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Lifetime Prevalence of Mental Disorders in Lebanon: First Onset, Treatment, and Exposure to War

Elie G. Karam1,2,3*, Zeina N. Mneimneh3,4, Hani Dimassi1,3, John A. Fayyad1,2,3, Aimee N. Karam1,2,3, Soumana C. Nasser3,6, Somnath Chatterji7, Ronald C. Kessler8

1 Department of Psychiatry and Clinical Psychology, Saint George Hospital University Medical Center, Beirut, Lebanon, 2 Department of Psychiatry and Clinical Psychology, Faculty of Medicine, Balamand University Medical School, Beirut, Lebanon, 3 Institute for Development, Research, Advocacy and Applied Care (IDRAAC), Beirut, Lebanon, 4 Survey Methodology Program, Institute for Social Research, University of Michigan, Ann Arbor, Michigan, United States of America, 5 School of Nursing, Faculty of Medicine, American University of Beirut, Beirut, Lebanon, 6 School of Pharmacy, Lebanese American University, Byblos, Lebanon, 7 World Health Organization (WHO), Geneva, Switzerland, 8 Department of Health Care Policy, Harvard Medical School, Boston, Massachusetts, United States of America

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Abbreviations: ADHD, attention deficit/hyperactivity disorder; CI, confidence interval; CIDI, Composite International Diagnostic Interview; DSM, Diagnostic and Statistical Manual; GAD, generalized anxiety disorder; ICD, International Classification of Diseases; IDRAAC, Institute for Development, Research, Advocacy and Applied Care; IED, intermittent explosive disorder; LEBANON, Lebanese Evaluation of the Burden of Ailments and Needs Of the Nation; MDD, major depressive disorder; OR, odds ratio; PTSD, post-traumatic stress disorder; SAD, separation anxiety disorder; SCID, Structured Clinical Interview for DSM-IV; WHO, World Health Organization; WMH, World Mental Health

* To whom correspondence should be addressed. E-mail: egkaram@idraac.org

ABSTRACT

Background

There are no published data on national lifetime prevalence and treatment of mental disorders in the Arab region. Furthermore, the effect of war on first onset of disorders has not been addressed previously on a national level, especially in the Arab region. Thus, the current study aims at investigating the lifetime prevalence, treatment, age of onset of mental disorders, and their relationship to war in Lebanon.

Methods and Findings

The Lebanese Evaluation of the Burden of Ailments and Needs Of the Nation study was carried out on a nationally representative sample of the Lebanese population (n = 2,857 adults). Respondents were interviewed using the fully structured WHO Composite International Diagnostic Interview 3.0. Lifetime prevalence of any Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) disorder was 25.8%. Anxiety (16.7%) and mood (12.6%) were more common than impulse control (4.4%) and substance (2.2%) disorders. Only a minority of people with any mental disorder ever received professional treatment, with substantial delays (6 to 28 y) between the onset of disorders and onset of treatment. War exposure increased the risk of first onset of anxiety (odds ratio [OR] 5.92, 95% confidence interval [CI] 2.5–14.1), mood (OR 3.32, 95% CI 2.0–5.6), and impulse control disorders (OR 12.72, 95% CI 4.5–35.7).

Conclusions

About one-fourth of the sample (25.8%) met criteria for at least one of the DSM-IV disorders at some point in their lives. There is a substantial unmet need for early identification and treatment. Exposure to war events increases the odds of first onset of mental disorders.

The Editors’ Summary of this article follows the references.
Introduction

Large-scale psychiatric epidemiologic studies have become increasingly common in industrialized countries in the past decade [1–5] in response to mounting concerns about the prevalence and burden of mental disorders [6,7]. Psychiatric epidemiological surveys are much less common, in comparison, in the Arab World and have so far focused on small populations [8–11]. Furthermore, although war has been linked to a higher risk of mental disorders [12–16], no previous study has comprehensively assessed on a national level the effect of war on the first onset of a broad range of mental disorders during the life span of individuals. In an effort to address these issues, the Institute for Development, Research, Advocacy and Applied Care (IDRAAC) with the Department of Psychiatry and Clinical Psychology at Balamand University and Saint George Hospital University Medical Center conducted the first nationally representative general population survey of mental disorders in Lebanon and the Arab World: the Lebanese Evaluation of the Burden of Ailments and Needs Of the Nation (LEBANON) survey. This survey is part of the World Health Organization (WHO) World Mental Health (WMH) Survey Initiative, a series of coordinated, large-scale psychiatric epidemiologic surveys being carried out in over 29 countries in the world [17].

We reported previously that 17% of Lebanese adults meet criteria for at least one Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) disorder in the year preceding the interview [18]. The current report assesses the lifetime prevalence, the risk of ever developing, the age of onset, and the treatment delay of mental disorders in Lebanon. Moreover, the effect of war exposure intensity on developing a first onset of mental disorder was explored in a multivariate time-dependent analysis.

Methods

Participants

A nationally representative, stratified multistage clustered area probability sample of noninstitutionalized adults (aged ≥18 y) who had no cognitive or physical impairment preventing participation was selected for this study. A total of 342 primary sampling units (area segments) were selected with probabilities proportional to size to represent the different geographic areas in the country. Complete household listing was carried out in the area segments. A sample of households was selected from each segment, and one eligible family member was randomly selected from each sampled household using the Kish method [19]. The final stage selected the spouse of the primary respondents in a random 10% of the households for a focused analysis on assortative mating. The response rate was 70.0%, with 2,857 completed interviews (n = 2,857). Part II (n = 1,031) was additionally weighted for differential probability of selection within households and post-adjusted to government population data on sociodemographic and geographical variables [20].

Procedures

Face-to-face interviews were conducted in the respondents’ households between September 2002 and September 2003 by 116 interviewers who were trained by certified Composite International Diagnostic Interview (CIDI) trainers. Interviews were conducted in two parts. Part I included a core diagnostic assessment of all respondents (n = 2,857). Part II (n = 1,031) included an assessment of risk factors and other correlates of disorders, and was administered to all Part I respondents who met lifetime criteria for any core disorder plus a probability subsample of the remaining Part I respondents. Part I was weighted for differential probability of selection within households and post-adjusted to government population data on sociodemographic and geographical variables [20]. Part II was additionally weighted for differential probability of subsampling from the Part I sample.

Diagnostic Assessment

The diagnostic instrument used in the survey was the WHO Composite International Diagnostic Interview (CIDI 3.0) [21], a fully structured, lay-administered interview generating both International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10) and DSM-IV diagnoses. DSM-IV criteria are used in the current report to generate diagnoses of anxiety, mood, impulse control, and substance disorders. The list of disorders assessed is presented in Table 1. Two childhood impulse control disorders, conduct disorder (CD) and attention deficit/hyperactivity disorder (ADHD), were limited to respondents ages 18–44 y to reduce recall bias. Retrospective age-of-onset reports were obtained using a unique probing method designed to stimulate active memory search and accurate reporting. Methodological research has shown that this method yields much more plausible age-of-onset reports than those obtained using standard questioning [22].

The Arabic version of CIDI 3.0 was translated from the original English using a rigorous WHO-monitored five-step process that included forward translation, backward translation, and resolution of discrepancies between translations, pilot testing, and final revision. More details on this process and other aspects of instrument adaptation have been published elsewhere [18]. Although the Arabic CIDI 3.0 has not yet been validated, validation against the Structured Clinical Interview for DSM-IV (SCID) [22] has been completed in WMH surveys carried out in France, Italy, Spain, and the United States [23,24], documenting consistently good individual-level CIDI–SCID concordance as well as aggregate prevalence estimates that were either unbiased or conservative in the CIDI relative to the SCID.

Sociodemographic Correlates

The sociodemographic correlates used in the analysis include age (18–34, 35–49, 50–64, and older than 64 y), sex, education (student, low [none-only primary], middle–low [intermediate/some secondary], middle [completed secondary without university], high [university degree]), and marital status (single, married, and previously married: separated/divorced/widowed). In the time-dependent analysis that linked war exposure to first onset of disorder, age was defined based on onset of the Lebanon wars in 1975, which ended in 1990. These age groups were appropriately corrected for the impulse control subsample: young children (0–10 y for anxiety and mood; 0–6 y for impulse control), adolescents (11–18 y for anxiety and mood; 7–16 y for impulse control), young adults (19–35 y for anxiety and mood; not
Table 1. Lifetime Prevalence of Mental Disorders and Age

<table>
<thead>
<tr>
<th>Category</th>
<th>Disorder</th>
<th>Total</th>
<th>Female</th>
<th>Male</th>
<th>Age, Years</th>
<th>18–34</th>
<th>35–49</th>
<th>50–64</th>
<th>65+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>% (SE)</td>
<td>% (SE)</td>
<td>% (SE)</td>
<td>% (SE)</td>
<td>% (SE)</td>
<td>% (SE)</td>
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<tr>
<td>Anxiety disorders</td>
<td>Panic disorder</td>
<td>16</td>
<td>0.6 (0.1)</td>
<td>0.7 (0.2)</td>
<td>0.3 (0.1)*</td>
<td>0.2 (0.1)</td>
<td>1.2 (0.4)</td>
<td>0.4 (0.2)</td>
<td>0.4 (0.4)</td>
</tr>
<tr>
<td></td>
<td>Agoraphobia without panic</td>
<td>13</td>
<td>0.5 (0.1)</td>
<td>0.7 (0.2)</td>
<td>0.1 (0.1)</td>
<td>0.5 (0.3)</td>
<td>0.5 (0.2)</td>
<td>0.1 (0.1)</td>
<td>0.8 (0.7)</td>
</tr>
<tr>
<td></td>
<td>Specific phobia</td>
<td>202</td>
<td>7.1 (0.5)</td>
<td>10.2 (0.7)</td>
<td>4.0 (0.8)**</td>
<td>8.4 (0.7)</td>
<td>7.3 (1.1)</td>
<td>5.1 (1.1)</td>
<td>4.3 (1.5)**</td>
</tr>
<tr>
<td></td>
<td>Social phobia</td>
<td>52</td>
<td>1.9 (0.4)</td>
<td>2.1 (0.5)</td>
<td>1.7 (0.5)</td>
<td>2.8 (0.7)</td>
<td>1.5 (0.4)</td>
<td>1.0 (0.5)</td>
<td>0.4 (0.3)**</td>
</tr>
<tr>
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<td>Generalized anxiety disorder</td>
<td>61</td>
<td>2.0 (0.3)</td>
<td>2.8 (0.4)</td>
<td>1.1 (0.3)**</td>
<td>1.8 (0.5)</td>
<td>2.3 (0.6)</td>
<td>1.4 (0.5)</td>
<td>2.9 (1.1)</td>
</tr>
<tr>
<td></td>
<td>PTSD</td>
<td>70</td>
<td>3.4 (0.6)</td>
<td>5.8 (1.1)</td>
<td>1.0 (0.3)**</td>
<td>3.4 (1.2)</td>
<td>3.6 (1.0)</td>
<td>3.7 (1.5)</td>
<td>2.5 (0.8)**</td>
</tr>
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<td>Separation anxiety/adult SAD</td>
<td>95</td>
<td>6.1 (1.0)</td>
<td>8.1 (1.4)</td>
<td>4.1 (1.0)**</td>
<td>7.8 (1.5)</td>
<td>6.7 (1.8)</td>
<td>2.2 (0.7)</td>
<td>3.2 (1.7)**</td>
</tr>
<tr>
<td></td>
<td>Any anxiety disorder*</td>
<td>282</td>
<td>16.7 (1.6)</td>
<td>24.8 (2.1)</td>
<td>8.6 (1.7)**</td>
<td>19.4 (2.2)</td>
<td>18.8 (2.2)</td>
<td>9.6 (2.5)</td>
<td>10.6 (3.4)**</td>
</tr>
<tr>
<td>Mood disorders</td>
<td>MDD</td>
<td>283</td>
<td>9.9 (0.9)</td>
<td>12.8 (1.1)</td>
<td>7.0 (1.0)**</td>
<td>8.5 (1.3)</td>
<td>12.4 (1.1)</td>
<td>10.9 (1.3)</td>
<td>9.1 (2.3)</td>
</tr>
<tr>
<td></td>
<td>Dysthymia</td>
<td>34</td>
<td>1.1 (0.2)</td>
<td>1.6 (0.3)</td>
<td>0.7 (0.3)</td>
<td>0.6 (0.3)</td>
<td>1.8 (0.6)</td>
<td>1.8 (0.5)</td>
<td>1.1 (0.7)</td>
</tr>
<tr>
<td></td>
<td>Bipolar disorders</td>
<td>61</td>
<td>2.4 (0.4)</td>
<td>2.3 (0.5)</td>
<td>2.6 (0.5)</td>
<td>3.9 (0.7)</td>
<td>1.7 (0.4)</td>
<td>0.6 (0.2)</td>
<td>0.2 (0.2)**</td>
</tr>
<tr>
<td></td>
<td>Any mood disorder</td>
<td>352</td>
<td>12.6 (0.9)</td>
<td>15.4 (1.2)</td>
<td>9.8 (0.9)**</td>
<td>12.6 (1.2)</td>
<td>14.4 (1.2)</td>
<td>12.1 (1.4)</td>
<td>9.3 (2.4)</td>
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<tr>
<td>Impulse control disorders</td>
<td>Conduct disorder*</td>
<td>13</td>
<td>1.0 (0.4)</td>
<td>0.1 (0.1)</td>
<td>1.9 (0.8)**</td>
<td>0.8 (0.4)</td>
<td>1.7 (0.8)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>ADHDd</td>
<td>20</td>
<td>1.5 (0.4)</td>
<td>1.6 (0.6)</td>
<td>1.4 (0.6)</td>
<td>1.6 (0.5)</td>
<td>1.3 (0.6)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Intermittent explosive disorder</td>
<td>43</td>
<td>1.7 (0.5)</td>
<td>1.2 (0.4)</td>
<td>2.2 (0.7)</td>
<td>2.8 (0.9)</td>
<td>1.0 (0.2)</td>
<td>0.2 (0.1)</td>
<td>0.3 (0.3)**</td>
</tr>
<tr>
<td></td>
<td>Any impulse control disorder*</td>
<td>53</td>
<td>4.4 (0.9)</td>
<td>3.6 (1.1)</td>
<td>5.1 (1.6)</td>
<td>4.7 (1.2)</td>
<td>3.5 (1.1)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Substance abuse disorders</td>
<td>Alcohol abuse</td>
<td>38</td>
<td>1.5 (0.3)</td>
<td>0.4 (0.3)</td>
<td>2.7 (0.6)**</td>
<td>2.1 (0.4)</td>
<td>1.2 (0.5)</td>
<td>1.1 (0.5)</td>
<td>0.8 (0.4)</td>
</tr>
<tr>
<td></td>
<td>Alcohol dependence</td>
<td>9</td>
<td>0.4 (0.2)</td>
<td>0.4 (0.3)</td>
<td>0.3 (0.2)</td>
<td>0.6 (0.3)</td>
<td>0.3 (0.2)</td>
<td>0.2 (0.1)</td>
<td>0.0 (0.0)</td>
</tr>
<tr>
<td></td>
<td>Drug abuse</td>
<td>6</td>
<td>0.5 (0.2)</td>
<td>0.1 (0.1)</td>
<td>0.9 (0.5)**</td>
<td>0.1 (0.1)</td>
<td>0.4 (0.2)</td>
<td>2.0 (1.8)</td>
<td>0.0 (0.0)*</td>
</tr>
<tr>
<td></td>
<td>Drug dependence*</td>
<td>3</td>
<td>0.1 (0.1)</td>
<td>0.1 (0.1)</td>
<td>0.2 (0.2)</td>
<td>0.1 (0.1)</td>
<td>0.2 (0.2)</td>
<td>0.2 (0.2)</td>
<td>0.0 (0.0)</td>
</tr>
<tr>
<td></td>
<td>Any substance abuse disorder*</td>
<td>27</td>
<td>2.2 (0.8)</td>
<td>0.6 (0.3)</td>
<td>3.8 (1.6)**</td>
<td>2.7 (1.6)</td>
<td>1.9 (0.7)</td>
<td>2.5 (1.8)</td>
<td>0.0 (0.0)**</td>
</tr>
<tr>
<td></td>
<td>Any disorder*</td>
<td>491</td>
<td>25.8 (1.9)</td>
<td>33.1 (2.6)</td>
<td>18.4 (2.4)**</td>
<td>29.1 (3.1)</td>
<td>26.9 (2.5)</td>
<td>21.4 (4.1)</td>
<td>15.2 (3.9)</td>
</tr>
<tr>
<td></td>
<td>Two or more disorders*</td>
<td>234</td>
<td>10.5 (1.4)</td>
<td>13.8 (1.8)</td>
<td>7.0 (1.3)**</td>
<td>12.1 (2.2)</td>
<td>11.6 (1.4)</td>
<td>6.8 (1.9)</td>
<td>5.9 (2.2)*</td>
</tr>
<tr>
<td></td>
<td>Three or more disorders*</td>
<td>105</td>
<td>4.6 (0.7)</td>
<td>6.0 (1.0)</td>
<td>3.2 (0.7)*</td>
<td>5.5 (1.2)</td>
<td>5.1 (1.0)</td>
<td>2.3 (1.0)</td>
<td>2.1 (1.3)**</td>
</tr>
</tbody>
</table>

DSM-IV organic exclusion rules and diagnosis hierarchy rules were used in making diagnoses, except for substance use disorders, where abuse was defined with or without dependence, in recognition of abuse often being a stage in the progression to dependence.

*Statistical significance at p < 0.05
**p < 0.01
*1 with df = 1 for all disorders.
*2 with df = 3 for all disorders except for conduct, attention deficit hyperactivity disorders (ADHD), and any impulse disorder where df = 1.
*3Assessed in Part II sample (n = 1,031).
*4SAD, conduct, and attention deficit hyperactivity disorders were assessed among Part II respondents in the age range 18–44 (n = 595).
*5These summary measures were analyzed in Part II sample (n = 1,031). SAD, conduct, and ADHD were coded as absent among respondents who were not assessed for these disorders.

SE, standard error.
doi:10.1371/journal.pmed.0050061.t001

Use of Mental Health Services

Information on whether respondents ever talked about their symptoms to a physician or other professional (psychologist, counselor, spiritual advisor, herbalist, acupuncturist, and other healing professionals) was assessed in each diagnostic section of the CIDI 3.0. Information was also obtained on age at first treatment contact.

Statistical Analysis

Projected lifetime risk was estimated using retrospective age-of-onset reports to estimate conditional probability of first onset at each year of life up to and including age 74 y. The actuarial method [25] was used to cumulate these conditional probability estimates. Predictors of first onset of disorder were analyzed using discrete-time survival analysis with person-year the unit of analysis [26]. Moreover, marital status, education, and war exposure were used as time-variant variables controlling for each year of the respondent’s life. Survival coefficients were exponentiated and were reported as odds ratios (ORs). All the models included age cohorts defined at the onset of the Lebanese wars. The first set of models had the five war exposure levels entered as dummy variables producing multiple ORs, with no exposure as a reference. To increase statistical power, we combined the war dummy variables into one index by generating individual level-predicted probabilities of the outcome based on the coefficients of the dummy variables. Interactions between this war index and demographics (age cohorts and sex) were tested. Significant interactions were explored further with contrast statements to identify differences applicable for impulse control), and adults (>35 y for anxiety and mood; not applicable for impulse control). This study was completed before a more recent outbreak of war in July 2006.

War-Related Traumatic Events

In light of previous evidence that prevalence of psychiatric disorders during the years of the Lebanese wars was strongly related to exposure to war-related traumata [10], information on exposure to a list of war-related traumatic events was added to the CIDI 3.0. Ten war events were assessed and included in this analysis: civilian in war region, civilian in terror region, refugee, rescue worker, witness death or injury, witness atrocities, death of close one, trauma to close one, kidnapped, and robbed or threatened by weapon. These war events were summarized into one index that reflects the level of war exposure as follows: none, one event, two events, three events, and four-plus events.
Results

Lifetime Prevalence of Mental Disorders

About one-fourth of the sample (25.8%) met criteria for at least one of the DSM-IV disorders at some point in their lives, with 10.5% having more than one disorder. Anxiety disorders were more common (16.7%) than mood (12.6%), impulse control (4.4%), and substance use disorders (2.2%). The most prevalent individual disorder was major depression (9.9%). A number of disorders varied across the different age groups, consistently being most common in younger age groups. Females had more lifetime anxiety and mood disorders than males, whereas the latter had more substance abuse and conduct disorders (Table 1).

Projected Lifetime Risk

Projecting lifetime risk to age 75 y, approximately one-third of respondents (32.9%) were expected eventually to meet criteria for one or more of the DSM-IV disorders. The highest projected risk was for major depression (17.2%). Median estimated age-of-onset ranged from a low of 11 y for specific phobia to a high of 39 y for generalized anxiety disorder (GAD) (Table 2). Half of all respondents who are expected ever to have a disorder in their lives, will have an onset by age 19 y.

War-Related Traumatic Events

The two most commonly reported war events were being a civilian in a war zone (55.2%) and being a refugee (37.7%) (Table 3). Almost half of the Lebanese (47%) were exposed to one or two events, almost one-quarter (21.8%) were exposed to three or more events, while almost one-third (31.2%) were not exposed to any event. Males were more likely to have been rescue workers ($\chi^2_{1,031} = 19.5, p < 0.001$) and refugees ($\chi^2_{1,031} = 27.5, p < 0.001$) than females. Females, on the other hand, were more likely to be civilians in a war zone ($\chi^2_{1,031} = 19.5, p < 0.001$) and atrocities ($\chi^2_{1,031} = 13.6, p < 0.001$) than females. Females, on the other hand, were more likely to have witnessed death or injury ($\chi^2_{1,031} = 110.4, p < 0.001$) or rob or threatened by a weapon ($\chi^2_{1,031} = 27.5, p < 0.001$) or atención to a loved one ($\chi^2_{1,031} = 13.6, p < 0.001$) than males. Females, on the other hand, were more likely to be civilians in a war zone ($\chi^2_{1,031} = 6.4, p = 0.01$) and refugees ($\chi^2_{1,031} = 26.4, p < 0.001$) Uncontrollable events such as the death of someone close ($\chi^2_{1,031} = 1.3, p = 0.3$) or trauma to a loved one ($\chi^2_{1,031} = 1.9, p = 0.2$) were not related to sex. The middle age groups (11–35 y) at the onset of the Lebanon wars were the most exposed to the majority of the war events ($\chi^2_{1,031} = 49.3, p < 0.001$) (Table 3).

Individual War Traumatic Events

Using the discrete-time survival analysis, our study showed that individuals exposed to individual war events were at a higher risk for developing a mental disorder for the first time ever, controlling for age, sex, marital status, and education. Exposure to these events still increased the odds of first onset

---

Table 2. Ages at Selected Percentiles on the Standardized Age-of-Onset Distributions of Disorders with Projected Lifetime Risk at 75 y

<table>
<thead>
<tr>
<th>Category</th>
<th>Disorder</th>
<th>Projected Lifetime Risk</th>
<th>Age at Selected Age-of-Onset Percentiles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Anxiety disorders</td>
<td>Panic disorder*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Agoraphobia without panic*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Specific phobia</td>
<td>7.9 (0.7)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Social phobia</td>
<td>2.0 (0.4)</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>GAD</td>
<td>3.9 (0.7)</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>PTSD*</td>
<td>5.3 (0.7)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Separation anxiety/adult SAD*</td>
<td>7.6 (1.1)</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Any anxiety disorder*</td>
<td>20.2 (1.8)</td>
<td>5</td>
</tr>
<tr>
<td>Mood disorders</td>
<td>MDD</td>
<td>17.2 (1.3)</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Dysthymia</td>
<td>2.1 (0.6)</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Bipolar disorders</td>
<td>2.9 (0.4)</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Any mood disorder</td>
<td>20.1 (1.2)</td>
<td>15</td>
</tr>
<tr>
<td>Impulse control disorders</td>
<td>Conduct disorder*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>ADHD</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Intermittent explosive disorder</td>
<td>1.8 (0.5)</td>
<td>13</td>
</tr>
<tr>
<td>Substance abuse disorders</td>
<td>Alcohol abuse</td>
<td>2.1 (0.4)</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Alcohol dependence*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Drug abuse*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Drug dependence*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Any substance abuse disorder*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Any disorder*</td>
<td>32.9 (2.1)</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
of mental disorders, even after controlling for the occurrence of other war trauma.

Witnessing death or injury in war time (OR 1.52, 95% CI 1.04–2.23), having a close person die (OR 1.48, 95% CI 1.03–2.12), and being a civilian in a war zone (OR 1.48, 95% CI 1.11–1.97) increased the odds of developing any mood disorder. Witnessing atrocities (OR 6.76, 95% CI 1.47–31.06) and being a refugee (OR 4.03, 95% CI 1.83–8.88) increased the odds of developing any impulse control disorder. Being a civilian in a terror region (OR 3.87, 95% CI 1.64–9.12) increased the odds of developing any anxiety disorder. Being a refugee (OR 4.03, 95% CI 1.83–8.88) increased the odds of developing any anxiety disorder and being a civilian in a war zone (OR 1.48, 95% CI 1.14–2.02) disorders compared to males. Being a student (compared to low education) and divorced/separated or widowed (ex-married compared to married), predicted the risk of developing a first onset of anxiety (OR 2.92, 95% CI 1.70–5.04) and mood (OR 1.52, 95% CI 1.14–2.02) disorders compared to males. Being young at the start of the Lebanon wars (aged 0–10 y) increased the risk of developing a first onset of mood disorders (within the broader categories mentioned above), the highest ORs being those for intermittent explosive disorder (IED) (OR 30.38), post-traumatic stress disorder (PTSD) (OR 10.24), and dysthymia (OR 7.71) (Figure 1). Interaction between war exposure and age at onset of wars was significant only for the category “any anxiety disorder,” showing an increased risk for respondents who were 35 y or older at the onset of the wars compared to each of the remaining age cohorts (63+ y at interview). The interaction of sex and war exposure, as well as marital status, was not significant for anxiety and mood but could not be carried out for impulse control disorders due to small numbers.

Treatment

About half (49.2%) of those with a lifetime mood disorder had obtained treatment for this disorder (Table 4). However, the median delay between age of onset and age of first seeking treatment was 6 y. Only 12.3% obtained treatment in the same year as the onset of their mood disorder. Treatment rates were much lower for other disorders. The proportions ever seeking treatment for the remaining disorders were lower (anxiety, 37.2%; substance, 35.4%; and impulse control disorders, 15.1%). However, delays in seeking treatment for anxiety and substance disorder were longer than that of depression. The median delay for substance disorders was 9 y and that for anxiety disorders was 28 y. The lowest treatment delay among all disorders (3 y) was reported for impulse control.

Discussion

This study presents data on national lifetime prevalence of a wide array of psychiatric disorders in an Arab country, to our knowledge for the first time. One-fourth of the Lebanese adult population met criteria for any of the DSM-IV disorders, and one-third were estimated to do so by age 75 y. Females are at higher risk of developing anxiety and mood

### Table 3. Differences in Exposure to Individual and Cumulative War Events by Sex and Age at Start of War

<table>
<thead>
<tr>
<th>Category</th>
<th>Event</th>
<th>People Exposed, ( n^a )</th>
<th>Total % (SE)</th>
<th>Sex</th>
<th>Age at Start of War, Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>Male</td>
<td>0–10</td>
<td>11–18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% (SE)</td>
<td>% (SE)</td>
<td>% (SE)</td>
<td>% (SE)</td>
</tr>
<tr>
<td>Individual war events</td>
<td>Rescue worker</td>
<td>37</td>
<td>3.0 (0.9)</td>
<td>1.2 (0.5)</td>
<td>4.8 (1.8)*</td>
</tr>
<tr>
<td></td>
<td>Witness death or injury</td>
<td>208</td>
<td>18.0 (1.3)</td>
<td>10.2 (1.6)</td>
<td>26.0 (2.2)**</td>
</tr>
<tr>
<td></td>
<td>Witness atrocities</td>
<td>119</td>
<td>10.6 (1.4)</td>
<td>5.5 (1.4)</td>
<td>15.8 (2.1)**</td>
</tr>
<tr>
<td></td>
<td>Civilian in war zone</td>
<td>620</td>
<td>55.2 (2.9)</td>
<td>61.2 (3.5)</td>
<td>49.0 (4.0)*</td>
</tr>
<tr>
<td></td>
<td>Civilian in terror region</td>
<td>114</td>
<td>8.6 (1.5)</td>
<td>6.5 (1.3)</td>
<td>10.6 (2.4)*</td>
</tr>
<tr>
<td></td>
<td>Refugee</td>
<td>447</td>
<td>37.7 (3.6)</td>
<td>44.4 (4.0)</td>
<td>30.9 (3.5)**</td>
</tr>
<tr>
<td></td>
<td>Death of close one</td>
<td>125</td>
<td>10.2 (1.2)</td>
<td>9.2 (1.3)</td>
<td>11.2 (1.8)</td>
</tr>
<tr>
<td></td>
<td>Trauma to close one</td>
<td>92</td>
<td>7.6 (0.8)</td>
<td>5.9 (1.3)</td>
<td>9.4 (1.7)</td>
</tr>
<tr>
<td></td>
<td>Kidnapped</td>
<td>44</td>
<td>3.0 (0.7)</td>
<td>0.04 (0.0)</td>
<td>6.1 (1.5)**</td>
</tr>
<tr>
<td></td>
<td>Robbed/threatened by weapon</td>
<td>42</td>
<td>2.2 (0.5)</td>
<td>0.6 (0.2)</td>
<td>3.9 (1.1)**</td>
</tr>
<tr>
<td>Number of war events</td>
<td>None</td>
<td>268</td>
<td>31.2 (3.2)</td>
<td>27.9 (3.5)</td>
<td>34.6 (4.1)**</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>233</td>
<td>23.4 (2.5)</td>
<td>25.4 (3.6)</td>
<td>21.8 (3.1)</td>
</tr>
<tr>
<td></td>
<td>Two</td>
<td>252</td>
<td>23.4 (2.2)</td>
<td>29.4 (3.5)</td>
<td>17.4 (2.4)</td>
</tr>
<tr>
<td></td>
<td>Three</td>
<td>129</td>
<td>10.7 (1.3)</td>
<td>11.6 (2.3)</td>
<td>9.8 (1.6)</td>
</tr>
<tr>
<td></td>
<td>Four+</td>
<td>149</td>
<td>11.1 (1.2)</td>
<td>5.8 (1.0)</td>
<td>16.5 (1.9)</td>
</tr>
</tbody>
</table>

*Statistical significance with \( p < 0.05 \).

** \( p < 0.01 \).

*Number of people exposed represents unweighted frequencies and was assessed in Part II sample (\( n = 1,031 \)).

†Significance level was measured using Chi-square for number of war events (as one categorical variable) versus sex and age each as one categorical variable.

SE, standard error.

doi:10.1371/journal.pmed.0050061.t003
disorders than are males. Being separated, divorced, or widowed increased the likelihood of developing a mood disorder. The effect of sex and marital status on the first onset of mental disorders was independent of war exposure.

The high prevalence of mental disorders and the early age of onset during the young, formative, and productive years create a considerable national burden. This burden is compounded by long delays in seeking care for these often chronic and recurrent conditions. Seeking treatment in the first year of onset of disorder and shortly after was very low. The extremely long delay for treatment of anxiety disorders was due to onset of many anxiety disorders occurring in childhood and treatment not occurring until adulthood. Whereas barriers to seeking care could include factors such as financial difficulties, stigma, and lack of awareness; shortage of health care professionals in Lebanon is not expected to be one of the reasons. It is estimated that there are 325 physicians per 100,000 population in Lebanon [29], the highest ratio in the Arab World and equivalent to many industrialized countries. Therefore, increasing awareness about mental health conditions and reducing possible taboos rather than increasing human resources becomes imperative, not only among the general public and health policy makers, but also and most importantly among health care professionals.

In addition, the study examines on a national level the effect of war on developing first-time mental disorders. In our sample, only 31.2% of the Lebanese were not exposed to any war events, whereas 11.1% were exposed to at least four war events. Males were exposed to more war events and to those events that reflect greater mobility in war time, whereas females reported more often being civilians in war regions or refugees. Those who were children at the start of war reported being less exposed to war events, possibly reflecting their lower mobility and lower recall of the war events at that time.

War, analyzed as both individual events and cumulative exposure, increased the risk of developing, for the first time, mental disorders in the life of the Lebanese. This increased risk was shown for all anxiety disorders that had enough participants to be analyzed (separation anxiety disorder [SAD], PTSD, and GAD), for mood disorders (major depressive disorder [MDD] and dysthymia, but not for bipolar disorder), and for impulse control disorder (intermittent...
explosive disorder). This increased risk was highest for impulse control disorders followed by PTSD and dysthymia. It is important to note here that the age cohort effect we report could be explained by either having been exposed to these events during this specific age or being in this age group per se [17,30].

Three main limitations of this study have to be considered. First, adults reporting on past psychiatric disorders, age of onset, treatment, and exposure to war may be subject to differential recall bias. A number of factors, including current psychiatric status, time to first onset of disorders, older age, and severity of episode, might have contributed to this differential recall bias. Second, the survey population excluded institutionalized respondents. Third, given the taboos surrounding mental illness, respondents in a face-to-face interview may have under-reported relevant symptoms. Taking these limitations into consideration, the results are probably an underestimate of the true lifetime prevalence of psychiatric disorders in Lebanon since all these factors are likely to bias the estimates downwards. Moreover, with regard to war exposure, although we looked at specific war events, exposure to the general war environment and its impact on the respondent’s mental health was difficult to assess. Also many of the Cs are very wide; consequently, results may not be reliably extrapolated to the whole population.

In conclusion, there is an urgent need to assess not only the prevalence, but also the determinants, of treatment failure and delays in treatment in a comparative manner to obtain robust evidence for policy making with regard to the burden of mental disorders in the Arab World. Furthermore, in the Middle East, where armed conflicts have been commonplace for decades, it is important to recognize that these conflicts result in mental disorders that are not limited to PTSD but also include mood and impulse control disorders that are likely to have long-term implications for the war-exposed populations.

Supporting Information
Alternative Language Abstract S1. Translation of the Abstract into Arabic
Found at doi:10.1371/journal.pmed.0050061.sd001

Alternative Language Abstract S2. Translation of the Abstract into French
Found at doi:10.1371/journal.pmed.0050061.sd002

Text S1. Ethics Approval
Found at doi:10.1371/journal.pmed.0050061.sd003 (171 KB DOC).

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Author contributions. EGK, ZNM, HD, JAF, ANK, and SCN provided statistical expertise. EGK, ZNM, HD, JAF, ANK, and SCN provided administrative, technical, or material support.

Competing Interests: RCK has been a consultant for Astra Zeneca, Bristol-Myers Squibb, Eli Lilly and Company, GlaxoSmithKline, Pfizer, Sanofi-Aventis, and Wyeth, and has had research support for his epidemiological studies from Bristol-Myers Squibb, Eli Lilly and Company, Ortho-McNeil, Pfizer, and the Pfizer Foundation. The other authors have declared that no competing interests exist.

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Single most common disorder. The researchers also calculated that by
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form of
Organization’s
'interviewed them using an Arabic version of the World Health
What Did the Researchers Do and Find? Recent epidemiological surveys (studies
that investigate the factors that affect the health of populations) have
important information about the burden of mental disorders in
some industrialized countries. However, little is known about the global
prevalence of mental disorders (the proportion of people in a population
with each disorder at one time) or about how events such as wars affect
mental health. This information is needed so that individual countries
can provide effective mental-health services for their populations. To
provide this information, the World Mental Health (WMH) Survey
Initiative is undertaking large-scale psychiatric epidemiological surveys
in more than 29 countries. As part of this Initiative, researchers have
examined the prevalence and treatment of mental disorders in Lebanon
and have asked whether war in this country has affected the risk of
becoming mentally ill.

What Did the Researchers Do and Find? The researchers randomly
selected a sample of nearly 3,000 adults living in Lebanon and
interviewed them using an Arabic version of the World Health
Organization’s “Composite International Diagnostic Interview” (CIDI
3.0). This interview tool generates diagnoses of mental disorders in the
form of “DSM-IV codes,” the American Psychiatric Association’s standard
codes for specific mental disorders. The researchers also asked the study
participants about their experience of war-related traumatic events such
as being a civilian in a war zone or being threatened by a weapon. The
researchers found that one in four Lebanese had had one or more DSM-
IV disorder at some time during their life. Major depression was the
single most common disorder. The researchers also calculated that by
the age of 75 years, about one-third of the Lebanese would probably
have had one or more DSM-IV disorder. Only half of the Lebanese with a
mood disorder ever received professional help; treatment rates for other
mental disorders were even lower. The average delay in treatment
ranged from 6 years for mood disorders to 28 years for anxiety disorders.
Finally, exposure to war-related events increased the risk of developing
an anxiety, mood, or impulse-control disorder by about 6-fold, 3-fold,
and 13-fold, respectively.

What Do These Findings Mean? These findings indicate that the
prevalence of mental illness in Lebanon is similar to that in the UK and
the US, the first time that this information has been available for an
Arabic-speaking country. Indeed, the burden of mental illness in
Lebanon may actually be higher than these findings suggest, because
the taboos associated with mental illness may have stopped some study
participants from reporting their problems. The findings also show that
in Lebanon exposure to war-related events greatly increases the risk of
developing for the first time several mental disorders. Further studies are
needed to discover whether this finding is generalizable to other
countries. Finally, these findings indicate that many people in Lebanon
who develop a mental illness never receive appropriate treatment. There
is no shortage of health-care professionals in Lebanon, so the researchers
suggest that the best way to improve the diagnosis and treatment of
mental disorders in this country might be to increase the awareness of
these conditions and to reduce the taboos associated with mental illness,
both among the general population and among health-care profes-
sionals.

Additional Information. Please access these Web sites via the online
version of this summary at http://dx.doi.org/10.1371/journal.pmed.0050061.

- Read a related PloS Medicine Perspective article
- IDRAAC has a database that provides access to all published research
  articles related to mental health in the Arab World
- The UK charity Mind provides information on understanding mental
  illness
- The US National Institute of Mental Health provides information
  on understanding, treating, and preventing mental disorders (mainly in
  English but some information in Spanish)
- MedlinePlus provides a list of useful links to information about mental
  health
- Wikipedia has a page on DSM-IV codes (note that Wikipedia is a free
  online encyclopedia that anyone can edit; available in several
  languages)