

The cross-national epidemiology of specific phobia in the World Mental Health Surveys

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Background. Although specific phobia is highly prevalent, associated with impairment, and an important risk factor for the development of other mental disorders, cross-national epidemiological data are scarce, especially from low- and middle-income countries. This paper presents epidemiological data from 22 low-, lower-middle-, upper-middle- and high-income countries.

Method. Data came from 25 representative population-based surveys conducted in 22 countries (2001–2011) as part of the World Health Organization World Mental Health Surveys initiative ($n = 124\,902$). The presence of specific phobia as defined by the Diagnostic and Statistical Manual of Mental Disorders, fourth edition was evaluated using the World Health Organization Composite International Diagnostic Interview.

Results. The cross-national lifetime and 12-month prevalence rates of specific phobia were, respectively, 7.4% and 5.5%, being higher in females (9.8 and 7.7%) than in males (4.9% and 3.3%) and higher in high- and higher-middle-income countries than in low-/lower-middle-income countries. The median age of onset was young (8 years). Of the 12-month patients, 18.7% reported severe role impairment (13.3–21.9% across income groups) and 23.1% reported any treatment (9.6–30.1% across income groups). Lifetime co-morbidity was observed in 60.5% of those with lifetime specific phobia, with the onset of specific phobia preceding the other disorder in most cases (72.6%). Interestingly, rates of impairment, treatment use and co-morbidity increased with the number of fear subtypes.

Conclusions. Specific phobia is common and associated with impairment in a considerable percentage of cases. Importantly, specific phobia often precedes the onset of other mental disorders, making it a possible early-life indicator of psychopathology vulnerability.

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Introduction

Specific phobia is one of the most common mental disorders in the general population with lifetime and 12-month prevalence estimates in representative population surveys ranging from 7.7 to 12.5% and from 2.0 to 8.8%, respectively (Kessler *et al.* 1994, 2005; Bijl *et al.* 1998; Alonso *et al.* 2004; Wells *et al.* 2006; Stinson *et al.* 2007; Grenier *et al.* 2011; de Graaf *et al.* 2012). In addition, prospective studies have shown high incidence rates for specific phobia. Angst *et al.* (2016) found a cumulative incidence of 26.9% between the ages of 20 and 50 years. Bijl *et al.* (2002) found a 1-year incidence rate of 2.20 new cases per 100 person-years. Grant *et al.* (2009) found a lower 1-year incidence rate of 0.44 new cases per 100 person-years. Interestingly, prevalence rates (e.g. Kessler *et al.* 1994; Bijl *et al.* 1998; Stinson *et al.* 2007) and incidence rates (Bijl *et al.* 2002; Angst *et al.* 2016) have been found to be higher in females than in males. Also, prevalence rates have been shown to decrease with age (e.g. Stinson *et al.* 2007; Sigström *et al.* 2016).

Because of its high prevalence, lifetime persistence (e.g. Goisman *et al.* 1998), associated impairment and high lifetime co-morbidity rate with other disorders, specific phobia is important from both an epidemiological and a clinical perspective. Previous work has shown considerable role impairment in those with specific phobia, with 34.2% reporting significant role impairments in their daily life, compared with 26.5% in agoraphobia and 33.5% in social phobia (Magee *et al.* 1996). Depla *et al.* (2008) showed that up to 59.2% of patients reported interference with their daily life. Using data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), Stinson *et al.* (2007) showed that impairment levels in specific phobia were comparable with other anxiety and substance use disorders. However, other studies have found low disability in specific phobia compared with other disorders (e.g. Wells *et al.* 2006; Ormel *et al.* 2008) and it has been suggested that observed functional impairment in specific phobia can be partly explained by high co-occurrence with other disorders (Comer *et al.* 2011). Nevertheless, the restricted lifestyle resulting from fear and avoidance in specific phobia is likely to contribute independently to functional impairment.

Previous surveys have shown that co-morbidity rates between specific phobia and other mental disorders are high (Kessler *et al.* 1996, 1997), with estimated rates of up to 83.4% (Magee *et al.* 1996). Interestingly, these retrospective studies showed that in the majority

of co-morbid cases, the onset of specific phobia precedes the other disorder(s) (Kessler *et al.* 1996, 1997; Magee *et al.* 1996). Prospective work has shown that specific phobia is associated with a higher odds of later depressive, anxiety and eating disorders (Goodwin, 2002; Bittner *et al.* 2004; Trumpf *et al.* 2010; Lieb *et al.* 2016) but not of later substance use disorders (Zimmermann *et al.* 2003). Grant *et al.* (2009) showed that specific phobia at baseline was associated with an increased incidence of other anxiety disorders. However, these associations could also be explained by other baseline disorders and sociodemographic factors.

Relatively effective treatments, such as behaviour therapy and cognitive therapy, are available for specific phobia (Choy *et al.* 2007). However, despite specific phobia patients' need for care, only a minority of patients seek treatment in their lifetime (Magee *et al.* 1996: 46.6%; Stinson *et al.* 2007: 8.0%). In addition, it has been shown that specific phobia patients that do seek treatment take much longer to do so compared with other anxiety disorders (Iza *et al.* 2013; ten Have *et al.* 2013).

Within specific phobia, the Diagnostic and Statistical Manual of Mental Disorders (DSM) distinguishes between different subtypes: animal (e.g. bugs, snakes), natural environment (e.g. heights, weather), blood-injection-injury, situational (e.g. flying on a plane, enclosed spaces) and other (e.g. vomiting, choking). Previously phobia subtypes have been shown to differ in terms of, for example, prevalence, impairment levels and co-morbidity rates (e.g. Fredrikson *et al.* 1996; Becker *et al.* 2007; Depla *et al.* 2008; LeBeau *et al.* 2010). Also, most patients have more than one subtype (Curtis *et al.* 1998; Burstein *et al.* 2012) and increasing numbers of subtypes have been shown to be associated with more co-morbidity, impairment and treatment-seeking (e.g. Curtis *et al.* 1998; Stinson *et al.* 2007; Burstein *et al.* 2012).

Although the above-described findings indicate that specific phobia is a highly relevant condition that deserves attention from both researchers and clinicians, they all come from surveys in Western, high-income countries. This makes it hard to judge the universal relevance of specific phobia as an impairing condition and a marker for increased psychopathology risk. In this study we therefore took a cross-national approach, combining World Mental Health (WMH) population survey data from 22 low-/lower-middle-income, upper-middle-income and high-income countries ($n = 124\,902$) to gain a more complete insight

into the epidemiological characteristics of specific phobia around the world.

Method

Sample

Data came from 25 World Health Organization (WHO) WMH surveys, conducted in 22 countries (online Supplementary Appendix Table S1). Of these countries, five are classified by the World Bank (World Bank, 2008) as low-/lower-middle-income countries [Colombia, Iraq, Nigeria, Peru and the People's Republic of China (PRC)], six as upper-middle-income countries [Brazil, Bulgaria, Colombia (Medellín), Lebanon, Mexico and Romania] and 12 as high-income countries (Belgium, France, Germany, Italy, Japan, the Netherlands, New Zealand, Northern Ireland, Poland, Portugal, Spain and the USA). The sample sizes of the surveys ranged from 2357 (Romania) to 12 790 (New Zealand) and the total combined sample size was 124 902. Most surveys were based on nationally representative stratified multistage clustered area probability samples of household residents. All respondents were aged 18 years or older. Response rates ranged from 45.9% (France) to 97.2% (Colombia) and the average weighted response rate across countries was 69.3%. The surveys were conducted face to face by trained lay interviewers. The same standardized procedures for interviewer training, translation of the used study materials and quality control were used in all countries (Kessler & Üstün, 2008). To reduce the burden of the interview it was often divided into two parts. In part I, core mental disorders were assessed. In part II, additional disorders and correlates were assessed. All respondents completed part I ($n = 124\,902$). Part II ($n = 60\,345$) was additionally administered to a subsample of respondents meeting criteria for any part I disorder and in a probability subsample of the other part I respondents. Part II responses were weighted by the inverse of their probability of selection into the part II sample to adjust for any differential sampling. All respondents provided informed consent prior to the interview and the study protocols were approved by the institutional review boards of the organizations coordinating the surveys.

Measures

Diagnostic assessments

The lifetime and 12-month prevalence and age of onset (AOO) of specific phobia as defined in the DSM-IV were evaluated with the WHO Composite International Diagnostic Interview (CIDI, Kessler & Üstün, 2004). In the screening section, respondents

were shown a list of six specific fears [animals, still water/weather events, blood/injuries/medical experiences (BIM), closed spaces, high places, flying] and were asked if they ever had a strong fear of any of these things. If any specific fear was reported in the screening section, the specific phobia section was administered. The CIDI was also used to assess other psychiatric disorders, including mood (major depressive, dysthymic, bipolar-I, bipolar-II and subthreshold bipolar disorder), anxiety (agoraphobia, social phobia, generalized anxiety, panic, post-traumatic stress and separation anxiety), substance use (alcohol and drug abuse, alcohol and drug dependence with abuse) and behaviour disorders (attention-deficit/hyperactivity, oppositional-defiant, conduct, intermittent explosive disorder). The WMH interview translation, back-translation and harmonization were done by culturally competent bilingual clinicians, who reviewed, modified and approved the key phrases describing the assessed symptoms (Harkness *et al.* 2008). Masked clinical reappraisal with a standardized clinical interview showed fair agreement for specific phobia (area under the receiver operating curve = 0.67; Haro *et al.* 2006).

Healthcare use

The services module of the WMH-CIDI v3.0 (Kessler & Üstün, 2004) was used to assess if respondents ever received treatment for emotion regulation problems, psychological distress, anxiety or substance use. If respondents reported ever receiving such care, follow-up questions were asked about their age at the first and last treatment and about the treatment they received in the past 12 months. Different sectors of treatment were distinguished. The specialty mental health sector included psychiatrists, psychologists or any other non-psychiatrist mental health specialists (social workers, counsellors in specialty mental health settings, mental health helplines, overnight hospital admissions for mental health or substance-related problems). The general medical sector included general practitioners, other medical doctors, nurses, occupational therapists or any other healthcare professional. The human services sector included religious or spiritual advisors, social workers or counsellors in other settings than the specialty mental health sector. The complementary and alternative medicine sector included any other type of healer (e.g. herbal healers, self-help groups).

Impairment

A modified version of the Sheehan Disability Scales (SDS; Leon *et al.* 1997) was used to assess 12-month role-functioning. Respondents were asked to

remember the month in which their specific phobia was most severe and to rate its interference with functioning in four domains (home management, ability to work, relationships and social life) on a 10-point scale. Those with a score of 7 or higher on one or more SDS domains were classified as severely impaired. Respondents with 12-month specific phobia were also asked how many of the 365 days in the past 12 months they had been totally unable to work or carry out their normal activities because of their specific phobia.

Demographic factors

The following demographic factors were investigated: age group (18–29 years, 30–44 years, 45–59 years and 60+ years), gender, employment status [employed, student, homemaker, retired, other (unemployed, temporarily laid off, maternity leave, illness/sick leave, and disabled)], marital status (currently married, divorced/separated/widowed, never married), education level (no education, some primary, finished primary, some secondary, finished secondary, some college, finished college) and household income (low, low-average, high-average and high). Income categories were based on the quartiles of country-specific gross household income distributions (Levinson *et al.* 2010).

Statistical analyses

Analyses of prevalence, AOO and impairment were carried out for the cross-national sample, each country-income group, each country survey and cross-national gender groups. Cross-tabulations were used to estimate the lifetime, 12-month and 30-day prevalence. Only lifetime prevalence rates were calculated for subtypes of specific phobia and the prevalence of specific phobia with one to more than four lifetime subtypes.

The 12-month prevalence of specific phobia among lifetime cases was used as an indicator of recurrence or chronicity: e.g. a disorder can have a high lifetime prevalence, but a low level of recurrence as shown by a low 12-month prevalence among lifetime cases. The 30-day prevalence among 12-month cases was calculated as an indicator of disorder duration: e.g. a disorder can have a high 12-month prevalence, but a limited duration, as shown by a low 30-day prevalence. The percentages of lifetime and 12-month co-morbidity in lifetime cases and the percentages of 12-month co-morbidity in 12-month cases were estimated. In addition, the percentages of cases in which specific phobia was the temporally primary disorder were calculated. The percentages of 12-month specific phobia cases with severe role impairment and healthcare use across sectors were calculated with cross-tabulation. The mean number of days out of role was

calculated for all 12-month specific phobia cases combined and for subsamples of 12-month cases, split out by their highest reported domain of role impairment. Percentages of lifetime co-morbidity, 12-month impairment and healthcare use were calculated for each subtype and groups with one to more than four lifetime subtypes.

The AOO and the projected risk at age 75 years were estimated with the two-part actuarial method implemented in SAS. The actuarial method assumes a constant conditional risk of onset in a given year of life across cohorts and allows for accurate estimations of the onset timings within a year (Halli *et al.* 1992). Associations of lifetime specific phobia with demographic factors were analysed with survival models, adjusted for age cohort, gender, person-years and country. Associations of 30-day specific phobia with demographic factors were analysed with logistic regression models, adjusted for time since specific phobia onset, AOO, gender and country. Associations of demographic factors with recurrence (12-month prevalence among lifetime cases) and duration (30-day prevalence among 12-month cases) were analysed with logistic regression, adjusted for time since specific phobia onset, AOO, gender and country. The distributions of AOO and of sociodemographic variables were calculated for groups with different subtypes and subgroups with one to more than four lifetime subtypes.

All analyses were weighted to adjust for differential selection probabilities within households, to match the samples to population sociodemographic distributions and to adjust for non-response (Kessler & Üstün, 2008). Design-adjusted standard errors were estimated using the Taylor series linearization method (Wolter, 1985), implemented in SAS 9.4 (SAS Institute Inc., USA). Design-adjusted Wald χ^2 tests were used to test the multivariate statistical significance of sets of predictors.

Results

Prevalence

Lifetime specific phobia prevalence ranged from 2.6% to 12.5% across countries (Table 1) and the averaged cross-national lifetime prevalence was 7.4% for the whole sample [median = 6.8%, interquartile range (IQR) = 4.8–10.2%], 4.9% for the male and 9.8% for the female subsample. The prevalence was 8.0–8.1% in high-income and upper-middle-income countries and 5.7% in the low-/lower-middle-income countries. The overall mean 12-month prevalence was 5.5% in the whole sample (median = 5.0%, IQR = 3.8–7.6%), 3.3% among males and 7.7% among females. The 12-month prevalence differed across countries (1.7–10.6%) and income groups (4.0–6.4%), with the lowest

Table 1. Prevalence of DSM-IV specific phobia in the World Mental Health surveys

Country	Lifetime prevalence	12-month prevalence	30-day prevalence	12-month prevalence of specific phobia among lifetime cases	30-day prevalence of specific phobia among 12-month cases	Part 1 sample sizes, <i>n</i>
Low-/lower-middle-income countries	5.7 (0.2)	4.0 (0.2)	2.4 (0.1)	70.6 (1.6)	58.7 (1.8)	31 773
Colombia	12.5 (0.8)	8.9 (0.8)	5.7 (0.5)	71.5 (2.6)	64.2 (3.2)	4426
Iraq	4.2 (0.4)	3.8 (0.4)	3.2 (0.4)	90.4 (3.5)	82.4 (4.2)	4332
Nigeria	5.9 (0.5)	4.4 (0.3)	2.2 (0.2)	74.5 (3.2)	49.6 (3.8)	6752
Peru	6.6 (0.4)	4.6 (0.3)	2.5 (0.2)	69.7 (4.8)	54.4 (3.6)	3930
PRC China	2.6 (0.3)	1.7 (0.3)	1.0 (0.2)	63.2 (3.6)	56.9 (8.0)	5201
PRC Shen Zhen	4.0 (0.3)	2.2 (0.3)	0.9 (0.1)	54.9 (5.4)	42.6 (4.1)	7132
Upper-middle-income countries	8.0 (0.2)	6.4 (0.2)	4.8 (0.2)	80.6 (1.1)	75.1 (1.5)	24 612
Brazil	12.5 (0.6)	10.6 (0.5)	8.8 (0.5)	85.2 (1.6)	82.9 (2.6)	5037
Bulgaria	5.8 (0.3)	3.9 (0.3)	3.1 (0.3)	68.1 (3.3)	78.3 (2.9)	5318
Colombia (Medellín)	10.2 (0.8)	8.3 (0.7)	6.4 (0.6)	81.7 (3.1)	76.9 (3.0)	3261
Lebanon	7.1 (0.6)	6.6 (0.5)	5.0 (0.5)	93.0 (1.7)	75.9 (3.8)	2857
Mexico	7.0 (0.5)	5.2 (0.4)	2.8 (0.2)	74.3 (2.6)	54.3 (3.9)	5782
Romania	3.8 (0.5)	3.3 (0.5)	2.8 (0.5)	86.1 (4.9)	84.3 (5.2)	2357
High-income countries	8.1 (0.1)	5.9 (0.1)	4.2 (0.1)	73.2 (0.8)	71.9 (0.8)	68 517
Belgium	6.8 (1.0)	5.0 (0.7)	3.6 (0.5)	73.2 (3.5)	71.1 (5.4)	2419
France	10.7 (0.6)	7.7 (0.7)	6.0 (0.5)	71.7 (3.8)	78.3 (3.3)	2894
Germany	9.9 (0.7)	6.9 (0.6)	4.8 (0.3)	69.5 (2.6)	70.6 (3.5)	3555
Italy	5.4 (0.5)	3.9 (0.4)	2.8 (0.3)	72.6 (2.2)	72.6 (2.8)	4712
Japan	3.4 (0.3)	2.3 (0.2)	1.8 (0.2)	68.0 (4.5)	77.9 (4.7)	4129
New Zealand	10.9 (0.4)	7.6 (0.3)	5.2 (0.3)	70.2 (1.4)	68.6 (2.1)	12 790
Northern Ireland	9.7 (0.6)	7.2 (0.5)	5.2 (0.4)	74.6 (2.1)	71.6 (2.7)	4340
Poland	3.4 (0.2)	2.5 (0.2)	1.7 (0.1)	72.8 (2.9)	67.6 (3.0)	10 081
Portugal	10.6 (0.6)	8.6 (0.5)	7.0 (0.5)	81.3 (1.8)	81.1 (2.0)	3849
Spain	4.8 (0.4)	3.8 (0.4)	2.9 (0.3)	80.1 (3.3)	74.6 (3.2)	5473
Spain (Murcia)	5.4 (0.5)	4.7 (0.4)	3.7 (0.3)	86.9 (2.5)	78.4 (3.5)	2621
The Netherlands	7.6 (0.7)	5.4 (0.6)	4.3 (0.6)	70.5 (3.2)	79.4 (3.9)	2372
USA	12.5 (0.4)	9.1 (0.4)	6.3 (0.4)	73.0 (2.2)	68.8 (1.9)	9282
All countries combined	7.4 (0.1)	5.5 (0.1)	3.9 (0.1)	74.2 (0.6)	70.2 (0.7)	124 902
All males	4.9 (0.1)	3.3 (0.1)	2.1 (0.1)	65.8 (1.2)	64.7 (1.4)	56 526
All females	9.8 (0.1)	7.7 (0.1)	5.5 (0.1)	78.2 (0.6)	72.4 (0.8)	68 376
Comparison between countries ^a	$\chi^2_{24} = 47.7^*$ $p < 0.001$	$\chi^2_{24} = 39.4^*$ $p < 0.001$	$\chi^2_{24} = 39.4^*$ $p < 0.001$	$\chi^2_{24} = 7.8^*$ $p < 0.001$	$\chi^2_{24} = 7.2^*$ $p < 0.001$	
Comparison between low-, middle- and high-income country groups ^a	$\chi^2_2 = 51.1^*$ $p < 0.001$	$\chi^2_2 = 56.8^*$ $p < 0.001$	$\chi^2_2 = 103.8^*$ $p < 0.001$	$\chi^2_2 = 19.1^*$ $p < 0.001$	$\chi^2_2 = 26.4^*$ $p < 0.001$	
Comparison between genders ^a	$\chi^2_1 = 722.1^*$ $p < 0.001$	$\chi^2_1 = 855.3^*$ $p < 0.001$	$\chi^2_1 = 735.5^*$ $p < 0.001$	$\chi^2_1 = 84.2^*$ $p < 0.001$	$\chi^2_1 = 23.7^*$ $p < 0.001$	

Data are given as percentage (standard error) unless otherwise indicated.

DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, fourth edition; PRC, People's Republic of China.

^a χ^2 Test of homogeneity to determine if there is variation in prevalence estimates.

* $p < 0.05$ (two-sided test).

prevalence in the low-/lower-middle-income group (4.0%). The overall mean 30-day prevalence was 3.9% in the total sample, with differences across gender (males: 2.1%; females: 5.5%), countries (0.9–8.8%) and income groups (2.4–4.8%), with the lowest prevalence (2.4%) in the low-/lower-middle-income countries.

Of specific phobia subtypes (Table 2), animal fear had the highest cross-national lifetime prevalence (3.8%), followed by BIM (3.0%), high places (2.8%) and still water or weather events fear (2.3%). Fear of flying had the lowest prevalence (1.3%). The low-/lower-middle-income countries showed the lowest

Table 2. Lifetime prevalence of DSM-IV specific phobia subtypes and cases with different numbers of co-occurring subtypes in the World Mental Health surveys

Country	Kinds of subtypes						Numbers of subtypes					Part 1 sample sizes, <i>n</i>
	Animal	Still water, weather events	Blood, injuries, medical experiences	Closed spaces	High places	Flying	One subtype	Two subtypes	Three subtypes	Four or more subtypes		
Low-/lower-middle-income countries	3.4 (0.1)	2.1 (0.1)	2.2 (0.1)	1.6 (0.1)	2.0 (0.1)	0.6 (0.1)	2.7 (0.1)	1.3 (0.1)	0.8 (0.1)	0.9 (0.1)	31 773	
Colombia	8.1 (0.6)	6.2 (0.5)	6.0 (0.5)	5.2 (0.4)	7.1 (0.6)	2.2 (0.3)	3.1 (0.4)	3.0 (0.4)	2.3 (0.3)	4.1 (0.4)	4426	
Iraq	2.3 (0.3)	1.3 (0.3)	1.4 (0.3)	0.7 (0.2)	0.9 (0.2)	0.3 (0.1)	2.8 (0.4)	0.7 (0.1)	0.4 (0.1)	0.3 (0.1)	4332	
Nigeria	3.7 (0.3)	2.2 (0.3)	1.6 (0.2)	1.4 (0.3)	1.0 (0.1)	0.4 (0.1)	3.4 (0.3)	1.4 (0.2)	0.6 (0.1)	0.5 (0.1)	6752	
Peru	3.6 (0.3)	2.0 (0.2)	2.6 (0.2)	1.4 (0.2)	1.7 (0.2)	0.6 (0.2)	3.7 (0.4)	1.4 (0.2)	0.9 (0.1)	0.6 (0.1)	3930	
PRC China	1.4 (0.2)	0.4 (0.1)	0.9 (0.2)	0.4 (0.1)	1.0 (0.2)	0.2 (0.1)	1.5 (0.3)	0.7 (0.2)	0.3 (0.1)	0.1 (0.1)	5201	
PRC Shen Zhen	2.1 (0.2)	1.0 (0.2)	1.8 (0.2)	1.0 (0.2)	1.3 (0.2)	0.4 (0.1)	2.1 (0.2)	1.0 (0.1)	0.4 (0.1)	0.4 (0.1)	7132	
Upper-middle-income countries	4.4 (0.2)	2.8 (0.1)	3.0 (0.2)	2.3 (0.1)	3.0 (0.1)	1.2 (0.1)	3.6 (0.2)	2.0 (0.1)	1.0 (0.1)	1.3 (0.1)	24 612	
Brazil	7.0 (0.4)	3.7 (0.3)	4.4 (0.5)	3.4 (0.3)	4.8 (0.4)	1.8 (0.2)	5.9 (0.3)	3.1 (0.3)	1.7 (0.2)	1.8 (0.2)	5037	
Bulgaria	3.0 (0.3)	2.2 (0.3)	2.4 (0.2)	1.0 (0.1)	1.7 (0.2)	0.4 (0.1)	2.6 (0.3)	2.0 (0.2)	0.6 (0.1)	0.6 (0.1)	5318	
Colombia (Medellín)	6.5 (0.6)	4.4 (0.5)	4.5 (0.5)	4.6 (0.5)	5.7 (0.6)	2.5 (0.3)	2.9 (0.4)	2.1 (0.4)	1.8 (0.3)	3.3 (0.4)	3261	
Lebanon	2.8 (0.2)	2.9 (0.4)	2.1 (0.4)	1.1 (0.3)	1.0 (0.2)	0.5 (0.1)	4.9 (0.5)	1.5 (0.2)	0.5 (0.2)	0.2 (0.0)	2857	
Mexico	4.0 (0.3)	2.2 (0.3)	2.4 (0.3)	2.1 (0.3)	2.7 (0.3)	1.1 (0.2)	3.4 (0.4)	1.7 (0.2)	0.9 (0.1)	1.1 (0.2)	5782	
Romania	1.7 (0.4)	2.0 (0.4)	2.0 (0.4)	1.1 (0.3)	1.8 (0.3)	0.4 (0.2)	1.3 (0.3)	1.2 (0.2)	0.6 (0.2)	0.7 (0.2)	2357	
High income	3.7 (0.1)	2.2 (0.1)	3.4 (0.1)	2.4 (0.1)	3.1 (0.1)	1.7 (0.1)	3.7 (0.1)	2.0 (0.1)	1.3 (0.1)	1.1 (0.1)	68 517	
Belgium	2.5 (0.5)	1.7 (0.4)	2.2 (0.4)	1.3 (0.5)	2.3 (0.6)	0.8 (0.2)	4.4 (0.6)	1.3 (0.3)	0.9 (0.3)	0.3 (0.2)	2419	
France	3.8 (0.4)	2.8 (0.3)	3.9 (0.4)	2.7 (0.4)	3.6 (0.4)	1.3 (0.3)	6.2 (0.5)	2.3 (0.4)	1.4 (0.2)	0.8 (0.2)	2894	
Germany	3.5 (0.4)	1.7 (0.4)	3.9 (0.4)	2.0 (0.3)	2.5 (0.2)	1.7 (0.2)	6.0 (0.5)	2.7 (0.3)	0.9 (0.2)	0.3 (0.1)	3555	
Italy	2.0 (0.2)	1.3 (0.2)	2.2 (0.3)	1.5 (0.2)	1.4 (0.2)	1.0 (0.2)	3.0 (0.3)	1.3 (0.2)	0.7 (0.2)	0.4 (0.1)	4712	
Japan	2.0 (0.2)	1.5 (0.2)	1.4 (0.2)	1.1 (0.2)	1.2 (0.2)	0.7 (0.1)	1.3 (0.2)	0.9 (0.1)	0.5 (0.1)	0.7 (0.2)	4129	
New Zealand	5.0 (0.3)	2.2 (0.2)	4.7 (0.2)	3.4 (0.2)	4.7 (0.2)	2.2 (0.2)	4.7 (0.2)	3.0 (0.2)	2.0 (0.2)	1.2 (0.1)	12 790	
Northern Ireland	4.6 (0.4)	3.9 (0.4)	4.8 (0.4)	3.5 (0.4)	4.6 (0.4)	2.3 (0.3)	3.3 (0.4)	2.3 (0.2)	1.7 (0.2)	2.4 (0.3)	4340	
Poland	1.5 (0.1)	0.9 (0.1)	1.3 (0.1)	0.8 (0.1)	1.4 (0.1)	0.6 (0.1)	1.7 (0.1)	0.8 (0.1)	0.5 (0.1)	0.4 (0.1)	10 081	
Portugal	6.1 (0.5)	4.1 (0.4)	4.6 (0.4)	3.6 (0.3)	4.3 (0.3)	1.9 (0.2)	3.8 (0.4)	2.8 (0.3)	1.9 (0.2)	2.2 (0.3)	3849	
Spain	2.1 (0.2)	1.1 (0.2)	1.4 (0.2)	1.3 (0.2)	1.1 (0.2)	0.7 (0.1)	3.0 (0.4)	1.0 (0.2)	0.4 (0.1)	0.3 (0.1)	5473	
Spain (Murcia)	2.6 (0.3)	0.9 (0.2)	0.7 (0.2)	1.7 (0.4)	1.5 (0.3)	0.7 (0.2)	3.5 (0.3)	1.1 (0.3)	0.6 (0.2)	0.1 (0.1)	2621	
The Netherlands	2.4 (0.4)	1.5 (0.3)	2.9 (0.5)	1.4 (0.3)	1.7 (0.3)	1.0 (0.3)	5.4 (0.6)	1.4 (0.3)	0.7 (0.2)	0.1 (0.1)	2372	
USA	6.6 (0.3)	4.3 (0.2)	6.0 (0.3)	4.4 (0.2)	5.9 (0.3)	3.8 (0.2)	4.1 (0.3)	3.1 (0.2)	2.3 (0.2)	2.9 (0.2)	9282	
All countries combined	3.8 (0.1)	2.3 (0.1)	3.0 (0.1)	2.2 (0.1)	2.8 (0.1)	1.3 (0.0)	3.4 (0.1)	1.8 (0.0)	1.1 (0.0)	1.1 (0.0)	124 902	

All males	2.0 (0.1)	1.3 (0.1)	2.2 (0.1)	1.2 (0.1)	2.0 (0.1)	0.8 (0.0)	2.5 (0.1)	1.2 (0.1)	0.6 (0.0)	56526	
All females	5.4 (0.1)	3.3 (0.1)	3.7 (0.1)	3.1 (0.1)	3.6 (0.1)	1.8 (0.1)	4.3 (0.1)	2.4 (0.1)	1.5 (0.1)	68376	
Country comparisons ^a	$\chi^2_3 = 27.4^*$ $p < 0.001$ $\chi^2_2 = 12.2^*$ $\chi^2_1 = 658.1^*$	$\chi^2_3 = 23.7^*$ $p < 0.001$ $\chi^2_2 = 11.4^*$ $\chi^2_1 = 420.2^*$	$\chi^2_3 = 28.1^*$ $p < 0.001$ $\chi^2_2 = 33.0^*$ $\chi^2_1 = 153.6^*$	$\chi^2_3 = 32.7^*$ $p < 0.001$ $\chi^2_2 = 25.2^*$ $\chi^2_1 = 333.4^*$	$\chi^2_3 = 33.6^*$ $p < 0.001$ $\chi^2_2 = 37.6^*$ $\chi^2_1 = 187.2^*$	$\chi^2_3 = 18.2^*$ $p < 0.001$ $\chi^2_2 = 63.6^*$ $\chi^2_1 = 190.1^*$	$\chi^2_3 = 20.8^*$ $p < 0.001$ $\chi^2_2 = 21.0^*$ $\chi^2_1 = 188.0^*$	$\chi^2_3 = 15.5^*$ $p < 0.001$ $\chi^2_2 = 20.3^*$ $\chi^2_1 = 203.0^*$	$\chi^2_3 = 14.5^*$ $p < 0.001$ $\chi^2_2 = 20.9^*$ $\chi^2_1 = 167.5^*$	$\chi^2_3 = 22.4^*$ $p < 0.001$ $\chi^2_2 = 5.4^*$ $\chi^2_1 = 191.2^*$	$p < 0.001$ $p < 0.001$ $p < 0.001$
Income-group comparisons ^a	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	
Gender comparison ^a	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	

Data are given as percentage (standard error) unless otherwise indicated.
 DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, fourth edition; PRC, People's Republic of China.
^a χ^2 Test of homogeneity to determine if there is variation in prevalence estimates.
 * $p < 0.05$ (two-sided test).

prevalence rates for all subtypes (0.6–3.4%) and considerably higher prevalence rates in upper-middle-income countries (1.2–4.4%) and high-income countries (1.7–3.7%). The clearest difference was seen for fear of flying, which had an almost three times higher prevalence in high-income (1.7%) than in low-/lower-middle-income (0.6%) countries. All subtypes were most common in females. Of the cross-national sample, 3.4% reported a single subtype, 1.8% reported two subtypes, 1.1% reported three subtypes and 1.1% reported more than four subtypes. Higher numbers of subtypes were more common among females than males.

Recurrence and duration

The averaged prevalence of 12-month specific phobia among lifetime specific phobia cases was 74.2% for the whole cross-national sample (median = 73.0%, IQR = 70.2–81.3%; Table 1). The averaged prevalence of 30-day specific phobia among 12-month cases was 70.2% for the cross-national sample (median = 72.6%, IQR = 67.6–78.3%). Both prevalence rates were higher in females than in males. In addition, the 30-day prevalence among 12-month cases was the only that differed notably across income groups, with the lowest rate in the low-/low-middle-income group (58.7%).

AOO

The median AOO was 8 years (IQR = 5–13 years; online Supplementary Appendix Table S2) and differed slightly across surveys (IQR = 8–9 years). The cross-national projected risk at age 75 years was only 0.7% higher than the observed lifetime prevalence rate (8.1% v. 7.4%), reflecting specific phobia's young AOO distribution. Early AOO was most common for all subtypes, but especially common for fear of still water/weather (Table 3; 37.1%), animals (36.6%) and closed spaces (35.2%). A slightly older-onset distribution was seen for fear of flying and high places. Early-onset rates increased and late-onset rates decreased with the number of fears.

Co-morbidity

In 60.5% of lifetime specific phobia cases, at least one other lifetime disorder was present, with 34.3% having a co-morbid mood disorder, 41.2% an anxiety disorder, 15.9% a substance use disorder and 17.4% an impulse-control disorder (Table 4). In those with 12-month co-morbidity of specific phobia with any other disorder, co-morbid anxiety disorders were most common (29.6%), followed by mood disorders (21.0%). Specific phobia preceded the other disorders in the majority of co-morbid cases (71.6–92.2%). Lifetime co-morbidity with any other disorder ranged from 60.6% to 73.0%

Table 3. Sociodemographic characteristics, impairment, co-morbidity and treatment use for each specific phobia subtype and for groups of patients with different numbers of phobias

	Kinds of lifetime phobias						Number of lifetime phobias			
	Animal	Still water, weather	Blood, injuries, medical experiences	Closed spaces	High places	Flying	One phobia	Two phobias	Three phobias	Four or more phobias
Age, years										
18–29	34.1 (0.9)	27.5 (1.1)	32.4 (1.0)	24.1 (1.0)	23.4 (0.9)	23.4 (1.3)	32.6 (0.9)	28.8 (1.3)	25.2 (1.5)	27.9 (1.4)
30–44	33.1 (0.8)	30.0 (1.0)	32.7 (0.9)	33.6 (1.1)	34.6 (1.0)	33.0 (1.4)	31.3 (0.9)	33.0 (1.2)	35.5 (1.5)	32.1 (1.5)
45–59	22.0 (0.8)	27.3 (1.0)	24.4 (0.9)	28.3 (1.0)	29.1 (0.9)	29.4 (1.3)	22.5 (0.7)	23.4 (1.1)	27.9 (1.5)	29.1 (1.4)
60+	10.8 (0.5)	15.2 (0.8)	10.5 (0.6)	14.0 (0.7)	12.8 (0.7)	14.3 (0.9)	13.6 (0.6)	14.7 (0.9)	11.5 (1.0)	11.0 (0.9)
Gender										
Male	25.3 (0.8)	26.5 (1.0)	35.7 (1.0)	27.7 (1.1)	34.8 (1.0)	29.6 (1.3)	36.0 (0.9)	31.0 (1.2)	28.3 (1.5)	26.5 (1.4)
Female	74.7 (0.8)	73.5 (1.0)	64.3 (1.0)	72.3 (1.1)	65.2 (1.0)	70.4 (1.3)	64.0 (0.9)	69.0 (1.2)	71.7 (1.5)	73.5 (1.4)
Marital status										
Married	58.6 (0.9)	61.7 (1.1)	58.4 (1.0)	60.3 (1.2)	61.4 (1.0)	63.9 (1.4)	59.6 (0.9)	59.6 (1.3)	61.8 (1.5)	60.4 (1.6)
Never married	28.1 (0.9)	22.0 (1.1)	28.4 (0.9)	22.9 (1.0)	23.3 (1.0)	20.1 (1.3)	28.1 (0.9)	26.1 (1.2)	23.9 (1.4)	22.9 (1.5)
Separated/widowed/divorced	13.2 (0.6)	16.2 (0.8)	13.2 (0.6)	16.7 (0.8)	15.2 (0.6)	16.0 (0.9)	12.3 (0.6)	14.3 (0.8)	14.2 (1.1)	16.7 (1.0)
Employment status										
Student	5.3 (0.6)	3.9 (0.6)	4.9 (0.6)	3.7 (0.5)	3.0 (0.4)	3.6 (0.6)	6.5 (0.7)	5.1 (0.7)	3.6 (0.8)	2.4 (0.6)
Working	57.2 (1.1)	53.9 (1.3)	59.6 (1.2)	55.1 (1.3)	58.1 (1.1)	55.4 (1.7)	57.7 (1.4)	58.4 (1.5)	60.8 (1.7)	53.1 (1.8)
Retired	8.1 (0.6)	11.3 (0.8)	9.1 (0.8)	10.4 (0.9)	10.1 (0.7)	10.3 (1.0)	10.9 (0.8)	10.1 (0.9)	10.5 (1.3)	7.9 (0.9)
Homemaker	16.9 (0.8)	18.1 (1.0)	13.9 (0.8)	17.3 (1.0)	15.4 (0.7)	17.2 (1.3)	13.7 (0.9)	14.2 (1.0)	13.9 (1.2)	20.9 (1.4)
Other	12.5 (0.8)	12.8 (0.9)	12.6 (0.8)	13.6 (1.0)	13.4 (0.8)	13.4 (1.2)	11.1 (0.9)	12.2 (1.0)	11.1 (0.9)	15.7 (1.4)
Income										
Low	30.1 (1.1)	31.4 (1.2)	31.1 (1.1)	32.5 (1.3)	30.7 (1.1)	33.2 (1.8)	27.0 (1.2)	29.0 (1.5)	32.7 (1.6)	34.6 (1.7)
Low-mid	25.4 (1.0)	26.2 (1.2)	25.1 (1.1)	24.9 (1.1)	25.9 (1.1)	23.7 (1.5)	23.8 (1.1)	23.8 (1.4)	25.3 (1.6)	27.8 (1.6)
Mid-high	24.3 (1.0)	24.5 (1.2)	23.8 (1.0)	22.4 (1.1)	24.6 (1.0)	22.7 (1.5)	27.5 (1.1)	26.3 (1.6)	22.8 (1.5)	20.4 (1.4)
High	20.2 (0.9)	17.9 (1.0)	20.0 (1.0)	20.2 (1.1)	18.8 (0.9)	20.4 (1.4)	21.7 (1.2)	20.9 (1.3)	19.2 (1.3)	17.2 (1.4)
Education level										
None	2.6 (0.3)	3.1 (0.3)	1.8 (0.3)	2.0 (0.3)	1.8 (0.2)	1.1 (0.2)	2.6 (0.3)	2.4 (0.3)	2.0 (0.4)	1.8 (0.3)
Some primary	10.1 (0.5)	11.7 (0.7)	9.4 (0.6)	10.8 (0.7)	10.6 (0.6)	9.6 (0.9)	8.0 (0.5)	10.0 (0.9)	9.4 (0.9)	12.8 (1.0)
Complete primary	8.2 (0.5)	10.1 (0.7)	6.9 (0.5)	9.1 (0.7)	8.1 (0.5)	7.3 (0.8)	7.0 (0.5)	7.9 (0.7)	7.5 (0.8)	9.9 (1.0)
Some secondary	21.0 (0.7)	22.2 (1.0)	22.1 (0.8)	23.4 (0.9)	22.3 (0.8)	23.3 (1.4)	19.0 (0.8)	21.4 (1.1)	22.5 (1.4)	24.4 (1.4)
Complete secondary	27.8 (0.8)	29.4 (1.0)	31.5 (1.0)	27.6 (1.0)	29.5 (0.9)	29.1 (1.4)	31.1 (0.9)	29.0 (1.1)	31.9 (1.5)	26.3 (1.4)
Some college	16.9 (0.7)	13.7 (0.8)	16.2 (0.8)	15.2 (0.8)	14.3 (0.7)	16.1 (1.2)	16.6 (0.7)	15.1 (1.0)	13.6 (1.1)	16.4 (1.2)
Complete college	11.8 (0.6)	8.8 (0.6)	11.0 (0.6)	10.8 (0.7)	12.1 (0.7)	12.3 (0.9)	13.8 (0.6)	13.0 (0.8)	12.1 (1.1)	7.6 (0.9)
Age of onset										
Early	36.6 (0.9)	37.1 (1.1)	33.4 (0.9)	35.2 (1.0)	32.6 (1.0)	32.9 (1.4)	23.1 (0.8)	31.3 (1.2)	37.7 (1.6)	43.1 (1.6)

Early-average	30.4 (0.8)	28.5 (1.0)	29.3 (1.0)	27.9 (1.0)	27.0 (0.9)	27.0 (1.3)	21.8 (0.8)	27.4 (1.1)	29.4 (1.4)	33.6 (1.5)
Late-average	23.8 (0.8)	24.4 (0.9)	23.8 (0.9)	21.8 (1.0)	23.1 (0.8)	21.5 (1.2)	26.9 (0.8)	25.6 (1.1)	23.0 (1.3)	19.6 (1.2)
Late	9.2 (0.5)	10.0 (0.6)	13.5 (0.7)	15.1 (0.8)	17.4 (0.7)	18.6 (1.1)	28.1 (0.8)	15.7 (0.9)	9.9 (0.9)	3.7 (0.5)
Co-morbidity, lifetime										
Mood disorder	34.7 (1.0)	39.9 (1.3)	40.0 (1.2)	43.6 (1.3)	41.3 (1.1)	43.5 (1.6)	26.5 (1.0)	34.3 (1.4)	41.0 (1.8)	51.0 (1.9)
Anxiety disorder	41.9 (1.1)	51.2 (1.4)	48.1 (1.3)	55.5 (1.4)	52.3 (1.2)	58.3 (1.8)	28.9 (1.0)	39.9 (1.5)	53.7 (1.8)	67.5 (1.7)
Impulse control disorder	18.3 (0.9)	21.1 (1.2)	21.7 (1.0)	22.0 (1.2)	22.4 (1.1)	23.6 (1.5)	13.2 (1.0)	16.0 (1.2)	20.4 (1.6)	30.2 (1.7)
Substance-use disorder	14.9 (0.8)	15.6 (0.9)	19.2 (0.9)	17.4 (1.0)	20.5 (0.9)	17.3 (1.3)	13.9 (0.9)	14.9 (1.0)	18.2 (1.6)	21.1 (1.4)
Any mental disorder	60.6 (1.1)	69.4 (1.4)	67.2 (1.3)	71.0 (1.4)	71.7 (1.2)	73.0 (1.6)	49.7 (1.3)	59.9 (1.7)	72.5 (1.9)	82.1 (1.4)
Any impairment	55.3 (0.9)	57.3 (1.1)	52.1 (1.0)	54.8 (1.1)	53.6 (1.0)	56.4 (1.4)	46.4 (1.0)	48.8 (1.3)	56.1 (1.6)	63.0 (1.5)
Severe impairment, SDS: 7–10 ^a	16.1 (0.6)	16.2 (0.8)	15.2 (0.7)	15.9 (0.8)	15.0 (0.7)	17.0 (1.1)	11.6 (0.6)	12.0 (0.8)	16.3 (1.2)	20.6 (1.3)
Moderate impairment, SDS: 4–6 ^a	17.5 (0.7)	19.3 (0.9)	16.7 (0.8)	16.8 (0.9)	17.8 (0.7)	17.0 (1.1)	16.2 (0.7)	16.2 (0.9)	17.6 (1.2)	19.3 (1.1)
Mild impairment, SDS: 1–3 ^a	21.6 (0.8)	21.7 (0.9)	20.2 (0.8)	22.2 (0.9)	20.7 (0.8)	22.4 (1.2)	18.7 (0.8)	20.6 (1.0)	22.2 (1.3)	23.1 (1.3)
Use of any treatment ^b	20.4 (0.6)	21.7 (0.8)	24.5 (0.8)	27.5 (1.0)	26.0 (0.9)	28.4 (1.2)	16.7 (0.7)	21.2 (0.9)	27.5 (1.3)	29.2 (1.3)

Data are given as percentage (standard error) unless otherwise indicated.
 DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, fourth edition; SDS, Sheehan Disability Scales.
^a Highest severity category across four SDS role domains.
^b Specialty mental health care, general medical care, human services or complementary/alternative medicine.

across subtypes (Table 3). Co-morbidity was highest with anxiety (range: 41.9–58.3%) and mood disorders (range: 34.7–43.6%). Co-morbidity rates were highest in those with fear of closed spaces and flying and increased with the number of subtypes from 49.7% (one subtype) to 82.1% (four or more subtypes).

Demographic correlates of specific phobia onset

In the combined sample, higher risk of lifetime onset of specific phobia (Table 5) was observed in respondents aged younger than 60 years compared with respondents aged 60 years and older [odds ratio (OR) 1.5–1.8], in women compared with men (OR 2.0), in homemakers and those with ‘other’ employment status compared with employed respondents (OR 1.2–1.4), in previously married compared with currently married (OR 1.2), in those with some college or less education compared with those who completed college (OR 1.3–1.7), and in those with low and low-average income compared with those with a high income (OR 1.1–1.2). When analysed by income group (online Supplementary Appendix Tables S3–S5), the following associations with increased odds of lifetime specific phobia onset were consistently observed: being in the youngest age cohort (OR 1.3–2.0), being female (OR 1.5–2.3), having employment status ‘other’ (OR 1.3–1.5) and having a lower education than finished college (OR 1.2–1.9).

The age group distribution varied across subtypes (Table 3), with most young persons in animal and BIM phobia. The percentage of females was highest in all subtype groups and increased with number of subtypes. Employment status showed limited variation across subtypes, but the percentage of working persons was markedly lower (53.1%) in those with four or more subtypes compared with those with one to three subtypes (57.7–60.8%). The percentages of cases with completed college showed some variation across subtypes (8.8–12.3%), but a more striking difference between those with four or more subtypes (7.6%) and those with one to three subtypes (12.1–13.8%). Income group distributions showed limited variation across subtypes, but the percentages of low and low-mid income increased with the number of subtypes.

Demographic correlates of persistence

Among lifetime cases, 12-month specific phobia prevalence (Table 5) was higher in those with early AOO compared with those with late AOO (OR 1.4), in women compared with men (OR 1.8), in those who were retired or had employment status ‘other’ compared with the employed (OR 1.3 and OR 1.5), in those with some college or less compared with those with finished college (OR 1.3–1.7), and in those with

Table 4. Co-morbidity of specific phobia with other DSM-IV disorders

	Specific phobia cases with co-morbid disorders				
	Mood disorder ^a	Anxiety disorder ^b	Impulse-control disorder ^c	Substance use disorder ^d	Any mental disorder ^e
Lifetime co-morbidity ^f					
Lifetime specific phobia diagnosis	34.3 (0.7)	41.2 (0.8)	17.4 (0.7)	15.9 (0.6)	60.5 (0.9)
12-month specific phobia	35.9 (0.9)	42.9 (0.9)	18.1 (0.7)	15.6 (0.6)	62.0 (1.0)
12-month co-morbidity ^g					
12-month specific phobia	21.0 (0.7)	29.6 (0.8)	10.1 (0.6)	5.3 (0.4)	42.2 (1.0)
Temporal priority of specific phobia ^h					
Lifetime specific phobia	89.3 (0.7)	71.6 (0.9)	72.5 (1.7)	92.2 (0.9)	72.6 (0.8)
12-month specific phobia	89.7 (0.8)	72.2 (1.1)	71.5 (2.0)	92.8 (1.0)	72.8 (1.0)

Data are given as percentage (standard error) unless otherwise indicated.

DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, fourth edition.

^a Respondents with major depressive episode or bipolar disorder (broad).

^b Respondents with panic disorder, generalized anxiety disorder, social phobia, agoraphobia, post-traumatic stress disorder or separation anxiety disorder.

^c Respondents with intermittent explosive disorder, attention-deficit disorder, conduct disorder, oppositional defiant disorder, binge-eating disorder or bulimia nervosa.

^d Respondents with alcohol abuse with or without dependence or drug abuse with or without dependence.

^e Respondents with any disorder listed above.

^f Percentage of respondents with either lifetime or 12-month specific phobia who also meet lifetime criteria for at least one of the other DSM-IV disorders.

^g Percentage of respondents with 12-month specific phobia who also meet 12-month criteria for at least one of the other disorders.

^h Percentage of respondents with either lifetime or 12-month specific phobia and at least one of the other disorders, whose age of onset of specific phobia is reported to be younger than the age of onset of all co-morbid disorders under consideration (i.e. either mood, anxiety, substance use, impulse control or any disorder).

low income compared with those with high income (OR 1.4). Only female gender was consistently observed to be associated with an increased odds of 30-day prevalence among 12-month cases (OR 1.5–1.9; online Supplementary Appendix Tables S3–S5).

Impairment

In the combined sample, 18.7% of 12-month specific phobia cases reported severe role impairment in any domain (online Supplementary Appendix Table S6), with the highest percentage of severe impairment in the home domain (10.3%) and the lowest in the relationship domain (7.9%). The percentages of severe impairment differed across income groups on all domains, except for work. The low-/lower-middle-income group, especially Nigeria and PRC Shen Zhen, showed the lowest percentages of severe impairment. The upper-middle-income group showed the highest percentages of severe impairment (range: 9.9–14.4%). The mean number of days out of role in the past year due to 12-month specific phobia was 12.2 (s.e. = 0.9). However, those with severe impairment in any domain reported 29.1 days out of role (online

Supplementary Appendix Table S7), with the number of days varying depending on the investigated domain of impairment (34.6–47.9 days). The percentage of cases reporting any impairment varied somewhat across subtypes (52.1–57.3%; Table 3). However, impairment rates increased with the number of fear subtypes, with 11.6% reporting severe impairment in those with one subtype and 20.6% in those with four or more subtypes.

Treatment

Cross-nationally, the percentage of 12-month specific phobia cases reporting any treatment was 23.1%. Treatment was more common in those reporting severe impairment (32.5%) compared with those reporting mild or moderate impairment (21.1% and 22.8%, respectively; online Supplementary Appendix Table S8). Treatment rates differed across income groups, with 9.6% in low-/lower-middle-income, 16.0% in higher-middle-income and 30.1% in high-income countries. Overall treatment use showed some variation across subtypes (Table 3), with the highest rates for fear of flying (28.4%), closed spaces (27.5%) and high

Table 5. Bivariate associations between sociodemographics correlates and DSM-IV specific phobia (all countries combined)

Correlates	30-day specific phobia ^a	Lifetime specific phobia ^b	12-month specific phobia among lifetime cases ^c	30-day specific phobia among 12-month cases ^c
Age cohort, years				
18–29	1.5 (1.3–1.6)*	1.8 (1.7–2.0)*	–	–
30–44	1.4 (1.3–1.6)*	1.6 (1.4–1.7)*	–	–
45–59	1.4 (1.2–1.6)*	1.5 (1.4–1.6)*	–	–
60+	1.0	1.0		
Age cohort difference ^d	$\chi^2_3 = 54.5^*$, $p < 0.001$	$\chi^2_3 = 208.2^*$, $p < 0.001$		
Age of onset				
Early	–	–	1.4 (1.2–1.7)*	0.9 (0.8–1.1)
Early-average	–	–	1.1 (0.9–1.3)	0.9 (0.7–1.0)
Late-average	–	–	1.1 (0.9–1.3)	0.8 (0.7–1.0)*
Late	–	–	1.0	1.0
Age of onset difference ^d			$\chi^2_3 = 20.7^*$, $p < 0.001$	$\chi^2_3 = 7.4$, $p = 0.061$
Time since onset, continuous	–	–	1.00 (0.99–1.00)*	1.01 (1.01–1.01)*
			$\chi^2_1 = 6.4^*$, $p < 0.012$	$\chi^2_1 = 19.6^*$, $p < 0.001$
Gender				
Female	2.7 (2.5–3.0)*	2.0 (1.9–2.2)*	1.8 (1.6–2.1)*	1.3 (1.2–1.5)*
Male	1.0	1.0	1.0	1.0
Gender difference ^d	$\chi^2_1 = 617.2^*$, $p < 0.001$	$\chi^2_1 = 635.9^*$, $p < 0.001$	$\chi^2_1 = 88.1^*$, $p < 0.001$	$\chi^2_1 = 15.7^*$, $p < 0.001$
Employment status				
Student	1.0 (0.8–1.2)	1.1 (1.0–1.3)	1.2 (0.9–1.7)	0.9 (0.7–1.2)
Homemaker	1.3 (1.2–1.5)*	1.2 (1.1–1.3)*	1.2 (1.0–1.5)	1.3 (1.1–1.6)*
Retired	1.1 (0.9–1.2)	1.1 (1.0–1.3)	1.3 (1.0–1.6)*	0.9 (0.7–1.2)
Other ^e	1.6 (1.5–1.8)*	1.4 (1.3–1.5)*	1.5 (1.2–1.8)*	1.3 (1.1–1.6)*
Employed	1.0	1.0	1.0	1.0
Employment status difference ^d	$\chi^2_4 = 90.4^*$, $p < 0.001$	$\chi^2_4 = 69.9^*$, $p < 0.001$	$\chi^2_4 = 21.0^*$, $p < 0.001$	$\chi^2_4 = 15.5^*$, $p = 0.004$
Marital status				
Never married	1.0 (0.9–1.1)	1.1 (1.0–1.1)	1.1 (0.9–1.2)	1.0 (0.9–1.2)
Divorced/separated/widowed	1.2 (1.1–1.3)*	1.2 (1.1–1.3)*	1.1 (0.9–1.3)	1.1 (0.9–1.3)
Currently married	1.0	1.0	1.0	1.0
Marital status difference ^d	$\chi^2_2 = 16.1^*$, $p < 0.001$	$\chi^2_2 = 23.0^*$, $p < 0.001$	$\chi^2_2 = 1.0$, $p = 0.614$	$\chi^2_2 = 1.0$, $p = 0.619$
Education level				
No education	1.7 (1.3–2.2)*	1.4 (1.1–1.6)*	1.7 (1.1–2.6)*	1.7 (1.1–2.6)*
Some primary	2.2 (1.9–2.5)*	1.7 (1.6–1.9)*	1.7 (1.2–2.2)*	1.4 (1.0–1.8)*
Finished primary	1.9 (1.6–2.3)*	1.5 (1.4–1.7)*	1.5 (1.1–2.0)*	1.4 (1.0–1.8)
Some secondary	1.7 (1.5–1.9)*	1.5 (1.4–1.6)*	1.3 (1.1–1.7)*	1.2 (0.9–1.5)
Finished secondary	1.5 (1.3–1.7)*	1.3 (1.2–1.4)*	1.3 (1.1–1.6)*	1.3 (1.0–1.6)*
Some college	1.4 (1.2–1.6)*	1.3 (1.2–1.4)*	1.3 (1.0–1.6)*	1.1 (0.8–1.4)
Finished college	1.0	1.0	1.0	1.0
Education level difference ^d	$\chi^2_6 = 117.8^*$, $p < 0.001$	$\chi^2_6 = 131.6^*$, $p < 0.001$	$\chi^2_6 = 16.7^*$, $p = 0.010$	$\chi^2_6 = 11.1$, $p = 0.086$
Household income				
Low	1.4 (1.2–1.6)*	1.2 (1.1–1.3)*	1.4 (1.1–1.6)*	1.3 (1.1–1.6)*
Low-average	1.2 (1.1–1.4)*	1.1 (1.0–1.2)*	1.2 (1.0–1.4)	1.2 (1.0–1.5)
High-average	1.1 (1.0–1.2)	1.0 (1.0–1.1)	1.1 (0.9–1.2)	1.1 (0.9–1.4)
High	1.0	1.0	1.0	1.0
Household income difference ^d	$\chi^2_3 = 38.7^*$, $p < 0.001$	$\chi^2_3 = 28.1^*$, $p < 0.001$	$\chi^2_3 = 14.4^*$, $p = 0.003$	$\chi^2_3 = 7.7$, $p = 0.053$
<i>n</i> ^f	124 902	5 130 258	9583	7140

Data are given as odds ratio (95% confidence interval).

DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, fourth edition.

^a These estimates are based on logistic regression adjusted for age, gender and country.

^b These estimates are based on survival models adjusted for age cohorts, gender, person-years and country.

^c These estimates are based on logistic regression adjusted for time since specific phobia onset, age of onset, gender and country.

^d χ^2 Test of significant differences between blocks of sociodemographic variables.

^e Includes, for example, looking for work or being disabled.

^f Denominator *n*: 124 902 = total sample; 5 130 258 = number of person-years in the survival models; 9583 = number of lifetime cases of specific phobia; 7140 = number of 12-month cases of specific phobia.

* $p < 0.05$ (two-sided test).

places (26.0%). Also, rates of treatment use increased from 16.7% in those with one subtype to 29.2% in those with four or more subtypes.

Discussion

Specific phobia is a common mental disorder with a cross-national lifetime prevalence of 7.4%. Interestingly, the prevalence, impairment and duration of specific phobia were considerably higher in high- and upper-middle-income countries than in low-/lower-middle-income countries. This could be due to cultural differences in the degree to which symptoms of specific phobia are recognized or attributed to a mental disorder and differences in catastrophic cognitions about phobic/anxious symptoms (Hinton & Pollack, 2009; Marques *et al.* 2011; Hofmann & Hinton, 2014). Also, there could be differences in how interview questions are interpreted, social norms, attitudes and stigmas surrounding mental problems (Angermeyer & Dietrich, 2006; Lee *et al.* 2009). For instance, differences in specific phobia duration could be attributed to the reasons above but could also reflect differences in the kinds and/or frequencies of reported phobic stimuli. Although cross-national differences could not be investigated in depth, the results suggest that the phenomenology and underlying processes of specific phobia vary across countries. As observed previously (e.g. Stinson *et al.* 2007; LeBeau *et al.* 2010), females showed higher specific phobia prevalence than males.

Young age was also observed to be associated with specific phobia, aligning with previous work (Stinson *et al.* 2007; Sigström *et al.* 2016). Those with lower education had higher odds of specific phobia, which has been observed previously (Magee *et al.* 1996) but not in all surveys (Stinson *et al.* 2007). Those with employment status 'other' (e.g. disabled, looking for a job) showed higher odds of specific phobia. Magee *et al.* (1996) found a similar association, but it has not been investigated in other surveys.

Subtype-specific analyses showed that animal phobia had the highest cross-national prevalence (3.8%; 1.4–8.1% across countries), in line with previous observations (3.3–7.0%; Curtis *et al.* 1998; Depla *et al.* 2008; LeBeau *et al.* 2010). Fear of still water or weather events had a prevalence of 2.3%, aligning with previously reported prevalence rates for 'water' phobia (2.2–3.4%) and 'storm' phobia (2.0–2.9%; LeBeau *et al.* 2010). For fear of heights, the cross-national prevalence (2.8%) was somewhat lower than reported previously (3.1–5.3%; LeBeau *et al.* 2010). The cross-national prevalence of BIM phobia (3.0%) was in line with previously estimated prevalence rates (3.2–4.5%; LeBeau *et al.* 2010). The cross-national prevalence rates fear of

closed spaces (2.2%) and fear of flying (1.3%) were both lower than reported previously (closed spaces: 3.2–3.3%; flying: 2.5–2.9%; LeBeau *et al.* 2010). Apart from methodological differences, some of the discrepancies between current and previous findings could be explained by variations across countries in culture (see above) and rates of exposure (e.g. flying is less common in low-income countries). Investigation of subtype co-occurrence showed that more than half of patients had two or more lifetime fear subtypes and that those with more subtypes had more severe clinical characteristics (e.g. impairment, co-morbidity), aligning with previous results (e.g. Curtis *et al.* 1998).

The median AOO of specific phobia was found to be young, showing relatively limited variation across surveys (IQR = 5–13 years). In line with this, the projected lifetime risk was only slightly higher than the observed lifetime prevalence rates (range of absolute differences across surveys: 0.1–1.2%; range of proportional differences across surveys: 1.7–22.0%). In line with previous work (e.g. Burstein *et al.* 2012), the AOO distribution showed some differences across subtypes, with more early AOO for animal and natural phenomena phobias. The observation of a younger AOO distribution in those with multiple fear subtypes also aligns with previous work (Burstein *et al.* 2012). Lifetime co-morbidity levels in specific phobia were high (60.5%), with some subtypes being associated with higher levels than others. In the majority of co-morbid cases, specific phobia onset preceded the other disorder(s). In addition, co-morbidity became more common with increasing numbers of fear subtypes. Together, these results support the idea that specific phobia is an early-life indicator of psychopathology vulnerability.

Severe role impairment was reported in roughly a fifth of 12-month specific phobia cases, but reported impairment was lower in low-/lower-middle-income countries than in the other countries. The mean number of days out of role in all subjects with 12-month specific phobia was 12.2, but in respondents reporting severe impairment, this number was much higher, often in excess of a month, depending on the domain of severe impairment. Twelve-month impairment increased with the number of reported fear subtypes, aligning with the idea that the presence of multiple lifetime fears marks increased clinical severity. Together, these results suggest that specific phobia can have a severe impact on persons' lives.

Treatment for specific phobia was threefold higher in high-income countries than in low-/lower-middle-income countries, which could be due to differences in the availability of care and financial resources (Saxena *et al.* 2007; McBain *et al.* 2012), the perceived need for treatment (Andrade *et al.* 2014), knowledge

about mental healthcare (Palazzo *et al.* 2014) and prejudices (Clement *et al.* 2015; Semrau *et al.* 2015). Despite differences in treatment rates, associations between the level of impairment and percentages of reported treatment were comparable across the income groups, with severely impaired cases reporting most treatment. These results indicate that self-reported impairment could be an informative clinical specifier indicating need for care.

The current study had several limitations. First, diagnoses were based on structured lay interviews. However, a previous clinical reappraisal study (Haro *et al.* 2006) showed sufficient concordance between CIDI-based and clinical diagnoses of specific phobia. Second, all information about lifetime prevalence and AOO was reported retrospectively. This could have led to recall bias, which has been suggested to lead to underestimated lifetime prevalence rates of common mental disorders (Moffitt *et al.* 2010). If this bias affected reporting of specific phobia in the current study, the true lifetime prevalence and co-morbidity rates could be higher. Third, the included surveys differed in terms of their response rate and sampling frames. Fourth, not all phobia types were systematically assessed (e.g. fear of choking, vomiting, contacting an illness), which could have led to under-reporting. Finally, the results are based on DSM-IV criteria for specific phobia and using DSM-5 diagnoses could have led to different results. Going from DSM-IV to DSM-5, two important modifications were made to the diagnostic criteria. First, persons above 18 years are no longer required to recognize that their fear/avoidance is excessive/unreasonable. Second, the fear/avoidance should at least last 6 months in all persons. Interestingly, the former modification is likely to increase prevalence, whereas the latter is likely to decrease the prevalence, possibly counteracting each other's effects. Given the fact that the core features have remained the same and the nature of the modifications, strongly differing prevalence estimations would not be expected.

Although cross-national differences were observed in the prevalence, associated impairment and treatment use, the results suggest that specific phobia is associated with considerable impairment across the world and often precedes other disorders. These findings suggest that specific phobia deserves attention of clinicians and researchers in view of its direct effects on the global burden of disease, and its role in the developmental unfolding of psychopathology.

Supplementary material

The supplementary material for this article can be found at <https://doi.org/10.1017/S0033291717000174>

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Declaration of Interest

In the past 3 years, R.C.K. has been a consultant for Hoffman-La Roche, Inc., Johnson & Johnson Wellness and Prevention and Sonofi-Aventis Groupe. R.C.K. has served on advisory boards for Mensante Corporation, Plus One Health Management, Lake Nona Institute and U.S. Preventive Medicine. R.C.K. is a co-owner of DataStat, Inc.

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