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Subthreshold Posttraumatic Stress Disorder in the World Health Organization World Mental Health Surveys

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Background: Although only a few people exposed to a traumatic event (TE) develop posttraumatic stress disorder (PTSD), symptoms that do not meet full PTSD criteria are common and often clinically significant. Individuals with these symptoms sometimes have been characterized as having subthreshold PTSD, but no consensus exists on the optimal definition of this term. Data from a large cross-national epidemiologic survey are used in this study to provide a principled basis for such a definition.

Methods: The World Health Organization World Mental Health Surveys administered fully structured psychiatric diagnostic interviews to community samples in 13 countries containing assessments of PTSD associated with randomly selected TEs. Focusing on the 23,936 respondents reporting lifetime TE exposure, associations of approximated DSM-5 PTSD symptom profiles with six outcomes (distress-impairment, suicidality, comorbid fear-distress disorders, PTSD symptom duration) were examined to investigate implications of different subthreshold definitions.

Results: Although consistently highest outcomes for distress-impairment, suicidality, comorbidity, and PTSD symptom duration were observed among the 3.0% of respondents with DSM-5 PTSD rather than other symptom profiles, the additional 3.6% of respondents meeting two or three of DSM-5 criteria B–E also had significantly elevated scores for most outcomes. The proportion of cases with threshold versus subthreshold PTSD varied depending on TE type, with threshold PTSD more common following interpersonal violence and subthreshold PTSD more common following events happening to loved ones.

Conclusions: Subthreshold DSM-5 PTSD is most usefully defined as meeting two or three of DSM-5 criteria B–E. Use of a consistent definition is critical to advance understanding of the prevalence, predictors, and clinical significance of subthreshold PTSD.

Key Words: Epidemiology, nosology, partial PTSD, posttraumatic stress disorder, PTSD, subthreshold PTSD

Although most adults have been exposed to lifetime traumatic events (TEs), only a few ever meet criteria for PTSD (1,2). However, many others develop PTSD symptoms classified as partial or subthreshold PTSD (3–8). Subthreshold symptoms are often clinically significant, may require intervention, and are treatable (9,10). Considerable research on subthreshold PTSD exists despite concerns about possible overdiagnosis (11) and secondary gain (12). Most, although not all (6,13–15), such studies document intermediate levels of distress, impairment, suicidality, and comorbidity between people with PTSD and people with no PTSD symptoms (13,16–18). However, these studies are inconsistent in definitions of subthreshold PTSD. The most common definitions are 1) at least one symptom of each

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DSM criterion (3–7,14,17,19,20), 2) all required symptoms of re-experiencing and one other DSM criterion (5,19–23), 3) all required symptoms of re-experiencing and hyperarousal and at least one avoidance symptom (24,25), and 4) all required symptoms of at least one DSM criterion (26,27). Because the number of symptom criteria required for a diagnosis has increased from three to four in DSM-5, additional definitions of subthreshold PTSD based on DSM-5 are possible.

One consequence of these inconsistent definitions is that lifetime prevalence estimates of subthreshold PTSD vary widely across studies (10,28). The few studies that examined multiple definitions argued for creating a consensus definition (23,29,30). However, only a few studies proposed such a definition (3,23), and even those studies did so based on comparison of only two definitions. We present more comprehensive data on prevalence and correlates of subthreshold PTSD to produce a consensus definition based on data from the World Health Organization (WHO) World Mental Health (WMH) Surveys.

Methods and Materials

Samples

Data are from the 13 surveys in the WMH surveys that assessed PTSD associated with randomly selected TEs (31). The 23,936 respondents in these surveys reporting lifetime TE exposure are the focus of analysis. The 13 countries include 8 countries classified by the World Bank (32) as high income (Belgium, Germany, Italy, Japan, Netherlands, New Zealand, Spain, United States), four upper-middle income (São Paulo in Brazil, Bulgaria, Mexico, Romania), and one lower-middle income (Colombia). Most surveys were based on nationally representative household samples, the exceptions being surveys of all urbanized areas in Colombia and Mexico and of specific metropolitan areas in Brazil (São Paulo) and several cities in Japan. Response rates ranged from 55.1% (Japan) to 87.7% (Colombia). The weighted (by sample size) mean response rate across surveys was 70.3%. More detailed sample descriptions are presented elsewhere (33).

Interviews were administered face-to-face in respondent homes after obtaining informed consent using procedures approved by local institutional review boards. The interview schedule was developed in English and translated into other languages using a standardized WHO translation, back-translation, and harmonization protocol (34). Interviews were in two parts. Part I, administered to all respondents, assessed core DSM-IV mental disorders ($n = 67{,}652$ respondents across all 13 surveys). Part II assessed additional disorders and correlates. Questions about TEs and PTSD were included in Part II, which was administered to 100% of Part I respondents who met lifetime criteria for any Part I disorder and a probability subsample of other Part I respondents ($n = 34{,}321$ across all 13 surveys). Part II respondents with no Part I disorder were up-weighted to adjust for undersampling, resulting in Part II weighted prevalence estimates being identical to Part I estimates. Additional weights adjusted for differential within and between household selection and deviations between sample and population demographic-geographic distributions. More details about WMH sample design and weighting are presented elsewhere (33).

Measures

TEs. The WMH assessed lifetime exposure to 29 TEs, including 7 war-related TEs (e.g., combatant, civilian in war zone), 5 types of physical assault (e.g., beaten by caregiver as a child, mugged), 3 types of sexual assault (e.g., stalked, attempted rape, rape), 6 TEs involving threats to physical integrity excluding violence (e.g., life-threatening accidents, natural disasters), 5 TEs involving threats to loved ones (e.g., life-threatening illness or injury), and traumatic death of a loved one. Two additional open-ended questions asked about TEs not included on the list and TEs respondents did not wish to describe concretely. Respondents were probed about number of lifetime occurrences and age at first occurrence of each reported TE.

PTSD. Mental disorders were assessed with the Composite International Diagnostic Interview (CIDI) (35), a fully structured, lay-administered interview yielding DSM-IV diagnoses. Assessment of PTSD was done in relation to one randomly selected lifetime TE for each respondent to produce a population-level representative sample of TEs (35). Each random TE was weighted by its probability of selection for the respondent, producing a weighted data set representative of all lifetime TEs occurring to all respondents. The possibility of some TEs being part of linked trauma clusters (e.g., a motor vehicle accident resulting in life-threatening injury to the respondent and death of a loved one) was addressed by probing for such clusters after selecting random TEs and adjusting weights when trauma clusters were reported.

Of Part II respondents, 23,936 (67.1%) reported one or more TEs. Approximately one fourth (24.6%) of respondents with TEs reported experiencing exactly one TE, and the others reported a mean of 6.0 TEs (range, 2–160; interquartile range, 3–6). Of random TEs, 15% were part of linked trauma clusters. As detailed elsewhere (36), CIDI–Structured Clinical Interview for DSM (SCID) concordance for DSM-IV PTSD was moderate ($\kappa = .49$; area under the curve = .69) (37). However, the proportion of CIDI cases confirmed by the SCID was high (86.1%), meaning that most CIDI cases would independently be judged to have PTSD by trained clinicians.

Based on preliminary analyses comparing DSM-IV and DSM-5 criteria in an independent sample (detailed results available on request), we used the DSM-IV/CIDI PTSD symptoms assessment in the CIDI to approximate DSM-5 criteria (38) by fully operationalizing DSM-5 criteria B (one of five symptoms of intrusive recollection), C (one of two symptoms of avoidance), F (duration >1 month), and G (clinically significant distress or impairment) and conservatively operationalizing criteria D (two of the four symptoms of negative alterations in cognitions and mood assessed in the CIDI, whereas two of seven are required in DSM-5) and E (two of the five symptoms of marked alterations in arousal and reactivity assessed in the CIDI, whereas two of six are required in DSM-5) (Table 1). Our approximation is conservative because it requires the same number of criteria D and E symptoms as DSM-5 but from smaller sets. Preliminary evaluation of this approximation in the independent above-mentioned sample suggests that it captures >90% of DSM-5 PTSD cases. Given this high sensitivity in conjunction with perfect specificity, we thought that a focus on approximate DSM-5 criteria was preferable to a focus on DSM-IV criteria in light of the fact that the practical implications of results in the future would be with regard to DSM-5 criteria.

We created four definitions of subthreshold PTSD to reflect the most commonly used definitions in previous studies and to capture the changes in the number of criteria and required symptoms within each cluster in DSM-5. These include definitions of subthreshold PTSD requiring 1) at least one symptom from each of the four DSM-5 criteria B–E, 2) full symptoms of three of criteria B–E, 3) full symptoms of two of criteria B–E, and 4) full symptoms of one of criteria B–E (Table 1).

Other Mental Disorders. In addition to PTSD, the CIDI assessed five DSM-IV fear disorders (panic disorder without agoraphobia, specific phobia, social phobia, agoraphobia without history of panic disorder, obsessive-compulsive disorder), three

Table 1. DSM-5 PTSD Criteria and Definitions of Subthreshold PTSD

DSM-5 PTSD Criteria	Symptoms Required[a]
A. Exposure to Actual or Threatened Death, Serious Injury, or Sexual Violence	
B. Re-experiencing	1 of 4
C. Avoidance	1 of 2
D. Negative Alterations in Cognition and Mood	2 of 7
E. Hyperarousal	2 of 6
F. Duration of at Least 1 Month	
G. Clinically Significant Distress-Impairment	
H. Symptoms Not Due to Physiologic Effects of a Substance or Medical Condition	

Subthreshold PTSD Definitions	Definition
1. One or More Symptoms of Each Criteria B–E	≥1 symptom in each of the 4 criteria B–E
2. Three of Four Criteria B–E	Exactly 3 of 4 criteria B–E
3. Two of Four Criteria B–E	Exactly 2 of 4 criteria B–E
4. One of Four Criteria B–E	Exactly 1 of 4 criteria B–E

PTSD, posttraumatic stress disorder.

[a]The number of symptoms required to meet each criterion is listed only for criteria B–E. The full list of symptoms that comprise each of these criteria can be found in DSM-5.

distress disorders (major depressive disorder/dysthymia, generalized anxiety disorder, bipolar disorders [I and II and subthreshold]), three disruptive behavior disorders (oppositional defiant disorder, conduct disorder, intermittent explosive disorder), and two substance disorders (alcohol and drug abuse with or without dependence). Age of onset of each disorder was assessed using special probing techniques shown experimentally to improve recall accuracy (39). The DSM-IV organic exclusion rules and diagnostic hierarchy rules were used (other than for oppositional defiant disorder, which was defined with or without conduct disorder, and substance abuse, which was defined with or without dependence). As detailed elsewhere (36), generally good concordance was found between these CIDI diagnoses and blinded clinical diagnoses based on clinical reappraisal interviews with the SCID (40).

Outcomes. Six outcomes were considered: 1) duration of DSM-5 criteria B–E symptoms of PTSD (coded for symptoms with longest duration to allow comparison of threshold and subthreshold PTSD), 2) clinically significant distress-impairment associated with these symptoms, 3) severe distress-impairment associated with these symptoms, 4) first lifetime onset of suicidal ideation in conjunction with the focal TE among respondents with no prior history of suicidality, 5) first lifetime onset of the five DSM-IV/CIDI fear disorders in conjunction with the focal TE among respondents with no prior history of these disorders, and 6) first lifetime onset of the four DSM-IV/CIDI distress disorders in conjunction with the focal TE among respondents with no prior history of these disorders.

Predictors. After a decision was made about how to define subthreshold PTSD, we examined predictors of threshold PTSD, subthreshold PTSD, and PTSD symptoms falling short of our subthreshold definition compared with respondents with no PTSD symptoms. The predictors included respondent sex, age at TE exposure, type of TE, and counts of four types of prior lifetime DSM-IV/CIDI disorders: fear, distress, disruptive behavior, and substance disorders.

Analysis Methods

Prevalence of PTSD symptom profiles was estimated with cross-tabulations. Initial regression analyses focused on associations between number of DSM-5 symptoms (0, 1, ≥2) within each of the criteria B–E sets and the six outcomes to evaluate, whether each symptom cluster was associated with these outcomes, and the implications of the DSM-5 thresholds requiring only one symptom each for criteria B and C and two symptoms each for criteria D and E. We estimated the associations between number of DSM-5 criteria (1, 2, 3, and threshold PTSD [4]) and the six outcomes to determine an optimal subthreshold PTSD definition. When a preferred definition was obtained, predictors of threshold PTSD, subthreshold PTSD, and symptomatic response not meeting our criteria for subthreshold (vs. no symptoms) were examined in parallel regression equations.

The regression equations were estimated using a logistic link function at the person level to study predictors of all outcomes other than symptom duration. Discrete-time survival analysis in a logistic regression framework using person-month as the unit of analysis was used to study predictors of symptom duration. Control variables included country, sex, type of TE, and respondent age at occurrence of the focal TE. The analyses predicting comorbid fear and distress disorders focused on first lifetime onset of each such disorder in the year of TE occurrence using a disorder-specific data array that was pooled across the five fear disorders and separately across the three distress disorders. Pooling was used because of the rarity of each comorbid disorder having first onset in the year of TE occurrence. The equations used to predict these comorbid disorders included dummy predictor variables to distinguish the outcome disorders, constraining coefficients to be constant across this range of outcomes. Logistic regression coefficients and their standard errors were exponentiated and are reported as odds ratios (ORs) with 95% confidence intervals (CIs). Statistical significance was evaluated using .05-level two-sided tests. The design-based Taylor series method (41) implemented with SAS Software Version 9.2 (SAS Institute Inc., Cary, North Carolina) was used to adjust for weighting and clustering.

Results

Prevalence of PTSD Symptom Profiles

Prevalence of the CIDI approximation of DSM-5 PTSD was 3.0%; an additional 4.6% of respondents met criteria for at least one definition of subthreshold PTSD (Table 2). Prevalence of

Table 2. Distribution of Threshold and Subthreshold DSM-5/CIDI PTSD Symptom Profiles in the WMH Representative Sample of Traumatic Events

	%	SE	n^a
I. Threshold PTSD	3.0	.2	835
II. Subthreshold			
One or more symptoms of each of criteria B–E	.7	.1	248
Three of the four criteria B–E	1.8	.1	621
Two of the four criteria B–E	1.7	.4	1085
One of the four criteria B–E	4.6	.5	1413
Any subthreshold	4.6	.5	1413
III. Others with Any Criteria B–E Symptoms	.2	.1	49
IV. No Symptoms	92.2	.5	21,639
V. Total	100.0		23,936

CIDI, Composite International Diagnostic Interview; PTSD, posttraumatic stress disorder; WMH, World Mental Health.

[a]Sample sizes reported are the numbers of respondents in the numerators. The denominator for all calculations is 23,936.

subthreshold PTSD was lowest for the definition requiring at least one symptom for each of criteria B–E (.7%) and highest for the definition requiring full symptoms for at least one of the four criteria B-E (4.6%). Only a small proportion of respondents (.2%) reported at least one symptom in criteria B–E and failed to qualify for any definition of subthreshold PTSD.

Associations of DSM-5 PTSD Criteria B–E Symptoms with Outcomes

Within-criterion symptom-level models found considerable variation across criteria in the associations between symptoms and outcomes (Table 3). Criterion D symptoms were significantly associated with all six outcomes ($\chi^2_2 = 6.2–38.3$, $p = .045–<.001$), criterion E symptoms were significantly associated with four outcomes ($\chi^2_2 = 6.1–11.2$, $p = .048–.004$), criterion B symptoms were significantly associated with two outcomes ($\chi^2_2 = 10.0–10.4$, $p = .012–.007$), and criterion C symptoms were significantly associated with one outcome ($\chi^2_2 = 8.0$, $p = .018$). The pattern of results for criteria B (re-experiencing) and C (avoidance) symptoms was consistent with the DSM-5 symptom threshold of one or more symptoms for each of these criteria. For models with globally significant effects of criteria B and C and at least one individually significant coefficient, ORs associated with one symptom (2.2 and 1.4, respectively) were virtually identical to ORs associated with two or more symptoms (2.1 and 1.4, respectively). Both ORs in each pair were statistically significant. The results for criteria D (negative alterations in cognition and mood) and E (hyperarousal) symptoms were consistent with the DSM-5 symptom threshold of two or more symptoms. Results for models with globally significant effects of criteria D and E showed ORs associated with two or more symptoms (1.7–5.3) to be statistically significant and higher than the insignificant ORs associated with one symptom (.7–2.7) in 9 of 10 comparisons.

Confounding Resulting from Contemporaneous Comorbidity

Before concluding that the DSM-5 criteria B–E symptom thresholds are appropriate, it is important to consider the possibility that the aforementioned results are due to uncontrolled contemporaneous comorbidity rather than to subthreshold PTSD. The analyses in Table 3 were replicated after adding controls for the onset of fear and distress disorders in conjunction with the focal TEs. Results were not affected by introducing these controls, arguing against the suggestion that these results are due to unmeasured comorbidity. (Results are not reported but are available on request.)

Associations of DSM-5 Subthreshold PTSD Profiles with Outcomes

Subsequent analyses examined associations of each subthreshold definition with the outcomes based on dichotomous classifications for whether or not the DSM-5 symptom threshold was met for each criterion. We did not examine the subthreshold definition requiring at least one symptom in each criterion given our results supporting the DSM-5 symptom thresholds and the low prevalence of this definition of subthreshold PTSD.

A clear gradient was found across the aggregated number-of-criteria profiles for all six outcomes, with the highest outcome scores consistently associated with threshold PTSD, the next highest generally associated with the three-of-four criteria profile (with the exception of clinically significant distress-impairment, which was higher in the two-of-four profile), and next highest with the two-of-four profiles (with the exception of suicidality, which was higher in the one-of-four profile than in the two-of-four profile) (Table 4). Finally, the none-of-four profile had the lowest scores on all outcomes other than symptom duration. The number of respondents with the none-of-four profile whose symptom duration was estimated (i.e., respondents with clinically significant symptoms persisting >1 month) was very small ($n = 49$), making the estimate of mean duration unstable in this subgroup.

Leaving aside duration because of this instability, differences in all five other outcome scores were statistically significant among respondents with threshold PTSD and three-of-four profiles compared with none-of-four profiles, in four outcomes among respondents with two-of-four profiles, and in one outcome among respondents with one-of-four profiles. Significance tests comparing the outcomes of respondents with threshold PTSD versus subthreshold profiles found three significant differences with the three-of-four profiles (clinically significant and severe distress-impairment and comorbid distress disorders; $\chi^2_1 = 4.0–17.3$, $p = .045–<.001$) and four each with the two-of-four profiles (all outcomes other than comorbid fear disorders; $\chi^2_1 = 4.4–27.5$, $p = .036–<.001$) and one-of-four profiles (all outcomes other than comorbid fear disorders; $\chi^2_1 = 4.0–39.5$, $p = .045–<.001$).

Differences in Outcomes Within DSM-5 Subthreshold Profiles

The above-described analyses focused on differences between but not within the three-of-four, two-of-four, and one-of-four DSM-5 subthreshold profiles. To investigate the latter distinctions, we estimated disaggregated versions of the models in Table 4 to consider different combinations of criteria within each of the subthreshold symptom profiles. There are 14 such profiles: 4 representing three-of-four criteria profiles, 6 representing two-of-four criteria profiles, and 4 representing one-of-four criteria profiles. The pattern of results from these models did not suggest any specific type or combination of symptoms was of particular importance. These results are not presented here but are available on request.

Predictors of Threshold versus Subthreshold PTSD

Based on finding that respondents with two of four criteria B–E exhibit consistently worse outcomes than respondents with one of four criteria B–E or less, we defined subthreshold PTSD as meeting at least two of four criteria B–E. Many interesting similarities and differences were found in the predictors of threshold PTSD, subthreshold PTSD, and other symptoms of PTSD versus no symptoms among people exposed to TEs (Table 5). Female respondents had significantly elevated odds of all

Table 3. Associations (ORs) of Symptom Counts Across DSM-5/CIDI PTSD Criteria B–E with a Range of Outcomes in the WMH Sample of Randomly Selected TEs[a]

	Distress/Impairment									Comorbid Disorders								
	Clinically Significant[b]			Severe[c]			Suicidal Ideation[d]			Fear[e]			Distress[e]			Symptom Duration[f]		
	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	Mean Duration	OR	95% CI
I. Criterion B: Intrusive Recollections																		
≥2	93.1	2.1	1.0–4.5	78.2	2.1[g]	1.3–3.4	5.2	1.1	.5–2.1	1.4	2.3	1.0–5.2	3.9	1.1	.6–1.9	89.9	.9	.7–1.4
1	86.1	1.6	.6–4.4	68.1	2.2[g]	1.0–4.8	3.6	1.5	.6–4.1	.1	.4	.1–2.2	3.9	1.7	.6–5.0	66.2	1.1	.7–1.7
0	84.0	1.0	—	54.4	1.0	—	1.2	1.0	—	.3	1.0	—	.6	1.0	—	70.2	1.0	—
χ^2_2			3.9			10.4[g]			.8			10.0[g,h]			1.1			.4
II. Criterion C: Avoidance																		
≥2	96.1	2.7[g]	1.1–6.5	75.8	.7	.4–1.3	5.4	.6	.2–1.4	1.7	.7	.2–1.8	4.0	.8	.4–1.4	103.1	1.4[g]	1.1–2.0
1	91.9	1.4	.7–3.1	75.7	1.1	.6–2.0	4.7	.6	.2–1.8	.7	.4	.2–1.1	3.7	.9	.4–1.7	90.2	1.4[g]	1.1–1.9
0	82.9	1.0	—	66.1	1.0	—	1.2	1.0	—	.3	1.0	—	.7	1.0	—	52.0	1.0	—
χ^2_2			5.2			2.4			1.6			3.7			.9			8.0[g]
III. Criterion D: Cognitions-Mood																		
≥2	96.5	2.5[g]	1.1–5.8	85.2	4.2[g]	2.4–7.1	7.7	5.3[g]	2.3–11.9	1.8	3.9[g]	1.5–10.3	5.3	2.9[g]	1.4–6.0	106.5	1.7[g]	1.2–2.0
1	92.5	1.7	.9–3.3	55.4	.9	.5–1.7	1.0	.7	.2–2.4	.8	2.7	.7–9.8	1.8	.9	.4–2.2	81.1	1.3	.9–1.7
0	81.7	1.0	—	60.9	1.0	—	1.2	1.0	—	.3	1.0	—	.6	1.0	—	49.1	1.0	—
χ^2_2			6.2[g]			38.3[g]			24.8[g]			8.2[c]			28.9[g]			10.9[g]
IV. Criterion E: Arousal-Reactivity																		
≥2	95.0	5.0[g]	1.5–16.1	77.6	2.3[g]	1.3–4.3	5.2	1.5	.6–3.6	1.3	1.0	.5–2.2	4.2	3.3[g]	1.6–6.8	90.1	1.4	.9–2.0
1	79.3	1.9	.6–6.1	55.0	1.1	.5–2.8	2.2	1.2	.4–4.1	.2	.3	.1–1.3	1.8	1.7	.9–3.6	53.0	1.7[g]	1.1–2.6
0	76.0	1.0	—	54.1	1.0	—	1.2	1.0	—	.3	1.0	—	.6	1.0	—	67.6	1.0	—
χ^2_2			7.8[g]			10.9[g]			.8			3.2			11.2[g]			6.1[g]
χ^2_8			41.8[g]			72.3[g]			55.7[g]			48.8[g]			152.3[g]			34.0[g]
n			2499[b]			2297[c]			22,030[d]			23,936[e]			23,908[e]			2297[f]

CI, confidence interval; CIDI, Composite International Diagnostic Interview; OR, odds ratio; PTSD, posttraumatic stress disorder; TE, traumatic event; WMH, World Mental Health.

[a]See the section on Analysis Methods in the text for a description of the regression models.

[b]The sample is limited to cases where the respondent reported one or more symptoms of at least one of criteria B–E lasting >1 month because clinically significant distress and impairment were assessed only when at least one such symptom was reported.

[c]The sample is limited to cases where the respondent reported one or more symptoms of at least one of criteria B–E lasting >1 month and reported clinically significant distress or impairment associated with this symptom because severe distress and impairment were assessed only in this subsample. The outcome of severe distress-impairment is conditionally independent of the outcome of serious distress-impairment because all respondents in the sample used to predict severe distress-impairment reported significant distress-impairment.

[d]The sample is limited to cases where the respondent did not have a lifetime history of suicidal ideation before age of occurrence of the TE because first lifetime onset of suicidal ideation is the outcome. The presence of clinically significant distress or impairment associated with the TE was not required in defining this sample, but criteria B–E symptoms were classified as present in defining the predictors only if the respondent reported clinically significant distress or impairment associated with these symptoms.

[e]The ORs reported here are pooled across disorder-specific equations for each of the fear disorders and each of the distress disorders assessed in the surveys. The % estimates are averages across the pooled equations. The presence of clinically significant distress or impairment associated with the TE was not required in defining these samples, but criteria B–E symptoms were classified as present in defining the predictors only if the respondent reported clinically significant distress or impairment associated with these symptoms. The 23,936 respondents included in the pooled person-disorder data array for the five fear disorders resulted in 112,460 observations, and the 23,908 respondents included in the pooled person-disorder data array for mood disorders resulted in 79,836 observations.

[f]The sample is limited to cases where the respondent reported one or more symptoms of at least one of criteria B–E lasting >1 month and reported clinically significant distress or impairment associated with this symptom because these are the cases for which symptom duration was assessed. The predictors of symptom duration are estimated in a discrete-time survival framework with person-month the unit of analysis. Duration was censored at 60 months if symptoms persisted >60 months to reduce the effects of extreme outliers. The analysis included 71,304 person-months.

[g]Significantly different from respondents with no symptoms of the criteria at the .05 level, two-sided test.

[h]The coefficients are significant as a pair even though neither OR is individually significant. This occurs because there is a significant difference between the insignificantly elevated OR for two or more symptoms and the insignificantly reduced OR for one symptom.

symptomatic outcomes compared with male respondents (OR = 1.7–2.6). Prior history of DSM-IV/CIDI fear and distress disorders predicted threshold (OR = 1.7–1.9) and subthreshold (OR = 1.5) PTSD but not other symptoms of PTSD, whereas prior substance disorder predicted threshold PTSD (OR = 1.4) but not the other two outcomes. Childhood TE exposure was associated with elevated odds of threshold PTSD (OR = 3.1) but not the other symptomatic outcomes, whereas adolescent TE exposure was associated with significantly reduced odds of other symptoms (OR = .4) but not of either threshold or subthreshold PTSD. The TEs involving intimate partner violence and sexual violence were associated with significantly elevated odds (relative to unexpected death of a loved one) of threshold PTSD (OR = 2.6) but not of the other outcomes, whereas TEs associated with traumas that occurred to a loved one were associated with significantly reduced relative odds of threshold PTSD (OR = .5) but not of the

Table 4. Associations (ORs) of Different Definitions of DSM-5 Subthreshold PTSD with a Range of Outcomes in the WMH Sample of Randomly Selected TEs[a]

	Distress-Impairment									Comorbid Disorders								
	Clinically Significant[b]			Severe[c]			Suicidal Ideation[d]			Fear[e]			Distress[e]			Symptom Duration[f]		
	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	%	OR	95% CI	Mean Duration	OR	95% CI
I. Threshold PTSD	98.0[g]	26.9[g,h]	6.7–108.0	87.6	22.3[h]	6.4–75.2	8.2	5.4[h]	3.0–9.8	2.0	5.5[h]	2.9–10.3	5.5	8.6[h]	5.6–13.0	117.0	2.0	1.0–3.6
II. Three of Criteria B–E	93.4	8.6[h]	2.4–30.4	70.4	6.8[h]	2.2–20.2	3.6	2.3[h]	1.0–5.1	.9	2.6[h]	1.2–5.8	3.6	4.9[h]	2.8–8.4	82.3	1.7	.8–3.2
III. Two of Criteria B–E	92.9	9.7[h]	2.2–42.7	69.4	5.4[h]	1.8–16.5	1.4	1.0	.4–2.6	.5	2.8[h]	1.3–5.9	1.9	3.0[h]	1.7–5.2	47.3	1.1	.6–2.2
IV. One of Criteria B–E	72.7	1.4	.4–5.2	47.6	2.3	.8–7.2	2.3	1.5	.5–4.9	.5	2.2	.8–6.0	1.9	2.9[h]	1.4–6.0	58.9	.9	.4–1.9
V. None of Criteria B–E	68.0	1.0	—	30.7	1.0	—	1.2	1.0	—	.3	1.0	—	.6	1.0	—	69.1	1.0	—
VI. Total	90.7			72.8			1.4			.4			.8			84.4		
n	2499[b]			2297[c]			22,030[d]			23,936[e]			23,908[e]			2297[f]		

CI, confidence interval; CIDI, Composite International Diagnostic Interview; OR, odds ratio; PTSD, posttraumatic stress disorder; WMH, World Mental Health; TE, traumatic event.

[a]See the section on Analysis Methods in the text for a description of the regression models.

[b]The sample is limited to cases where the respondent reported one or more symptoms of at least one of criteria B–E lasting >1 month because clinically significant distress and impairment were assessed only when at least one such symptom was reported.

[c]The sample is limited to cases where the respondent reported one or more symptoms of at least one of criteria B–E lasting >1 month and reported clinically significant distress or impairment associated with this symptom because severe distress and impairment were assessed only in this subsample. The outcome of severe distress-impairment is conditionally independent of the outcome of serious distress-impairment because all respondents in the sample used to predict severe distress-impairment reported clinically significant distress-impairment.

[d]The sample is limited to cases where the respondent did not have a lifetime history of suicidal ideation before age of occurrence of the TE because first lifetime onset of suicidal ideation is the outcome. The presence of clinically significant distress or impairment associated with the TE was not required in defining this sample, but criteria B–E symptoms were classified as present in defining the predictors only if the respondent reported clinically significant distress or impairment associated with these symptoms.

[e]The ORs reported here are pooled across disorder-specific equations for each of the fear disorders and each of the distress disorders assessed in the surveys. The % estimates are averages across the pooled equations. The presence of clinically significant distress or impairment associated with the TE was not required in defining these samples, but criteria B–E symptoms were classified as present in defining the predictors only if the respondent reported clinically significant distress or impairment associated with these symptoms. The 23,936 respondents included in the pooled person-disorder data array for the five fear disorders resulted in 112,460 observations, and the 23,908 respondents included in the pooled person-disorder data array for mood disorders resulted in 79,836 observations.

[f]The sample is limited to cases where the respondent reported one or more symptoms of at least one of criteria B–E lasting >1 month and reported clinically significant distress or impairment associated with this symptom because these are the cases for which symptom duration was assessed. The predictors of symptom duration are estimated in a discrete-time survival framework with person-month the unit of analysis. Duration was censored at 60 months if symptoms persisted >60 months to reduce the effects of extreme outliers. The analysis included 71,304 person-months.

[g]The requirement of clinically significant distress or impairment was not operationalized in defining threshold cases for this outcome because this would have led to 100% of cases having the outcome and making it impossible to include them in the regression equation.

[h]Significantly different from respondents with no symptoms of criteria B–E at the .05 level, two-sided test.

Table 5. Associations (ORs) of Sociodemographics, Prior Mental Disorders, and Characteristics of TEs with DSM-5/CIDI PTSD, Subthreshold PTSD, and PTSD Symptoms in the WMH Representative Sample of TEs[a]

	Threshold PTSD		Subthreshold[b]		Others with Symptoms[c]	
	OR	95% CI	OR	95% CI	OR	95% CI
Sex						
Female	1.7[d]	1.1–2.6	2.6[d]	1.6–4.2	1.8[d]	1.1–3.1
Male	1.0	—	1.0	—	1.0	—
χ^2_1	5.5[d]		15.1[d]		5.0[d]	
Prior Mental Disorders[e]						
Fear disorders	1.9[d]	1.7–2.2	1.5[d]	1.3–1.8	1.2	.9–1.7
Distress disorders	1.7[d]	1.4–2.0	1.5[d,f]	1.2–1.9	1.0	.7–1.4
Substance disorders	1.4[d]	1.0–1.8	1.3[f]	.9–2.0	.7	.4–1.3
Behavior disorders	1.1	.8–1.6	.8[f]	.5–1.5	1.9[d]	1.0–3.5
χ^2_3	190.6[d]		35.9[d]		7.4	
Age of TE Exposure (Years)						
0–12	3.1[d]	1.4–6.5	1.0	.8–4.0	.4	.1–1.4
13–19	1.2	.5–2.6	1.2	.5–2.1	.4[d]	.2–.9
20–29	1.3	.7–2.3	1.1	.7–2.3	.5	.2–1.1
30–44	.9	.5–1.7	1.0	.7–1.8	1.1	.5–2.2
≥45+	1.0	—	1.0	—	1.0	—
χ^2_4	24.6[d]		5.8		11.1[d]	
Type of TE						
War-related events	.3[d]	.2–.7	.3[d]	.2–.6	1.0	.4–2.8
Other interpersonal violence	.7	.4–1.2	.9	.5–1.5	.6	.4–1.2
Intimate/sexual violence	2.6[d,g]	1.7–4.0	1.2	.7–1.9	1.5	.6–3.3
Accidents	.5[d]	.3–.8	.6[d]	.4–.9	1.0	.5–1.8
Death of loved one	1.0	—	1.0	—	1.0	—
Other events to loved ones	.5[d,g]	.3–.8	1.1	.7–1.9	.7	.4–1.3
Other	2.1[d]	1.3–3.3	2.5[d]	1.6–4.0	3.1	.9–10.5
χ^2_6	86.9[d]		53.9[d]		8.0	
n	22,474		22,742		22,016	

CI, confidence interval; CIDI, Composite International Diagnostic Interview; OR, odds ratio; PTSD, posttraumatic stress disorder; TE, traumatic event; WMH, World Mental Health.

[a]Based on logistic regression analysis controlling for country income group, marital status, and education at the time of the random TE and TEs occurring before the random TE, with the reference group equaling respondents with a random TE who did not have any criteria B–E symptoms lasting at least 1 month.

[b]Subthreshold cases include all respondents meeting criteria for at least two of four criteria B–E symptoms.

[c]Includes all respondents with one or more criteria B–E symptoms lasting at least 1 month but not meeting criteria for threshold or subthreshold DSM-5 PTSD.

[d]Significant at the .05 level, two-sided test.

[e]Prior mental disorder variables represent counts of fear, distress, substance, and behavior disorders with onsets before the occurrence of the random TE.

[f]Significant difference between the ORs for subthreshold DSM-5 PTSD and some criteria B–E symptoms.

[g]Significant difference between ORs for threshold and subthreshold DSM-5 PTSD.

other outcomes. War-related TEs (OR = .3), accidents (OR = .5–.6), and "other" TEs (OR = 2.1–2.5) were associated with significantly reduced relative odds of threshold and subthreshold PTSD but not of other PTSD symptoms.

Discussion

The data reported here are the first large-scale, cross-national data on prevalence and correlates of subthreshold PTSD and provide the first comprehensive comparison of diverse subthreshold PTSD definitions. Before commenting on these results, it is noteworthy that the associations between DSM-5 criteria B–E symptom counts and the outcomes considered here generally supported the DSM-5 thresholds of one symptom each for criteria B (re-experiencing) and C (avoidance) and for criteria D (negative alterations in cognition and mood) and E (hyperarousal). However, a question could be raised whether our use of a conservative approximation of DSM-5 criteria biased the data on which this result is based. We believe this is not the case because the independent comparison of diagnoses based on our approximation with diagnoses based on full DSM-5 criteria that was mentioned in the section on measures suggests that any such bias was minimal (i.e., >90% of DSM-5 cases captured by our approximation). The symptoms added in DSM-5 are much less common than the symptoms already contained in DSM-IV, leading to the number of people having the new symptoms in the absence of the DSM-IV symptoms being small. The criterion-level thresholds considered here consequently should be good approximations of DSM-5 thresholds, bolstering the validity of our empirical support for the DSM-5 thresholds.

As expected, we found threshold DSM-5 PTSD associated with distress-impairment and comorbidity at levels generally higher than subthreshold PTSD. This result is broadly consistent with previous studies (3,4,7,25,42). However, the main focus of the present study was on alternative subthreshold symptom profiles. We found that

the subthreshold profiles requiring two or three criteria B–E were clearly associated with more adverse outcomes than the outcomes associated with one of four criteria B–E, leading us to recommend that future epidemiologic studies define subthreshold DSM-5 PTSD as meeting two or three criteria B–E.

Our proposed definition focuses only on number of DSM-5 PTSD criteria, whereas previous studies made distinctions regarding specific symptoms, most notably regarding the particular importance of avoidance (23), re-experiencing (5), and hyperarousal (20). We found no evidence for special importance of these or other specific symptoms. Also, a wide variation was found in prevalence estimates of subthreshold PTSD across the range of definitions proposed in the literature, demonstrating that it is important to have a consensus definition to avoid wide variation in estimates of prevalence and correlates. Use of such a consistent definition could also promote the accumulation of data allowing valid comparisons of prevalence, predictors, and markers of clinical significance. Such evidence might subsequently lead to the inclusion of a diagnosis of subthreshold PTSD or stress-related adjustment disorder in future DSM editions (43).

When using our preferred definition of subthreshold PTSD, the proportion of people exposed to TEs classified as having subthreshold DSM-5 PTSD (3.6%) is roughly comparable to the proportion classified as having threshold PTSD (3.0%) (Table 2). Although this finding is generally consistent with other studies (3,14,29), our additional finding of significant differences in relative prevalence of threshold versus subthreshold prevalence across TE types shows that this comparability would vary depending on the types of TEs under study.

The results need to be interpreted in the context of three limitations in the WMH assessment of PTSD, all of which would be expected to introduce a conservative bias into the designation of respondents as having threshold DSM-5 PTSD: 1) that the assessment was based on a conservative approximation of DSM-5 criteria, 2) that it was made using a fully structured lay interview rather than a semistructured clinical interview, and 3) that focal TEs were selected randomly from all the TEs respondents ever experienced rather than from the TEs nominated by respondents as their worst.

As noted earlier, we think that the conservative bias associated with using DSM-IV symptom measures to approximate DSM-5 criteria reduced the prevalence estimate of DSM-5 PTSD by $<$10% of that estimate (i.e., true DSM-5 prevalence might have been 3.3% compared with the 3.0% estimated with our approximation). The conservative bias associated with using the fully structured CIDI was noted in the section on measures, where we reported that most CIDI cases were confirmed in blinded SCID clinical reappraisal interviews, whereas the SCID also found additional cases that were missed by the CIDI. In comparison, the conservative bias associated with the focus on randomly selected TEs was not mentioned in the section on measures. This bias relates to the fact that $\sim$15% of respondents reported that their randomly selected TE was part of a linked trauma cluster. If the random TE was not the central trauma in the cluster (e.g., the random TE was a motor vehicle accident, whereas the linked trauma that caused the PTSD was the death of a loved one in that accident) and if the respondent answered the symptom questions with a narrow focus on the random TE rather than on the entire cluster (e.g., nightmares about the crash rather than about the death), the presence of symptoms associated with the linked TE might not have been reported, leading to a conservative bias in estimating threshold PTSD.

These conservative biases almost certainly led to an underestimation of the prevalence of threshold DSM-5 PTSD. However, it is less clear whether these biases increased or decreased the estimated prevalence of subthreshold PTSD or the odds ratios reported here because the incorrect classification of true threshold cases as subthreshold cases would increase estimated subthreshold prevalence and severity, whereas the incorrect classification of true subthreshold cases as asymptomatic would reduce estimated subthreshold prevalence and severity. More fine-grained assessments than the assessments in the WMH surveys would be needed to determine the relative importance of these competing types of bias and, with it, the possibility that a more valid definition of subthreshold PTSD exists than the definition proposed here. Until such data are available, we suggest that our proposed definition be used as a way to systematize comparisons across existing data sets and to provide a starting point for the evaluation of more nuanced definitions in new studies collecting more nuanced data.

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