BMC Psychiatry

RESEARCH

Open Access

Determinants of effective treatment coverage for posttraumatic stress disorder: findings from the World Mental Health Surveys

Dan J. Stein[1*], Alan E. Kazdin[2], Richard J. Munthali[3], Irving Hwang[4], Meredith G. Harris[5,6], Jordi Alonso[7], Laura Helena Andrade[8], Ronny Bruffaerts[9], Graça Cardoso[10], Stephanie Chardoul[11], Giovanni de Girolamo[12], Silvia Florescu[13], Oye Gureje[14], Josep Maria Haro[15], Aimee N. Karam[16], Elie G. Karam[16,17,18], Viviane Kovess-Masfety[19], Sing Lee[20], Maria Elena Medina-Mora[21], Fernando Navarro-Mateu[22], José Posada-Villa[23], Juan Carlos Stagnaro[24], Margreet ten Have[25], Nancy A. Sampson[4], Ronald C. Kessler[4], Daniel V. Vigo[3,26] and on behalf of the WHO World Mental Health Survey Collaborators

Abstract

Background Posttraumatic stress disorder (PTSD) is associated with significant morbidity, but efficacious pharmacotherapy and psychotherapy are available. Data from the World Mental Health Surveys were used to investigate extent and predictors of treatment coverage for PTSD in high-income countries (HICs) as well as in low- and middle-income countries (LMICs).

Methods Seventeen surveys were conducted across 15 countries (9 HICs, 6 LMICs) by the World Health Organization (WHO) World Mental Health Surveys. Of 35,012 respondents, 914 met DSM-IV criteria for 12-month PTSD. Components of treatment coverage analyzed were: (a) any mental health service utilization; (b) adequate pharmacotherapy; (c) adequate psychotherapy; and (d) effective treatment coverage. Regression models investigated predictors of treatment coverage.

Results 12-month PTSD prevalence in trauma exposed individuals was 1.49 (S.E., 0.08). A total of 43.0% (S.E., 2.2) received any mental health services, with fewer receiving adequate pharmacotherapy (13.5%), adequate psychotherapy (17.2%), or effective treatment coverage (14.4%), and with all components of treatment coverage lower in LMICs than HICs. In a multivariable model having insurance (OR = 2.31, 95 CI 1.17, 4.57) and severity of symptoms (OR = .35, 95% CI 0.18, 0.70) were predictive of effective treatment coverage.

Conclusion There is a clear need to improve pharmacotherapy and psychotherapy coverage for PTSD, particularly in those with mild symptoms, and especially in LMICs. Universal health care insurance can be expected to increase effective treatment coverage and therefore improve outcomes.

Keywords Posttraumatic stress disorder, Contact coverage, Effective treatment coverage, Insurance

*Correspondence:
Dan J. Stein
dan.stein@uct.ac.za
Full list of author information is available at the end of the article

Introduction

Posttraumatic stress disorder (PTSD) is a prevalent disorder throughout the world, and is associated with significant morbidity [1, 2]. PTSD leads to individual suffering, reduced quality of life, and considerable societal costs [3, 4]. Fortunately, there is a growing evidence-base of efficacious treatments for this condition, including various forms of psychotherapy and pharmacotherapy [5, 6]. Treatment guidelines for PTSD have been developed by several professional organizations to encourage evidence-based interventions, with most guidelines advocating both pharmacotherapy and psychotherapy as first-line interventions [7, 8]. Data from the WHO World Mental Health Surveys have emphasized that the delay in treatment seeking for mental disorders is a global problem [9], and that there is a treatment gap for a range of these conditions, including anxiety disorders and PTSD [10].

Although contact coverage (the percentage of people in need that get any service) is an important indicator, effective coverage (the percentage that get good care and obtain health benefits) is particularly relevant to health system performance assessment [11, 12]. Determining the extent and predictors of effective coverage for PTSD is an important first step towards developing appropriate strategies to address obstacles to care. While some structural and attitudinal barriers have received attention [13], a number of others, including symptom severity and health insurance have not. The focus on universal health coverage in the Sustainable Developmental Goals further emphasizes the need to investigate effective coverage [14]. A small literature on effective coverage indicators in the area of mental health has emerged, and relies on a number of different methods including need assessment strategies, utilization assessment strategies, and quality assessment strategies [12, 15]. The recent development of an "effective treatment coverage" indicator that quantifies utilization, but also adjusts for quality of care and user adherence, facilitates such work [16].

The WHO World Mental Health Survey Initiative provides a valuable dataset for more detailed investigations of effective treatment coverage across the world, so providing an important foundation for work on addressing key barriers to care and scaling up interventions [16, 17]. We investigated the extent and predictors of treatment coverage for PTSD in individuals who met DSM-IV criteria for 12-month PTSD in a range of high-income countries (HICs) as well as low- and middle-income countries (LMICs). Components of treatment coverage analyzed were: (a) any mental health service utilization; (b) adequate pharmacotherapy; (c) adequate psychotherapy; and (d) effective treatment coverage (adequate severity-specific use of pharmacotherapy and/or psychotherapy).

Methods

Sample

The WHO World Mental Health Surveys (WMHS) include 17 community surveys with 35,012 adults across 15 countries, including six classified by the World Bank as low- or middle-income countries (LMICs) and nine classified as high-income countries (HICs) [18]. All samples were based on multi-stage clustered area probability household designs. Samples were nationally representative in 11 surveys, representative of all urbanized areas in two others, and representative of selected regions or Metropolitan areas in the others [18] (Table 1).

Surveys were approved by the review boards of the coordinating organizations, which monitored adherence with procedures for informed consent [19]. Interviews were carried out face-to-face in respondents' homes by trained lay interviewers. Field training and quality control procedures are described elsewhere [19]. Respondents were aged 18+ in all surveys other than one (19+ in Medellin, Colombia) and had unrestricted upper age limits in most surveys. The average response rate weighted by sample size was 70.3% using the American Association for Public Opinion Research RR1w definition [20].

To reduce respondent burden, interviews were divided into two parts [21]. Part I, administered to all respondents, assessed core mental disorders. Part II assessed additional disorders and correlates and was administered to all respondents with any Part I disorder plus a probability subsample of other Part I respondents. Part II data were weighted to adjust for the under-sampling of Part I non-cases [21]. In total, 71,576 Part I and 35,012 Part II respondents were interviewed. Of these 35,012 respondents, 914 met DSM-IV criteria for 12-month PTSD (Table 2).

Measures and data analysis

The interview schedule used in WMH was the WHO Composite International Diagnostic Interview (CIDI) Version 3.0 [22], a fully-structured interview generating lifetime and 12-month prevalence estimates of common DSM-IV disorders that includes stringent protocols of translation, back-translation, expert review, adaptation, and harmonization across sites [23]. Blinded clinical reappraisal interviews with the Structured Clinical Interview for DSM-IV had good concordance with diagnoses based on the CIDI [24]. Respondents with PTSD were considered severe either if their symptoms resulted in severe role impairment (7–10 points) according to the Sheehan Disability Scale [25], moderate if they reported moderate role impairment in the SDS (4–6), and mild if they reported no or moderate role impairment (3 or less).

We classified health treatment providers into two categories: (1) specialist mental health (SMH; psychiatrist,

Table 1 WMH sample characteristics by World Bank income categories[a]Country

	Survey[b]	Sample characteristics[c]	Field dates	Age range	Sample size		Response rate[d]
					Part I	Part II	
I. Low and Middle-income countries							
Brazil – São Paulo	São Paulo Megacity	São Paulo metropolitan area	2005–8	18–93	5037	2942	81.3
Colombia	NSMH	All urban areas of the country (approximately 73% of the total national population).	2003	18–65	4426	2381	87.7
Colombia – Medellín	MMHHS	Medellin metropolitan area	2011–12	19–65	3261	1673	97.2
Lebanon	LEBANON	Nationally representative.	2002–3	18–94	2857	1031	70.0
Mexico	M-NCS	All urban areas of the country (approximately 75% of the total national population).	2001–2	18–65	5782	2362	76.6
Nigeria	NSMHW	21 of the 36 states in the country, representing 57% of the national population. The surveys were conducted in Yoruba, Igbo, Hausa and Efik languages.	2002–4	18–100	6752	2143	79.3
Romania	RMHS	Nationally representative.	2005–6	18–96	2357	2357	70.9
Total					(30472)	(14889)	80.1
II. High-income countries							
Argentina	AMHES	Eight largest urban areas of the country (approximately 50% of the total national population)	2015	18–98	3927	2116	77.3
Belgium	ESEMeD	Nationally representative. The sample was selected from a national register of Belgium residents.	2001–2	18–95	2419	1043	50.6
France	ESEMeD	Nationally representative. The sample was selected from a national list of households with listed telephone numbers.	2001–2	18–97	2894	1436	45.9
Germany	ESEMeD	Nationally representative.	2002–3	19–95	3555	1323	57.8
Italy	ESEMeD	Nationally representative. The sample was selected from municipality resident registries.	2001–2	18–100	4712	1779	71.3
Netherlands	ESEMeD	Nationally representative. The sample was selected from municipal postal registries.	2002–3	18–95	2372	1094	56.4
Portugal	NMHS	Nationally representative.	2008–9	18–81	3849	2060	57.3
Spain	ESEMeD	Nationally representative.	2001–2	18–98	5473	2121	78.6
Spain – Murcia	PEGASUS- Murcia	Murcia region. Regionally representative.	2010–12	18–96	2621	1459	67.4
United States	NCS-R	Nationally representative.	2001–3	18–99	9282	5692	70.9
Total					(41104)	(20123)	64.4
III. Total[e]					(71576)	(35012)	70.3

[a] The World Bank (2012) Data. Accessed May 12, 2012 at: http://data.worldbank.org/country. Some of the WMH countries have moved into new income categories since the surveys were conducted. The income groupings above reflect the status of each country at the time of data collection. The current income category of each country is available at the preceding URL

[b] NSMH (The Colombian National Study of Mental Health); MMHHS (Medellín Mental Health Household Study); LEBANON (Lebanese Evaluation of the Burden of Ailments and Needs of the Nation); M-NCS (The Mexico National Comorbidity Survey); NSMHW (The Nigerian Survey of Mental Health and Wellbeing); RMHS (Romania Mental Health Survey); AMHES (Argentina Mental Health Epidemiologic Survey); ESEMeD (The European Study Of The Epidemiology Of Mental Disorders); NMHS (Portugal National Mental Health Survey); PEGASUS-Murcia (Psychiatric Enquiry to General Population in Southeast Spain-Murcia);NCS-R (The US National Comorbidity Survey Replication)

[c] Most WMH surveys are based on stratified multistage clustered area probability household samples in which samples of areas equivalent to counties or municipalities in the US were selected in the first stage followed by one or more subsequent stages of geographic sampling (e.g., towns within counties, blocks within towns, households within blocks) to arrive at a sample of households, in each of which a listing of household members was created and one or two people were selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. These household samples were selected from census area data in all countries other than France (where telephone directories were used to select households) and the Netherlands (where postal registries were used to select households). Several WMH surveys (Belgium, Germany, Italy, Spain-Murcia) used municipal, country resident or universal health-care registries to select respondents without listing households. 10 of the 17 surveys are based on nationally representative household samples

[d] The response rate is calculated as the ratio of the number of households in which an interview was completed to the number of households originally sampled, excluding from the denominator households known not to be eligible either because of being vacant at the time of initial contact or because the residents were unable to speak the designated languages of the survey. The weighted average response rate is 70.3%

[e] The following surveys, included in Thornicroft et al., 2016,[10] were excluded from this study due to lack of data on the specific drug taken and on adherence to prescribed dosage: Beijing/Shanghai, Bulgaria, Iraq, Israel, Japan, and Peru

psychologist, other mental health professional in any setting, social worker or counselor in a mental health specialized setting); and (2) general medical (GM; primary care doctor, other medical doctor, any other

Table 2 Sociodemographic distribution of the sample by country-income level, among those with 12-month posttraumatic stress disorder

	All countries ($n = 914$)		High income countries ($n = 694$)		Low/ middle income countries ($n = 220$)	
	%/ Mean	(SE)	%/ Mean	(SE)	%/ Mean	(SE)
Gender						
Male	22.7	(1.7)	23.5	(1.8)	20.3	(4.3)
Female	77.3	(1.7)	76.5	(1.8)	79.7	(4.3)
Age Group						
18–29	25.3	(1.9)	22.8	(2.0)	32.7	(4.9)
30–44	31.0	(2.0)	28.9	(2.0)	37.6	(5.0)
45–59	31.8	(2.0)	35.4	(2.2)	21.0	(4.4)
60+	11.9	(1.5)	12.9	(1.9)	8.7	(2.3)
Marital status						
Separated, divorced, or widowed	23.9	(1.7)	26.1	(1.9)	17.0	(3.1)
Never married	22.0	(1.9)	21.8	(2.0)	22.8	(4.5)
Married or cohabitating	54.1	(2.1)	52.1	(2.3)	60.1	(4.5)
Income						
Low	35.0	(2.2)	35.6	(2.5)	32.9	(4.5)
Low-Average	24.1	(1.9)	22.8	(2.0)	28.0	(5.1)
Average-High	23.6	(1.9)	25.0	(2.3)	19.1	(3.7)
High	17.4	(1.8)	16.5	(1.9)	20.0	(4.0)
Education						
Low	20.5	(1.7)	21.2	(2.0)	18.5	(3.4)
Low-Average	35.4	(2.4)	37.4	(2.9)	29.0	(4.6)
Average-High	27.0	(2.0)	24.8	(2.2)	33.6	(4.6)
High	17.2	(1.7)	16.6	(2.0)	19.0	(3.5)
Insurance						
Any Insurance (Yes)	83.9	(1.7)	90.3	(1.3)	64.3	(5.0)
Direct Private/Optional Insurance (Yes)	16.0	(1.7)	20.1	(2.2)	3.4	(1.3)
Employment Status						
Homemaker	13.4	(1.5)	7.6	(1.1)	31.3	(4.4)
Other	20.2	(1.8)	21.5	(2.2)	16.1	(2.9)
Retired	10.5	(1.3)	12.1	(1.6)	5.6	(1.9)
Student	2.4	(0.8)	2.0	(0.8)	3.6	(2.0)
Working	53.5	(2.1)	56.8	(2.3)	43.4	(4.6)
Severity						
Mild	24.0	(2.4)	21.7	(2.6)	31.2	(5.1)
Moderate	35.1	(2.1)	37.8	(2.3)	26.9	(4.2)
Severe	40.9	(2.2)	40.5	(2.6)	41.9	(4.6)
Survey Year[a]						
Continuous	2.9	(0.2)	2.4	(0.2)	4.5	(0.3)

[a] Survey year is continuous, so the mean is shown instead of %

healthcare professional seen in a GM setting) [18]. Respondents were asked about number of visits with each type of provider in the past 12 months and, for medical providers, about whether they provided psychotherapy, pharmacotherapy, or both. Specific type, dose, and duration were recorded for each psychotropic medication used in the past 12 months. Further details about the treatment variables are presented elsewhere [26].

Consistent with our previous work [18], a series of summary variables was created from these detailed respondent reports. *Contact coverage* involved any 12-month contact with a specialist or general medical provider for a mental health condition. For the pharmacotherapy

measures two clinical psychiatrists with expertise in public health (DV, CSW) independently reviewed responses about medications used (which involved selecting from country specific lists including generic and brand names) and classified them. Discrepancies were reconciled by consensus.

As described in our previous work [18], *Adequate medication control* required at least four physician visits [26]. *Medication adherence* required taking the prescribed daily dose at least 90% of the time during the past 12 months of pharmacotherapy (e.g., at least 27 out 30 days in a month) [27–29]. *Adequate pharmacotherapy* required taking an antidepressant with adequate medication control and adherence. While some PTSD guidelines have recommended only specific antidepressants, others have made broader recommendations [7]. A small fraction of people with PTSD may avoid antidepressants due to side effects, failed trials, or other legitimate reasons, so if a non-antidepressant psychotropic was adequately controlled by a psychiatrist with adequate patient adherence, it was also considered adequate.

In congruence with our previous work [30], *Any psychotherapy* required having two or more visits to any specialty mental health provider among help seekers. *Adequate number of sessions* required at least eight sessions. *Adequate psychotherapy* required at least 8 sessions from an adequate provider or still being in treatment after 2 visits. In the case of psychiatrists, for an encounter to be considered as a psychotherapeutic intervention (as opposed to medication adjustment), visits needed to last 30 minutes or more. PTSD guidelines emphasize the efficacy of trauma-focused therapies, but some make more specific recommendations, while others recommend broader classes of psychotherapy [7]. We chose "at least 8 sessions" following the United Kingdom's National Institute for Health and Care Excellence (NICE) guidelines for the psychotherapy of PTSD [31]; this also has the advantage of mirroring definitions used in previous WMHS research on effective treatment coverage for MDD [18].

We also defined a severity-specific variable for *effective treatment coverage,* which for mild and moderate PTSD required adequate pharmacotherapy and/or adequate psychotherapy, and for severe PTSD both adequate pharmacotherapy and adequate psychotherapy [26, 32]. These criteria are consistent with our previous work on depression. However, the evidence-base on combined treatment for PTSD is thin, and most PTSD guidelines do not recommend initiating treatment with combined pharmacotherapy and psychotherapy [33]. Nevertheless, there is a clinical rationale for considering combined treatment in some patients, and the combination of evidence-based pharmacotherapy and psychotherapy has been recommended when initial treatments fail [34].

The sample for analysis was respondents who met criteria for 12-month PTSD. Differences in within-household probabilities of selection and residual discrepancies between sample and population distributions were adjusted for through weights based on census demographic-geographic variables [21]. The Taylor series linearization method [35] implemented in SUDAAN software [36] was used to estimate standard errors to adjust for weighting and geographic clustering of data. Components of effective treatment coverage were stratified by country-income level.

As described in our previous work [30], bivariate logistic regression analyses were employed to explore significant associations between a broad set of potential predictors (gender, age, marital status, income, education, type of health insurance, private insurance (yes/no), any form of insurance (yes/no), employment status, severity, and survey year) and the outcome of interest, effective treatment coverage for PTSD. A multivariable logistic regression model was employed to predict effective treatment coverage including all the variables that had $p < .01$ in the bivariate analyses. Significance was established at $p < 0.05$, and we report the unadjusted p values as well as values adjusted for false discovery rates (FDR) resulting from multiple testing using the Benjamini-Hochberg procedure.

Additionally, as detailed in previous articles in this series [18], for those bivariate models that were significant in predicting effective treatment coverage, we conducted exploratory analyses by decomposing this indicator to identify which components may drive coverage for specific subgroups. Thus, we investigated determinants of contact coverage among those with 12-month PTSD, and of the specific components of treatment (i.e., any pharmacotherapy, adequate pharmacotherapy, any psychotherapy, and adequate psychotherapy) among those with 12-month PTSD and contact coverage. Finally, we stratified the bivariate and multivariable analyses by country-income level.

Results

Effective treatment coverage

Twelve-month PTSD prevalence in trauma exposed individuals was 1.49% (S.E., 0.08) across countries. A total of 43.0% (S.E., 2.2) of these cases had contact coverage. Among these individuals with contact coverage (a) 32.7% (S.E., 1.9) received pharmacotherapy, but fewer received antidepressants (22.1% [S.E., 1.6]), and only 13.5% (S.E., 1.4) received adequate pharmacotherapy; (b) 19.9% (S.E., 1.5) received psychotherapy and slightly less (17.2% [S.E., 1.5]) received adequate psychotherapy; (c) 14.4% (S.E., 1.4) received effective treatment coverage (Table 3).

Stratification by country income-level (HIC vs LMIC) demonstrated that (a) contact coverage (50.6% vs 19.8%;

(b) adequate pharmacotherapy (16.6% vs 4.1%); (c) adequate psychotherapy (21.3% vs 4.5%; and (d) effective treatment coverage (17.8% vs 4.1%) were all higher in HICs than in LMICs (Fig. 1).

Predictors of effective treatment coverage

In initial bivariate models, level of education, type of insurance, and severity of symptoms were associated with effective treatment coverage (Table 4). Those with low-average and average-high levels of education were less likely to receive effective treatment than those with high level of education. In general, those with any form of insurance are more likely to receive effective treatment coverage than those with no insurance. Having state funded coverage or subsidized insurance made it more likely to receive any modality of therapy and effective treatment, while those with insurance through employment or national social security were more likely to receive any pharmacotherapy, adequate pharmacotherapy, or effective treatment. Those with mild or moderate symptoms were less likely to receive any or adequate pharmacotherapy, or any or adequate psychotherapy, and those with mild symptoms were less likely to receive effective treatment. Stratification by country-income level showed similar findings in HICs (Supplemental Tables S1 and S2), while in LMICs the sample size did not allow for analyses by effective treatment and its components, analyses of contact coverage found that any form of insurance was particularly important in predicting contact coverage (Supplement Table S3).

In the final multivariable model, after adjusting for the FDR, any form of insurance (OR = 2.31, 95% CI 1.17, 4.57) and mild symptom severity (OR = .35, 95% CI 53,1.08) remained significant predictors (Table 5). Stratification by country-income level showed similar findings in HICs (Supplement Table S2), while in LMICs although sample size again did not allow analyses by effective treatment and its components any form of insurance was again particularly important in predicting contact coverage (Supplement Table S3).

Discussion

Key findings from this analysis of WHO World Mental Health Surveys (WMHS) data were 1) that only 43.0.% of those with 12-month PTSD had contact coverage, with fewer receiving adequate pharmacotherapy (13.5%), adequate psychotherapy (17.2%), or effective treatment coverage (adequate severity specific use of pharmacotherapy and/or psychotherapy) (14.4%), and with all components of treatment coverage lower in LMICs than HICs, and 2) that lack of insurance and mild clinical symptoms

Table 3 Coverage for posttraumatic stress disorder by severity

Coverage		Severe *n* = 504		Mild/ Moderate *n* = 410		Any severity *n* = 914		Significance test	
Numerator	**Denominator**	**%**	**(SE)**	**%**	**(SE)**	**%**	**(SE)**	**F**	**(*p*-value)**
Contact coverage[a]	*People with 12-month PTSD (n = 914)*	58.1	(2.9)	32.7	(2.6)	43.0	(2.2)	43.31*	(<.001)
Any psychotropic medication[b,c]		46.5	(2.7)	23.1	(2.3)	32.7	(1.9)	37.64*	(<.001)
Antidepressants[d]		34.1	(2.5)	13.8	(1.7)	22.1	(1.6)	47.72*	(<.001)
Adequate medication control[e]		32.1	(2.6)	9.4	(1.5)	18.7	(1.5)	53.48*	(<.001)
Adequate pharmacotherapy[f]		23.0	(2.4)	7.0	(1.3)	13.5	(1.4)	35.74*	(<.001)
Any psychotherapy[g]		29.5	(2.5)	13.3	(1.6)	19.9	(1.5)	31.52*	(<.001)
Adequate psychotherapy[h]		28.0	(2.6)	9.7	(1.5)	17.2	(1.5)	47.56*	(<.001)
Effective coverage[i]		18.5	(2.2)	11.7	(1.7)	14.4	(1.4)	6.03*	(0.01)

Abbreviations: *PTSD* Posttraumatic stress disorder, *SE* Standard error

*Significant at the .05 level, two-sided test

[a] Contact coverage required any 12-month contact with a specialist or general medical provider for a mental health condition

[b] Requires any 12-month healthcare/contact coverage too

[c] Any psychotropic required receiving any psychotropic and any 12-month healthcare

[d] Antidepressants required appropriate medication (antidepressant) and any 12-month healthcare

[e] Adequate medication control required at least four physician visits

[f] Adequate pharmacotherapy required taking an antidepressant with adequate medication control and adherence

[g] Any psychotherapy required having two or more visits to any specialty mental health provider among help seekers

[h] Adequate psychotherapy required at least 8 sessions from an adequate provider or still being in treatment after 2 visits

[i] Effective treatment coverage, for mild and moderate PTSD required adequate pharmacotherapy and/or adequate psychotherapy, and for severe PSTD both adequate pharmacotherapy and adequate psychotherapy

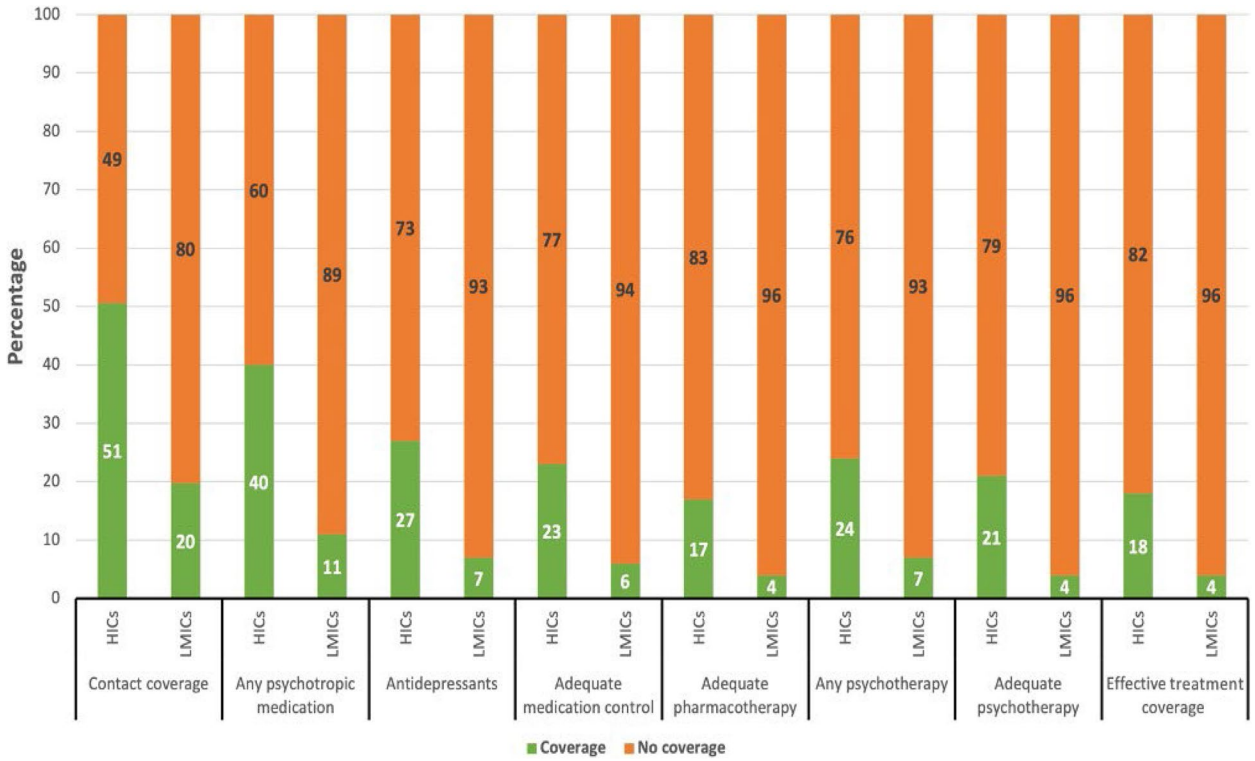

Fig. 1 Treatment coverage for posttraumatic stress disorder (12-month PTSD). HICs ($n=694$): High income countries; LMICs ($n=220$): Low/ middle income countries. *Contact coverage* required any 12-month contact with a specialist or general medical provider for a mental health condition. *Any psychotropic* required receiving any psychotropic and any 12-month healthcare. A*ntidepressants* required appropriate medication (antidepressant) and any 12-month healthcare. *Adequate medication control required at least four physician visits*. *Adequate pharmacotherapy* required taking an antidepressant with adequate medication control and adherence. *Any psychotherapy* required having two or more visits to any specialty mental health provider among help seekers. *Adequate psychotherapy* required at least 8 sessions from an adequate provider or still being in treatment after 2 visits. *Effective treatment coverage,* for mild and moderate PTSD required adequate pharmacotherapy and/or adequate psychotherapy, and for severe PSTD both adequate pharmacotherapy and adequate psychotherapy

were predictive of lower effective treatment coverage for PTSD.

The literature on treatment coverage of PTSD is relatively sparse. In veterans in the United States, studies have found that 23–40% of those who screened positive for a mental health issue received professional assistance [37], that 53% of those recently diagnosed with PTSD in primary care started treatment at that level [38], and that only 33% of veterans have received minimally adequate PTSD care [39]. In earlier work from the WMHS, of those with a 12-month anxiety disorder or PTSD, only 41.3% perceived a need for care, and only 27.6% received any treatment [10].

Several barriers to treatment of PTSD have previously been reported in the literature. These include both structural barriers such as lack of those providing evidence-based psychotherapy for PTSD [40], and attitudinal barriers such as ambivalence about treatment seeking [41]. In veterans in the US, those recently diagnosed with and treated at primary care level are more likely to receive pharmacotherapy [42]. In earlier work from the WMHS on barriers to care, low perceived need was the most common reason for not initiating treatment and was more common among moderate and mild than severe cases. Notably, attitudinal barriers dominated for mild-moderate cases, while structural barriers were more important for severe cases [13].

The finding that patients with more severe symptoms are more likely to receive effective treatment coverage suggests that a more comprehensive treatment package is available for people who suffer severe PTSD, compared to those that suffer severe MDD [18]. While more severe PTSD symptoms may be associated with more disability, previous findings from WMHS have emphasized the graded relationship between PTSD severity and clinical outcomes [43]. Thus decisions about treating cases should be based on cost-effectiveness rather than severity [44]. There is growing evidence of the cost-effectiveness of interventions for individuals meeting diagnostic criteria for PTSD, although further such work is needed [4].

Table 4 Bivariate predictors of effective coverage and its components among those with 12-Month posttraumatic stress disorder, in all countries ($n = 914$)[a]

	Among those with 12-month PTSD ($n = 914$), received contact coverage[b]			Received any pharmacotherapy			Received adequate pharmacotherapy[d]			Received any psychotherapy[e]			Received adequate psychotherapy[f]			Among those with 12-month PTSD ($n = 914$), received effective coverage[g]			
	OR	(95% CI)	F test	OR	(95% CI)	F test	OR	(95% CI)	F test	OR	(95% CI)	F test	OR	(95% CI)	F test	OR	(95% CI)	F test	FDR[h]
Level of education																			
Low	0.9	(0.6–1.5)	2.3[@]	1.1	(0.7–1.9)	5.3[*]	0.9	(0.5–1.7)	3.0*	0.6	(0.4–1.1)	1.7	0.6	(0.3–1.1)	1.5	0.7	(0.4–1.3)	2.3[@]	0.07
Low-Average	0.6	(0.4–1.1)		0.7	(0.4–1.1)		0.6	(0.3–1.1)		0.6*	(0.4–0.99)		0.6	(0.4–1.1)		0.5*	(0.3–0.9)		
Average-High	0.5*	(0.3–0.9)		0.5*	(0.3–0.7)		0.5*	(0.3–0.8)		0.6	(0.4–1.04)		0.6	(0.4–1.3)		0.5*	(0.3–0.9)		
High	REF			REF			REF			REF			REF			REF			
Type of insurance																			
No insurance coverage	REF			REF			REF			REF			REF			REF			
State funded coverage or subsidized insurance	3.9*	(2.2–6.9)		3.5*	(1.6–7.9)		3.5*	(1.5–8.3)		2.7*	(1.3–5.6)		3.6*	(1.5–8.6)		3.1*	(1.4–7.1)		
Other	1.8*	(1.01–3.2)		1.8	(0.9–3.5)		1.4	(0.4–3.3)		1.5	(0.8–2.8)		1.8	(0.8–4.1)		1.6	(0.8–3.3)		
Direct Private/Optional Insurance	1.9	(0.8–4.2)	6.7*	1.6	(0.6–4.3)	4.4*	1.7	(0.6–5.2)	3.8*	1.7	(0.7–4.1)	3.9*	1.8	(0.6–5.0)	3.1*	2.2	(0.8–6.1)	2.7*	0.06
Insurance through employment or national social security	5.9*	(1.7–20.2)		5.4*	(1.5–19.0)		8.3*	(1.7–41.5)		3.4	(0.95–11.9)		2.9	(0.7–11.6)		5.4*	(1.4–21.4)		
Insurance																			
Any Insurance (Yes)	2.3*	(1.3–4.1)	8.5*	2.2*	(1.1–4.4)	4.8*	2.1	(0.9–4.7)	3.1[@]	1.8	(0.97–3.4)	3.5	2.2*	(1.01–4.9)	4.0*	2.1*	(1.02–4.5)	4.1*	0.06
Severity																			
Mild	0.2*	(0.1–0.3)		0.1*	(0.08–0.2)		0.1*	(0.04–0.3)		0.3*	(0.2–0.6)		0.2*	(0.08–0.3)		0.4*	(0.2–0.8)		
Moderate	0.4*	(0.3–0.6)	29.7*	0.5*	(0.3–0.7)	24.9*	0.3*	(0.2–0.5)	18.0*	0.4*	(0.3–0.6)	15.9[*]	0.3*	(0.2–0.5)	25.0*	0.8	(0.5–1.2)	3.7*	0.06
Severe	REF			REF			REF			REF			REF			REF			

Abbreviations: *PTSD* Posttraumatic stress disorder, *OR* Odds ratio, *CI* Confidence interval

*Significant at the .05 level, two-sided test [@] $P < 0.1$

[a] Models are bivariate with each demographic predictor in separate models, controlling for country dummies. The following variables were non-significant or $P > 0.1$: age, sex, marital status, income, employment status and survey year

[b] Contact coverage required any 12-month contact with a specialist or general medical provider for a mental health condition

[c] Any psychotropic required receiving any psychotropic and any 12-month healthcare

Antidepressants required appropriate medication (antidepressant) and any 12-month healthcare

Adequate medication control required at least four physician visits

[d] Adequate pharmacotherapy required taking an antidepressant with adequate medication control and adherence

[e] Any psychotherapy required having two or more visits to any specialty mental health provider among help seekers

[f] Adequate psychotherapy required at least 8 sessions from an adequate provider or still being in treatment after 2 visits

[g] Effective treatment coverage, for mild and moderate PTSD required adequate pharmacotherapy and/or adequate psychotherapy, and for severe PSTD both adequate pharmacotherapy and adequate psychotherapy

[h] FDR: False discovery rate adjustment for multiple testing implementing the Benjamini-Hochberg method

Table 5 Multivariable model of effective coverage among those with 12-Month posttraumatic stress disorder, in all countries ($n = 914$) [a]

	Among those with 12-month PTSD ($n = 914$), received effective coverage			
	OR	(95% CI)	F test	FDR[b]
Level of education				
Low-Average Education Y/N	0.76	(0.52–1.11)	2.02	0.157
Type of insurance				
Any Insurance Y/N	2.31*	(1.17–4.57)	5.88*	0.025
Severity				
Mild	0.35*	(0.18–0.70)		
Moderate	0.76	(0.53–1.08)	5.10*	0.021
Severe	REF			
Global F test for multivariate model			7.08*	

Abbreviations: *PTSD* Posttraumatic stress disorder, *O*, Odds ratio, *CI* Confidence interval

*Significant at the .05 level, two-sided test

[a] Model is a multivariate model with all rows in the same model, controlling for country dummies

[b] FDR: False discovery rate adjustment for multiple testing implementing the Benhamini-Hochberg method

The most important social determinant of treatment coverage was the presence of insurance. Private insurance was also found to be a significant predictor in our previous work on effective treatment coverage for major depressive disorder, but in this case the difference is more salient: every form of insurance warrants increased coverage for PTSD when compared to no insurance [18]. A focus on the relevance of insurance for treatment coverage is timely given the current emphasis on universal health care coverage [14, 45].

Some limitations deserve emphasis. First, the data regarding service utilization and adherence are dependent on respondent recall. However, the focus here on 12-month treatment rather than lifetime prevalence minimizes recall bias. To compensate for potential bias we used a particularly stringent compliance threshold (taking the indicated dose at least 90% of the time) [27–29]. With respect to the time-span covered by surveys, our models included dummy control variables for each survey, an approach that controls for survey year, so that findings are based on pooled within-survey results. Second, several aspects of the treatment provided, such as adherence to treatment manuals, may influence judgments of whether or not treatment coverage was effective. While a clinical trial allows assessment of such issues, it does not have the statistical power of an epidemiological approach. Third, our definitions of adequate treatment mirror our prior work on depression, but the evidence-base of randomized controlled trials of interventions for PTSD is smaller, with fewer approved pharmacotherapies, fewer evidence-based psychotherapies, and less evidence for the value of combined pharmacotherapy and psychotherapy [33]. Although our definitions of adequate treatment overlap in part with evidence-based guidelines for PTSD such as the NICE guideline their limitations deserve emphasis; for example, although such treatment guidelines for PTSD note the value of both pharmacotherapy and psychotherapy, they emphasize initiating treatment with either specific antidepressants or psychotherapies, rather than their combination.

In summary, these data emphasize that there is a clear need to improve pharmacotherapy and psychotherapy coverage for PTSD, particularly in those with mild symptoms, and especially in LMIC contexts. Previous work has emphasized the potential value of increasing human resources for mental health care and of increasing population mental health literacy in order to address structural and attitudinal barriers to accessing mental health services [14]. A key component of addressing such barriers is the provision of universal health care insurance for both physical and mental disorders.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12888-023-04605-2.

Additional file 1: Supplemental Table 1. Bivariate predictors of effective coverage and its components among those with 12-Month posttraumatic stress disorder, in HICs countries (n=694)[a]. **Supplemental Table 2.** Multivariable model of effective coverage among those with 12-Month posttraumatic stress disorder, in high-income countries (n=694) [a]. **Supplemental Table 3.** Predictors of contact coverage among those with 12-Month posttraumatic stress disorder, in LMICs countries (n=220) [a].

Acknowledgments

WHO World Mental Health Survey Collaborators:
The WHO World Mental Health Survey collaborators are Sergio Aguilar-Gaxiola[25], Ali Al-Hamzawi[26], Jordi Alonso[6], Yasmin A. Altwaijri[27], Laura Helena Andrade[7], Lukoye Atwoli[28,29], Corina Benjet[30], Guilherme Borges[31], Evelyn J. Bromet[32], Ronny Bruffaerts[8], Brendan Bunting[33], Jose Miguel Caldas-de-Almeida[34], Graça Cardoso[9], Stephanie Chardoul[10], Somnath Chatterji[35], Alfredo H. Cia[36], Louisa Degenhardt[37], Koen Demyttenaere[38], Silvia Florescu[12], Giovanni de Girolamo[11], Oye Gureje[13], Josep Maria Haro[14]; Meredith G. Harris[5], Hristo Hinkov[39], Chi-yi Hu[40], Peter de Jonge[41,42], Aimee Nasser Karam[15], Elie G. Karam[15,16], Georges Karam[15], Norito Kawakami[43], Ronald C. Kessler[4], Andrzej Kiejna[44], Viviane Kovess-Masfety[17], Sing Lee[18], Jean-Pierre Lepine[45], John J. McGrath[46,47,48], Maria Elena Medina-Mora[19], Jacek Moskalewicz[49], Fernando Navarro-Mateu[20], Marina Piazza[50,51], Jose Posada-Villa[21], Kate M. Scott[52], Tim Slade[53], Juan Carlos Stagnaro[22], Dan J. Stein[1], Margreet ten Have[23], Yolanda Torres[54], Maria Carmen Viana[55], Daniel V. Vigo[3,24], Harvey Whiteford[56], David R. Williams[57], Bogdan Wojtyniak[58].

[25]Center for Reducing Health Disparities, UC Davis Health System, Sacramento, California, USA.
[26]College of Medicine, University of Al-Qadisiya, Diwaniya governorate, Iraq.
[27]Epidemiology Section, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia.
[28]Department of Mental Health and Behavioural Sciences, Moi University School of Medicine, Eldoret, Kenya.

[29]Brain and Mind Institute and Medical College East Africa, the Aga Khan University, Nairobi, Kenya.
[30]Department of Epidemiologic and Psychosocial Research, National Institute of Psychiatry Ramón de la Fuente Muñiz, Mexico City, Mexico.
[31]National Institute of Psychiatry Ramón de la Fuente Muñiz, Mexico City, Mexico.
[32]Department of Psychiatry, Stony Brook University School of Medicine, Stony Brook, New York, USA.
[33]School of Psychology, Ulster University, Londonderry, United Kingdom.
[34] Lisbon Institute of Global Mental Health and Chronic Diseases Research Center (CEDOC), NOVA Medical School, Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Lisbon, Portugal.
[35]Department of Information, Evidence and Research, World Health Organization, Geneva, Switzerland.
[36]Anxiety Disorders Research Center, Buenos Aires, Argentina.
[37]National Drug and Alcohol Research Centre, University of New South Wales, Sydney, Australia.
[38]Department of Psychiatry, University Hospital Gasthuisberg, Katholieke Universiteit Leuven, Leuven, Belgium.
[39]National Center of Public Health and Analyses, Sofia, Bulgaria.
[40]Shenzhen Institute of Mental Health, Shenzhen Kangning Hospital, Shenzhen, China.
[41]Department of Developmental Psychology, University of Groningen, Groningen, The Netherlands.
[42] Interdisciplinary Center Psychopathology and Emotion Regulation, University Medical Center Groningen, Groningen, The Netherlands.
[43]Department of Mental Health, Graduate School of Medicine, The University of Tokyo, Tokyo, Japan.
[44]Faculty of Applied Studies, University of Lower Silesia, Wroclaw, Poland.
[45]Hôpital Lariboisière-Fernand Widal, Assistance Publique Hôpitaux de Paris, Universités Paris Descartes-Paris Diderot, Paris, France.
[46]Queensland Centre for Mental Health Research, The Park Centre for Mental Health, Wacol, Australia.
[47]Queensland Brain Institute, The University of Queensland, St Lucia, Australia.
[48]National Centre for Register-based Research, Aarhus University, Aarhus, Denmark.
[49]Institute of Psychiatry and Neurology, Warsaw, Poland.
[50]Instituto Nacional de Salud, Lima, Peru.
[51]Universidad Cayetano Heredia, Lima, Peru.
[52]Department of Psychological Medicine, University of Otago, Dunedin, Otago, New Zealand.
[53]The Matilda Centre for Research in Mental Health and Substance Use, University of Sydney, Sydney, Australia.
[54]Center for Excellence on Research in Mental Health, CES University, Medellin, Colombia.
[55]Department of Social Medicine, Postgraduate Program in Public Health, Federal University of Espírito Santo, Vitoria, Brazil.
[56]School of Public Health, University of Queensland, Herston, Australia.
[57]Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, USA.
[58]Centre of Monitoring and Analyses of Population Health, National Institute of Public Health-National Research Institute, Warsaw, Poland.

Authors' contributions

DJS, AEK, DVV, MGH, and RCK made substantial contributions to the conception and design of the work. RJM and IH analyzed and interpreted the data, supervised by DVV, NAS, and RCK. MGH, JA, LHA, RB, GC, SC, GG, SF, OG, JMH, ANK, EGK, VK-M, SL, MEM-M, FN-M, JP-V, JCS, and MH led data acquisition in their surveys. All authors worked on revising the text critically for important intellectual content and read and approved the final manuscript.

Funding

The World Health Organization World Mental Health (WMH) Survey Initiative is supported by the United States National Institute of Mental Health (NIMH; R01 MH070884), the John D. and Catherine T. MacArthur Foundation, the Pfizer Foundation, the United States Public Health Service (R13-MH066849, R01-MH069864, and R01 DA016558), the Fogarty International Center (FIRCA R03-TW006481), the Pan American Health Organization, Eli Lilly and Company, Ortho-McNeil Pharmaceutical Inc., GlaxoSmithKline, and Bristol-Myers Squibb. We thank the staff of the WMH Data Collection and Data Analysis Coordination Centres for assistance with instrumentation, fieldwork, and consultation on data analysis. None of the funders had any role in the design, analysis, interpretation of results, or preparation of this paper. The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of the World Health Organization, other sponsoring organizations, agencies, or governments.
The Argentina survey — Estudio Argentino de Epidemiología en Salud Mental (EASM) — was supported by a grant from the Argentinian Ministry of Health (Ministerio de Salud de la Nación) — (Grant Number 2002–17270/13–5). The São Paulo Megacity Mental Health Survey is supported by the State of São Paulo Research Foundation (FAPESP) Thematic Project Grant 03/00204–3. The Colombian National Study of Mental Health (NSMH) is supported by the Ministry of Social Protection. The Mental Health Study Medellín – Colombia was carried out and supported jointly by the Center for Excellence on Research in Mental Health (CES University) and the Secretary of Health of Medellín. The ESEMeD project is funded by the European Commission (Contracts QLG5–1999-01042; SANCO 2004123, and EAHC 20081308), the Piedmont Region (Italy)), Fondo de Investigación Sanitaria, Instituto de Salud Carlos III, Spain (FIS 00/0028), Ministerio de Ciencia y Tecnología, Spain (SAF 2000–158-CE), Generalitat de Catalunya (2017 SGR 452; 2014 SGR 748), Instituto de Salud Carlos III (CIBER CB06/02/0046, RETICS RD06/0011 REM-TAP), and other local agencies and by an unrestricted educational grant from GlaxoSmithKline. The Lebanese Evaluation of the Burden of Ailments and Needs of the Nation (L.E.B.A.N.O.N.) is supported by the Lebanese Ministry of Public Health, the WHO (Lebanon), National Institute of Health / Fogarty International Center (R03 TW006481–01), anonymous private donations to IDRAAC, Lebanon, and unrestricted grants from, Algorithm, AstraZeneca, Benta, Bella Pharma, Eli Lilly, Glaxo Smith Kline, Lundbeck, Novartis, OmniPharma, Pfizer, Phenicia, Servier, UPO. The Mexican National Comorbidity Survey (MNCS) is supported by The National Institute of Psychiatry Ramon de la Fuente (INPRFMDIES 4280) and by the National Council on Science and Technology (CONACyT-G30544- H), with supplemental support from the Pan American Health Organization (PAHO). The Nigerian Survey of Mental Health and Wellbeing (NSMHW) is supported by the WHO (Geneva), the WHO (Nigeria), and the Federal Ministry of Health, Abuja, Nigeria. The Portuguese Mental Health Study was carried out by the Department of Mental Health, Faculty of Medical Sciences, NOVA University of Lisbon, with collaboration of the Portuguese Catholic University, and was funded by Champalimaud Foundation, Gulbenkian Foundation, Foundation for Science and Technology (FCT) and Ministry of Health. The Romania WMH study projects "Policies in Mental Health Area" and "National Study regarding Mental Health and Services Use" were carried out by National School of Public Health & Health Services Management (former National Institute for Research & Development in Health), with technical support of Metro Media Transilvania, the National Institute of Statistics-National Centre for Training in Statistics, SC Cheyenne Services SRL, Statistics Netherlands and were funded by Ministry of Public Health (former Ministry of Health) with supplemental support of Eli Lilly Romania SRL. The Psychiatric Enquiry to General Population in Southeast Spain – Murcia (PEGASUS-Murcia) Project has been financed by the Regional Health Authorities of Murcia (Servicio Murciano de Salud and Consejería de Sanidad y Política Social) and Fundación para la Formación e Investigación Sanitarias (FFIS) of Murcia. The US National Comorbidity Survey Replication (NCS-R) is supported by the National Institute of Mental Health (NIMH; U01-MH60220) with supplemental support from the National Institute of Drug Abuse (NIDA), the Substance Abuse and Mental Health Services Administration (SAMHSA), the Robert Wood Johnson Foundation (RWJF; Grant 044708), and the John W. Alden Trust. Dr. Stein is supported by the Medical Research Council of South Africa (MRC).
A complete list of all within-country and cross-national WMH publications can be found at http://www.hcp.med.harvard.edu/wmh/.

Availability of data and materials

Access to the cross-national World Mental Health (WMH) data is governed by the organizations funding and responsible for survey data collection in each country. These organizations made data available to the WMH consortium through restricted data sharing agreements that do not allow us to release the data to third parties. The exception is that the U.S. data are available for secondary analysis via the Inter-University Consortium for Political and Social Research (ICPSR), http://www.icpsr.umich.edu/icpsrweb/ICPSR/series/00527.

Declarations

Ethics approval and consent to participate

All methods were carried out in accordance with relevant guidelines and regulations. The study protocol was approved by all local institutional review boards. Written or verbal informed consent was obtained in a manner consistent with the regulations of each country. Details of the ethics committees for the WMH surveys can be viewed at this link: http://www.hcp.med.harvard.edu/wmh/ftpdir/IRB_Ethics_approval_WMH.pdf. They are: Bioethics Committee, School of Medicine, University of Buenos Aires (Argentina); Ethics Committee of the Institute of Public Health (Federal Public Service Health, Food Chain Safety, and Environment) (Belgium); Research and Ethics Committee of the School of Medicine, University of São Paulo (Brazil, São Paulo metropolitan area); Ethics Committee for the FES Social Foundation (Colombia); Research Committee of the School of Medicine, and Ethics Committee CES University of Medellín (Colombia – Medellín); Committee of the CNIL - Commission Nationale Informatique et Libertés (France); Ethics Committee of the University of Leipzig (Germany); Italian National Institute of Health (Italy); University of Balamand Faculty of Medicine Institutional Review Board (Lebanon); Ethics committee in research of the National Institute of Psychiatry Ramon de la Fuente Muñiz (Mexico); Ethics Committee of the Netherlands Institute of Mental Health and Addiction (Netherlands); University of Ibadan/University College Hospital Joint Ethics Committee (Nigeria); Ethics Committee, Faculdade de Ciências Médicas, Universidade Nova de Lisboa (Portugal); Ethic Commission, Scientific Board of National Institute for Research and Development in Health (Romania); Ethical committee of Sant Joan de Deu Serveis de Salut Mental and Ethical Committee of Institut Municipal d'Investigació Mèdica (Spain); Clinical Research Ethical Committee of Hospital Universitario Virgen de la Arrixaca (Murcia, Spain) (Spain - Murcia); Human Subjects Committees of the Institute for Social Research at the University of Michigan and of Harvard Medical School (United States).

Consent for publication

Not applicable.

Competing interests

MGH reports consulting fees from RAND Corporation outside the submitted work.
In the past 3 years, RCK was a consultant for Cambridge Health Alliance, Canandaigua VA Medical Center, Holmusk, Partners Healthcare, Inc., RallyPoint Networks, Inc., and Sage Therapeutics. He has stock options in Cerebral Inc., Mirah, PYM, and Roga Sciences.
FN-M reports non-financial support from Otsuka outside the submitted work.
DJS has received honoraria from Discovery Vitality, Johnson & John, Kanna, L'Oreal, Lundbeck, Orion, Sanofi, Servier, Takeda, and Vistagen.
The remaining authors declare that they have no competing interests.

Author details

[1]Department of Psychiatry & Mental Health and South African Medical Council Research Unit on Risk and Resilience in Mental Disorders, University of Cape Town and Groote Schuur Hospital, Cape Town, South Africa. [2]Department of Psychology, Yale University, New Haven, CT, USA. [3]Department of Psychiatry, University of British Columbia, Vancouver, British Columbia, Canada. [4]Department of Health Care Policy, Harvard Medical School, Boston, MA, USA. [5]School of Public Health, The University of Queensland, Herston, Queensland, Australia. [6]Queensland Centre for Mental Health Research, The Park Centre for Mental Health, Wacol, Queensland, Australia. [7]Health Services Research Unit, IMIM-Hospital del Mar Medical Research Institute, CIBER en Epidemiología y Salud Pública (CIBERESP), Pompeu Fabra University (UPF), Barcelona, Spain. [8]Núcleo de Epidemiologia Psiquiátrica - LIM 23, Instituto de Psiquiatria Hospital das Clinicas da Faculdade de Medicina da Universidade de São Paulo, São Paulo, Brazil. [9]Universitair Psychiatrisch Centrum - Katholieke Universiteit Leuven (UPC-KUL), Campus Gasthuisberg, Leuven, Belgium. [10]Lisbon Institute of Global Mental Health, Comprehensive Health Research Center (CHRC)/NOVA Medical School, NOVA University of Lisbon, Lisbon, Portugal. [11]Institute for Social Research, University of Michigan, Ann Arbor, MI, USA. [12]IRCCS Istituto Centro San Giovanni di Dio Fatebenefratelli, Brescia, Italy. [13]National School of Public Health, Management and Professional Development, Bucharest, Romania. [14]Department of Psychiatry, University College Hospital, Ibadan, Nigeria. [15]Parc Sanitari Sant Joan de Déu, CIBERSAM, Universitat de Barcelona, Sant Boi de Llobregat, Barcelona, Spain. [16]Institute for Development, Research, Advocacy and Applied Care (IDRAAC), Beirut, Lebanon. [17]Department of Psychiatry and Clinical Psychology, Balamand University, Beirut, Lebanon. [18]Department of Psychiatry and Clinical Psychology, St George Hospital University Medical Center, Beirut, Lebanon. [19]Ecole des Hautes Etudes en Santé Publique (EHESP), EA 4057, Paris Descartes University, Paris, France. [20]Department of Psychiatry, Chinese University of Hong Kong, Tai Po, Hong Kong. [21]National Institute of Psychiatry Ramón de la Fuente Muñiz, Mexico City, Mexico. [22]UDIF-SM, Subdirección General de Planificación, Innovación y Cronicidad, Servicio Murciano de Salud. IMIB-Arrixaca, CIBERESP-Murcia, Murcia, Spain. [23]Colegio Mayor de Cundinamarca University, Faculty of Social Sciences, Bogota, Colombia. [24]Departamento de Psiquiatría y Salud Mental, Facultad de Medicina, Universidad de Buenos Aires, Buenos Aires, Argentina. [25]Trimbos-Instituut, Netherlands Institute of Mental Health and Addiction, Utrecht, Netherlands. [26]Department of Global Health and Social Medicine, Harvard Medical School, Boston, MA, USA.

Received: 16 May 2022 Accepted: 13 February 2023
Published online: 04 April 2023

References

1. Atwoli L, Stein DJ, Koenen KC, McLaughlin KA. Epidemiology of posttraumatic stress disorder: prevalence, correlates and consequences. Curr Opin Psychiatry. 2015;28:307–11.
2. Koenen KC, Ratanatharathorn A, Ng L, McLaughlin KA, Bromet EJ, Stein DJ, et al. Posttraumatic stress disorder in the world mental health surveys. Psychol Med. 2017;47:2260–74.
3. Olatunji BO, Cisler JM, Tolin DF. Quality of life in the anxiety disorders: a meta-analytic review. Clin Psychol Rev. 2007;27:572–81.
4. von der Warth R, Dams J, Grochtdreis T, König H-H. Economic evaluations and cost analyses in posttraumatic stress disorder: a systematic review. Eur J Psychotraumatol. 2020;11:1753940.
5. Cipriani A, Williams T, Nikolakopoulou A, Salanti G, Chaimani A, Ipser J, et al. Comparative efficacy and acceptability of pharmacological treatments for post-traumatic stress disorder in adults: a network meta-analysis. Psychol Med. 2018;48:1975–84.
6. Mavranezouli I, Megnin-Viggars O, Daly C, Dias S, Welton NJ, Stockton S, et al. Psychological treatments for post-traumatic stress disorder in adults: a network meta-analysis. Psychol Med. 2020;50:542–55.
7. Hamblen JL, Norman SB, Sonis JH, Phelps AJ, Bisson JI, Nunes VD, et al. A guide to guidelines for the treatment of posttraumatic stress disorder in adults: an update. Psychotherapy. 2019;56:359–73.
8. Martin A, Naunton M, Kosari S, Peterson G, Thomas J, Christenson JK. Treatment guidelines for PTSD: a systematic review. J Clin Med. 2021;10:4175.
9. Wang PS, Angermeyer M, Borges G, Bruffaerts R, Tat Chiu W, de Girolamo G, et al. Delay and failure in treatment seeking after first onset of mental disorders in the World Health Organization's world mental health survey initiative. World Psychiatry. 2007;6:177–85.
10. Alonso J, Liu Z, Evans-Lacko S, Sadikova E, Sampson N, Chatterji S, et al. Treatment gap for anxiety disorders is global: results of the world mental health surveys in 21 countries. Depress Anxiety. 2018;35:195–208.
11. Boerma T, AbouZahr C, Evans D, Evans T. Monitoring intervention coverage in the context of universal health coverage. PLoS Med. 2014;11:e1001728.
12. Jannati A, Sadeghi V, Imani A, Saadati M. Effective coverage as a new approach to health system performance assessment: a scoping review. BMC Health Serv Res. 2018;18:886.
13. Andrade LH, Alonso J, Mneimneh Z, Wells JE, Al-Hamzawi A, Borges G, et al. Barriers to mental health treatment: results from the WHO world mental health surveys. Psychol Med. 2014;44:1303–17.
14. Patel V, Saxena S, Lund C, Thornicroft G, Baingana F, Bolton P, et al. The Lancet Commission on global mental health and sustainable development. Lancet. 2018;392:1553–98.
15. Corrao G, Barbato A, D'Avanzo B, Di Fiandra T, Ferrara L, Gaddini A, et al. Does the mental health system provide effective coverage to people with schizophrenic disorder? A self-controlled case series study in Italy. Soc Psychiatry Psychiatr Epidemiol. 2022;57:519–29.
16. Vigo DV, Haro JM, Hwang I, Aguilar-Gaxiola S, Alonso J, Borges G, et al. Toward measuring effective treatment coverage: critical bottlenecks

in quality- and user-adjusted coverage for major depressive disorder. Psychol Med. 2020;52:1948–58.
17. Degenhardt L, Glantz M, Evans-Lacko S, Sadikova E, Sampson N, Thornicroft G, et al. Estimating treatment coverage for people with substance use disorders: an analysis of data from the world mental health surveys. World Psychiatry. 2017;16:299–307.
18. Vigo DV, Kazdin AE, Sampson NA, Hwang I, Alonso J, Andrade LH, et al. Determinants of effective treatment coverage for major depressive disorder in the WHO world mental health surveys. Int J Ment Health Syst. 2022;16:29.
19. Pennell BE, Mneimneh ZN, Bowers A, Chardoul S, Wells JE, Viana MC, et al. Implementation of the world mental health surveys. In: The WHO world mental health surveys: global perspectives on the epidemiology of mental disorders. New York: Cambridge University Press; 2008.
20. American Association for Public Opinion Research. Standard definitions: final dispositions of case codes and outcome rates for surveys. 9th ed. Oakbrook Terrace: American Association for Public Opinion Research; 2016.
21. Heeringa SG, Wells JE, Hubbard F, Mneimneh ZN, Chiu WT, Sampson NA, et al. Sample designs and sampling procedures. In: The WHO world mental health surveys: global perspectives on the epidemiology of mental disorders. New York: Cambridge University Press; 2008.
22. Kessler RC, Üstün TB. The world mental health (WMH) survey initiative version of the World Health Organization (WHO) composite international diagnostic interview (CIDI). Int J Method Psychiat Res. 2004;13:93–121.
23. Harkness J, Pennell B, Villar A, Gebler N, Aguilar-Gaxiola S, Bilgen I. Translation procedures and translation assessment in the world mental health survey initiative. In: The WHO world mental health surveys: global perspectives on the epidemiology of mental disorders. New York: Cambridge University Press; 2008. p. 91–113.
24. Haro JM, Arbabzadeh-Bouchez S, Brugha TS, de Girolamo G, Guyer ME, Jin R, et al. Concordance of the composite international diagnostic interview version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO world mental health surveys. Int J Methods Psychiatr Res. 2006;15:167–80.
25. Sheehan DV, Harnett-Sheehan K, Raj BA. The measurement of disability. Int Clin Psychopharmacol. 1996;11:89–95.
26. Wang PS, Aguilar-Gaxiola S, Alonso J, Angermeyer MC, Borges G, Bromet EJ, et al. Use of mental health services for anxiety, mood, and substance disorders in 17 countries in the WHO world mental health surveys. Lancet. 2007;370:841–50.
27. Cramer JA, Rosenheck R. Compliance with medication regimens for mental and physical disorders. Psychiatr Serv. 1998;49:196–201.
28. Jeon-Slaughter H. Economic factors in of patients' nonadherence to antidepressant treatment. Soc Psychiatry Psychiatr Epidemiol. 2012;47:1985–98.
29. Osterberg L, Blaschke T. Adherence to medication. N Engl J Med. 2005;353:487–97.
30. Scott KM, de Jonge P, Stein DJ, Kessler RC. Mental disorders around the world: facts and figures from the WHO world mental health surveys: Cambridge University Press; 2018.
31. National Institute for Health and Care Excellence. Post-traumatic stress disorder: NICE Guideline. 2018. https://www.nice.org.uk/guidance/ng116. Accessed 22 Dec 2022.
32. ten Have M, Nuyen J, Beekman A, de Graaf R. Common mental disorder severity and its association with treatment contact and treatment intensity for mental health problems. Psychol Med. 2013;43:2203–13.
33. Storm MP, Christensen KS. Comparing treatments for post-traumatic stress disorder - a systematic review. Dan Med J. 2021;68:A09200643.
34. Baldwin DS, Anderson IM, Nutt DJ, Allgulander C, Bandelow B, den Boer JA, et al. Evidence-based pharmacological treatment of anxiety disorders, post-traumatic stress disorder and obsessive-compulsive disorder: a revision of the 2005 guidelines from the British Association for Psychopharmacology. J Psychopharmacol. 2014;28:403–39.
35. Wolter K. Introduction to variance estimation. New York: Springer-Verlag; 1985.
36. Research Triangle Institute. SUDAAN version 8.0. Research Triangle Park; 2002.
37. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. Combat duty in Iraq and Afghanistan, mental health problems and barriers to care. N Engl J Med. 2004;351:13–22.37.
38. Bohnert KM, Sripada RK, Mach J, McCarthy JF. Same-day integrated mental health care and PTSD diagnosis and treatment among VHA primary care patients with positive PTSD screens. Pyschiatr Serv. 2016;67:94–100.
39. Spoont MR, Murdoch M, Hodges J, Nugent S. Treatment receipt by veterans after a PTSD diagnosis in PTSD, mental health, or general medical clinics. Psychiatr Serv. 2010;61:58–63.
40. Rauch SAM, Cigrang J, Austern D, Evans A, For the STRONG STAR Consortium. Expanding the reach of effective PTSD treatment into primary care: prolonged exposure for primary care. Focus (Am Psychiatr Publ). 2017;15:406–10.
41. Possemato K, Ouimette P, Lantinga LJ, Wade M, Coolhart D, Schohn M, et al. Treatment of Department of Veterans Affairs primary care patients with posttraumatic stress disorder. Psychol Serv. 2011;8:82–93.
42. Bohnert KM, Pfeiffer PN, Szymanski BR, McCarthy JF. Continuation of care following an initial primary care visit with a mental health diagnosis: Differences by receipt of VHA Primary Care–Mental Health Integration services. Gen Hosp Psychiatry. 2013;35:66–70.
43. McLaughlin KA, Koenen KC, Friedman MJ, Ruscio AM, Karam EG, Shahly V, et al. Subthreshold posttraumatic stress disorder in the World Health Organization world mental health surveys. Biol Psychiatry. 2015;77:375–84.
44. Kessler RC, Merikangas KR, Berglund P, Eaton WW, Koretz DS, Walters EE. Mild disorders should not be eliminated from the DSM-V. Arch Gen Psychiatry. 2003;60:1177–22.
45. GBD 2019 Universal Health Coverage Collaborators. Measuring universal health coverage based on an index of effective coverage of health services in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396:1250–84.

Publisher's Note