Use of mental health services for anxiety, mood, and substance disorders in 17 countries in the WHO world mental health surveys

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Summary

Background Mental disorders are major causes of disability worldwide, including in the low-income and middle-income countries least able to bear such burdens. We describe mental health care in 17 countries participating in the WHO world mental health (WMH) survey initiative and examine unmet needs for treatment.

Methods Face-to-face household surveys were undertaken with 84 850 community adult respondents in low-income or middle-income (Colombia, Lebanon, Mexico, Nigeria, China, South Africa, Ukraine) and high-income countries (Belgium, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Spain, USA). Prevalence and severity of mental disorders over 12 months, and mental health service use, were assessed with the WMH composite international diagnostic interview. Logistic regression analysis was used to study sociodemographic predictors of receiving any 12-month services.

Findings The number of respondents using any 12-month mental health services (57 [2%; Nigeria] to 1477 [18%; USA]) was generally lower in developing than in developed countries, and the proportion receiving services tended to correspond to countries' percentages of gross domestic product spent on health care. Although seriousness of disorder was related to service use, only five (11%; China) to 46 (61%; Belgium) of patients with severe disorders received any care in the previous year. General medical sectors were the largest sources of mental health services. For respondents initiating treatments, 152 (70%; Germany) to 129 (95%; Italy) received any follow-up care, and one (10%; Nigeria) to 113 (42%; France) received treatments meeting minimum standards for adequacy. Patients who were male, married, less-educated, and at the extremes of age or income were treated less.

Interpretation Unmet needs for mental health treatment are pervasive and especially concerning in less-developed countries. Alleviation of these unmet needs will require expansion and optimum allocation of treatment resources.

Introduction

Neuropsychiatric disorders are the leading causes of disability worldwide, accounting for 37% of all healthy life years lost through disease. They are the most disabling disorders even in low-income and middle-income countries, which can be least able to bear such burdens.[1] Although effective and tolerable treatments are increasingly available, even economically advantaged societies have competing priorities and budgetary constraints.[2] Knowledge of how to provide effective mental health care has become imperative worldwide.[3] Unfortunately, most countries have insufficient data to guide decisions, absent or competing visions for resources, and near constant pressures to cut insurance and entitlements.[4]

How can countries redesign their mental health care systems and best allocate resources? A first step is documentation of services being used and the extent and nature of unmet needs for treatment. A second step could be to do a cross-national comparison of service use and unmet needs in countries with different mental health care systems. Such comparisons can help to uncover optimum financing, national policies, and delivery systems for mental health care. Unfortunately, few cross-national studies are available.[5,6]

For these reasons, WHO established the world mental health (WMH) survey initiative in 1998.[7] Coordinated surveys on mental disorders, their severity, impairments, and treatments have been implemented in 28 developing and developed countries. We assessed the frequency, types, and adequacy of mental health service use in 17 countries in which WMH surveys are complete. We also examined unmet needs for treatment in strata defined by the seriousness of mental disorders. Finally, we identified sociodemographic correlates of unmet needs for treatment to guide design and targeting of future resources, policies, and interventions.

Methods

Survey respondents

WMH surveys were done in Africa (Nigeria, South Africa), the Americas (Colombia, Mexico, USA), Asia and the Pacific (Japan, New Zealand, Beijing and Shanghai in the Peoples Republic of China), Europe (Belgium, France, Germany, Italy, Netherlands, Spain,

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Ukraine), and the middle east (Israel, Lebanon).[7] Countries were classified with World Bank criteria[8] as low-income (Nigeria), lower middle-income (China, Columbia, South Africa, Ukraine), higher middle-income (Lebanon, Mexico), and high-income (all others). Conventional multistage clustered area probability designs were used (exceptions being countries with population registries, which were used to avoid probability-of-selection weights within households) to select mainly nationally representative samples, and the remainder focusing on major metropolitan areas (table 1). Trained lay interviewers did surveys face-to-face and returned to households up to 15 times when respondents were not available. They used standardised refusal conversion procedures to improve response rates. The total sample size of respondents aged 18 years and older was 84 850, with individual country samples ranging from 2372 in Netherlands to 12 790 in New Zealand. The weighted average response rate across all countries was 71%, with individual country rates ranging from 46% (France) to 88% (Colombia). Non-respondent surveys have been done to learn about people who declined participation.

All respondents completed part I of the survey, which contained core diagnostic assessments. All such respondents who met criteria for any disorder and a subsample of about 25% of others were administered part II, which assessed correlates, service use, and disorders of secondary interest. Data were weighted to

adjust for this differential sampling of part II respondents, differential probabilities of selection within households, and to match samples to population sociodemographic distributions.

To help to ensure that valid estimates of the prevalence of mental disorders could be made across potentially different cultural settings, a standardised WHO protocol was used to develop, pilot test, review, translate, back translate, and harmonise all WMH-composite international diagnostic interview (CIDI) schedules. Furthermore, standardised interviewer training procedures were followed and are described in more detail elsewhere.[7] Written or oral informed consent (depending on country) was required before beginning interviews in all countries. Procedures for obtaining informed consent and protecting participants were approved and monitored by the Institutional Review Boards of organisations coordinating surveys in all countries.

Classification of mental health disorders

The WMH-CIDI, a fully structured diagnostic interview, was used to assess the presence of mental disorders for 12 months with the definitions and criteria of the American Psychiatric Association's diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV).[9] The disorders considered in this analysis include anxiety (agoraphobia, generalised anxiety disorder, panic disorder, post-traumatic stress disorder,

	Percentage of health budget to GDP*	Survey*	Sample characteristics†	Field dates	Age (years)	Sample size			Response rate‡
						Part I	Part II	Part II and age ≤44 years§	
Low income									
Nigeria	3·4%	NSMHW	Stratified multistage clustered area probability sample of households in 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	2002–03	≥18	6752	2143	1203	79·3
Low–middle income									
PRC Beijing	5·5%	B-WMH	Stratified multistage clustered area probability sample of household residents in the Beijing metropolitan area	2002–03	≥18	2633	914	307	74·8
PRC Shanghai	5·5%	S-WMH	Stratified multistage clustered area probability sample of household residents in the Shanghai metropolitan area	2002–03	≥18	2568	714	263	74·6
Colombia	5·5%	NSMH	Stratified multistage clustered area probability sample of household residents in all urban areas of the country (around 73% of the total national population)	2003	18–65	4426	2381	1731	87·7
South Africa	8·6%	SASH	Stratified multistage clustered area probability sample of household residents. NR	2003–04	≥18	4315	..	..	87·1
Ukraine	4·3%	CMDPSD	Stratified multistage clustered area probability sample of household residents. NR	2002	≥18	4725	1720	541	78·3
High–middle income									
Lebanon	12·2%	LEBANON	Stratified multistage clustered area probability sample of household residents. NR	2002–03	≥18	2857	1031	595	70·0
Mexico	6·1%	M-NCS	Stratified multistage clustered area probability sample of household residents in all urban areas of the country (around 75% of the total national population)	2001–02	18–65	5782	2362	1736	76·6
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High income

Belgium	8·9%	ESEMeD	Stratified multistage clustered probability sample of individuals residing in households from the national register of Belgium residents. NR	2001–02	≥18	2419	1043	486	50·6
France	9·6%	ESEMeD	Stratified multistage clustered sample of working telephone numbers merged with a reverse directory (for listed numbers). Initial recruitment was by telephone, with supplemental in-person recruitment in households with listed numbers. NR	2001–02	≥18	2894	1436	727	45·9
Germany	10·8%	ESEMeD	Stratified multistage clustered probability sample of individuals from community resident registries. NR	2002–03	≥18	3555	1323	621	57·8
Italy	8·4%	ESEMeD	Stratified multistage clustered probability sample of individuals from municipality resident registries. NR	2001–02	≥18	4712	1779	853	71·3
Israel	8·7%	NHS	Stratified multistage clustered area probability sample of household residents. NR	2002–04	≥21	4859	..	..	72·6
Japan	8·0%	WMHJ2002–03	Unclustered two-stage probability sample of individuals residing in households in four metropolitan areas (Fukiage, Kushikino, Nagasaki, Oyayama)	2002–03	≥20	2436	887	282	56·4
Netherlands	8·9%	ESEMeD	Stratified multistage clustered probability sample of individuals residing in households that are listed in municipal postal registries. NR	2002–03	≥18	2372	1094	516	56·4
New Zealand¶	8·3%	NZMHS	Stratified multistage clustered area probability sample of household residents. NR	2004–05	≥16	12 992	7435	4242	73·3
Spain	7·5%	ESEMeD	Stratified multistage clustered area probability sample of household residents. NR	2001–02	≥18	5473	2121	960	78·6
USA	13·9%	NCS-R	Stratified multistage clustered area probability sample of household residents. NR	2002–03	≥18	9282	5692	3197	70·9

ESEMeD=The European Study of the Epidemiology of Mental Disorders. NSMH=The Colombian National Study of Mental Health. NHS=Israel National Health Survey. WMHJ2002-2003=World Mental Health Japan Survey. LEBANON=Lebanese Evaluation of the Burden of Ailments and Needs of the Nation. M-NCS=The Mexico National Comorbidity Survey. NZMHS=New Zealand Mental Health Survey. NSMHW=The Nigerian Survey of Mental Health and Wellbeing. B-WMH=The Beijing World Mental Health survey. S-WMH=The Shanghai World Mental Health Survey. SASH=South Africa Health Survey. CMDPSD=Comorbid Mental Disorders during Periods of Social Disruption. NCS-R=The US National Comorbidity Survey Replication. NR=nationally representative. PRC=People's Republic of China. GDP=gross domestic product. *Reference 17. †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 USA were selected in the first stage followed by one or more subsequent stages of geographic sampling (eg, 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 Netherlands (where postal registries were used to select households). Several WMH surveys (Belgium, Germany, Italy) used municipal resident registries to select respondents without listing households. The Japanese sample is the only totally unclustered sample, with households randomly selected in each of the four sample areas and one random respondent selected in each sample household. Nine of the 15 surveys are based on NR household samples, and two others are based on NR household samples in urbanised areas (Colombia, Mexico). ‡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. §All countries, with the exception of Nigeria, PRC Beijing, PRC Shanghai, and Ukraine (which were age restricted to ≤39 years) were age restricted to ≤44 years. ¶For cross-national analysis, the New Zealand sample was restricted to ≥18 years of age for a total sample size of 12 790.

Table 1: **Sample characteristics of the 17 countries of the WHO world mental health survey initiative**

social phobia, specific phobia), mood disorders (bipolar disorder, including bipolar I and II; dysthymia; major depressive disorder), and substance disorders (alcohol and drug abuse and dependence). All diagnoses were made with CIDI organic exclusion rules, which ascertain that the symptoms are not due to a physical cause or the use of medication or drugs. WHO-CIDI field trials and clinical calibration studies provided evidence that the WMH-CIDI assesses the disorders included here with generally acceptable reliability and validity.[10,11] Cross-national comparisons of the validity of WMH-CIDI diagnoses are underway.

Because the simple presence of a diagnosis might not show the level of need for services, we classified WMH-CIDI mental disorders as serious, moderate, or mild. Serious disorders were defined as bipolar I disorder or substance dependence with a physiological dependence syndrome, making a suicide attempt in conjunction with any other disorder, reporting severe role impairment due to a mental disorder in at least two areas of functioning measured by disorder-specific Sheehan Disability Scales (SDS),[12] or having overall functional impairment from any disorder consistent with a Global Assessment of Functioning (GAF)[13] score of 50 or less. Disorders were classified as moderate if the respondent had substance dependence without a physiological dependence syndrome or at least moderate interference in any SDS domain. All other disorders were classified as mild. Although the accuracy of this measure of disorder seriousness has not been firmly established, some evidence for its validity comes from significant monotonic (ie, generally linear relation) associations in all but two surveys between disorder severity and number of days in the previous year that respondents were unable to undertake normal daily activities because of disorders.[7]

Services received in the previous 12 months were assessed by asking respondents if they ever saw any type of professional, either as an outpatient or inpatient, for problems with emotions, nerves, mental health, or

	Any treatment (p<0·0001)	Respondents*				Respondents using services†			
		Mental health specialty (p<0·0001)‡	General medical (p<0·0001)‡	Human services (p<0·0001)‡	CAM (p<0·0001)‡	Mental health specialty (p<0·0001)‡	General medical (p<0·0001)‡	Human services (p<0·0001)‡	CAM (p<0·0001)‡
Low income									
Nigeria	57 (1·6%; 0·3)	5 (0·1%; 0·1)	42 (1·1%; 0·2)	14 (0·5%; 0·2)	1 (0%; 0)	5 (8·3%; 3·6)	42 (66·6%; 10·0)	14 (30·9%; 10·1)	1 (1·1%; 1·1)
Low-middle income									
China	74 (3·4%; 0·6)	19 (0·6%; 0·2)	41 (2·3%; 0·5)	6 (0·3%; 0·1)	18 (0·7%; 0·3)	19 (18·0%; 5·9)	41 (68·5%; 7·1)	6 (7·4%; 3·7)	18 (21·2%; 7·2)
Colombia	217 (5·5%; 0·6)	126 (3·0%; 0·4)	82 (2·3%; 0·4)	19 (0·5%; 0·2)	10 (0·2%; 0·1)	126 (53·4%; 4·8)	82 (41·7%; 5·1)	19 (9·2%; 2·8)	10 (3·7%; 1·4)
South Africa	675 (15·4%; 1·0)	108 (2·5%; 0·4)	440 (10·2%; 0·8)	169 (3·7%; 0·4)	161 (3·7%; 0·3)	108 (16·3%; 2·2)	440 (66·4%; 2·5)	169 (24·0%; 1·9)	161 (23·8%; 2·1)
Ukraine	212 (7·2%; 0·8)	39 (1·2%; 0·3)	135 (4·0%; 0·7)	47 (1·7%; 0·4)	29 (1·0%; 0·3)	39 (17·2%; 3·8)	135 (55·4%; 7·1)	47 (24·1%; 5·1)	29 (14·4%; 4·0)
High-middle income									
Lebanon	77 (4·4%; 0·6)	18 (1·0%; 0·3)	53 (2·9%; 0·5)	11 (0·8%; 0·3)	0 (0·0%; 0·0)	18 (22·3%; 5·7)	53 (66·6%; 7·4)	11 (17·5%; 6·1)	0 (0·0%; 0·0)
Mexico	240 (5·1%; 0·5)	121 (2·8%; 0·3)	92 (1·7%; 0·3)	15 (0·3%; 0·1)	45 (1·0%; 0·2)	121 (53·6%; 4·2)	92 (33·1%; 4·0)	15 (6·2%; 2·0)	45 (20·0%; 3·4)
High income									
Belgium	187 (10·9%; 1·4)	96 (5·2%; 0·7)	147 (8·2%; 1·3)	6 (0·4%; 0·2)	12 (0·7%; 0·3)	96 (47·9%; 4·4)	147 (75·5%; 3·8)	6 (3·7%; 1·8)	12 (6·5%; 2·9)
France	272 (11·3%; 1·0)	111 (4·4%; 0·5)	214 (8·8%; 0·9)	10 (0·4%; 0·2)	9 (0·5%; 0·3)	111 (39·4%; 3·6)	214 (78·4%; 3·3)	10 (3·4%; 1·2)	9 (4·3%; 2·1)
Germany	183 (8·1%; 0·8)	100 (3·9%; 0·6)	102 (4·2%; 0·6)	16 (1·0%; 0·4)	15 (0·6%; 0·2)	100 (48·5%; 4·8)	102 (51·7%; 5·1)	16 (12·2%; 4·5)	15 (7·4%; 2·5)
Israel	421 (8·8%; 0·4)	215 (4·4%; 0·3)	169 (3·6%; 0·3)	71 (1·6%; 0·2)	42 (0·8%; 0·1)	215 (50·5%; 2·6)	169 (40·4%; 2·6)	71 (18·0%; 2·0)	42 (9·6%; 1·5)
Italy	141 (4·3%; 0·4)	55 (2·0%; 0·3)	107 (3·0%; 0·3)	15 (0·4%; 0·1)	4 (0·1%; 0·0)	55 (47·1%; 5·1)	107 (70·9%; 4·8)	15 (9·1%; 2·4)	4 (1·5%; 0·7)
Japan	92 (5·6%; 0·9)	43 (2·4%; 0·5)	47 (2·8%; 0·5)	8 (0·8%; 0·5)	13 (0·6%; 0·2)	43 (42·5%; 5·5)	47 (50·2%; 8·2)	8 (15·0%; 6·7)	13 (11·1%; 4·7)
Netherlands	202 (10·9%; 1·2)	105 (5·5%; 1·0)	141 (7·7%; 1·1)	14 (0·6%; 0·2)	27 (1·5%; 0·4)	105 (51·0%; 6·0)	141 (71·2%; 6·1)	14 (5·4%; 1·6)	27 (13·5%; 3·8)
New Zealand	1592 (13·8%; 0·5)	585 (5·2%; 0·3)	1122 (9·2%; 0·4)	203 (1·6%; 0·2)	265 (2·6%; 0·3)	585 (37·6%; 1·8)	1122 (66·5%; 1·8)	203 (11·5%; 1·1)	265 (19·0%; 1·7)
Spain	375 (6·8%; 0·5)	200 (3·6%; 0·4)	249 (4·4%; 0·4)	11 (0·1%; 0·1)	20 (0·2%; 0·1)	200 (52·2%; 3·6)	249 (64·9%; 3·4)	11 (2·1%; 0·8)	20 (3·5%; 1·0)
USA	1477 (17·9%; 0·7)	738 (8·8%; 0·5)	773 (9·3%; 0·4)	266 (3·4%; 0·3)	247 (2·8%; 0·2)	738 (48·8%; 1·7)	773 (51·8%; 1·3)	266 (18·8%; 1·1)	247 (15·6%; 1·0)

Data are number (%; SE). The reported numbers are actual numbers rather than weighted estimates, which is why the ratios of these numbers to the total number of respondents in the survey do not equal the percentages. See methods section for a description of the weighting. *Percentages for respondents are based on entire part II samples. †Percentages are based on respondents using any 12-month services. ‡χ² test from a model predicting any 12-month service use among respondents within each level of severity. CAM=complementary and alternative medicine.

Table 2: 12-month service use by sectors in the WMH surveys

use of alcohol or drugs. Included were mental health professionals (eg, psychiatrist, psychologist), general medical professionals (eg, family doctor, occupational therapist), religious counsellors (eg, minister, sheikh), and traditional healers (eg, herbalist, spiritualist). Examples of these types of providers were presented in a respondent booklet as a visual recall aid and varied somewhat across countries, dependent on local circumstances. Follow-up questions were asked about age at first and most recent contacts and number and duration of visits in the past 12 months.

Reports of 12-month service use were classified into the following sectors: mental health specialty (psychiatrist, psychologist, other mental health professional in any setting, social worker or counsellor in a mental health specialty setting, use of a mental health hotline); general medical (primary care doctor, other general medical doctor, nurse, any other health professional not previously mentioned); human services (religious or spiritual advisor, social worker, or counsellor in any setting other than a specialty mental health setting); and complementary and alternative medicine (any other type of healer such as chiropractors, participation in an internet support group, participation in a self-help group).

Treatment

A definition of follow-up care that could be applied in both low-resource and high-resource countries consisted of receiving two or more visits to any service sector (one visit for presumptive assessment or diagnosis and one or more visits for treatment or monitoring). Because respondents who began treatments shortly before interview might not have had time to meet these requirements, anyone who reported receiving continuing treatment at interview was regarded as having met this definition.

A second more rigorous definition identified those who potentially could have received minimally adequate treatment according to evidence-based guidelines.[14–16] This definition consisted of receiving either pharmacotherapy (≥1 month of a medication, plus ≥four visits to any type of medical doctor) or psychotherapy (≥eight visits with any professional). The decision to have four or more physician visits for pharmacotherapy was based on the fact that for medication assessment, initiation, and monitoring, four or more visits are generally recommended during the acute and continuation phases of treatment.[14–16] At least eight sessions were needed for psychotherapy since clinical trials showing efficacy have generally included eight or

more visits.[14–16] Any respondent in continuing treatment was regarded as having met this definition.

Sociodemographic variables included cohort (defined by age at interview and categorised as <35, 35–49, 50–64, ≥65 years), sex, completed years of education (four country-specific categories), marital status (married-cohabiting, separated-widowed-divorced, never married), and family income as related to country medians (low, low average, high average, high).

Statistical analysis

We first computed the number of patients in treatment in any or specific sectors, and probabilities of service use meeting criteria for follow-up or potentially minimally adequate care. We then examined how these basic patterns of service use differed across strata defined by the severity of disorders. Logistic regression analysis was used to study sociodemographic predictors of receiving any 12-month services. Standard errors were estimated with the Taylor series method as implemented in SUDAAN (version 8.0.1). Two-sided significance tests at the 0·05 level were made in logistic regression analyses with Wald χ^2 tests based on coefficient variance–covariance matrices adjusted for design effects with the Taylor series method.

Role of the funding source

The sponsor of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

Respondents using any mental health services in the previous 12 months varied significantly, with generally fewer services used in low-income or middle-income countries than in high-income countries (table 2). The proportions receiving services also tended to correspond to countries' overall spending on health care (table 1).[17] Most respondents used general medical, followed by mental health specialty sectors (with the exceptions of Mexico, Columbia, and Israel, where this trend was reversed); smaller proportions used human services and complementary and alternative therapies. Table 2 shows proportions using specific sectors in respondents receiving any 12-month services. Apart from Mexico, Colombia, and Israel, the sectors used most frequently by treated respondents were the general medical followed by mental health specialty.

Significant, generally monotonic relations existed between disorder severity and probability of service use in every country except China (table 3). Despite these dose-response relations, only between five (11%; China) and 46 (61%; Belgium) of serious cases received any service in the previous year. Fewer participants with moderate and mild disorders tended to receive services in the previous year than did those with serious

disorders. Some of those apparently without disorders used treatments. Cross-national differences were significant in all severity categories, with generally less service use in low-income and middle-income countries than in high-income countries.

Table 4 shows associations between disorder severity and use of the mental health specialty sector in respondents receiving services. Statistical power was low in these analyses because treated respondents were few. Nevertheless, significant relations between severity and use of mental health specialty sectors existed in only seven of 17 countries. Even in those countries where such a relation exists, significant proportions of mild and non-cases use these services.

For respondents initiating treatments, those receiving any follow-up care varied greatly (table 5). Although the proportions were generally smaller in low-income or middle-income countries than in high-income countries, there were notable exceptions to this trend. Significant relations between disorder severity and the probability of receiving follow-up care existed in only seven countries. Therefore, receiving at least some follow-up care for treatment initiators was by no means universal in severe cases and it was quite common in apparent non-cases.

	Severe (p<0.0001)*	Moderate (p<0.0001)*	Mild (p<0.0001)*	None (p<0.0001)*	p value†
Low income					
Nigeria	8 (21·3%; 10·2)	6 (13·8%; 7·1)	14 (10·0%; 2·7)	29 (1·0%; 0·3)	<0·0001
Low-middle income					
China	5 (11·0%; 5·9)	11 (23·5%; 10·6)	3 (1·7%; 1·1)	55 (2·9%; 0·6)	0·0005
Colombia	54 (27·8%; 4·8)	47 (10·3%; 2·0)	30 (7·8%; 1·6)	86 (3·4%; 0·6)	<0·0001
South Africa	45 (26·2%; 3·6)	66 (26·6%; 3·9)	67 (23·1%; 3·2)	497 (13·4%; 0·9)	<0·0001
Ukraine	49 (25·7%; 3·2)	68 (21·2%; 3·6)	19 (7·6%; 2·6)	76 (4·4%; 0·8)	<0·0001
High-middle income					
Lebanon	22 (20·1%; 5·2)	19 (11·6%; 3·1)	7 (4·0%; 1·6)	29 (3·0%; 0·7)	<0·0001
Mexico	52 (25·8%; 4·3)	53 (17·9%; 2·9)	33 (11·9%; 2·3)	102 (3·2%; 0·4)	<0·0001
High income					
Belgium	46 (60·9%; 9·1)	30 (36·5%; 8·6)	15 (13·9%; 4·3)	96 (6·8%; 1·1)	<0·0001
France	56 (48·0%; 6·4)	71 (29·4%; 3·9)	43 (21·1%; 3·5)	102 (7·0%; 1·1)	<0·0001
Israel	86 (53·1%; 3·9)	55 (32·3%; 3·7)	19 (14·4%; 3·1)	261 (6·0%; 0·4)	<0·0001
Germany	30 (40·0%; 8·5)	40 (23·9%; 4·6)	27 (20·3%; 5·1)	86 (5·9%; 0·9)	<0·0001
Italy	29 (51·0%; 6·4)	39 (25·9%; 4·1)	21 (17·3%; 4·3)	52 (2·2%; 0·4)	<0·0001
Japan‡	10 (24·2%; 5·0)	16 (24·2%; 5·0)	9 (12·8%; 4·4)	57 (4·5%; 0·9)	<0·0001
Netherlands	59 (50·4%; 6·8)	36 (31·3%; 7·1)	15 (16·1%; 5·9)	92 (7·7%; 1·3)	<0·0001
New Zealand	458 (56·6%; 2·2)	421 (39·8%; 1·9)	184 (22·2%; 1·9)	529 (7·3%; 0·5)	<0·0001
Spain	79 (58·7%; 4·9)	93 (37·4%; 4·8)	37 (17·3%; 3·9)	166 (3·9%; 0·5)	<0·0001
USA	385 (59·7%; 2·4)	394 (39·9%; 1·3)	219 (26·2%; 1·7)	479 (9·7%; 0·6)	<0·0001

Data are number (%; SE). The reported numbers are actual numbers rather than weighted estimates, which is why the ratios of these numbers to the total number of respondents in the survey do not equal the percentages. See methods section for a description of the weighting. *χ^2 is from a model predicting any 12-month service use in respondents within each level of severity. †Test of difference in probability of treatment by severity ‡Severe and moderate cases were combined into one category for Japan and the percentage using services was displayed in both columns. The χ^2 test was two df for this country. §Percentages based on entire part II sample and on respondents using any services within each level of severity.

Table 3: **12-month service use by severity of mental disorders in the WMH surveys**§

	Severe	Moderate	Mild	None	p value*
Low income					
Nigeria†	1	0	3 (9·5%; 4·4)	1 (9·5%; 4·4)	0·23
Low-middle income					
China†	3	2	3 (16·7%; 6·8)	11 (16·7%; 6·8)	0·64
Colombia	30 (62·9%; 8·3)	28 (47·1%; 8·0)	19 (62·2%; 10·3)	49 (48·8%; 8·3)	0·60
South Africa	14 (35·9%; 7·6)	13 (19·7%; 5·9)	12 (15·5%; 5·6)	69 (14·1%; 2·0)	0·002
Ukraine	15 (34·8%; 6·8)	9 (16·2%; 8·2)	3	12 (12·5%; 5·3)	0·035
High-middle income					
Lebanon†	7 (35·6%; 9·2)	5 (35·6%; 9·2)	1 (14·0%; 7·3)	5 (14·0%; 7·3)	0·08
Mexico	26 (60·3%; 8·0)	30 (59·1%; 6·8)	15 (51·0%; 11·2)	50 (50·4%; 7·0)	0·78
High income					
Belgium	25 (58·6%; 9·8)	17 (48·6%; 10·9)	6	48 (44·0%; 7·4)	0·53
France	27 (49·7%; 8·6)	26 (33·8%; 8·3)	13 (34·1%; 7·0)	45 (40·1%; 6·9)	0·49
Germany	17 (46·4%; 12·1)	28 (68·9%; 8·8)	12	43 (47·4%; 6·2)	0·018
Israel	42 (47·4%; 5·6)	30 (53·2%; 7·0)	10	133 (50·7%; 3·2)	0·85
Italy	10	11 (31·7%; 10·1)	7	27 (65·8%; 7·4)	0·029
Japan†	7	13	5 (34·2%; 6·0)	18 (34·2%; 6·0)	0·0005
Netherlands	35 (64·9%; 7·1)	22 (45·2%; 15·5)	6	42 (47·5%; 9·2)	0·55
New Zealand	232 (57·4%; 2·9)	140 (34·7%; 3·4)	49 (26·3%; 4·3)	164 (32·0%; 2·9)	<0·0001
Spain	52 (65·4%; 7·3)	55 (61·3%; 5·5)	21 (45·2%; 10·4)	72 (45·1%; 6·5)	0·14
USA	250 (66·0%; 2·4)	182 (45·0%; 3·3)	91 (41·5%; 3·1)	215 (43·8%; 2·6)	<0·0001

Data are number (%; SE). The reported numbers are actual numbers rather than weighted estimates, which is why the ratios of these numbers to the total number of respondents in the survey do not equal the percentages. See methods section for a description of the weighting. *Test of difference in probability of treatment by severity. †One df χ^2 tests were done for Nigeria, Lebanon, Japan and China, where combined severe and moderate was compared against combined mild and none category. Three degree of freedom tests were done for all other countries. ‡Percentages based on entire part II samples and are those in any mental health treatment among respondents using any services within each level of severity. Percentages not reported if the number of respondents using any services in a level of severity <30.

Table 4: Mental health specialty sector use for respondents using any services in the WMH surveys‡

For respondents using services, those who received treatments that were potentially minimally adequate varied significantly (table 6). Proportions were generally smaller in low-income countries than in high-income countries, with the low rate in the USA being a notable exception. There were significant relations between severity and receiving potentially minimally adequate treatment in only five countries; as a result, several severe cases using services failed to receive minimally adequate treatment, whereas many non-cases did so.

Sex was significantly related to any 12-month service use in ten countries, with women more likely to use services than men in all ten (results available from the authors on request). Age was a significant predictor of receiving mental health services in eight countries; in these countries, respondents in the middle years of life were generally more likely to receive services than were either younger or older respondents. There were significant positive relations between education and service use in three countries. Marital status was significantly related to service use in five countries, with those married being less likely than those unmarried to receive services in all five. Income was significantly related to service use in four countries, positively so in three and negatively in one.

Discussion

We have shown that the proportion of respondents using 12-month mental health services was generally lower in resource-poor settings than in developed countries, and the proportion receiving services tended to correspond with countries' overall spending on health care. More respondents used general medical sectors than mental health specialty sectors. There were significant relations between disorder severity and probability of service use in almost all countries. However, few of those with serious disorders received services in the previous year. Many patients who initiated treatment failed to receive follow-up care or treatment meeting minimal standards for adequacy.

Our results should be interpreted with five sets of limitations in mind. First, response rates in the WMH surveys varied widely and included some below standard responses usually regarded as acceptable. We did attempt to control for differential response through poststratification adjustments. However, survey response could relate to the presence and severity of mental disorders or treatment in ways that were not corrected, potentially leading to biased cross-national comparisons. Missing data are another potential limitation, especially if they were related to psycho-pathological disorders or treatment.

Second, some clinically important disorders such as schizophrenia were not assessed in WMH surveys because earlier validation studies have shown that they are overestimated in interviews administered by lay-people, as happens with the CIDI.[11] However, these studies have also shown that even if disorders such as non-affective psychosis are not assessed, most respondents would still meet criteria for comorbid anxiety, mood, or substance disorders, and are therefore captured in our analyses. Another related limitation is that the exact disorders assessed also varied across surveys because some were felt a priori to have low relevance in some countries. For example, specific phobia was not assessed in Israel. Although we replicated analyses using only disorders assessed in all surveys and found little change in results (unpublished data), other findings could be sensitive to differences in the disorders assessed.

A third potential limitation is that the reliability and validity of diagnoses made with the WMH CIDI might vary across countries. Although acceptable concordance has been noted between diagnoses made with the CIDI and those from blinded clinical re-interviews, such studies have been done almost exclusively in developed countries. The accuracy of CIDI diagnoses could be worse in other countries. One distinct possibility is that there is a lower relevance of CIDI symptom descriptions in developing cultures than in developed countries, or greater reluctance to endorse emotional problems in countries with short traditions of free speech and anonymous public-opinion surveying. In fact, much lower rates of CIDI alcohol disorders have been reported

	Any severity (p<0·0001)*	Severe (p=0·051)*	Moderate (p<0·0001)*	Mild (p=0·10)*	None (p<0·0001)*	p value†
Low income						
Nigeria‡	47 (76·3%; 7·8)	6	6	13 (74·6%; 8·4)	22 (74·6%; 8·4)	0·50
Low-middle income						
China‡	56 (77·6%; 6·1)	4	6	3 (80·8%; 6·9)	43 (80·8%; 6·9)	0·33
Colombia	158 (72·0%; 4·3)	49 (92·6%; 3·5)	31 (73·1%; 7·9)	20 (61·7%; 11·3)	58 (63·6%; 7·9)	0·006
South Africa	601 (89·1%; 1·7)	42 (93·9%; 3·9)	63 (95·7%; 3·0)	58 (87·4%; 3·7)	438 (88·0%; 2·2)	0·39
Ukraine	167 (79·1%; 3·8)	44 (92·3%; 3·6)	51 (82·3%; 4·5)	14	58 (71·8%; 7·0)	0·006
High-middle income						
Lebanon‡	62 (78·9%; 6·9)	17 (84·1%; 4·4)	15 (84·1%; 4·4)	7 (75·7%; 10·2)	23 (75·7%; 10·2)	0·367
Mexico	180 (74·5%; 4·4)	40 (85·5%; 4·2)	41 (76·6%; 6·7)	25 (84·3%; 6·9)	74 (67·8%; 7·7)	0·11
High income						
Belgium	165 (84·3%; 3·9)	42 (84·4%; 9·5)	27 (84·3%; 10·4)	14	82 (83·1%; 5·3)	0·30
France	235 (86·0%; 3·9)	49 (87·5%; 4·7)	66 (97·3%; 1·6)	35 (89·7%; 4·4)	85 (80·0%; 6·9)	0·049
Germany	152 (70·2%; 5·1)	28 (89·2%; 8·5)	38 (97·1%; 0·7)	23	63 (61·1%; 7·4)	<0·0001
Israel	364 (86·1%; 1·8)	77 (88·2%; 4·1)	49 (89·2%; 4·1)	17	221 (83·6%; 2·3)	0·66
Italy	129 (94·5%; 1·5)	28	35 (93·5%; 3·4)	19	47 (94·4%; 2·5)	0·73
Japan‡	83 (89·8%; 2·6)	9	13	9 (91·2%; 3·3)	52 (91·2%; 3·3)	0·33
Netherlands	183 (85·9%; 4·3)	55 (96·6%; 2·0)	35 (98·9%; 1·2)	15	78 (78·1%; 7·3)	0·006
New Zealand	1394 (85·7%; 1·3)	421 (92·5%; 1·4)	368 (88·7%; 1·8)	151 (83·5%; 3·2)	454 (81·0%; 2·8)	0·002
Spain	341 (88·8%; 2·6)	73 (95·3%; 1·9)	86 (92·6%; 3·0)	35 (91·5%; 5·8)	147 (84·7%; 4·8)	0·12
USA	1313 (86·8%; 1·4)	362 (93·2%; 1·7)	354 (88·4%; 2·0)	187 (83·0%; 2·9)	410 (83·3%; 2·6)	0·0006

Data are numbers (%; SE). The reported numbers are actual numbers rather than weighted estimates, which is why the ratios of these numbers to the total number of respondents in the survey do not equal the percentages. See methods section for a description of the weighting. *χ² is from a model predicting follow-up treatment among respondents in each level of severity that used any 12-month services. †Test of difference in probability of treatment by severity. ‡One df χ² tests were done for Nigeria, Lebanon, Japan, and China, where combined severe and moderate was compared against combined mild and none categories. Three df tests were done for all other countries. §Follow-up treatment was defined as receiving two or more visits to any service sector, or being in continuing treatment at interview. Percentages are based on entire part II samples and are those receiving follow-up treatment among those in treatment within each level of severity. Percentages not reported if the number of cases with any treatment in a level of severity <30.

Table 5: **Follow-up treatment for respondents using services in the WMH surveys§**

in Ukraine than was expected from administrative data.[18] Furthermore, countries with the lowest disorder rates also had the highest proportions of treated respondents who were apparently subthreshold cases, suggesting greater underestimation of disorders. Clinical reappraisal studies are underway in both developed and less-developed WMH countries, which will shed light on the magnitude and seriousness of concerns over differential diagnostic validity.

Fourth, without corroborating data for service use we cannot study the accuracy of self-reported treatment use or how this validity could differ across specific sectors or clinical, sociodemographic, and cultural groups. Earlier studies suggest that self-reports of service use might overestimate administrative records, especially for respondents with distressing disorders.[19,20] WMH surveys did attempt to keep such inaccuracies to a minimum by using commitment probes (ie, questions measuring a respondent's commitment to the survey) and excluding respondents who failed to say that they would think carefully and answer honestly. Nevertheless, potentially biased recall of service use remains possible and could have led to underestimation of unmet need for treatment, especially for those with serious

disorders. Finally, despite the unprecedented scope and size of the WHO WMH survey initiative, some analyses consisted of small numbers of respondents, which might have rendered our conclusions less certain.

With these limitations in mind, our results show disturbingly high levels of unmet need for mental health treatment worldwide, even for people with the most serious disorders. The situation seems to be worst in less-developed nations, with only a few people with serious disorders receiving any form of care in the previous year; however, even in developed countries, roughly half of those with severe disorders receive no services. Additionally, the study limitations we describe that would lead to underestimation of unmet needs for treatment, especially in less-developed countries, compound these findings.

For the small number of people receiving some services, it seems likely that few are treated effectively. Some received non-health care from complementary and alternative medicine and human services sectors, despite growing questions about the effectiveness and safety of such treatments.[21] In many countries, nearly a quarter of those initiating treatments failed to receive any follow-up care. Consistent with previous studies,

	Any severity (p<0·0001)*	Severe (p<0·0001)*	Moderate (p=0·0011)*	Mild (p=0·0056)*	None (p<0·0001)*	p value†
Low income						
Nigeria‡	1 (10·4%; 9·8)	0	0	0 (12·4%; 11·7)	1 (12·4%; 11·7)	
Low-middle income						
China‡	19 (24·1%; 7·1)	0	3	2 (20·1%; 6·2)	14 (20·1%; 6·2)	0·37
Colombia	33 (14·7%; 3·4)	11 (23·1%; 8·5)	7 (21·7%; 10·5)	3 (6·3%; 4·6)	12 (10·1%; 3·5)	0·20
South Africa§	0	0	0	0	0	
Ukraine§	0	0	0	0	0	
High-middle income						
Lebanon‡	18 (24·5%; 7·1)	5 (24·0%; 6·2)	3 (24·0%; 6·2)	3 (24·8%; 10·7)	7 (24·8%; 10·7)	0·95
Mexico	42 (15·2%; 2·7)	8 (11·3%; 4·5)	13 (28·6%; 6·3)	6 (19·8%; 5·8)	15 (11·3%; 4·0)	0·014
High income						
Belgium	78 (33·6%; 5·2)	23 (42·5%; 8·5)	12 (35·5%; 12·6)	6	37 (29·4%; 6·3)	0·63
France	113 (42·3%; 5·4)	29 (57·9%; 8·5)	29 (36·5%; 6·6)	15 (41·5%; 9·7)	40 (40·2%; 8·3)	0·35
Germany	91 (42·0%; 6·1)	21 (67·3%; 10·7)	22 (53·9%; 8·5)	14	34 (35·4%; 8·9)	0·10
Israel	148 (35·1%; 2·5)	31 (35·2%; 5·3)	23 (42·8%; 6·8)	6	88 (34·3%; 3·0)	0·63
Italy	45 (33·0%; 5·1)	12	11 (33·4%; 9·1)	6	16 (31·0%; 7·5)	0·41
Japan‡	35 (31·8%; 6·8)	6	6	5 (27·9%; 7·0)	18 (27·9%; 7·0)	0·037
Netherlands	98 (34·4%; 5·0)	39 (67·2%; 9·0)	19 (34·1%; 10·2)	10	30 (20·8%; 5·1)	<0·0001
New Zealand§	0	0	0	0	0	
Spain	152 (37·3%; 3·3)	41 (47·5%; 7·5)	37 (43·6%; 5·6)	22 (48·5%; 9·8)	52 (29·2%; 4·6)	0·023
USA‡	302 (18·1%; 1·1)	160 (41·8%; 3·2)	101 (24·8%; 2·1)	41 (4·9%; 0·8)	..	<0·0001

Data are number (%; SE). The reported numbers are actual numbers rather than weighted estimates, which is why the ratios of these numbers to the total number of respondents in the survey do not equal the percentages. See methods section for a description of the weighting. *χ^2 is from a model predicting minimally adequate treatment among respondents in each level of severity that used any 12-month services. †Test of difference in probability of treatment by severity. ‡The test was not done for Nigeria because there was only one (unweighted) case with adequate treatment. One degree of freedom χ^2 tests were done for Lebanon, Japan, and China, where combined severe and moderate was compared against combined mild and none category. Two degree of freedom test was done for the USA, where the mild and none categories were collapsed. Three degree of freedom tests were done for all other countries. §The questions on pharmacoepidemiology were not asked in Ukraine, South Africa, or New Zealand. ¶Minimally adequate treatment was defined as receiving eight or more visits to any service sector, or four or more visits and at least 1 month of medication, or being in continuing treatment at interview. Percentages are based on entire part II samples are those receiving minimally adequate treatment among those in treatment within each level of severity. Percentages not reported if the number of cases with any treatment in a level of severity <30.

Table 6: Minimally adequate treatment use for respondents using services in the WMH surveys¶

few treatments were observed to meet minimum standards for adequacy.[13–15,22]

High levels of unmet need worldwide are not surprising, since WHO Project ATLAS' findings of much lower mental health expenditures than was suggested by the magnitude of burdens from mental illnesses.[1,23] Generally, unmet needs in low-income and middle-income countries might be attributable to these nations spending reduced amounts (usually <1%) of already diminished health budgets on mental health care, and they rely heavily on out-of-pocket spending by citizens who are ill equipped for it.[23] Notable exceptions to the rule of greater unmet needs in developing countries than in developed ones could be explained by levels of investment in health care. For example, South Africa's high rates of treatment could indicate its greater spending (8·6% of gross domestic product) on health care than any low-income or middle-income country studied, and even some high-income countries; however, Japan's and Italy's smaller rates of treatment could reflect less spending (8·0% and 8·4% of gross domestic product, respectively) than other high-income and even some low or middle-income countries.[16]

We need to understand how the few mental health resources that nations do have can be best allocated. An overly simplistic view of our results could be that a meaningful number of services are going to those without apparent needs. Such potential diversion of limited treatment resources to individuals without apparent needs would be of concern in view of the magnitude of unmet needs for patients with clearly defined and serious disorders.[24] The weak or absent relation between use of specialty sectors and disorder severity could also be further evidence of poor prioritisation of treatment for severe cases. However, identification of whether such services are being used appropriately for disorders not assessed in WMH surveys, subthreshold symptoms, secondary prevention of lifetime disorders, or even primary prevention, is crucial.[25] Uncovering other factors, beyond clinical severity, disability, or distress that could motivate use of mental health services will also be important.[26]

The general medical sector is the largest source of mental health services for most countries, which could indicate conscious attempts by policymakers to broaden access to services, rather than concentrating resources

on the few patients with access to specialty sectors.[27] This finding could also suggest gatekeeping by primary care physicians employed in some countries to reserve specialty treatment for severe cases.[28] Whatever the rationale, we need to ensure that mental health care received in general medical sectors is not of low intensity and adequacy, as has been recorded in other studies.[22]

Our results for predictors of service use are generally consistent with previous work. The young relative to middle-aged carers might be more dependent on others and therefore reluctant to access services;[29] on the other hand, elderly people might avoid seeking mental health care because of the greater perceived stigma of mental disorders and treatments for people in this age range than for those who are younger.[30] Higher rates of treatment for women than for men could be explained by women's diminished perceptions of stigma and their greater abilities to translate non-specific feelings of distress into conscious recognition of having a mental health problem.[31]

Effects of greater income were variable, since service use increased in some countries but decreased in others. Substantial effects of financial barriers on seeking treatment could exist in countries where there is a positive association between income and service use.[32] However, negative associations could be explained by the fact that only poor people qualify for entitlements in some countries.[32] Respondents who are well educated might also have greater resources than those whose education was poor; alternatively, their higher treatment rates might show that some methods (eg, psychotherapies) place an emphasis on knowledge and cognitive processes. The generally increased use of mental health services in those not married could indicate the power of relationship loss, strife, or social impairments as motivators for seeking treatment.[30]

Our results have implications in several areas. First, alleviation of the difficulty of widespread undertreatment will almost certainly need expansion of treatment resources and governmental as well as private means of financing mental health services. Second, there is also a pressing need to devise rational, transparent, and ethical allocation rules. Should countries focus resources on those with the greatest needs rather than on increasing numbers with mild disorders (to prevent negative sequelae)? Should service be delivered through primary rather than specialty sectors, or inpatient instead of community settings? And should countries provide mental health services on parity with those for general medical disorders?[33] Ideally these questions would be answered through formal analyses of the burdens from illnesses and the cost-effectiveness of treatments.[34] Unfortunately, rigorous data to analyse disease burdens and weigh the costs and benefits of different regimens are largely scarce.[27] Without such rational schemes, decisions about resource allocation are usually made on the basis of simple minimisation of costs and even attitudinal factors such as stigma and desire to punish people perceived as being personally responsible for their mental health problems.[35]

Finally, when rational, transparent, and ethical priorities have been set, policymakers need specific designs that they can implement to achieve their goals. Some techniques used in managed care systems (eg, gatekeeping, increased cost sharing, review of use, previous approval, etc) could presumably be brought to bear on unnecessary use but not underuse—in fact, some techniques could worsen unmet needs for treatment. Furthermore, these elements from largely developed nations such as the USA might not be translatable to other countries and circumstances. The effects of other policies, delivery system features, and means of financing that policymakers could implement, are essentially unknown. Therefore, gathering of detailed data for the mental health policies, delivery system features, and means of financing mental health care in different countries is a promising area for future work.[23] When merged with WMH surveys on the use and adequacy of treatments, such combined data could shed light on the effects of policies, delivery system, and financing features, and help policymakers choose policies that achieve their desired goals.[36]

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