

# Association of perceived stigma and mood and anxiety disorders: results from the World Mental Health Surveys

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**Objective:** We assessed the prevalence of perceived stigma among persons with mental disorders and chronic physical conditions in an international study.

**Method:** Perceived stigma (reporting health-related embarrassment and discrimination) was assessed among adults reporting significant disability. Mental disorders were assessed with Composite International Diagnostic Interview (CIDI) 3.0. Chronic conditions were ascertained by self-report. Household-residing adults (80 737) participated in 17 population surveys in 16 countries.

**Results:** Perceived stigma was present in 13.5% (22.1% in developing and 11.7% in developed countries). Suffering from a depressive or an anxiety disorder (vs. no mental disorder) was associated with about a twofold increase in the likelihood of stigma, while comorbid depression and anxiety was even more strongly associated (OR 3.4, 95%CI 2.7–4.2). Chronic physical conditions showed a much lower association.

**Conclusion:** Perceived stigma is frequent and strongly associated with mental disorders worldwide. Efforts to alleviate stigma among individuals with comorbid depression and anxiety are needed.

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Key words: mental disorders; stereotyping/stigmatization; disability evaluation; epidemiology; health surveys

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### Significant outcomes

- Perceived stigma is strongly associated with common mental disorders, particularly with comorbid mood and anxiety.
- Although perceived stigma is more frequent in the developing countries considered in our study, its association with mental disorders is universal.
- Special efforts to alleviate stigma are needed for individuals with common mental disorders.

### Limitations

- Only two items (health-related embarrassment and discrimination) were used to assess perceived stigma.
- Perceived stigma was assessed only among individuals with significant disability in the previous month.
- Our estimates of stigma are conservative, among other reasons, because information about psychotic disorders, typically associated with high levels of stigma, was not included in our study.

### Introduction

Mental and behavioural disorders are estimated to account for 12% of the global burden of disease worldwide (1–3). Persons with mental disorders must not only cope with the debilitating symptoms of their disease, but also with the stigma that accompanies mental illness. Stigma may have negative consequences for management of mental disorders, including delay in seeking care, or less adequate care, as well as an overall decline in quality of life (4, 5). A US national survey on respondents with mental disorders found that one in four reported stigma (6). Information on the occurrence of stigma among those suffering from mental disorders in the general population is limited as most studies have been based on clinical populations (5, 6) or persons with one specific disorder or severe mental illness (4–6).

The general public seems to disapprove of persons with mental illness more than persons with physical disabilities (4, 7–13). However, stigmatizing attitudes are not confined only to mental illness. Infectious diseases, such as HIV/AIDS, tuberculosis and leprosy, have been associated with considerable stigma (14). Perceived stigma among persons with non-infectious chronic disease has not received much attention in general population samples. Nevertheless, important stigma combating initiatives have been launched in the last decade (15–17).

Stigma is a complex concept for which there exist many definitions and measures (18). Since Erving Goffman's first notes on stigma in 1963 (19), the focus on components of stigma has progressively shifted towards a social perspective

(20). Key components of stigma include discrimination, embarrassment regarding impairments, perceptions of attitudes of others by persons experiencing illness, treatment-related stigma and internalization of these attitudes by the patient (14). Among these elements, embarrassment, emotional reactions and perceived discrimination are among the most frequently identified components used to characterize perceived stigma (4, 14, 18).

Concomitants and consequences of stigma are likely to vary across communities (20), but, to our knowledge, no international surveys of representative population samples have addressed the extent to which persons with mental and physical disorders experience perceived stigma.

### Aims of the study

Based on population-wide data from 16 countries involved in the World Mental Health Survey Initiative, this report addresses two questions: i) among adults with significant activity limitations, what is the prevalence of perceived stigma among persons with mental disorders and chronic physical diseases? and (ii) what is the association between the report of stigma and these disorders, after controlling for demographic differences (age, sex and education)?

### Material and methods

The methods employed in the World Mental Health Surveys relevant to this report have been described previously (21, 22). Here, we provide a brief overview of the key methodological features of these surveys most relevant to this report.

Samples

Seventeen surveys were carried out in 16 countries in the Americas (Colombia, Mexico and the USA), Europe (Belgium, France, Germany, Italy, the Netherlands, Spain and Ukraine), the Middle East (Israel and Lebanon), Africa (Nigeria), Asia (Japan, separate surveys in Beijing and Shanghai in the People’s Republic of China) and the South Pacific (New Zealand). As shown in Table 1, sample sizes ranged from 2372 (the Netherlands) to 12 992 (New Zealand), with a total of 80 737 participating adults. Response rates averaged 70% (see Table 1). The institutional review board of the organization that coordinated the survey in each country approved and monitored compliance with procedures for obtaining informed consent and protecting human subjects.

The questionnaire was divided in two parts. Part 1, administered to all respondents, included screening questions on psychopathology and additional questions for the assessment of some mood and anxiety disorders as well as health status and main demographic characteristics. All respondents who presented a number of symptoms of specific

mood or anxiety disorders and a probability subsample of other part 1 respondents were administered Part 2. Part 2 of the interview included questions on chronic conditions and disability and two questions concerning perceived stigma. Selection probabilities for part 2 of the interview were incorporated into sample analysis weights so that survey estimates provide unbiased estimates for the populations surveyed.

Mental disorders

All surveys used the World Mental Health Survey version of the WHO Composite International Diagnostic Interview (CIDI 3.0) (21), a fully structured diagnostic interview, to assess disorders and treatment. Substantial cross-cultural work was carried out before producing the national versions of the instrument. We do not have empirical data, however, that show the equivalence of assessment of mental disorders across the participating countries. Nevertheless, the validity of the Composite International Diagnostic Interview (CIDI) and its concordance with diagnoses based on follow-up clinical interviews were assessed in the USA and some

Table 1. Sample characteristics and population estimates of the prevalence of perceived stigma, chronic physical condition and mental disorder by country – the World Mental Health (WMH) Surveys

Country	Sample size, <i>N</i>	Response rate (%)	Activity limitation <i>N</i> (%)	Among people with significant activity limitation				
				Embarrassment (%)	Discrimination (%)	Perceived stigma* (%)	Chronic physical condition (%)	Mental disorder (%)
The Americas								
Colombia	4426	87.7	173 (5.0)	33.6	23.8	17.8	37.8	29.8
Mexico	5782	76.6	185 (4.6)	45.1	25.6	21.0	27.3	32.2
USA	9282	70.9	1154 (16.2)	31.1	13.8	8.5	53.2	36.5
Asia								
Japan	2436	56.4	97 (7.5)	48.4	9.9	8.7	39.7	11.2
Beijing	2633	74.8	69 (5.0)	36.2	20.2	12.4	39.4	17.7
Shanghai	2568	74.6	41 (6.5)	44.3	37.7	22.4	49.6	5.2
Lebanon	2857	70.0	198 (13.5)	25.3	14.8	9.2	28.3	20.4
Israel	4859	79.3	1089 (22.6)	53.8	24.6	20.2	49.4	20.4
Oceania								
New Zealand	12 992	73.3	1393 (14.5)	31.9	14.6	8.7	46.9	28.2
Europe								
Belgium	2419	50.6	205 (13.7)	37.7	14.8	12.5	38.2	22.1
France	2894	45.9	244 (13.1)	76.7	13.0	12.8	31.8	25.9
Germany	3555	57.8	219 (13.5)	19.6	6.2	3.2	49.3	13.6
Italy	4712	71.3	215 (10.0)	37.8	13.5	13.1	35.3	18.9
The Netherlands	2372	56.4	291 (20.3)	20.7	15.3	6.7	45.7	20.2
Spain	5473	78.6	376 (10.3)	15.2	11.7	8.2	41.4	20.5
Ukraine	4725	78.3	506 (24.1)	87.4	32.4	32.1	59.2	28.6
Africa								
Nigeria	6752	79.3	1089 (22.6)	23.4	17.5	9.7	25.3	7.8
All countries	80 737	70.5	6574 (13.5)	41.0	18.0	13.5	46.6	25.5
Developing countries	29 743	77.9	1291 (8.6)	56.0	26.2	22.1	44.4	24.7
Developed countries	50 994	66.3	5283 (15.5)	37.8	16.3	11.7	47.1	25.6

\*Stigma was considered present when both embarrassment and discrimination were reported.

European countries and showed acceptable values (23). Disorders considered in this paper include anxiety disorders (generalized anxiety disorder, panic disorder and/or agoraphobia, post-traumatic stress disorder and social phobia) and mood disorders (dysthymia and major depressive disorder). Disorders were assessed using the definitions and criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (24). The analyses in this paper concern persons with: i) an anxiety disorder in the absence of comorbid mood disorder; ii) a mood disorder in the absence of comorbid anxiety disorder; or iii) comorbid mood and anxiety disorders. All disorders considered referred to the 12 months prior to the interview.

#### Chronic physical conditions

Using a standard chronic disorders checklist (25), respondents were asked whether they had ever been told by a doctor that they had: stroke, heart attack or heart disease, asthma or Chronic Obstructive Pulmonary Disease (COPD) diabetes, ulcer, HIV/AIDS, epilepsy, tuberculosis and cancer. The number of chronic physical disorders were grouped as 0, 1 and 2+, (heart attack and heart disease were counted as one condition, and asthma and COPD as well).

#### Perceived stigma

Stigma was assessed with two items from the WHODAS II (26): 'How much *embarrassment* did you experience because of your health problems during the past 30 days?' and 'How much *discrimination or unfair treatment* did you experience because of your health problems during the past 30 days?'. For both questions, response options included: 'None, a little, some, a lot or extreme'. Individuals endorsing at least 'A little' embarrassment and at least 'A little' discrimination were considered to have perceived stigma, since both concepts are included in most stigma definitions (18). Nevertheless, by requiring their coexistence, our evaluation might be somewhat restrictive. Because perceived stigma related to health problems is most relevant to persons with significant health problems, the stigma questions were only administered to individuals who reported significant activity limitation due to health problems in the month prior to the interview. To qualify as having significant activity limitation, a respondent was required to report at least moderate difficulty with two or more items in the following WHODAS-II domains: cognition, mobility, self-care and social.

#### Analyses

Odds ratios for the association of chronic physical conditions and mental disorders with stigma were estimated via logistic regression, with perceived stigma as the dependent variable. Predictors included age (four levels), gender, education level (completed secondary education or not), number of chronic physical conditions (0, 1 and 2+) and number and type of mental disorders (none; only mood, only anxiety; and comorbid mood and anxiety). Information on education was not available for France. We did not perform logistic regression analyses for countries if fewer than 20 people reported stigma.

Data are presented for each individual country and for all the countries, developing countries, i.e. those with a World Development Index < 0.90 (i.e. China, Colombia, Lebanon, Mexico, Nigeria and Ukraine), and developed countries. All analyses employed weighted data to adjust for sample selection probabilities. Ninety-five per cent confidence intervals for the odds ratios were estimated using the Taylor Series method (27) with SUDAAN software (28) to adjust for clustering and weighting. Pooled estimates for surveys in developed and developing countries, and for all surveys combined, take into account clustering within each survey sample. On the other hand, estimates for total sample and for developed and developing countries were calculated as simple averages, without any additional data weighting.

#### Results

Table 1 shows the weighted proportion of the adult population with significant activity limitations as well as the proportions reporting health-related embarrassment, health-related discrimination and overall perceived stigma (the presence of both embarrassment and discrimination). Moreover, the prevalence of physical and mental disorders is presented. The prevalence of significant activity limitation ranged from 4.6% to 24.1%. Among those with significant activity limitations, embarrassment (range 15.2–87.4%) was more common than discrimination (range 6.2–37.7%). Table 1 also shows that among persons with significant activity limitations, perceived stigma was relatively common: 13.5% in the overall sample (22.1% in developing and 11.7% in developed countries).

Mean age was similar among those with and without perceived stigma. Male gender and lower education levels tended to be more common among persons reporting perceived stigma than

among those not reporting it (results not shown). The prevalence of perceived stigma among persons with and without chronic physical disease, and among persons with and without a mental disorder, is shown in Table 2. Except in three surveys with small numbers of respondents with significant activity limitations (Beijing, Shanghai and Lebanon), the prevalence of health-related stigma was greater among persons with a mental disorder (prevalence for all countries: 21.9%) than among persons without a mental disorder (10.6%). Difference in the prevalence of perceived stigma among persons with a chronic physical condition (15.5%) relative to those without (11.8%) was smaller.

Of course, comparison of prevalence rates of perceived stigma among persons with and without chronic physical disease and persons with and without a mental disorder is not meaningful without controlling for differences in age, sex, educational attainment and comorbidity. In Table 3, the association of chronic physical disease and mental disorder status with perceived stigma, controlling for age, sex and education is presented. Compared with those without a chronic physical condition, perceived stigma was somewhat more

likely to be reported by those with two or more chronic physical conditions (pooled odds ratios of 1.3 for a single chronic condition and 1.4 for multiple chronic conditions,  $P < 0.05$  for both). In contrast, perceived stigma was much more likely to occur among individuals with mental disorders in comparison with those without mental disorders. As shown in Table 3 and Fig. 1, there was an increased occurrence of stigma among persons with an anxiety disorder in the absence of a mood disorder (OR 1.8,  $P < 0.05$ , Fig. 1a) and among persons with a mood disorder in the absence of an anxiety disorder (OR 2.3,  $P < 0.05$ , Fig. 1b). Among persons with comorbid mood and anxiety mental disorders, the increased risk of stigma was still greater (OR 3.4,  $P < 0.05$ , Fig. 1c). The pattern of association of perceived stigma with anxiety and depressive disorders was similar in both developed and developing countries.

We assessed whether the presence of comorbid anxiety and mood disorders was more strongly associated with perceived stigma than non-comorbid anxiety and non-comorbid mood disorders (results not shown). In the pooled analysis, the risk of perceived stigma was significantly lower (OR 0.5, 95% CI 0.4–0.7) for persons with anxiety

Table 2. Percent prevalence (and 95% confidence intervals) of perceived stigma according to chronic physical condition and mental disorder status\* – The World Mental Health (WMH) Surveys

Country	Chronic physical condition		Mental disorder	
	Absent	Present	Absent	Present
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
<b>The Americas</b>				
Colombia	12.5 (7.8–19.6)	26.6 (17.1–38.8)	12.1 (6.2–22.3)	31.4 (18.9–47.3)
Mexico	20.4 (12.6–31.2)	22.6 (14.7–33.2)	12.3 (6.6–21.7)	39.2 (27.8–52.0)
USA	6.8 (4.9–9.4)	10.0 (7.2–13.8)	3.7 (2.2–6.2)	16.9 (12.9–21.9)
<b>Asia</b>				
Japan	9.1 (4.3–18.5)	8.0 (2.3–24.6)	6.3 (3.3–11.7)	27.8 (11.2–54.0)
Beijing	11.5 (4.8–25.1)	13.8 (5.3–31.8)	12.6 (6.2–23.9)	11.5 (3.4–32.8)
Shanghai	2.9 (0.4–17.0)	42.2 (10.1–82.6)	22.5 (6.9–53.1)	21.9 (2.4–75.8)
Lebanon	9.4 (3.3–24.0)	5.7 (1.8–16.9)	10.8 (6.0–18.7)	2.9 (1.0–8.1)
Israel	17.1 (14.0–20.7)	23.4 (19.8–27.3)	17.4 (14.9–20.3)	30.9 (24.7–7.8)
<b>Oceania</b>				
New Zealand	9.1 (6.6–12.6)	8.1 (5.8–11.3)	5.8 (3.9–8.6)	16.0 (12.2–20.5)
<b>Europe</b>				
Belgium	12.7 (6.9–22.2)	12.1 (5.3–25.4)	10.2 (5.1–19.4)	20.6 (10.2–37.1)
France	7.6 (3.4–16.4)	24.0 (10.0–47.4)	9.2 (3.0–25.1)	23.2 (11.9–40.3)
Germany	3.6 (1.8–7.3)	2.9 (1.1–7.6)	0.7 (0.4–1.5)	19.3 (9.9–34.4)
Italy	12.0 (6.7–20.5)	15.0 (8.0–26.3)	10.3 (5.6–18.3)	24.9 (15.4–37.6)
The Netherlands	7.7 (3.3–16.9)	5.5 (2.6–11.3)	6.0 (2.6–13.2)	9.3 (4.4–18.7)
Spain	8.5 (4.6–15.2)	7.7 (3.4–16.4)	5.5 (2.5–11.4)	18.7 (12.5–26.9)
Ukraine	30.3 (21.1–41.3)	33.4 (26.4–41.3)	30.0 (22.1–39.3)	37.5 (31.1–44.4)
<b>Africa</b>				
Nigeria	9.9 (5.7–16.5)	9.2 (2.7–26.8)	7.6 (4.2–13.4)	35.2 (13.8–64.7)
All countries	11.8 (10.6–13.3)	15.5 (13.8–17.3)	10.6 (9.4–12.0)	21.9 (19.8–24.1)
Developing countries	18.3 (14.6–22.7)	28.2 (22.9–34.2)	19.2 (15.4–23.6)	31.2 (26.8–36.0)
Developed countries	10.5 (9.2–12.0)	13.0 (11.5–14.8)	8.8 (7.7–10.1)	20.0 (17.7–22.5)

\*Perceived stigma was assessed among individuals with significant activity limitation. See Material and methods section for details.

Table 3. Odds ratios (and 95% confidence intervals) for perceived stigma\* according to the number of chronic physical conditions and mental disorder status, controlling for age, sex and education – The World Mental Health (WMH) Surveys

Country	Chronic physical condition (reference = none)		Mental disorder (reference = none)		
	One	2+	Anxiety only	Mood only	Comorbid anxiety and mood
All countries	1.3 (1.0–1.6)**	1.4 (1.1–1.8)**	1.8 (1.3–2.4)**	2.3 (1.8–3.0)**	3.4 (2.7–4.2)**†
Developing countries	1.7 (1.0–2.8)**	1.3 (0.8–2.1)	2.0 (1.1–3.5)**	1.8 (1.2–2.7)**	3.3 (2.1–5.2)**
Developed countries	1.1 (0.9–1.5)	1.6 (1.2–2.1)**	1.9 (1.4–2.6)**	2.5 (1.8–3.3)**	3.6 (2.7–4.6)**

\*Perceived stigma was assessed among individuals with significant activity limitation. See Material and methods section for details. \*\* $P < 0.05$ .

†Pooled odds ratios (ORs) for comorbid mood and anxiety disorders are significantly greater than the pooled OR for non-comorbid mood and non-comorbid anxiety disorders.

disorder only and for persons with mood disorder only (OR 0.7, 95% CI 0.5–0.9) relative to persons with comorbid anxiety and mood. Thus, the presence of comorbid anxiety and mood disorder was associated with significantly greater likelihood of perceived stigma than among persons with non-comorbid anxiety or mood disorders. We also assessed whether persons with a mental disorder without a comorbid physical disorder were more likely to report perceived stigma than persons with a physical disorder without a mental disorder. In a pooled analysis, persons with an anxiety or a mood disorder that was not comorbid with a physical disorder were more likely to report stigma (OR 1.9, 95% CI 1.2–2.4) relative to persons with a chronic physical disorder that was not comorbid with a mental disorder.

## Discussion

Our results show that among persons with significant activity limitations, perceived stigma is commonly reported, where stigma is defined by the presence of both embarrassment and perceived discrimination. Stigma was almost two times more prevalent in the developing countries studied. Despite between-country variation in the prevalence of perceived stigma, mental disorders and particularly comorbid depression and anxiety showed a robust association with stigma, while chronic physical disorders showed a relatively weak association. Thus, mental disorders appear to be a considerably more important correlate of perceived stigma than chronic physical conditions among persons in the general population with significant activity limitations in both developed and developing countries.

The results presented here must be interpreted in the context of several limitations. First, the questions about perceived stigma were administered only to those individuals who reported significant activity limitation in the month before the interview. The underlying assumption was that questions about perceived stigma are not particularly

salient to individuals who do not experience activity limitations. Second, we evaluated perceived stigma using only two items instead of more complex measures used in studies focused largely on perceived stigma (29). This might render comparability with other studies difficult. Specifically, by requiring both embarrassment and discrimination, we might have underestimated the prevalence of perceived stigma. Nevertheless, only a small fraction of those reporting perceived discrimination had not reported embarrassment. Had we studied it in more detail, we probably would have found a higher prevalence of stigma. Given the scope of the World Mental Health Surveys, the number of questions that could be devoted to assessing stigma was necessarily limited, which can have implications for measurement error in assessment of perceived stigma (30). Generalizability may be further hindered because of the low response rates in some other countries, although many countries had response rates well over the expected 70%. Third, although the entire questionnaire was cross-culturally adapted using state-of-the-art methods, there is inevitably some uncertainty about the cross-cultural equivalence of the items used to assess stigma. We did a blind, independent back-translation of the embarrassment item and found high equivalence with the original version in all countries except France, where there was some ambiguity in meaning. This may explain the relatively high prevalence of embarrassment in that country (while the prevalence of perceived stigma in France was intermediate). Fourth, schizophrenia and other psychotic mental disorders associated with high levels of perceived stigma were not included in our study. Therefore, we may have underestimated the prevalence of stigma and its association with mental disorders. Importantly, underestimation of stigma could also occur because one consequence of embarrassment about a symptom or health problem may be not to report it to interviewers. This would render our estimates of prevalence of perceived stigma conservative. Finally, it might be

## Perceived stigma and common mental disorders

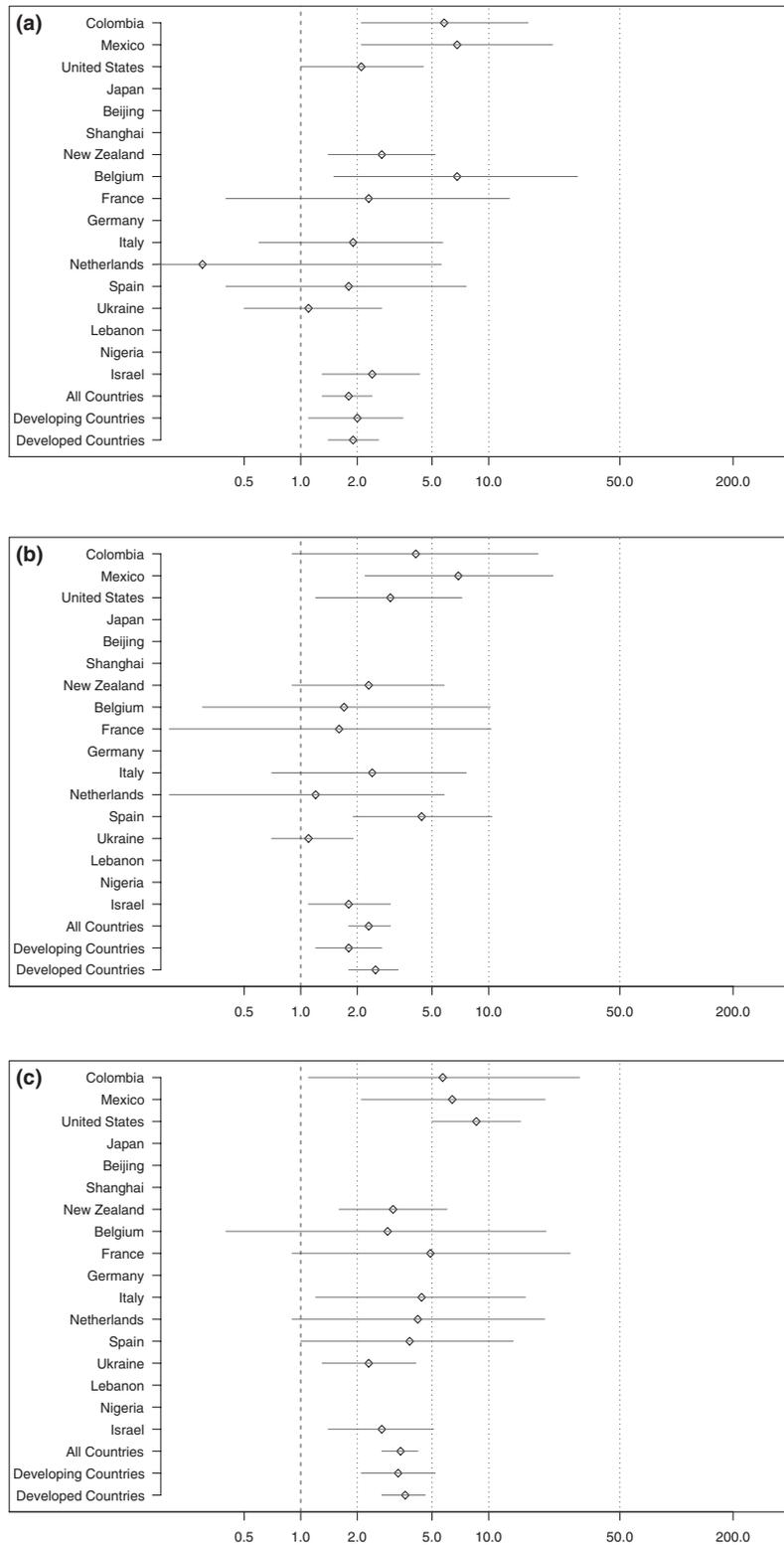


Fig. 1. Odds ratios and 95% confidence intervals for the effect of having certain mental disorders (vs. having no mental disorder) on perceived stigma, controlling for age, sex, education and chronic physical conditions (logarithmic scale). (a) Anxiety disorders, but not mood disorders. (b) Mood disorders, but not anxiety disorders. (c) Comorbid anxiety and mood disorders. Country not included if fewer than 20 people have stigma.

argued that the high association of stigma with mental disorders is due to the fact that self-perceived embarrassment and discrimination are a symptom of psychopathology rather than the consequence of mental disorders. However, there is evidence that stigma persists after the alleviation of

psychological symptoms (31). In addition, we recognize that stigma can also be relevant for families, friends and even healthcare providers of people with stigmatizing conditions. However, the investigation of these instances is beyond the scope of our current investigation.

To our knowledge, these are the first international, population-based results on the relationship between mental disorders and stigma. In general, our findings are consistent with prior research, which had used quite different methods and populations from those employed in the World Mental Health Surveys (4, 7, 8). Individuals reporting stigma were more frequently male and had lower education than those not reporting stigma. These characteristics have been associated with a lower use of the health services for mental disorders (32). It has been pointed out that stigma has negative behavioural consequences, such as not seeking help when it is needed (4). It is therefore important to reduce stigma to diminish the burden of mental disorders. Stigma-reducing efforts might specifically consider the male and the lower educated individuals with mental disorders.

We found considerable cross-country variation in the prevalence of perceived stigma among persons with significant activity limitations. In particular, perceived stigma was more common in developing countries. This seems to contradict the limited pre-existing reports (33), but results might not be strictly comparable. However, the strong association of mental disorders with stigma was similar in both types of countries. To our knowledge, there are not prior cross-national studies of persons experiencing stigma to put these findings in context. One international study did investigate the attitudes of the general public towards stigma and social distance in reference to other individuals with mental disorders (34). That study showed that stigmatizing attitudes towards people with mental disorders were common in different countries. If general public attitudes against mental disorders are similar, in zones, such as Ukraine, Shanghai or Israel, with a high prevalence of perceived stigma, there is a pressing need for programs to address stigma. Across all countries, the high prevalence of perceived stigma associated with mental disorders should be taken into account when caring for individuals with mental disorders.

Our finding that perceived stigma is common among persons with significant activity limitations in general and among persons with mental disorders in particular has significant implications. First, this suggests that healthcare providers should be aware that individuals with significant health problems, particularly those with mental disorders, are likely to experience embarrassment about their health condition and to perceive discrimination on the basis of their health condition. This is especially prevalent among individuals with comorbid mood and anxiety disorders. More-

over, more research is needed on the whole spectrum of social exclusion among those suffering from mental disorders. Finally, our results also indicate that it may be of interest to investigate social, cultural and health service characteristics that differentiate countries in which patients feel less excluded from countries in which patients are more likely to report perceived stigma.

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Dr Yanling He is on the speaker's list for Jassen Cilag, Johnson & Johnson and is also on the Advisory board of Wyeth Pharmaceuticals. Dr Jean-Pierre Lepine has a research grant from BMS Otsuka, is on the advisory board of Wyeth Pharmaceuticals and has educational support from Servier. Dr Giovanni de Girolamo received honoraria up to €500 for seminars or talks from the following companies: Boehringer-Ingelheim and GlaxoSmithKline. Dr Josep Maria Haro has been a consultant for Eli Lilly, Lundbeck, GlaxoSmithKline and Astra Zeneca. Dr Ronald C. Kessler has been a consultant for GlaxoSmithKline Inc., Pfizer Inc., Wyeth-Ayerst, Sanofi-Aventis, Kaiser Permanente and Shire Pharmaceuticals, has served on advisory boards for Eli Lilly & Company and Wyeth-Ayerst and has had research support for his epidemiological studies from Eli Lilly and Company, Pfizer Inc., Ortho-McNeil Pharmaceuticals Inc. and Bristol-Myers Squibb. Dr Michael Von Korff is responsible for the overview of the analysis for this article.

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