hypersomnia, fatigue or loss of energy, feelings of worthlessness, diminished ability to think or concentrate, and recurrent thoughts of death. The (Criterion A) symptom "observable psychomotor agitation or retardation" was omitted because interviewers did not conduct mental status examinations in this study.

For PTSD, the *DSM-IV* algorithm included a positive response (3 or 4 on

the HTQ) on at least 1 of the 4 reexperiencing symptoms (Criterion B), at least 3 of the 7 avoidance and numbing symptoms (Criterion C), and at least 2 of the 5 arousal symptoms (Criterion D). Criterion A (exposure to traumatic event) was deemed to have been met by all respondents. The refugee status of all subjects in the study had been certified by the United Nations High Commissioner for Refugees.²²

For disability, the item responses were summed on the physical functioning scale of the SF-20 and then transformed linearly to a 0-100 scale with 0 indicating the poorest physical functioning and 100 indicating no limitations in physical functioning. Using the convention established in our earlier analysis, a dichotomous variable was created from the 100-point functional impairment scale. Using the cutoff point of 50 resulted in 25% of baseline respondents being classified as disabled with these respondents reporting limitation on 3.9 of the 6 items, on average, compared with 0.8 limitations for those classified as not disabled. Twenty-six percent of reinterviewed respondents were classified as disabled, reporting limitation on 3.3 of the 6 items. The cutoff point of 50 was selected as a conservative estimate of disability. We chose a cutoff point of 50, which is more stringent than what is used in the US populations,¹⁶ to examine the highly physically impaired individuals who, by most professional and clinical standards, unequivocally would be classified as impaired or disabled.

Bivariate relationships between follow-up status (reinterview and living in region, emigration, death) and baseline personal characteristics, trauma and torture experience, psychiatric symptoms, and disability are described using multinomial logistic regression. These analyses produced relative odds, ie, the likelihood of being reinterviewed given the presence of a certain characteristic compared with not having the characteristic. Two multivariate techniques were used to statistically control the effects of extraneous

variables. Hierarchical log-linear models^{19,23} for cross-classified data were used to test for the presence of interaction between psychiatric symptoms and disability over time. Multivariate multinomial logistic regression was performed to adjust odds ratios (ORs) in an examination of the impact of depression on emigration and mortality with final results based on parameters from a model that only includes significant predictors detected during stepwise addition of blocks of variables representing demographic characteristics, torture, trauma experienced prior to baseline interview, and health status and functioning. All analyses were performed with SAS statistical analysis software, version 8.1.²⁴

RESULTS

Follow-up interviewing was initiated in March 1999 and concluded in December 1999 and succeeded in accounting for all of the 534 baseline respondents. Thirty-nine individuals (7.3%) were deceased. The most frequently mentioned cause of death was cardiovascular disease, including stroke. Only 1 suicide was reported. One hundred fourteen refugees (21.3%) had emigrated out of the region, primarily to the United States, Canada, and Sweden. Five (1%) of the original respondents were unavailable for interview (3 refused, 2 were not located). The remaining 376 (70.4%) were located in either the Varazdin camps (n=179) or had left the camps and resettled in Bosnia-Herzegovina (n=197).

TABLE 1 provides the results of bivariate multinomial logistic regression models, with follow-up status as the outcome variable and baseline personal characteristics, trauma and refugee experience, health status, and psychiatric and disability status as the uncontrolled (univariate) predictors. This analysis shows how the cohort's baseline composition is affected by emigration and mortality. Prisoner of war status and PTSD were not statistically significantly associated with either emigration or mortality. The odds of emigration were significantly higher for re-

spondents who were men, were not widowed, had a secondary education or higher, were in camp 12 months or less, experienced 6 or more trauma events, were tortured, were in good or excellent health, did not have an observed handicap (such as a missing limb), reported 1 or no chronic conditions, did not have a heart or cardiovascular condition, or were not disabled.

The odds of mortality were significantly higher for respondents who were men, were older, had primary schooling or less, were in camp 12 months or less, had no other family members in camp, were not earning income, were in poor or fair health, had an observed handicap, had 2 or more chronic conditions, had a heart or cardiovascular condition, were disabled at baseline, or were depressed at baseline. Posttraumatic stress disorder was not associated with increased risk of mortality unless it occurred with depression.

The odds of dying compared with being reinterviewed were 3.12 times greater among those respondents who were depressed at the baseline interview, an impact exceeded only by age and existence of a chronic heart or cardiovascular condition.

TABLE 2 shows data on the persistence of depression and PTSD over time. Overall, 55% of all participants originally classified as asymptomatic remained so at follow-up. In addition, 48 (16%) of those asymptomatic expressed symptoms of psychiatric disorder at reinterview, primarily depression, 72 (25%) had emigrated, and 11 (4%) had died. About 45% of all subjects who were originally classified as having depression, PTSD, or both depression and PTSD remained symptomatic 3 years later; 62 (26%) were asymptomatic; 42 (18%) had emigrated; and 28 (12%) had died. Eighty-eight (43%) of 207 participants originally diagnosed with depression and 32 (23%) of 139 participants originally diagnosed with PTSD continued to meet the DSM-IV criteria at follow-up. Few respondents were classified as having PTSD at 3-year follow-up, with almost all those also meeting the criteria for

Table 1. Associations Between Baseline Personal Characteristics, Risk Factors, Psychiatric Status, Disability, and 3-Year Follow-up Status for 529 Bosnian Refugees*

| Variable | Total No. Interviewed, 1996 | No. (%) Reinterviewed, 1999 | No. (%) Emigrated | Emigrated vs Reinterviewed | | No. (%) Died | Died vs Reinterviewed | |
|-----------------------------------|-----------------------------|-----------------------------|-------------------|----------------------------|----------|--------------|-----------------------|----------|
| | | | | Odds Ratio (95% CI) | P Value† | | Odds Ratio (95% CI) | P Value† |
| Total | 529 | 376 (71.0) | 114 (21.5) | ... | ... | 39 (7.3) | ... | ... |
| Sex | | | | | | | | |
| Men | 217 | 132 (60.8) | 63 (29) | 2.29 (1.49-3.50) | <.001 | 22 (10.1) | 2.39 (1.23-4.66) | .01 |
| Women | 312 | 244 (78.2) | 51 (16.3) | 1.00 | | 17 (5.4) | 1.00 | |
| Age, y | | | | | | | | |
| 18-34 | 105 | 67 (63.8) | 38 (36.1) | 1.00 | | 0 | 1.00 | |
| 35-54 | 178 | 135 (75.8) | 37 (20.7) | | | 6 (3.3) | | |
| 55-64 | 136 | 103 (75.7) | 23 (16.9) | 0.60 (0.36-1.02) | .06 | 10 (7.3) | 3.27 (1.16-9.24) | .03 |
| ≥65 | 110 | 71 (64.5) | 16 (14.5) | 0.61 (0.33-1.11) | .11 | 23 (20.9) | 10.91 (4.27-27.87) | <.001 |
| Marital status‡ | | | | | | | | |
| Married | 251 | 173 (68.9) | 63 (25) | 1.00 | | 15 (5.9) | 1.00 | |
| Separated/divorced | 63 | 44 (69.8) | 16 (25.3) | 1.00 (0.53-1.90) | .997 | 3 (4.7) | 0.79 (0.22-2.84) | .71 |
| Widowed | 116 | 89 (76.7) | 11 (9.4) | 0.34 (0.17-0.68) | .002 | 16 (13.7) | 2.07 (0.98-4.39) | .06 |
| Never married | 91 | 66 (72.5) | 22 (24.1) | 0.92 (0.52-1.61) | .76 | 3 (3.2) | 0.52 (0.15-1.87) | .32 |
| Educational level | | | | | | | | |
| <Primary | 196 | 150 (76.5) | 26 (13.2) | 1.00 | | 20 (10.2) | 1.00 | |
| Primary | 111 | 90 (81) | 19 (17.1) | 1.22 (0.64-2.33) | .55 | 2 (1.8) | 0.17 (0.04-0.73) | .02† |
| Secondary | 146 | 89 (60.9) | 47 (32.1) | 3.05 (1.77-5.26) | <.001 | 10 (6.8) | 0.84 (0.38-1.88) | .68 |
| Vocational/university | 76 | 47 (61.8) | 22 (28.9) | 2.70 (1.40-5.20) | .003 | 7 (9.2) | 1.12 (0.45-2.81) | .81 |
| Time in camp, mo§ | | | | | | | | |
| 0-12 | 190 | 85 (44.7) | 86 (45.2) | 1.00 | | 19 (10) | 1.00 | |
| 13-24 | 95 | 72 (75.7) | 17 (17.8) | 0.23 (0.13-0.43) | <.001 | 6 (6.3) | 0.37 (0.14-0.98) | .046 |
| 25-36 | 91 | 83 (91.2) | 4 (4.3) | 0.05 (0.02-0.14) | <.001 | 4 (4.3) | 0.22 (0.07-0.66) | .007 |
| >36 | 152 | 135 (88.8) | 7 (4.6) | 0.05 (0.02-0.12) | <.001 | 10 (6.5) | 0.33 (0.15-0.75) | .008 |
| Family members in camp, No.§ | | | | | | | | |
| 1 | 197 | 136 (69) | 34 (17.2) | 1.00 | | 27 (13.7) | 1.00 | |
| 2 | 170 | 123 (72.3) | 38 (22.3) | 1.24 (0.73-2.09) | .43 | 9 (5.2) | 0.37 (0.17-0.81) | .01 |
| 3 | 73 | 56 (76.7) | 16 (21.9) | 1.14 (0.58-2.24) | .70 | 1 (1.3) | 0.09 (0.01-0.68) | .02 |
| ≥4 | 88 | 61 (69.3) | 25 (28.4) | 1.64 (0.90-2.98) | .11 | 2 (2.2) | 0.17 (0.04-0.72) | .02 |
| Earning income in camp§ | | | | | | | | |
| Yes | 109 | 87 (79.8) | 20 (18.3) | 0.71 (0.41-1.21) | .21 | 2 (1.8) | 0.18 (0.04-0.76) | .02 |
| No | 419 | 289 (68.9) | 93 (22.1) | 1.00 | | 37 (8.8) | 1.00 | |
| Prisoner of war status | | | | | | | | |
| Yes | 42 | 32 (76.1) | 5 (11.9) | 0.49 (0.19-1.30) | .15 | 5 (11.9) | 1.58 (0.58-4.32) | .37 |
| No | 485 | 342 (70.5) | 109 (22.4) | 1.00 | | 34 (7.0) | 1.00 | |
| Cumulative No. of trauma events¶ | | | | | | | | |
| 0-2 | 102 | 85 (83.3) | 7 (6.8) | 1.00 | | 10 (9.8) | 1.00 | |
| 3-5 | 156 | 126 (80.7) | 19 (12.1) | 1.83 (0.74-4.55) | .19 | 11 (7.0) | 0.74 (0.30-1.82) | .52 |
| ≥6 | 271 | 165 (60.8) | 88 (32.4) | 6.48 (2.87-14.60) | <.001 | 18 (6.6) | 0.93 (0.41-2.10) | .86 |
| Torture | | | | | | | | |
| Yes | 94 | 53 (56.3) | 34 (36.1) | 2.59 (1.58-4.25) | <.001 | 7 (7.4) | 1.33 (0.56-3.18) | .52 |
| No | 435 | 323 (74.2) | 80 (18.3) | 1.00 | | 32 (7.3) | 1.00 | |
| Health status§ | | | | | | | | |
| Excellent/good | 198 | 138 (69.6) | 54 (27.2) | 1.55 (1.02-2.37) | .04 | 6 (3.0) | 0.31 (0.13-0.77) | .01 |
| Fair/poor | 330 | 237 (71.8) | 60 (18.1) | 1.00 | | 33 (10.0) | 1.00 | |
| Observed handicap# | | | | | | | | |
| Yes | 51 | 40 (78.4) | 2 (3.9) | 0.15 (0.04-0.63) | .01 | 9 (17.6) | 2.52 (1.12-5.69) | .03 |
| No | 478 | 336 (70.2) | 112 (23.4) | 1.00 | | 30 (6.2) | 1.00 | |
| Chronic conditions, No. | | | | | | | | |
| 0-1 | 265 | 187 (70.5) | 70 (26.4) | 1.61 (1.05-2.47) | .03 | 8 (3.0) | 0.26 (0.12-0.58) | .001 |
| ≥2 | 264 | 189 (71.5) | 44 (16.6) | 1.00 | | 31 (11.7) | 1.00 | |
| Heart or cardiovascular condition | | | | | | | | |
| Yes | 264 | 193 (73.1) | 39 (14.7) | 0.49 (0.32-0.76) | .002 | 32 (12.1) | 4.34 (1.87-10.07) | <.001 |
| No | 265 | 183 (69.0) | 75 (28.3) | 1.00 | | 7 (2.6) | 1.00 | |

(continued)

depression. Conversion from symptomatic to asymptomatic status occurred with approximately the same relative frequency for subjects with depression, PTSD, or PTSD and depression at baseline.

TABLE 3 and TABLE 4 focus on reinterviewed respondents still living in the region. With so few respondents symptomatic for PTSD alone persisting beyond baseline or emerging, all respondents with psychiatric symptoms meeting the DSM-IV criteria were pooled. Table 3 is a cross-classification of psychiatric symptom status and disability at baseline and reinterview. Aggregation of the observed data shows that among reinterviewed partici-

pants, those who were not disabled at baseline were less likely to exhibit psychiatric symptoms at reinterview (32% [90/278] than those who were disabled (65% [63/97]). Among the 167 participants with psychiatric symptoms at baseline, 105 (63%) remained symptomatic; while of the 208 participants without symptoms, 160 (77%) remained asymptomatic.

Log-linear models^{19,23} of the frequency data were used to determine which interactions were necessary to describe the association between psychiatric status and disability across the 2 times. This analysis showed that the data were best described by a model including parameters for 4 associations:

between psychiatric and disability status at baseline, between psychiatric and disability status at reinterview, between baseline psychiatric status and reinterview psychiatric status, and between baseline disability and reinterview disability status (likelihood ratio, $\chi^2_7=7.431$; $P=.39$). It was not necessary to include terms for the association between baseline disability and reinterview psychiatric status or between baseline psychiatric and reinterview disability status. Nor was it necessary to include higher order interaction terms. Selected ORs estimated from the expected frequencies under the model are shown in Table 4 and demonstrate that symptoms of de-

Table 1. Associations Between Baseline Personal Characteristics, Risk Factors, Psychiatric Status, Disability, and 3-Year Follow-up Status for 529 Bosnian Refugees* (cont)

| Variable | Total No. Interviewed, 1996 | No. (%) Reinterviewed, 1999 | No. (%) Emigrated | Emigrated vs Reinterviewed | | No. (%) Died | Died vs Reinterviewed | |
|---------------|-----------------------------|-----------------------------|-------------------|----------------------------|----------|--------------|-----------------------|----------|
| | | | | Odds Ratio (95% CI) | P Value† | | Odds Ratio (95% CI) | P Value† |
| Disability | | | | | | | | |
| Disabled | 136 | 98 (72) | 19 (13.9) | 0.57 (0.33-0.98) | .04 | 19 (13.9) | 2.70 (1.38-5.26) | .004 |
| Not disabled | 393 | 278 (70.7) | 95 (24.1) | 1.00 | | 20 (5.0) | 1.00 | |
| Depression | | | | | | | | |
| Depression | 207 | 147 (71.0) | 34 (16.4) | 0.66 (0.42-1.04) | .07 | 26 (12.5) | 3.12 (1.55-6.26) | .001 |
| No depression | 322 | 229 (71.1) | 80 (24.8) | 1.00 | | 13 (4.0) | 1.00 | |
| PTSD§ | | | | | | | | |
| PTSD | 139 | 98 (70.5) | 28 (20.1) | 0.92 (0.57-1.49) | .74 | 13 (9.3) | 1.41 (0.70-2.86) | .34 |
| No PTSD | 389 | 277 (71.2) | 86 (22.1) | 1.00 | | 26 (6.6) | 1.00 | |

*Psychiatric status was determined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* algorithm as described in the text. CI indicates confidence interval; ellipses, not applicable; and PTSD, posttraumatic stress disorder. Disability status was determined by the Medical Outcomes Study Short-Form 20 physical functioning scale as described in the text. Odds ratios (ORs) were calculated from univariate logistic regression models. Of the 534 baseline-interview respondents, 5 were lost to follow-up or refused reinterview at the 3 year follow-up.

†Based on a univariate, multinomial logistic regression analysis model.

‡Data missing for 8 respondents.

§Data missing for 1 respondent.

||Data missing for 2 respondents.

¶Measures of cumulative trauma were constructed from responses to questions about trauma events before and after leaving home, related to conflict.

#As part of the overall health assessment, respondents were asked whether they had any of the following 5 physical handicaps: blind in 1 or both eyes, deaf, needs or uses a hearing aid, missing a limb, or uses crutches or cane.

Table 2. Baseline Psychiatric Status and 3-Year Follow-up Psychiatric and Interview Status for 528 Bosnian Refugees*

| 1996 Interview | | Reinterviewed in 1999 | | | | | |
|---------------------|-------|-----------------------|------------------|------------|---------------------|-----------|---------|
| | | Asymptomatic | Symptomatic | | | Emigrated | Died |
| Psychiatric Status | Total | | Depression Alone | PTSD Alone | Depression and PTSD | | |
| Asymptomatic | 291 | 160 (55) | 24 (8) | 9 (3) | 15 (5) | 72 (25) | 11 (4) |
| Symptomatic | 237 | 62 (26) | 62 (26) | 6 (3) | 37 (16) | 42 (18) | 28 (12) |
| Depression alone | 98 | 26 (27) | 32 (33) | 1 (1) | 10 (10) | 14 (14) | 15 (15) |
| PTSD alone | 30 | 7 (23) | 5 (17) | 2 (7) | 6 (20) | 8 (27) | 2 (7) |
| Depression and PTSD | 109 | 29 (27) | 25 (22) | 3 (3) | 21 (19) | 20 (18) | 11 (10) |
| Total | 528 | 222 (42) | 86 (16) | 15 (3) | 52 (10) | 114 (22) | 39 (7) |

*Data are presented as number (percentage). Percentages may not sum to 100 due to rounding. Psychiatric status was determined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* algorithm as described in the text. PTSD indicates posttraumatic stress disorder. One respondent who was reinterviewed had incomplete psychiatric baseline data; 5 respondents were lost to follow-up or refused reinterview at 3-year follow-up.

pression, PTSD, and disability are associated with each other at baseline and at follow-up and jointly persist over time.

In TABLE 5, we report adjusted ORs for associations between baseline characteristics and emigration or death at the time of reinterview in 1999. The basic risk of mortality was 3.12 times greater for respondents who were depressed at baseline (Table 1). The association between mortality and baseline depression was no longer statistically significant after adjustment for sex, age, educational level, time in camp, living alone, cumulative trauma, handicap, and reported chronic heart or cardiovascular disease (adjusted OR, 1.85; 95% CI, 0.82-4.16). After controlling for the other baseline characteristics, trauma experience, and health status, the adjusted risk of dying was increased for men vs women (OR, 2.63; 95% CI, 1.17-5.92), with each additional decade of age (OR, 1.91; 95% CI, 1.34-2.71), and with social isolation (living alone) (OR, 2.40; 95% CI, 1.07-5.38). The adjusted odds of emigrating increased with educational level (OR, 1.90; 95% CI, 1.10-3.29), trauma history (OR, 3.34; 95% CI, 1.89-5.91), and for those who were in camp for 12 months or less (OR, 11.30; 95% CI, 6.55-19.50). The odds of emigrating also decreased for persons with an observed handicap (OR, 0.11; 95% CI, 0.02-0.52). This logistic model had moderate predictive power, with a generalized $R^2=0.36$.

COMMENT

To date, longitudinal studies of refugee mental health have focused on resettled populations in North America and Western Europe.²⁵ To our knowledge this is the first longitudinal mental health study of refugees remaining in the conflict region that investigates the associations among psychiatric morbidity, disability, emigration, and mortality over time. These data allow a prospective look at the refugee experience of mental health and disability as a refugee cohort adjusts to conditions in a postconflict society.

Table 3. Observed Frequency of Psychiatric Disorders and Disability for 375 Bosnian Refugees at Baseline and 3-Year Follow-up in the Reinterviewed Sample*

| Baseline Diagnosis | Follow-up Status | | | | Total No. (%) |
|-----------------------------------|-------------------------|---------------|----------------------|----------------|---------------|
| | No Psychiatric Disorder | | Psychiatric Disorder | | |
| | No Disability | Disability | No Disability | Disability | |
| No psychiatric disorder (n = 208) | | | | | |
| No disability | 130 | 12 | 26 | 8 | 176 (47) |
| Disability | 8 | 10 | 3 | 11 | 32 (9) |
| Psychiatric disorder (n = 167) | | | | | |
| No disability | 43 | 3 | 35 | 21 | 102 (27) |
| Disability | 9 | 7 | 15 | 34 | 65 (17) |
| Total No. (%) | 190 (51) | 32 (9) | 79 (21) | 74 (20) | 375 |

*Psychiatric status was determined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* algorithm as described in the text. In this table, the category *psychiatric disorder* includes respondents with depression alone, PTSD (posttraumatic stress disorder) alone, and those with PTSD plus depression. Disability status was determined on the basis of the Medical Outcomes Study, Short-Form 20 physical functioning scale as described in the "Methods" section. Percentages may not sum to 100 due to rounding. One additional respondent with a self-reported disability at baseline and follow-up and incomplete baseline psychiatric data had no psychiatric disorders at follow-up.

A major finding of our follow-up study is the chronicity of baseline psychiatric disorders. For example, 43% continue to meet the *DSM-IV* criteria for depression (alone or comorbid with PTSD) at follow-up. In addition 16% of asymptomatic individuals became symptomatic for psychiatric disorders 3 years later, primarily developing depression. The level of chronic depression found at follow-up in this refugee population is 2 to 4 times higher than that found in the general population, in which depression remains chronic in approximately 10% to 20% after 2 years.²⁶ It is possible that some individuals who were initially depressed improved and then relapsed by the time of our follow-up interview since the course of depression is highly variable.²⁷ While we do not know the phenomenological pattern of depressive symptoms, further research would be able to test whether those refugees with the highest initial levels of symptoms are most likely to retain their symptoms.

Few systematic studies of PTSD exist at multiple times in general populations affected by traumatic events such as natural disasters.^{28,29} This makes it difficult to know whether PTSD is a chronic condition in these populations. In this study, few cases of PTSD alone existed at baseline or at the 3-year follow-up since PTSD was primarily comorbid with depression.³⁰ At follow-up, only 23% of those original respondents with PTSD (PTSD alone and

Table 4. Odds Ratios for the Association Between Psychiatric Disorders and Disability of 375 Bosnian Refugees Based on the Final Log Linear Model*

| | Adjusted OR (95% CI) |
|--|----------------------|
| Psychiatric disorder at follow-up given psychiatric disorder at baseline | 4.96 (3.14-7.82) |
| Disability at follow-up given disability at baseline | 8.21 (4.83-13.96) |
| Disability at baseline given psychiatric disorder at baseline | 2.71 (1.64-4.48) |
| Disability at follow-up given psychiatric disorder at follow-up | 4.74 (2.88-7.81) |

*For determining psychiatric status and disability, see Table 3. OR indicates odds ratio; CI, confidence interval. These results are based on data presented in Table 3. Odds ratios are adjusted for the 4 main effects (disability at baseline and follow-up; psychiatric disorder at baseline and follow-up) and the 3 remaining 2-way associations included in the final model and noted in this table (for further detail, see "Results" section). One additional respondent with a self-reported disability at baseline and follow-up and incomplete baseline psychiatric data had no psychiatric disorders at follow-up.

PTSD plus depression) continued to have a diagnosis of PTSD, primarily in association with depression. In this population, PTSD is unlikely to be a chronic condition unless it is comorbid with depression.

Disability was also a chronic condition in 63 (46%) of 136 participants. In fact, psychiatric disorders and disability were associated with each other at baseline and follow-up and jointly persisted over time. These results are consistent with our prior report⁶ and with findings in mainstream populations that link psychiatric disorders, especially depres-

sion, to disability.^{31,32} This evidence supports the hypothesis that psychiatric disorders diagnosed in the early stages of a refugee crisis are predictors of chronic psychiatric illnesses and disabilities.³³⁻³⁵

Among the questions about intervention in refugee communities are whether early intervention aimed at treating depression would disrupt this chronic process or whether the treatment of disability alone could reduce the disability associated with psychiatric disorders. Our findings suggest that since psychiatric disorders and disability occur jointly, they must be considered together in refugee and postconflict refugee treatment and prevention settings. Further research might clarify whether psychiatric disorder or disability or both should be the primary focus of intervention.

The potentially fatal consequences of psychiatric disorders in refugee populations have not been studied. In the univariate analysis, depression was associated with mortality, although in the multivariate analysis age, male sex, and living in a single-person household were the only statistically significant associations. Given the relatively low numbers of deaths in this group to date, the adjusted risk of death in association with depression, although not statistically significant, continues to be a concern for elderly persons affected by this disorder, especially in light of previ-

ous research.³⁶⁻⁴² Our results raise a number of concerns about psychological factors associated with premature death in elderly refugees and displaced persons that may or may not be captured by a psychiatric diagnosis. The severe psychological impact of the war in Bosnia on elderly persons has been noted in a number of clinical studies.^{43,44} Engel⁴⁵ described a response to illness he called “giving up—given-up,” about which he postulated that illness overwhelms coping, producing a depressive state and the loss of a desire to go on. The depressive symptom for a “wish to die” has been associated with mortality in the elderly who are medically ill.⁴⁶ Many participants in our study may feel so hopeless and helpless about their current lives that they are giving up and dying from their chronic illness.

Before the recent war in Bosnia-Herzegovina, the population was approximately 4.4 million. It is estimated that the war created 2 million refugees, and internally displaced persons.⁴⁷ Since the Dayton Peace Accord in 1995, there has been a major international effort to return Bosnian refugees to their communities of origin. This survey offers a unique opportunity to compare the demographic, health, and mental health characteristics of Bosnian refugees who emigrated with those who remained in the

region. The fact that healthier educated Bosnian refugees are resettling in North America and Western Europe must be of concern to policymakers whose aim is to rebuild Bosnian society. These data also challenge the widely held public and psychiatric conception that refugees bring preexisting mental disorders into their new societies. Additional research is required to determine whether those who emigrated remained free of psychiatric symptoms and disability over time.²⁵

Limitations

Potential limitations of this study warrant consideration. First, the precision of the estimated OR for the association between mortality and depression was limited by overall sample size and the number of subjects who had died. A planned 6-year follow-up may correct this limitation.

Second, we did not include data from physical and psychiatric examinations. Because structured clinical interviews were not used, it is unclear to what extent the rates of self-reported symptoms for PTSD and depression on the HTQ and HSCL-25, respectively, would match clinical diagnoses. The HSCL-25 and HTQ have been validated against a clinical criterion standard in other refugee settings,¹³ supported by cross-validation that links checklist positive diagnoses and dis-

Table 5. Multivariate Logistic Regression of the Association Among 3-Year Follow-up Status and Baseline Psychiatric Symptoms, Personal Characteristics, and Risk Factors of 528 Participants*

| Baseline Characteristics | Emigrated vs Reinterview | | Death vs Reinterview | |
|-----------------------------------|--------------------------|----------------------|------------------------|----------------------|
| | Unadjusted OR (95% CI) | Adjusted OR (95% CI) | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
| Symptoms of depression (positive) | 0.66 (0.42-1.04) | 0.75 (0.41-1.38) | 3.12 (1.55-6.26) | 1.85 (0.82-4.16) |
| Men | 2.28 (1.49-3.50) | 1.41 (0.82-2.43) | 2.39 (1.23-4.66) | 2.63 (1.17-5.92) |
| Age per 10-year increase | 0.81 (0.71-0.93) | 0.97 (0.80-1.17) | 2.14 (1.60-2.86) | 1.91 (1.34-2.71) |
| ≥Secondary education | 2.71 (1.76-4.16) | 1.90 (1.10-3.29) | 1.36 (0.70-2.66) | 2.26 (0.95-5.36) |
| ≤12 Months in camp | 10.52 (6.44-17.17) | 11.30 (6.55-19.50) | 3.25 (1.66-6.37) | 2.04 (0.95-4.37) |
| 1 Member in family in camp | 0.75 (0.48-1.18) | 0.71 (0.40-1.25) | 3.97 (1.95-8.09) | 2.40 (1.07-5.38) |
| ≥6 Trauma events | 4.33 (2.67-7.01) | 3.34 (1.89-5.91) | 1.10 (0.57-2.12) | 1.68 (0.76-3.70) |
| Observed handicap | 0.15 (0.04-0.63) | 0.11 (0.02-0.52) | 2.52 (1.12-5.69) | 1.16 (0.43-3.12) |
| Has cardiovascular condition | 0.49 (0.32-0.76) | 0.67 (0.36-1.22) | 4.34 (1.87-10.07) | 2.62 (1.00-6.89) |

*OR indicates odds ratio; CI, confidence interval. Psychiatric status was determined by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* algorithm as described in the “Methods” section. Additional details about this multivariate, multiple logistic analysis are available on request. One respondent who was reinterviewed had incomplete psychiatric baseline data and was excluded from this analysis; 5 respondents were lost to follow-up or refused reinterview at 3-year follow-up. The generalized (pseudo) R² for the final model was 0.36.

ability^{3,6,48} and demonstrated to be accurate measures of change of depressive disorders over time.⁴⁹ The study's DSM-IV multidimensional algorithm was recently used in a large scale epidemiological study in Kosovo.³ Evidence for medical illnesses came from self-report. Cause of death relied primarily on family interviews. Objective measures of medical and psychiatric illnesses through clinical examination of all respondents might have increased the precision of analysis for determining those risk factors associated with mortality.

Third, the number of respondents who were successfully treated, for example, by their local primary care physicians (the main source of mental health care in Bosnia) is not known. Our experience in a current project training Bosnian primary care physicians in their treatment of psychiatric disorders suggests that the early status of Bosnia's health reform, physical damage to Bosnia's health care infrastructure, and modest levels of mental health skills in the general medical community all make it highly unlikely that many of our respondents were receiving adequate psychiatric care.

Conclusions

This 3-year follow-up of Bosnian refugees reveals continued high levels of chronic psychiatric disorders and disability. These results are consistent with other psychiatric studies conducted inside Bosnia during and after the war.⁵⁰

The role of initial symptoms of depression or PTSD comorbid with depression in predicting chronic psychiatric illness among former refugees indicates the importance of early recognition and treatment. Since not all symptomatic refugees need to be clinically treated, emphasis must be placed on those who will not recover without medical or psychiatric care.⁵¹ Because there are so many affected individuals who were refugees during the war in Bosnia, the focus most likely should be on the identification and treatment of those individuals with depression and disability in Bosnia's primary health care

system.⁵² Developing a mental health capacity within primary care must be a priority of Bosnia's health care reform.⁵³

Finally, there is a need for continued research that can determine those strategies most culturally effective in reducing the suffering and disability associated with psychiatric disorders and disabilities in postconflict societies.

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Peace is only possible if men cease to place their happiness in the possession of things "which cannot be shared," and if they raise themselves to a point where they adopt an abstract principle superior to their egotisms. In other words, it can only be obtained by a betterment of human morality.

—Julien Benda (1867-1956)