Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative

Ronald C. Kessler[1], Matthias Angermeyer[2], James C. Anthony[3], Ron de Graaf[4], Koen Demyttenaere[5], Isabelle Gasquet[6], Giovanni de Girolamo[7], Semyon Gluzman[8], Oye Gureje[9], Josep Maria Haro[10], Norito Kawakami[11], Aimee Karam[12], Daphna Levinson[13], Maria Elena Medina Mora[14], Mark A. Oakley Browne[15], José Posada-Villa[16], Dan J. Stein[17], Cheuk Him Adley Tsang[18], Sergio Aguilar-Gaxiola[19], Jordi Alonso[20], Sing Lee[21], Steven Heeringa[22], Beth-Ellen Pennell[22], Patricia Berglund[22], Michael J. Gruber[1], Maria Petukhova[1], Somnath Chatterji[23], T. Bedirhan Üstün[23], for the WHO World Mental Health Survey Consortium

[1]Department of Health Care Policy, Harvard Medical School, 180 Longwood Avenue, Boston, MA 02115, USA; [2]Department of Psychiatry, University of Leipzig, Germany; [3]Department of Epidemiology, Michigan State University, East Lansing, MI, USA; [4]Netherlands Institute of Mental Health and Addiction, Utrecht, The Netherlands; [5]Department of Neurosciences and Psychiatry, University Hospital Gasthuisberg, Leuven, Belgium; [6]Hôpitaux de Paris, Paris, France; [7]Department of Mental Health, Local Health Unit, Bologna, Italy; [8]Ukrainian Psychiatric Association, Kyiv, Ukraine; [9]Department of Psychiatry, University College Hospital, Ibadan, Nigeria;[10]Sant Joan de Deu – Mental Health Services, Barcelona, Spain; [11]Department of Mental Health, University of Tokyo Graduate School of Medicine, Tokyo, Japan; [12]Institute for Development, Research, Advocacy and Applied Care (IDRAAC), Beirut, Lebanon; [13]Research and Planning, Mental Health Services, Ministry of Health, Jerusalem, Israel; [14]Department of Epidemiology, National Institute of Psychiatry, Mexico City, Mexico; [15]Department of Rural and Indigenous Health, School of Rural Health, Faculty of Medicine, Nursing and Health Sciences, Monash University, Victoria, Australia; [16]Colegio Mayor de Cundinamarca University, Saldarriaga Concha Foundation, Bogota, Colombia; [17]Department of Psychiatry and Mental Health, University of Cape Town, South Africa; [18]Hong Kong Mood Disorders Centre, Hong Kong, People's Republic of China; [19]Center for Reducing Health Disparities, UC Davis School of Medicine, Sacramento, CA, USA; [20]Health Services Research Unit, Institut Municipal d'Investigacio Medica (IMIM), Barcelona, Spain; [21]Department of Psychiatry, Chinese University of Hong Kong, People's Republic of China; [22]Institute for Social Research, University of Michigan, Ann Arbor, MI, USA; [23]Global Programme on Evidence for Health Policy, World Health Organization, Geneva, Switzerland

Data are presented on the lifetime prevalence, projected lifetime risk, and age-of-onset distributions of mental disorders in the World Health Organization (WHO)'s World Mental Health (WMH) Surveys. Face-to-face community surveys were conducted in seventeen countries in Africa, Asia, the Americas, Europe, and the Middle East. The combined numbers of respondents were 85,052. Lifetime prevalence, projected lifetime risk, and age of onset of DSM-IV disorders were assessed with the WHO Composite International Diagnostic Interview (CIDI), a fully-structured lay administered diagnostic interview. Survival analysis was used to estimate lifetime risk. Median and inter-quartile range (IQR) of age of onset is very early for some anxiety disorders (7-14, IQR: 8-11) and impulse control disorders (7-15, IQR: 11-12). The age-of-onset distribution is later for mood disorders (29-43, IQR: 35-40), other anxiety disorders (24-50, IQR: 31-41), and substance use disorders (18-29, IQR: 21-26). Median and IQR lifetime prevalence estimates are: anxiety disorders 4.8-31.0% (IQR: 9.9-16.7%), mood disorders 3.3-21.4% (IQR: 9.8-15.8%), impulse control disorders 0.3-25.0% (IQR: 3.1-5.7%), substance use disorders 1.3-15.0% (IQR: 4.8-9.6%), and any disorder 12.0-47.4% (IQR: 18.1-36.1%). Projected lifetime risk is proportionally between 17% and 69% higher than estimated lifetime prevalence (IQR: 28-44%), with the highest ratios in countries exposed to sectarian violence (Israel, Nigeria, and South Africa), and a general tendency for projected risk to be highest in recent cohorts in all countries. These results document clearly that mental disorders are commonly occurring. As many mental disorders begin in childhood or adolescents, interventions aimed at early detection and treatment might help reduce the persistence or severity of primary disorders and prevent the subsequent onset of secondary disorders.

Key words: Mental disorders, lifetime prevalence, projected lifetime risk, age-of-onset distribution

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Although psychiatric epidemiological surveys have been carried out since after World War II (1), absence of a common format for diagnosis hampered cross-national syntheses. This situation changed in the early 1980s, with the development of fully structured research diagnostic interviews (2) and the implementation of large-scale psychiatric epidemiological surveys in many countries (3-5). The World Health Organization (WHO) developed a diagnostic instrument, the WHO Composite International Diagnostic Interview (CIDI) (6,7), based on extensive cross-national field trials, for use in cross-national epidemiological surveys (8-14). In 1998, the WHO created the WHO International Consortium in Psychiatric Epidemiology (ICPE) to coordinate comparative analyses of these surveys. The ICPE launched the WHO World Mental Health (WMH) Survey Initiative shortly thereafter to conduct coordinated CIDI surveys in all parts of the world. The current report presents the first cross-national results regarding age of onset, lifetime prevalence, and projected lifetime risk of mental disorders from the 17 WMH surveys so far completed.

Data of this sort are sorely needed by policy planners to assess the societal burden of mental disorders, unmet need for treatment, and barriers to treatment. These data are especially important given evidence from the WHO Global Burden of Disease Study that mental disorders impose enormous burdens worldwide, due to their combination of high prevalence and high disability (15), and evidence that, despite efficacious treatments, substantial unmet need for

treatment exists throughout the world (16). While earlier studies found high lifetime prevalence and generally early age-of-onset distributions of mental disorders, they did not make systematic disorder-specific age-of-onset comparisons. The latter are important for targeting early interventions, which are coming to be seen as critical for an effective public health response to mental disorders (17-19). Previous studies also focused on lifetime prevalence (the proportion of the population with a lifetime disorder up to age at interview) rather than projected lifetime risk (the estimated proportion of the population who will have the disorder by the end of their life), even though the latter is more important for policy planning purposes. We consider both prevalence and risk in this report.

METHODS

Samples

WMH surveys were administered in Africa (Nigeria, South Africa); the Americas (Colombia, Mexico, United States), Asia and the Pacific (Japan, New Zealand, Beijing and Shanghai in the People's Republic of China, henceforth referred to as Metropolitan PRC), Europe (Belgium, France, Germany, Italy, the Netherlands, Spain, Ukraine) (20); and the Middle East (Israel, Lebanon). Seven of these countries are classified by the World Bank as less developed (China, Colombia, Lebanon, Mexico, Nigeria, South Africa, Ukraine), while the others are classified as developed (21).

Most WMH surveys were based on stratified multistage clustered area probability household samples. 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 them, a listing of household members was created and one or two people were selected to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. The household samples were selected from census area data in all countries other than France (where telephone directories were used) and the Netherlands (where postal registries were used). 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 17 surveys were based on nationally representative household samples, while two others were based on nationally representative household samples in urbanized areas (Colombia, Mexico).

All surveys were conducted face-to-face by trained lay interviewers in multi-stage household probability samples, with 85,052 respondents. Country-level samples ranged from 2372 (Netherlands) to 12,992 (New Zealand). The weighted average cross-national response rate was 71.1%, with a 45.9-87.7% range (Table 1).

The Part I interview schedule, completed by all respondents, assessed core diagnoses. All respondents who met criteria for any diagnosis plus a probability sub-sample of other Part I respondents were administered Part II, which assessed disorders of secondary interest and a wide range of correlates. Part I data were weighted to adjust for differential probabilities of selection and to match population distributions on socio-demographic and geographic data. The Part II sample was additionally weighted for the oversampling of Part I respondents with core disorders. The interview schedule and other study materials were translated using standardized WHO translation and back-translation protocols. Consistent interviewer training procedures and quality control monitoring were used in all surveys (22,23). Informed consent was obtained in all countries using procedures approved by local Institutional Review Boards.

Measures

Diagnoses were based on CIDI Version 3.0 (24), which generates both ICD-10 (25) and DSM-IV (26) diagnoses. DSM-IV criteria are used here to facilitate comparison with previous epidemiological surveys. Core diagnoses included anxiety disorders (panic disorder, agoraphobia without panic disorder, specific phobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder, and separation anxiety disorder), mood disorders (major depressive disorder, dysthymic disorder, bipolar disorder I or II or subthreshold bipolar disorder), impulse control disorders (intermittent explosive disorder, oppositional-defiant disorder, conduct disorder, attention-deficit/hyperactivity disorder), and substance use disorders (alcohol and drug abuse with or without dependence). Not all disorders were assessed in all countries. The Western European countries did not assess bipolar disorders and drug dependence. Only three countries (Colombia, Mexico, United States) assessed all impulse control disorders.

The disorders that require childhood onset (oppositional defiant disorder, conduct disorder, and attention-deficit/hyperactivity disorder) were included in Part II and limited to respondents in the age range 18-39/44, because of concerns about recall bias among older respondents. All other disorders were assessed for the full sample age range. Organic exclusion rules and hierarchy rules were used to make all diagnoses other than substance use disorders, which were diagnosed without hierarchy, because abuse often is a stage in the progression to dependence. Clinical calibration studies (27) found CIDI to assess these disorders with generally good validity in comparison to blinded clinical reappraisal interviews using the Structured Clinical Interview for DSM-IV (SCID) (28). CIDI prevalence es-

Table 1 Sample characteristics of the World Mental Health Surveys

Country	Survey	Field dates	Age range	Sample size			Response rate
				Part I	Part II	Part II and age ≤ 44[a]	
Belgium	ESEMeD	2001-2	18+	2419	1043	486	50.6
Colombia	NSMH	2003	18-65	4426	2381	1731	87.7
France	ESEMeD	2001-2	18+	2894	1436	727	45.9
Germany	ESEMeD	2002-3	18+	3555	1323	621	57.8
Israel	NHS	2002-4	21+	4859	-	-	72.6
Italy	ESEMeD	2001-2	18+	4712	1779	853	71.3
Japan	WMHJ 2002-2003	2002-3	20+	2436	887	282	56.4
Lebanon	LEBANON	2002-3	18+	2857	1031	595	70.0
Mexico	M-NCS	2001-2	18-65	5782	2362	1736	76.6
Netherlands	ESEMeD	2002-3	18+	2372	1094	516	56.4
New Zealand	NZMHS	2004-5	16+	12992	7435	4242	73.3
Nigeria	NSMHW	2002-3	18+	6752	2143	1203	79.3
People's Republic of China	B-WMH S-WMH	2002-3	18+	5201	1628	570	74.7
South Africa	SASH	2003-4	18+	4315	-	-	87.1
Spain	ESEMeD	2001-2	18+	5473	2121	960	78.6
Ukraine	CMDPSD	2002	18+	4725	1720	541	78.3
United States	NCS-R	2002-3	18+	9282	5692	3197	70.9

ESEMeD - European Study of the Epidemiology of Mental Disorders; NSMH - Colombian National Study of Mental Health; NHS - Israel National Health Survey; WMHJ 2002-2003 - World Mental Health Japan Survey; LEBANON - Lebanese Evaluation of the Burden of Ailments and Needs of the Nation; M-NCS - Mexico National Comorbidity Survey; NZMHS - New Zealand Mental Health Survey; NSMHW - Nigerian Survey of Mental Health and Wellbeing; B-WMH - Beijing World Mental Health Survey; S-WMH - Shanghai World Mental Health Survey; SASH - South Africa Health Survey; CMDPSD - Comorbid Mental Disorders during Periods of Social Disruption; NCS-R - U.S. National Comorbidity Survey Replication

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

[a]All countries were age restricted to ≤44, with the exception of Nigeria, People's Republic of China, and Ukraine, which were age restricted to ≤39

timates were not higher than SCID prevalence estimates. Retrospective age-of-onset reports were based on a question series designed to avoid the implausible response patterns obtained in using the standard CIDI age-of-onset question (29). Experimental research has shown that this question sequence yields responses with a much more plausible age-of-onset distribution than the standard CIDI age-of-onset question (30). Predictor variables included cohort (defined by ages at interview 18-34, 35-49, 50-64, 65+), sex, and education (students versus non-students with low, low-average, average-high, and high education categories based on country-specific distributions). Education was coded as a time-varying predictor by assuming an orderly educational history.

Analysis procedures

Age of onset and projected lifetime risk as of age 75 were estimated using the two-part actuarial method implemented in SAS 8.2 (31). Predictors were examined using discrete-time survival analysis with person-year as the unit of analysis (32). Standard errors were estimated using the Taylor series linearization method (33) implemented in the SUDAAN software system (34). Multivariate significance tests were made with Wald χ^2 tests, using Taylor series design-based coefficient variance-covariance matrices. Standard errors of lifetime risk were estimated using the jackknife repeated replication method (35) implemented in a SAS macro (31). Significance tests were all evaluated at the .05 level with two-sided tests.

RESULTS

Lifetime prevalence

The estimated lifetime prevalence of having one or more of the disorders considered here varies widely across the WMH surveys, from 47.4% in the United States to 12.0% in Nigeria. The inter-quartile range (IQR; 25th-75th percentiles across countries) is 18.1-36.1%. Symptoms consistent with the existence of one or more lifetime mental disorders were reported by more than one-third of respondents in five countries (Colombia, France, New Zealand, Ukraine, United States), more than one-fourth in six (Belgium, Germany, Lebanon, Mexico, The Netherlands, South Africa), and more than one-sixth in four (Israel, Italy, Japan, Spain). The re-

maining two countries, Metropolitan PRC (13.2%) and Nigeria (12.0%), had considerably lower prevalence estimates, that are likely to be downwardly biased (36, 37). Prevalence estimates for other developing countries were all above the lower bound of the inter-quartile range (Table 2).

All four classes of disorder were important components of overall prevalence. Anxiety disorders were the most prevalent in ten countries (4.8-31.0%, IQR 9.9-16.7%) and mood disorders in all but one other country (3.3-21.4%, IQR 9.8-15.8%). Impulse control disorders were the least prevalent in most countries that included a relatively full assessment of these disorders (0.3-25.0%, IQR 3.1-5.7%). Substance use disorders were generally the least prevalent elsewhere (1.3-15.0%, IQR 4.8-9.6). The Western European countries did not assess illicit drug abuse-dependence, though, leading to artificially low prevalence estimates (1.3-8.9%) compared to other countries (2.2-15.0%). Substance dependence was also assessed only in the presence of abuse, possibly further reducing estimated prevalence (38). Lifetime disorder co-occurrence was quite common, as seen by noting that the sum of prevalence across the four disorder types was generally between 30% and 50% higher than the prevalence of any disorder. Within-class co-occurrence cannot be seen in the reported results, but is even stronger than between-class co-occurrence (results available on request).

Age-of-onset distributions

Despite the wide cross-national variation in estimated lifetime prevalence, considerable cross-national consistency exists in standardized age-of-onset distributions (detailed results are not reported here, but are available on request).

Impulse control disorders have the earliest age-of-onset distributions, both in terms of early median ages of onset (7-9 years of age for attention-deficit/hyperactivity disorder, 7-15 for oppositional-defiant disorder, 9-14 for conduct disorder, and 13-21 for intermittent explosive disorder) and an extremely narrow age range of onset risk, with 80% of all lifetime attention-deficit/hyperactivity disorder beginning in the age range 4-11 and the vast majority of oppositional-defiant disorder and conduct disorder beginning between ages 5 and 15. Although the age-of-onset distribution is less concentrated for intermittent explosive disorder, fully half of all lifetime cases have onsets in childhood and adolescence.

The situation is more complex with anxiety disorders, as the age-of-onset distributions fall into two distinct sets. The phobias and separation anxiety disorder all have very early ages of onset (medians in the range 7-14, IQR 8-11). Generalized anxiety disorder, panic disorder, and post-traumatic stress disorder, in comparison, have much later age-of-onset distributions (median 24-50, IQR 31-41), with much wider cross-national variation than for the impulse control disorders or the phobias or separation anxiety disorder.

The age-of-onset distributions for mood disorders are similar to those for generalized anxiety disorder, panic disorder, and post-traumatic stress disorder. Prevalence is consistently low until the early teens, at which time a roughly linear increase begins that continues through late middle age, with a more gradual increase thereafter. The median age of onset of mood disorders ranges between the late 20s and the early 40s (29-43, IQR 35-40).

The age-of-onset distribution of substance use disorders is consistent across countries, in that few onsets occur prior to the mid teens and cumulative increase in onset is rapid in adolescence and early adulthood. Considerable cross-national variation exists, though, in the sharpness of the change in the slope as well as in the age range of this change. This cross-national variation leads to wider cross-national variation in both the median and the inter-quartile range of the age-of-onset distributions than for impulse control disorders or phobias or separation anxiety disorder, but lower variation than for mood disorders or other anxiety disorders.

Projected lifetime risk

Projected lifetime risk of any disorder as of age 75 is between 17% (United States) and 69% (Israel) higher than estimated lifetime prevalence (IQR 28-44%) (Table 2). The highest risk-to-prevalence ratios (57-69%) are in countries exposed to sectarian violence (Israel, Nigeria, and South Africa). Excluding these three, there is no strong difference in ratios of less developed (28-41%) versus developed (17-49%) countries. The highest class-specific proportional increase in projected risk is for mood disorders (45-170%, IQR 61-98%) and the lowest for impulse control disorders (0-14%, IQR 0-2%), consistent with the former having the latest and the latter having the earliest age-of-onset distribution. The projected lifetime risk estimates suggest that approximately half the population (47-55%) will eventually have a mental disorder in six countries (Colombia, France, New Zealand, South Africa, Ukraine, United States), approximately one-third (30-43%) in six other countries (Belgium, Germany, Israel, Lebanon, Mexico, the Netherlands), approximately one-fourth (24-29%) in three others (Italy, Japan, Spain), and approximately one-fifth (18-19%) in the remaining countries (Metropolitan PRC, Nigeria).

Cohort effects

Previous research has suggested that projected lifetime risk might be increasing in recent cohorts (39). Prospective tracking studies are required to monitor cohort effects directly. However, indirect approximations can be obtained in cross-sectional data using retrospective age-of-onset re-

Table 2 Lifetime prevalence and projected lifetime risk as of age 75 of DSM-IV disorders

Country	Any anxiety disorder					Any mood disorder					Any impulse control disorder					Any substance use disorder					Any disorder				
	Prevalence			Projected lifetime risk		Prevalence			Projected lifetime risk		Prevalence			Projected lifetime risk		Prevalence			Projected lifetime risk		Prevalence			Projected lifetime risk	
	%	N[a]	SE	%	SE	%	N[a]	SE	%	SE	%	N[a]	SE	%	SE	%	N[a]	SE	%	SE	%	N[a]	SE	%	SE
Belgium	13.1	219	1.9	15.7	2.5	14.1	367	1.0	22.8	1.7	5.2	31	1.4	5.2	1.4	8.3	195	0.9	10.5	1.1	29.1	519	2.3	37.1	3.0
Colombia	25.3	948	1.4	30.9	2.5	14.6	666	0.7	27.2	2.0	9.6	273	0.8	10.3	0.9	9.6	345	0.6	12.8	1.0	39.1	1432	1.3	55.2[d]	6.0
France	22.3	445	1.4	26.0	1.6	21.0	648	1.1	30.5	1.4	7.6	71	1.3	7.6	1.3	7.1	202	0.5	8.8	0.6	37.9	847	1.7	47.2	1.6
Germany	14.6	314	1.5	16.9	1.7	9.9	372	0.6	16.2	1.3	3.1	31	0.8	3.1	0.8	6.5	228	0.6	8.7	0.9	25.2	573	1.9	33.0	2.5
Israel	5.2	252	0.3	10.1	0.9	10.7	524	0.5	21.2	1.6	-[b]	-	-	-	-	5.3	261	0.3	6.3	0.4	17.6	860	0.6	29.7	1.5
Italy	11.0	328	0.9	13.7	1.2	9.9	452	0.5	17.3	1.2	1.7	27	0.4	-[c]	-	1.3	56	0.2	1.6	0.3	18.1	612	1.1	26.0	1.9
Japan	6.9	155	0.6	9.2	1.2	7.6	183	0.5	14.1	1.7	2.8	11	1.0	-[c]	-	4.8	69	0.5	6.2	0.7	18.0	343	1.1	24.4	1.8
Lebanon	16.7	282	1.6	20.2	1.8	12.6	352	0.9	20.1	1.2	4.4	53	0.9	4.6	1.0	2.2	27	0.8	-	-[c]	25.8	491	1.9	32.9	2.1
Mexico	14.3	684	0.9	17.8	1.6	9.2	598	0.5	20.4	1.7	5.7	152	0.6	5.7	0.6	7.8	378	0.5	11.9	1.0	26.1	1148	1.4	36.4[d]	2.1
Netherlands	15.9	320	1.1	21.4	1.8	17.9	476	1.0	28.9	1.9	4.7	37	1.1	4.8	1.1	8.9	210	0.9	11.4	1.2	31.7	633	2.0	42.9	2.5
New Zealand	24.6	3171	0.7	30.3	1.5	20.4	2755	0.5	29.8	0.7	-[b]	-	-	-	-	12.4	1767	0.4	14.6	0.5	39.3	4815	0.9	48.6	1.5
Nigeria	6.5	169	0.9	7.1	0.9	3.3	236	0.3	8.9	1.2	0.3	9	0.1	-[c]	-	3.7	119	0.4	6.4	1.0	12.0	440	1.0	19.5	1.9
PR China	4.8	159	0.7	6.0	0.8	3.6	185	0.4	7.3	0.9	4.3	37	0.9	4.9	0.9	4.9	128	0.7	6.1	0.8	13.2	419	1.3	18.0	1.5
South Africa	15.8	695	0.8	30.1	4.4	9.8	439	0.7	20.0	2.4	-[b]	-	-	-	-	13.3	505	0.9	17.5	1.2	30.3	1290	1.1	47.5	3.7
Spain	9.9	375	1.1	13.3	1.4	10.6	672	0.5	20.8	1.2	2.3	40	0.8	2.3	0.8	3.6	180	0.4	4.6	0.5	19.4	842	1.4	29.0	1.8
Ukraine	10.9	371	0.8	17.3	2.0	15.8	814	0.8	25.9	1.5	8.7	91	1.1	9.7	1.3	15.0	293	1.3	18.8	1.7	36.1	1074	1.5	48.9	2.5
United States	31.0	2692	1.0	36.0	1.4	21.4	2024	0.6	31.4	0.9	25.0	1051	1.1	25.6	1.1	14.6	1144	0.6	17.4	0.6	47.4	3929	1.1	55.3	1.2

[a]The numbers reported here are the numbers of respondents with the disorders indicated in the column heading. The denominators used to calculate prevalence estimates based on these numbers of cases are reported in Table 1. In the case of anxiety disorders and substance use disorders, the denominators are the numbers of respondents in the Part II sample. In the case of mood disorders, the denominators are the numbers of respondents in the Part I sample. In the case of impulse control disorders and any disorders, the denominators are the numbers of respondents aged ≤44 in the Part II sample

[b]Impulse control disorders not assessed

[c]Cell size was too small to be included in analysis

[d]Projected lifetime risk to age 65 due to the sample including only respondents up to age 65

ports. This was done in the WMH data using discrete-time survival analysis to predict onset of disorders across age groups 18-34, 35-49, 50-64, and 65+. As these surveys were completed between 2002 and 2005, the most recent cohorts (aged 18-34 at interview) roughly correspond to those born in the years from 1968+. Respondents aged 35-49 at interview correspond roughly to cohorts born in 1953-1970, while those aged 50-64 were born in 1938-1955, and those aged 65+ were born before 1938. Survival analysis finds that the odds ratios for anxiety, mood, and substance use disorders are generally higher in recent compared to older cohorts, while not for impulse control disorders (Tables 3-5). No meaningful difference exists between less developed and developed countries, although cross-national variation exceeds chance expectations.

DISCUSSION

Three possible biases could have led to under-estimating prevalence. First, people with mental illness have been found to be less likely than others to participate in surveys, because of sample frame exclusions (e.g., excluding homeless people), differential mortality, or greater reluctance to participate (40). Variation in the magnitude of such under-representation across countries could help account for the wide between-country variation in prevalence-risk estimates. Second, previous research suggests that lifetime prevalence is sometimes under-reported because of respondent reluctance to admit mental illness (41). This bias might be especially strong in less developed countries with no strong tradition of independent public opinion research, which could help account for the especially low prevalence-risk estimates in Nigeria and Metropolitan PRC. Third, interviewer error might have led to under-reporting, especially in countries where there was an indirect incentive to rush through interviews, because interviewers were paid by the interview rather than by the hour. The most plausible bias that could have led to over-estimating prevalence, in comparison, is that the interview thresholds for defining disorders might have been too liberal. However, as noted in the section on measures, clinical reappraisal studies carried out in some of the countries with the highest prevalence estimates found no evidence of such bias (27).

Two possible biases of other sorts are also noteworthy. First, the method used to estimate lifetime risk was based on the assumption of constant conditional risk of first onset in a given year of life across cohorts. The existence of an apparent cohort effect means that this assumption is incorrect, probably causing an under-estimation of lifetime risk in younger cohorts. Second, age of onset might have been recalled with error related to age at interview, which could produce the data pattern found here as indirect evidence for a cohort effect (42). Evidence for age-related bias has been documented in previous epidemiological research (29), although the novel probing strategy used in the WMH surveys has been shown to minimize this problem (30).

Based on these considerations, the wide cross-national variation in WMH prevalence and risk estimates should be

Table 3 Inter-cohort differences in lifetime risk of any DSM-IV anxiety disorder[a]

Country	18-34			35-49			50-64			65+[b]			χ^2	df	N
	OR	95% CI	N	OR	95% CI	N	OR	95% CI	N	OR	95% CI	N			
Belgium	2.6*	1.3-5.0	254	1.6	0.8-3.2	331	1.3	0.6-2.6	278	1.0	-	180	14.2*	3	1043
Colombia	1.6*	1.2-2.1	1125	1.3	0.9-1.8	818	1.0	-	438	-	-	-	10.0*	2	2381
France	3.1*	1.5-6.4	388	3.2*	1.5-6.7	472	1.6	0.8-3.3	362	1.0	-	214	21.3*	3	1436
Germany	3.1*	1.9-5.1	316	2.3*	1.4-3.9	436	2.3*	1.3-4.1	345	1.0	-	226	21.8*	3	1323
Israel	4.7*	2.6-8.3	1627	2.7*	1.6-4.4	1302	2.1*	1.4-3.3	1069	1.0	-	861	27.3*	3	4859
Italy	1.5	0.7-3.0	496	1.6	0.9-2.8	516	1.3	0.8-2.2	454	1.0	-	313	3.3	3	1779
Japan	5.6*	2.2-13.8	155	2.8*	1.3-6.1	219	2.6*	1.2-5.6	295	1.0	-	218	14.9*	3	887
Lebanon	3.2*	1.6-6.2	349	2.5*	1.2-5.1	348	1.0	0.5-2.1	199	1.0	-	135	24.1*	3	1031
Mexico	2.4*	1.6-3.4	1183	1.6*	1.1-2.4	750	1.0	-	429	-	-	-	25.3*	2	2362
Netherlands	3.6*	2.1-6.1	264	4.5*	3.0-6.8	358	3.0*	2.0-4.6	302	1.0	-	170	60.6*	3	1094
New Zealand	3.4*	2.7-4.2	2394	2.6*	2.1-3.1	2474	2.1*	1.7-2.7	1517	1.0	-	927	126.3*	3	7312
Nigeria	3.1*	1.4-6.9	971	2.3*	1.1-4.9	549	2.8*	1.5-5.4	369	1.0	-	254	11.1*	3	2143
PR China	1.7	0.6-4.4	379	1.1	0.5-2.5	726	1.6	0.7-3.9	357	1.0	-	166	3.3	3	1628
South Africa	2.3*	1.3-4.0	2172	1.8*	1.1-3.1	1264	1.3	0.8-2.1	638	1.0	-	241	16.5*	3	4315
Spain	3.8*	2.2-6.5	545	2.8*	1.5-5.2	556	1.3	0.8-2.2	456	1.0	-	564	28.7*	3	2121
Ukraine	1.7*	1.1-2.6	420	1.0	0.6-1.6	434	1.0	0.7-1.6	412	1.0	-	454	6.5	3	1720
United States	3.5*	2.8-4.4	1939	3.4*	2.7-4.1	1831	2.5*	2.0-3.0	1213	1.0	-	709	159.2*	3	5692

[a]Based on discrete-time survival models with person-year as the unit of analysis, controls are time intervals
[b]Referent category
*Significant at the .05 level, two-sided test

Table 4 Inter-cohort differences in lifetime risk of any DSM-IV mood disorder[a]

Country	18-34			35-49			50-64			65+[b]			χ^2	df	N
	OR	95% CI	N	OR	95% CI	N	OR	95% CI	N	OR	95% CI	N			
Belgium	11.3*	6.1-20.9	573	4.9*	3.2-7.5	775	3.6*	2.0-6.4	570	1.0	-	501	87.3*	3	2419
Colombia	6.3*	4.2-9.3	2000	2.3*	1.6-3.1	1577	1.0	-	849	-	-	530	92.7*	2	4426
France	9.0*	6.0-13.5	743	3.0*	2.2-4.2	942	1.8*	1.2-2.6	719	1.0	-	490	146.4*	3	2894
Germany	12.2*	7.1-21.0	815	5.2*	3.5-7.7	1180	2.4*	1.6-3.4	893	1.0	-	667	94.4*	3	3555
Israel	6.5*	4.5-9.4	1627	2.8*	2.0-4.0	1302	1.8*	1.3-2.5	1069	1.0	-	861	118.4*	3	4859
Italy	5.7*	3.8-8.4	1326	3.6*	2.6-5.0	1393	2.3*	1.6-3.3	1153	1.0	-	840	91.3*	3	4712
Japan	23.7*	13.4-42.0	410	7.7*	4.5-13.2	571	3.8*	2.4-5.8	764	1.0	-	691	146.2*	3	2436
Lebanon	6.2*	3.0-12.8	965	3.1*	1.4-6.7	931	1.7	0.8-3.2	553	1.0	-	408	60.5*	3	2857
Mexico	4.0*	2.6-6.1	2871	1.6*	1.1-2.3	1888	1.0	-	1023	-	-	646	65.0*	2	5782
Netherlands	11.7*	6.6-20.8	564	6.4*	4.0-10.2	729	2.9*	1.7-4.8	627	1.0	-	452	115.7*	3	2372
New Zealand	10.0*	8.2-12.2	3747	5.0*	4.1-6.0	4102	2.9*	2.4-3.6	2697	1.0	-	2244	653.9*	3	12790
Nigeria	3.7*	1.8-7.6	3175	1.8	0.9-3.6	1631	1.2	0.7-2.1	1104	1.0	-	842	19.4*	3	6752
PR China	20.8*	9.4-45.8	1209	4.4*	2.3-8.4	2261	2.5*	1.4-4.4	1184	1.0	-	547	76.5*	3	5201
South Africa	9.6*	5.5-16.7	2172	5.5*	3.1-9.9	1264	2.5*	1.4-4.4	638	1.0	-	241	95.6	3	4315
Spain	9.6*	6.6-13.9	1567	4.2*	3.0-5.9	1431	2.2*	1.6-3.0	1024	1.0	-	1451	176.3*	3	5473
Ukraine	1.9*	1.4-2.4	1194	1.0	0.8-1.3	1225	0.9	0.8-1.1	1180	1.0	-	1126	38.2*	3	4725
United States	9.5*	7.3-12.4	3034	5.0*	3.7-6.6	2865	3.0*	2.3-3.9	1922	1.0	-	1461	383.6*	3	9282

[a]Based on discrete-time survival models with person-year as the unit of analysis, controls are time intervals
[b]Referent category
*Significant at the .05 level, two-sided test

interpreted with caution, because it is likely over-estimated due to between-country differences in some of the biases enumerated above. The overall prevalence-risk estimates, which are consistent with previous cross-national research (8-14,39), are likely to be conservative, as the most plausible biases lead to under-estimation. The evidence for cohort effects is more difficult to judge, as both substantive and methodological interpretations are plausible. The options are either that the prevalence of mental disorders is on the rise or that prevalence is stable but under-estimated among older respondents.

Given the high prevalence-risk estimates even with the possibility of conservative bias, a question can be raised about the meaningfulness of these estimates. Our clinical reappraisal studies, consistent with comparable studies carried out in conjunction with previous community psychiatric epidemiological surveys (43), show that the high prevalence estimates are genuine (i.e., consistent with expert clinician judgments) rather than due to CIDI errors. It is important to recognize, though, that not all mental disorders are severe. WMH measures of disorder severity were applied only to 12-month cases, so we have no way to estimate severity of lifetime cases. Analysis of 12-month cases, though, finds the majority rated mild on a clinical rating scale with categories mild, moderate, and severe (22). These cases are nonetheless meaningful, because even mild cases can be impairing and often evolve into more serious disorders over time (44).

Table 5 Inter-cohort differences in lifetime risk of any DSM-IV substance use disorder[a]

Country	18-34			35-49			50-64			65+[b]			χ^2	df	N
	OR	95% CI	N	OR	95% CI	N	OR	95% CI	N	OR	95% CI	N			
Belgium	5.0*	2.6-9.8	254	3.6*	1.7-7.3	331	2.6*	1.2-5.4	278	1.0	-	180	26.7*	3	1043
Colombia	2.3*	1.6-3.3	2000	1.1	0.7-1.6	1577	1.0	-	849	-	-	530	39.3*	2	4426
France	5.8*	3.3-10.0	388	3.3*	2.0-5.7	472	2.5*	1.4-4.2	362	1.0	-	214	44.1*	3	1436
Germany	5.6*	2.9-10.7	316	3.7*	2.0-6.8	436	3.9*	2.1-7.1	345	1.0	-	226	35.0*	3	1323
Israel	11.3*	5.9-21.6	1627	4.6*	2.4-9.0	1302	2.5*	1.2-5.1	1069	1.0	-	861	119.9*	3	4859
Italy	2.6*	1.0-6.7	496	1.8	0.8-4.1	516	1.6	0.6-3.9	454	1.0	-	313	5.5	3	1779
Japan	1.9	0.6-6.0	155	2.3*	1.1-4.9	219	2.5*	1.1-5.7	295	1.0	-	218	6.7	3	887
Lebanon[c]	-	-		-	-		-	-		-	-		-	-	-
Mexico	1.7*	1.3-2.4	2871	1.2	0.9-1.7	1888	1.0	-	1023	-	-	646	12.8*	2	5782
Netherlands	12.4*	7.0-21.8	264	7.0*	3.8-13.1	358	6.8*	3.4-13.9	302	1.0	-	170	85.3*	3	1094
New Zealand	8.1*	6.1-10.7	3747	3.5*	2.7-4.7	4102	2.5*	1.9-3.3	2697	1.0	-	2244	283.7*	3	12790
Nigeria	3.4*	1.1-10.1	971	4.9*	1.8-13.3	549	2.9	1.0-8.7	369	1.0	-	254	11.8*	3	2143
PR China	8.2*	1.0-67.2	379	4.0	0.6-28.2	726	1.5	0.2-11.2	357	1.0	-	166	31.9*	3	1628
South Africa	2.6*	1.3-5.4	2172	1.5	0.8-2.9	1264	1.0	0.6-1.9	638	1.0	-	241	29.1	3	4315
Spain	9.3*	3.6-24.2	545	5.0*	1.8-13.7	556	1.5	0.6-4.2	456	1.0	-	564	38.1*	3	2121
Ukraine	10.8*	5.8-20.1	420	5.0*	2.4-10.4	434	2.8*	1.3-5.8	412	1.0	-	454	116.4*	3	1720
United States	6.7*	4.6-10.0	1939	4.9*	3.5-7.0	1831	3.5*	2.4-5.3	1213	1.0	-	709	111.0*	3	5692

[a]Based on discrete-time survival models with person-year as the unit of analysis, controls are time intervals
[b]Referent category
[c]Cell size too small to be included in analysis
*Significant at the .05 level, two-sided test

The age-of-onset distributions reported here are consistent with those in previous epidemiological surveys (39,45). Given the enormous personal and societal burdens of mental disorders, the finding that many cases have early ages of onset suggests that public health interventions might profitably begin in childhood. Importantly, studies of initial contact with the treatment system (46-48) show that people with these early-onset disorders often wait more than a decade before seeking treatment, and present with seriously impairing disorders that might have been easier to treat if they had sought treatment earlier in the course of illness. Interventions aimed at early detection and treatment might help reduce the persistence or severity of these largely primary anxiety and impulse control disorders and prevent the onset of secondary disorders. More preclinical and clinical research is needed on treatments of early cases, though, to determine whether this is true. Epidemiological research is also needed on the long-term consequences of early interventions for long-term secondary prevention.

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