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Psychiatric disorders in Mexico: lifetime prevalence in a nationally representative sample

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Background No national data on lifetime prevalence and risk factors for DSM–IV psychiatric disorders are available in Mexico.

Aims To present data on lifetime prevalence and projected lifetime risk, age at onset and demographic correlates of DSM–IV psychiatric disorders assessed in the Mexican National Comorbidity Survey.

Method The survey was based on a multistage area probability sample of non-institutionalised people aged 18–65 years in urban Mexico. The World Mental Health Survey version of the Composite International Diagnostic Interview was administered by lay interviewers.

Results Of those surveyed, 26.1% had experienced at least one psychiatric disorder in their life and 36.4% of Mexicans will eventually experience one of these disorders. Half of the population who present with a psychiatric disorder do so by the age of 21 and younger cohorts are at greater risk for most disorders.

Conclusions Our results suggest an urgent need to re-evaluate the resources allocated for the detection and treatment of psychiatric illnesses in Mexico.

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The Mexican National Comorbidity Survey (Medina-Mora *et al*, 2005; Borges *et al*, 2006) is the first nationally representative epidemiological survey of psychiatric disorders in Mexico, and forms part of the World Mental Health Surveys Initiative of the World Health Organization (WHO) (Demyttenaere *et al*, 2004; Kessler *et al*, 2004). Previously, DSM–III (Medina-Mora *et al*, 1993; Caraveo *et al*, 1996) and DSM–III–R (Caraveo *et al*, 1998) diagnoses among restricted groups were the only available data for the prevalence of psychiatric disorders in Mexico.

In a previous study of the 12-month prevalence, severity and demographic correlates of 16 DSM–IV psychiatric disorders and service utilisation in Mexico (Medina-Mora *et al*, 2005), we showed that although psychiatric disorders are common, with a 12-month prevalence of 12.1%, very severe mental disorders are less common (prevalence of 3.7%); moreover, there was extreme under-utilisation of mental health services, with only 24% of those more severely affected using any services at all. The most common disorders were specific phobia (4.0%), major depressive disorder (3.7%) and alcohol abuse or dependence (2.2%). Income was associated with severity of illness, with people of low and low–average incomes more likely to report a 12-month disorder. Females were more likely to report a mood and anxiety disorder but less likely to report a substance use disorder.

In this paper, we report the lifetime prevalence and the projected lifetime risk of DSM–IV psychiatric disorders in the Mexican population. We expand prior analyses of age at onset of major depression in Mexico (Benjet *et al*, 2004) to other psychiatric disorders which are now more common among youths in Mexico, and investigate whether new cohorts are at an increased risk, especially for substance use disorders (Villatoro *et al*, 2005).

METHOD

Sample

The Mexican National Comorbidity Survey (Medina-Mora *et al*, 2005; Borges *et al*, 2006) is based on a stratified, multistage area probability sample of non-institutionalised people aged 18–65 years living in urban areas (population of 2500 and over) of Mexico. About three-quarters of the adult Mexican population is urban according to this definition. Data collection took place between September 2001 and May 2002. The response rate was 76.6% of eligible respondents giving a total of 5826 interviews. Direct refusals were rare (6.2% of listed individuals); most non-response was because people were not at home during the limited period the interviewers were in their locality (14.0% of listed individuals); other reasons included incomplete or delayed interviews that could not be completed during the time scheduled for the fieldwork.

All interviews were conducted at the respondent's home after providing a careful description of the study goals and obtaining informed consent. No financial incentive was given for respondents' participation. All recruitment and consent procedures were approved by the ethics committee of the National Institute of Psychiatry.

Diagnostic assessment

A laptop computer version (CAPI) of the WHO World Mental Health Survey Initiative version of the CIDI (WMH–CIDI; Kessler & Ustun, 2004) was administered in face-to-face interviews and yielded DSM–IV diagnoses (American Psychiatric Association, 1994). Adequate interrater reliability (Wittchen *et al*, 1991; Wittchen, 1994), test–retest reliability (Wacker *et al*, 1990) and validity (Farmer *et al*, 1987; Janca *et al*, 1992) of earlier versions of the CIDI have been documented (Andrews & Peters, 1998). These instruments have shown good performance in studies in Mexico (Caraveo *et al*, 1991, 1998) and other Spanish-speaking communities (Vega *et al*, 1998). The translation of the WMH–CIDI into Spanish was carried out according to WHO recommendations, utilising material currently in use in Spanish, such as the ICD–10 (World Health Organization, 1993), DSM–IV, and SF–36 (Duran-Arenas *et al*, 2004), with back-translation of selected items and terms of the clinical sections.

The disorders are grouped into the following categories: mood disorders (major

depressive disorder, dysthymia with hierarchy and bipolar disorder I and II); anxiety disorders (panic disorder, generalised anxiety disorder, social phobia, specific phobia, agoraphobia without panic disorder, separation anxiety disorder and post-traumatic stress disorder); substance use disorders (alcohol and drug misuse and dependence); and impulse-control disorders (oppositional-defiant disorder, conduct disorder and attention-deficit hyperactivity disorder). These three disorders were assessed only in respondents in the 18- to 44-year age group because of concerns about recall bias among older respondents. With the exception of substance use disorders, all disorders used organic exclusions rules as well as hierarchy rules.

Retrospective ages at onset were obtained from the WMH–CIDI using a series of questions designed to avoid implausible response patterns sometimes reported using the standard CIDI age at onset question (Simon & VonKorff, 1995; Kessler *et al*, 2005). First, a question is posed which aims to obtain the *exact* age when the syndrome started. If the respondent is unable to report the exact age, subsequent questions probe for approximate ages in ascending order, using anchoring events or stages such as 'Was it before you first started school?' or 'Was it before you became a teenager?'

Analysis

The data analysed in this study were obtained from a stratified multistage sample and were subsequently weighted to adjust for differential probabilities of selection and non-response. Post-stratification to the total Mexican population according to the year 2000 Census in the target age range and of the corresponding gender was also performed. The interview schedule consisted of two parts. All respondents completed part 1, which contained core diagnostic assessments, and those meeting criteria for any of these core disorders plus a probability subsample of other respondents were administered part 2, which assessed disorders of secondary interest and a wide range of correlates. Data from part 1 were weighted to adjust for differential probabilities of selection within and between households and to match sample distributions to population distributions for socio-demographic and geographic data. The part 2 sample was also weighted for the undersampling of part 1 respondents without core disorders.

As a result of this complex sample design and weighting, estimates of standard errors for proportions were obtained by the Taylor series linearisation method using the Sudaan release 8.0.1 for Windows (http://www.rti.org/sudaan). Lifetime prevalence was estimated as the proportion of respondents who ever had a given disorder up to their age at the time of the interview. Age at onset and projected lifetime risk (the estimated proportion of the population who will have the disorder by the end of their life) as of age 65 were estimated using a two-part actuarial method implemented in SAS version 8.2 for Windows. Socio-demographic predictors were examined using discrete time survival analyses with person-year as the unit of analysis (Efron, 1988). Statistical significance was evaluated using two-sided design-based tests at the 0.05 level of probability. Standard errors of lifetime risk estimates were obtained using the jackknife repeated replication method implemented in an SAS macro (Berglund, 2002: pp. 1–5).

RESULTS

Lifetime prevalence

The lifetime prevalence of DSM–IV disorders is presented in Table 1. There were 26.1% of Mexican respondents that reported a lifetime prevalence of any disorder, with 12.0% reporting two or more disorders and 5.0% reporting three or more disorders. Anxiety disorders were the most common (14.3%), followed by mood disorders (9.2%). The most prevalent single disorder in Mexico was alcohol abuse (7.6%), followed by major depressive disorder (7.2%) and specific phobia (7.0%). These prevalence figures varied little with age groups, but major depression and alcohol abuse were more prevalent among older groups whereas bipolar disorder I and II and drug abuse and dependence were more frequently reported among the younger groups. Specific phobia was most frequent among the 18- to 29-year-olds. With the exception of any anxiety disorder, there were no differences in the crude prevalence for our summary measure of any disorder or for the number of comorbid disorders across age groups.

Age at onset and lifetime risk

The distribution of age at onset is presented in Table 2. The median age at onset (50th percentile) for any psychiatric disorder in Mexico was 21 years, ranging from 9 years for impulse-control disorders, rising to 14 for anxiety disorders, 26 for substance use disorders and 41 for mood disorders. The young age at onset for anxiety disorders is primarily a result of the specific and social phobias which make up 61% of all anxiety disorders. The disorder with the lowest age at onset was attention-deficit disorder (8 years) and that with the highest generalised anxiety disorder (47 years). With the exception of impulse-control disorders, there was a large interquartile range (IQR) for age of onset (IQR=28 years for any disorder).

Table 2 also presents the projected lifetime risk of psychiatric disorders in Mexico. According to these estimates, approximately 36.4% of Mexicans will develop a psychiatric disorder by age 65, 20.4% will develop a mood disorder, 17.8% will develop an anxiety disorder and 11.9% will develop a substance use disorder. The projected lifetime risk for any disorder is larger than the prevalence estimate reported in Table 1 (36.4 *v.* 26.1%). The greatest increase in lifetime risk was found for the mood disorders (20.4 *v.* 9.2%), which is mainly owing to the late age at onset for this group.

Cohort effects

Dummy variables defining age groups 18–29, 30–44, 45–54 and $\geqslant 55$ years were used to predict lifetime disorders using discrete time survival analysis (Table 3). The cohorts were significant predictors for all classes of disorders, except impulse-control disorders which had a narrow age range in our survey. Younger cohorts (18–29 years) had larger odds ratios when compared with the older cohort ($\geqslant 55$ years) for most groups of disorders and for 'any' disorder. There was a dose–response relationship such that the younger the cohort the greater the odds of having a lifetime disorder. For example, in the any disorder group, respondents of 18–29 years were 2.7 times more likely to have a lifetime disorder compared with the cohort of $\geqslant 55$, those aged 30–44 years had 2 times the risk and the cohort aged 45–54 years had 1.4 times higher risk.

Predictors of disorders

Table 4 shows discrete time survival analyses for the impact of education (time-varying predictor), gender and age on the lifetime risk of DSM–IV disorders. Educational level was associated with mood disorders (with current students less likely to

Table 1 Lifetime prevalence of DSM–IV psychiatric disorders in the Mexican National Comorbidity Survey sample according to age

	n	Age (years)										*P*
		Total		18–29		30–44		45–54		⩾55		
		%	s.e.	%	s.e.	%	s.e.	%	s.e.	%	s.e.	
Anxiety disorders												
Panic disorder	65	1.0	0.2	1.0	0.3	1.0	0.2	1.3	0.5	0.8	0.4	0.877
Generalised anxiety disorder	56	0.9	0.1	0.5	0.2	1.2	0.2	1	0.4	1.1	0.8	0.124
Social phobia	203	2.9	0.2	3.20	0.4	2.9	0.4	2.5	0.7	2.6	0.6	0.748
Specific phobia	413	7.0	0.5	8.0	0.8	6.8	0.6	6.1	1.2	5.3	1.1	0.138
Agoraphobia without panic	74	1.0	0.1	1.0	0.3	1.2	0.3	0.8	0.3	1.0	0.3	0.821
Separation anxiety disorder[2,4]	194	4.5	0.4	4.6	0.7	5.2	1.0	3.3	1.0	3.1	1.3	0.404
Post-traumatic stress disorder[1]	68	1.5	0.3	1.5	0.4	1.5	0.5	1.6	0.6	1.1	0.4	0.896
Any anxiety disorder[3]	684	14.3	0.9	15.10	1.2	16.0	1.3	10.9	1.8	9.5	2.3	0.014
Mood disorders												
Major depressive disorder	484	7.2	0.5	5.7	0.7	7.4	0.7	9.0	1.1	9.6	1.4	0.005
Dysthimia	42	0.6	0.1	0.6	0.2	0.6	0.2	0.6	0.3	0.9	0.4	0.947
Bipolar I and II disorders	106	1.9	0.2	3.0	0.4	1.3	0.3	1.0	0.4	1.0	0.8	0.003
Any mood disorder	598	9.2	0.5	8.9	0.9	8.7	0.8	10.1	1.2	10.6	1.6	0.434
Impulse-control disorders												
Oppositional-defiant disorder[2,4]	69	2.7	0.4	3.4	0.6	1.8	0.5	.	.	.	.	0.048
Conduct disorder[2,4]	31	1.3	0.3	1.4	0.4	1.1	0.4	.	.	.	.	0.477
Attention-deficit disorder[2,4]	88	3.0	0.4	3.2	0.4	2.8	0.6	.	.	.	.	0.632
Any impulse-control disorder[2,4]	152	5.7	0.6	6.8	0.8	4.3	0.9	.	.	.	.	0.067
Substance disorders												
Alcohol abuse	367	7.6	0.5	6.3	0.7	7.9	0.8	9.6	1.5	8.8	1.5	0.013
Alcohol dependence	141	3.4	0.4	2.8	0.5	3.2	0.6	5.2	1.4	3.4	1.0	0.177
Drug abuse	74	1.4	0.2	2.2	0.4	1.0	0.2	0.8	0.4	0.4	0.4	0.006
Drug dependence	22	0.5	0.1	0.9	0.3	0.2	0.1	0	0	0.4	0.4	0.001
Any substance disorder	378	7.8	0.5	6.8	0.7	8.0	0.8	9.6	1.5	8.8	1.5	0.082
Any disorder												
Any[3] (one or more)	1148	26.1	1.4	25.7	1.7	28.1	1.8	25.4	3.1	22.2	2.8	0.300
Two or more disorders[3]	548	12.0	0.7	12.0	1.1	12.9	1.2	11.9	1.9	9.1	1.2	0.205
Three or more disorders[3]	268	5.0	0.4	5.7	0.6	4.9	0.6	3.9	0.8	4.0	1.0	0.243

1. Post-traumatic stress disorder was assessed only in the part II sample (n=2362).
2. Separation anxiety disorder, oppositional-defiant disorder, conduct disorder and attention-deficit disorder were assessed only among part 2 respondents in the age range 18–44 years (n=1736).
3. These summary measures were analysed in the full part 2 sample (n=2362). Separation anxiety disorder, oppositional-defiant disorder, conduct disorder and attention-deficit disorder were coded as absent among respondents who were not assessed for these disorders.
4. The χ^2-test evaluates statistical significance of age-related differences in estimated prevalence. χ^2 is evaluated with one degree of freedom for oppositional-defiant disorder, conduct disorder, attention-deficit disorder and any impulse-control disorder.

report mood disorders than respondents with high-school or a higher level of education) and with substance use disorders (with current students less likely to report substance use disorders, and all other educational groups more likely than respondents with high-school or a higher level of education). Anxiety and mood disorders were more likely among females and impulse-control and substance use disorders more likely to be reported by males. With the exception of any impulsive disorder, which had a narrow age range in our survey, age was strongly related to psychiatric disorders; all age groups had increased risks compared with those over 55, with the youngest (18–29 years) showing the largest increases in risk.

DISCUSSION

Main findings

This first nationally representative survey of psychiatric disorders in Mexico shows that 26.1% of Mexicans report having experienced at least one disorder sometime in their life. Although the lifetime prevalence estimates for any psychiatric disorder in this national survey were similar to those for residents of Mexico City (Caraveo *et al*, 1998), this represents only half that documented for the United States and The Netherlands, somewhat lower than Brazil, Canada and Germany, and double that documented for Turkey (World Health Organization International Consortium in Psychiatric Epidemiology, 2000). Mexico also had the lowest 12-month prevalences compared with other countries from the

Table 2 Projected lifetime risk at age 65 years of DSM–IV psychiatric disorder and percentiles of age at onset

	Projected lifetime risk at age 65		Percentiles of age at onset							
	%	s.e.	5	10	25	50	75	90	95	99
Anxiety disorders										
Panic disorder	1.8	0.4	7	11	21	31	44	57	57	57
Generalised anxiety disorder	2.3	1.0	14	18	28	47	58	58	58	61
Social phobia	3.2	0.3	6	7	11	15	19	26	40	54
Specific phobia	7.7	0.6	5	5	7	9	16	31	50	63
Agoraphobia without panic	1.5	0.3	8	9	15	21	52	61	61	61
Separation anxiety disorder[2,4]	5.7	0.7	6	7	8	17	30	53	64	64
Post-traumatic stress disorder[1]	2.7	0.5	9	12	22	31	60	62	62	62
Any anxiety disorder[3]	17.8	1.6	5	6	8	14	28	58	61	64
Mood disorders										
Dysthimia	1.5	0.6	12	15	25	40	61	61	61	61
Major depressive disorder	18.3	1.7	16	19	30	45	59	64	65	65
Bipolar I and II disorders	2.5	0.3	13	15	19	23	29	44	48	51
Any mood disorders	20.4	1.7	14	18	25	41	59	64	65	65
Impulse-control disorders										
Oppositional-defiant disorder[2]	2.7	0.4	7	7	9	11	13	15	16	18
Conduct disorder[2]	1.3	0.3	8	9	10	13	15	17	18	19
Attention-deficit disorder[2]	3.0	0.4	6	6	7	8	9	10	11	13
Any impulse-control disorder[2]	5.7	0.6	6	7	8	9	12	15	16	18
Substance use disorders										
Alcohol abuse[1]	12.0	1.0	17	18	21	28	39	53	56	62
Alcohol dependence[1]	5.6	0.7	18	19	22	29	42	54	54	54
Drug abuse[1]	1.7	0.3	15	16	18	20	29	52	52	52
Drug dependence[1,4]										
Any substance disorder[3]	11.9	1.0	17	18	21	26	38	52	54	62
Any disorder[3]	36.4	2.1	6	7	11	21	39	57	64	65

1. Post-traumatic stress disorder was assessed only in the part 2 sample (n=2362).
2. Separation anxiety disorder, oppositional-defiant disorder, conduct disorder and attention-deficit disorder were assessed only among part 2 respondents in the age range 18–44 years (n=477).
3. These summary measures were analysed in the full part 2 sample (n=2362). Separation anxiety disorder, oppositional-defiant disorder, conduct disorder and attention-deficit were coded as absent among respondents who were not assessed for these disorders.
4. Cell size $\leqslant$30 hence too small to estimate.

Americas region of the World Mental Health surveys, which included Colombia and the United States in addition to Mexico (Demyttenaere *et al*, 2004). Our rates of DSM–IV disorders are lower than the lifetime prevalence of 31.6% in Ukraine (Bromet *et al*, 2005) and 46.4% in the United States (Kessler *et al*, 2005), but higher than the 12.1% reported in Nigeria (Gureje *et al*, 2006). Interestingly, our lifetime estimate is also half that for Hispanics in the United States (Breslau *et al*, 2005), a large portion of whom are Mexican immigrants. Vega *et al* (1998) reported that Mexicans who had immigrated less than 13 years previously to Fresno, California had similar lifetime prevalence rates of psychiatric disorders to Mexico City residents, whereas Mexican immigrants with more than 13 years in the United States and Mexican Americans had similar rates of the general US population. This suggests that cultural factors in Mexico might be responsible for the low prevalence. It is beyond the scope of this study to determine which cultural factors might be serving as a buffer to the development of psychiatric disorders, but the effect of social support afforded by family cohesion and extended family networks, and the lower use of illicit drugs should be investigated in future cross-national, cross-cultural analyses, especially among countries with similar cultural backgrounds such as Colombia and Brazil but which have higher rates of psychiatric disorders than Mexico.

As in other countries (Kessler *et al*, 1994; Bromet *et al*, 2005), psychiatric disorders have early ages at onset in Mexico. Half of the population who present with a psychiatric disorder do so by the age of 21, thus the disorder affects the population throughout a large portion of their life. Early ages at onset may have far-reaching repercussions given the important developmental tasks of the first decades of life, which include educational attainment, career choice, selection of romantic partners

Table 3 Age at interview as predictor of lifetime risk of DSM–IV psychiatric disorders[1]

	Younger cohorts compared with respondents ⩾ 55 years						*P*
	18–29		30–44		45–54		
	OR	95% CI	OR	95% CI	OR	95% CI	
Anxiety disorders							
Panic disorder	5.2*	1.8–15.4	2.5*	1.0–6.3	2.2	0.7–6.7	0.025
Generalised anxiety disorder	4.5*	1.4–14.3	4.9*	1.8–13.3	2.3	0.8–6.4	0.017
Social phobia	1.4	0.8–2.3	1.1	0.7–1.9	1.0	0.5–2.1	0.422
Specific phobia	1.8*	1.2–2.8	1.4	0.9–2.3	1.2	0.6–2.2	0.013
Agoraphobia without panic	2.0	0.8–4.9	1.9	0.9–4.3	1.0	0.4–2.8	0.349
Separation anxiety disorder[3,5]	2.3	0.8–6.8	2.0	0.7–5.7	1.1	0.4–3.6	0.154
Post-traumatic stress disorder[2]	5.5*	1.8–16.9	2.5*	1.1–6.0	2.2	0.8–6.2	0.022
Any anxiety disorder[2]	2.5*	1.6–4.2	2.2*	1.3–3.7	1.4	0.7–2.6	<0.001
Mood disorders							
Major depressive disorder	5.4*	3.0–9.6	2.5*	1.4–4.3	1.6	1.0–2.8	0.000
Dysthimia	3.8	0.9–15.9	2.0	0.6–7.1	1.3	0.4–4.8	0.288
Bipolar I and II disorders	8.9*	2.0–40.3	1.8	0.3–9.3	1.1	0.2–7.0	0.000
Any mood disorders	6.3*	3.6–10.8	2.4*	1.4–4.0	1.6	0.9–2.7	0.000
Impulse-control disorders							
Oppositional-defiant disorder[3,5]	2.0	1.0–4.0	1.0				0.056
Conduct disorder[3,5]	1.3	0.6–3.1	1.0				0.496
Attention-deficit disorder[3,5]	1.1	0.6–2.0	1.0				0.629
Any impulse-control disorder[3,5]	1.6	0.9–2.7	1.0				0.084
Substance use disorders							
Alcohol abuse	2.3*	1.6–3.4	1.3	0.9–1.8	1.2	0.8–2.0	<0.001
Alcohol dependence	3.4*	1.9–6.0	1.5	1.0–2.3	1.9	0.8–4.3	<0.001
Drug abuse	13.6	0.9–197.0	3.9	0.3–53.8	2.5	0.1–71.2	<0.001
Drug dependence[6]							
Any substance use disorder	2.3*	1.5–3.3	1.20	0.9–1.8	1.2	0.7–2.0	<0.001
Any[4]	2.7*	1.8–4.0	2.0*	1.3–3.1	1.4	0.9–2.3	<0.001

*$P < 0.05$.
1. Based on discrete time survival models with person-year as the unit of analysis.
2. Estimated in the part 2 sample (n=2362).
3. Estimated among respondents in the age range 18–44 years in the part 2 sample (n=2362).
4. Estimated in the full part 2 sample. Separation anxiety disorder, oppositional-defiant disorder, conduct disorder and attention-deficit disorder were coded as absent among respondents who were not assessed for these disorders.
5. χ^2 is evaluated with one degree of freedom for separation anxiety disorder, oppositional-defiant disorder, conduct disorder, attention-deficit disorder and any impulse-control disorder comparing ages 18–29 with the omitted control group of respondents aged 30–44 years.
6. Cell size ⩽30, hence too small to estimate.

and development of sexual identity. Adolescents with depression, have been found to have significantly more social, work and family impairment 9–10 years later as adults compared with their peers without depression (Weissman *et al*, 1999). Early ages at onset may also have a deleterious impact upon service utilisation because psychiatric symptoms must first be identified by a parent, teacher or other relevant adult. In Mexico, those with early-onset depression were less likely to receive treatment and reported greater treatment delays than those with adult-onset depression (Benjet *et al*, 2004). Further complicating the early ages at onset for psychiatric disorders is the greater availability and consumption of drugs at ever younger ages. However, in marked contrast to the USA where ages at onset are concentrated in the first two decades of life (Kessler *et al*, 2005), in Mexico there is considerably more variation for any disorder (IQR=11–39 years). This contributes to the increase from the prevalence estimates (26.1%) to the projected lifetime risk (36.4%).

The median age at onset was much higher for most disorders in Mexico compared with the USA (with the exception of impulse-control disorders) and also higher for mood and alcohol use disorders in Mexico (but not for any anxiety disorder) than in the Ukraine. Reasons for differences are largely speculative but it is possible that in the USA social factors have led to a sharp increase in the prevalence of psychiatric disorders (e.g. substance use disorders) among younger cohorts. This is supported by the consistently higher odds ratios for lifetime psychiatric disorders in the USA than in Mexico. For example, the youngest cohort in the USA has a fourfold likelihood of any disorder compared with the oldest cohort whereas in Mexico the corresponding figure is 2.7 (Kessler *et al*, 2005). If this trend continues, Mexico will have increasingly younger ages at onset in the future. Also youths leave home earlier in the USA

Table 4 Socio-demographic variables associated with lifetime risk of DSM–IV disorders[1]

	Anxiety disorders		Mood disorders		Impulse-control disorders[2]		Substance use disorders	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Education[3]								
Currently a student	0.9	0.4–1.8	0.6*	0.4–1.0	1.4	0.3–7.4	0.2*	0.1–0.4
None/some elementary	1.0	0.5–1.9	1.1	0.6–1.9	2.2	0.4–11.5	2.8*	1.4–5.9
Complete elementary/some secondary	0.9	0.4–1.9	0.9	0.6–1.5	1.0	0.2–6.0	2.0*	1.1–3.7
Complete secondary/some high school	0.8	0.4–1.7	1.5*	1.0–2.1	1.0		1.9*	1.0–3.4
Complete high school and more	1.0		1.0				1.0	
Gender								
Female	1.7*	1.3–2.3	1.6*	1.2–2.2	0.6*	0.4–0.9	0.06*	0.04–0.1
Male	1.0		1.0		1.0		1.0	
Age, years								
18–29	2.5*	1.4–4.5	5.9*	2.5–13.8	1.6	1.0–2.7	4.3*	2.4–7.6
30–44	2.2*	1.2–4.1	2.1	0.9–4.9	1.0		1.9*	1.2–3.0
45–54	1.4	0.7–2.7	1.5	0.5–4.2			1.7	0.9–3.2
55+	1.0		1.0				1.0	

*$P < 0.05$.
1. Based on discrete time survival models with person-year as the unit of analysis.
2. Based on part 2 respondents in the age range 18–44 (n=1736).
3. Time-varying predictor.

(often at the age of 18) and are expected to live independently, whereas in Mexico they generally live with their family of origin for much longer, often not leaving until they form families of their own. This probably provides an extended period of family support and thus a more gradual transition into independence, which may contribute to a later onset of psychiatric disorder.

The socio-demographic predictors of lifetime psychopathology are consistent with findings from other countries: being female is related to a greater risk for anxiety and mood disorders and lesser risk for impulse-control and substance use disorders, younger cohorts are at greater risk for most disorders and those who are less educated are at a greater risk for substance use disorders (Abou-Saleh *et al*, 2001; Alonso *et al*, 2004; Kessler *et al*, 2005). Interestingly, current students are at reduced risk of substance use and mood disorders. Whether this is owing to the protection afforded by the educational environment or a reflection of impairment caused by substance use and mood disorders preventing those affected from being able to carry out their studies cannot be determined. Other research in Latin-American countries has evaluated the impact of socio-demographic variables (Araya *et al*, 2001) and has found an independent inverse association between education and the 1-week prevalence of 'common mental disorders' (Araya *et al*, 2003). Differences in the impact of education on psychiatric disorders in Chile and Mexico could be attributed to differences in the time frames employed (1 week in the Chilean survey and lifetime presented here for Mexico). It is noteworthy that a similar survey in Nigeria (Gureje *et al*, 2006) and a more recent survey in Chile (Vicente *et al*, 2006) also did not find education to be related to lifetime prevalence of psychiatric disorders. A more detailed investigation of the social determinants of psychiatric disorders in the context of the World Mental Health Surveys, including Mexico, is ongoing.

Study limitations

One limitation of this study is that diagnosis is based on a single structured interview administered by lay interviewers. In order to survey such a large and geographically disperse sample, we sacrificed some diagnostic precision that might have been obtained by using clinical interviewers, multiple interviews or additional sources of information. In addition, although evidence of reliability and validity of different versions of the CIDI has been documented in other countries (Farmer *et al*, 1987; Wacker *et al*, 1990; Janca *et al*, 1992) and previous versions of the CIDI have shown good performance in Mexico (Caraveo *et al*, 1991) and other Spanish-speaking communities (Vega *et al*, 1998), the reliability and validity of the Spanish language version of the CIDI used in this survey have not been established.

However, studies of validity of the WMH–CIDI are currently underway (Demyttenaere *et al*, 2004) in major regions of the world, including other non-Western countries participating in the World Mental Health Survey Initiative (Bromet *et al*, 2005; Gureje *et al*, 2006; Karam *et al*, 2006). Specific analyses of sub-threshold cases in the World Mental Health Survey Initiative have also helped to shed light on validity issues, especially those related to low prevalences found in some sites (Gureje *et al*, 2006; Shen *et al*, 2006).

Bias in respondents' ability to recall events or symptoms as well as willingness to disclose them are also potential limitations. Longitudinal studies might help to evaluate the magnitude of recall bias. One such study which evaluated the recall of key depressive symptoms at age 25 compared with reports between the ages of 15 and 21 found that 4% of those without any previous symptoms of depression recalled symptoms, whereas of those who had a diagnosis of major depression up to age 21, only 44% recalled symptoms (Wells

& Horwood, 2004). This suggests that recall bias leads to major underestimation of the lifetime prevalence of depression. Reports of age at onset may be particularly subject to errors in recall, possibly as a function of age at interview. Despite improvements in the reporting of age at onset estimates in the US National Comorbidity Study (Knauper *et al*, 1999), some recall bias most probably remains.

Moreover we might have underestimated the prevalence of psychiatric disorders because the disorders assessed were only a subset of those in DSM–IV and because those that did not participate might be more likely to have a psychiatric disorder (Lundberg *et al*, 2005). We tried to compensate for possible imbalances in the age and gender distribution of those that participated with a weighting scheme that adjusted for differential probabilities of selection and non-response (Kessler *et al*, 2004; Hofler *et al*, 2005). Finally, our sample does not include people without a fixed residence, those who are institutionalised, those without sufficient proficiency in Spanish and those from rural areas with less than 2500 inhabitants. Local surveys conducted among rural populations in Mexico have documented lower prevalence rates of psychiatric disorders, with the exception of alcohol abuse and dependence which is higher. Rates of service utilisation are also considerably lower in rural areas (Salgado de Snyder & Díaz-Pérez, 1999; Berenzon *et al*, 2003). However, homeless and institutionalised people might be assumed to have a higher prevalence of psychiatric disorder. Taken together these limitations suggest that bias has probably led to underestimation of the lifetime prevalence of disorders.

Implications

We project that one in three Mexicans will experience a psychiatric disorder by the end of their life. This, in conjunction with the increasing prevalence in younger cohorts, suggests an important challenge for the Mexican health system in the present and the near future, especially since most mental health speciality services are concentrated in Mexico City and are poorly distributed throughout the rest of the country (World Health Organization, 2005). Although not all psychiatric disorders necessarily require specialised attention, other results of this survey reported previously (Medina-Mora *et al*, 2005) suggest that among those with a 12-month disorder, one-third are classified as serious, one-third as moderate and one-third as mild. Even among those most severely affected, current treatment rates are low (Borges *et al*, 2006).

Projected lifetime risks for psychiatric disorders can be of enormous benefit to policy makers in Mexico, where no such estimates have previously aided optimal allocation of constrained resources. We hope this survey can also serve as evidence of feasibility and an impetus for comparable efforts in other low- and middle-income countries. Although the lifetime prevalence estimates of psychiatric disorders for Mexico are not as high as in some countries the number of associated disability-adjusted life years (Murray & Lopez, 1996; Frenk *et al*, 1999) and the projected lifetime risk suggest an urgent need to re-evaluate the resources allocated for the detection and treatment of these disorders in Mexico, particularly for major depression and alcohol misuse.

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