Epidemiology of major depression in four cities in Mexico

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Abstract:

Analyses were conducted to estimate lifetime and current prevalence of major depressive disorder (MDD) for four representative cities of Mexico, to identify variables that influence the probability of MDD, and to further describe depression in Mexican culture. A multistage probability sampling design was used to draw a sample of 2,509 adults in four different regions of Mexico. MDD was assessed according to DSM-IV criteria by using the Composite International Diagnostic Interview collected by trained lay interviewers. The prevalence of MDD in these four cities averaged 12.8% for lifetime and 6.1% for the previous 12 months. MDD was highly comorbid with other mental disorders. Women were more likely to have lifetime MDD than were men. Being divorced, separated, or widowed (compared to married or never married) and having experienced childhood trauma were related to higher lifetime prevalence but not to current prevalence. In addition, age and education level were related to current 12-month MDD. Data on the profile of MDD in urban Mexico are provided. This research expands our understanding of MDD across cultures.

Keywords: depressive disorder | MDD | Latino | developing countries | CIDI | general population

Article:

INTRODUCTION

Psychiatric disorders are a major concern for the health and welfare of people all around the world. Major depressive disorder (MDD) has been cited as one of the world's most troublesome diseases [World Health Organization, 2002] and the leading cause of disease-related disability among women today [Kessler, 2002b]. Depression is highly related to inability to carry out normal activities, absenteeism at work, and problems in social and cognitive functioning [Kessler et al., 2003]. In addition, the onset of MDD, like many psychological disorders, tends to happen

early in life. According to a recent review of the depression literature, the average age of onset of MDD occurs in the mid-20s [Kessler 2002a; Sorenson et al., 1991]. Because this psychological disorder negatively influences so many individuals during their formative years, it is imperative to continue to increase our understanding of this psychological problem.

The epidemiology of MDD has been researched extensively. Although most thoroughly examined in the United States [Essau and Dobson, 1999; Kessler, 2002a,b; Kessler et al., 1994, 1997, 2003, 2005; Robins and Regier, 1991; Robins et al., 1988], MDD has also been studied in Canada, several European countries, Taiwan, Korea, New Zealand, and other countries around the world [Andrade et al., 2003; Bland, 1997]. Because the majority of depression research has been completed in the United States and other developed, Western countries, more extensive cross-cultural research efforts are needed. According to Marsella and Kaplan, ‘‘The current world population is approaching six billion people. Of this number, only one billion are of white European and North American ancestry’’ [2002, p. 55]. Due to the paucity of research across a variety of cultural settings, the generalizability of the findings on depression, thus far, remains limited.

This article stems from a combination of the importance of MDD as a problematic condition and the need for further exploration of epidemiology of psychiatric disorders in other countries and cultures. Here we discuss a research project conducted in Mexico, a country close in proximity to the United States, yet vastly different in culture. Although the epidemiology of MDD in Mexican Americans has been researched [Burnam et al., 1987a; Golding and Karno, 1988; Karno et al., 1987; Vega et al., 1986, 1998], very little work has been done to explore the epidemiology of MDD in Mexico [Andrade et al., 2003; Vega et al., 1998]. Our epidemiological study was conducted in four cities in Mexico during 1999–2001. The main purpose of this study was to provide normative data on demographics, psychological disorders, and the social environment of urban Mexico, in preparation for future research on disaster recovery in this population. The purpose of this article is to provide normative and descriptive data regarding major depression in Mexico. Data are provided on demographics, social structure and support, trauma exposure, physical symptomatology, and selected psychiatric disorders, including MDD.

EPIDEMIOLOGY OF MAJOR DEPRESSIVE DISORDER

Worldwide, estimates of the prevalence of lifetime MDD range from as low as 0.9% in Taiwan to as high as 19% in Beruit [Bland, 1997]. Estimates of prevalence of current MDD (in the most recent 12-month period) range from 0.6% to 7.4%. In the United States, lifetime MDD prevalence for the overall population ranges from 3% to 17.1% [Bland, 1997; Kessler, 2002a; Kessler et al., 1994, 2005; Robins and Regier, 1991]. The National Comorbidity Survey [NCS; Kessler et al., 1994], using the Composite International Diagnostic Interview [CIDI; World Health Organization, 1997], reported lifetime prevalence of MDD for Americans at 17.1%, and current MDD (the past 12 months) at 10.3%. In the more recent NCS revised study (NCS-R) conducted in the United States [Kessler et al., 2003], prevalences were 16.2% for lifetime and 6.6% for current. The International Consortium of Psychiatric Epidemiology (ICPE), the first worldwide survey, reported on worldwide lifetime MDD prevalence of 3.0–16.9% and current (12 month) MDD at 1.2–10.0% [Andrade et al., 2003]. The rather sizable range between earlier studies and more recent ones is due to several factors, including use of different assessment

instruments, changes in diagnostic criteria, increased prevalence, decreased stigma associated with the reporting of MDD, and refined methodology [Kessler, 2002a].

PREDICTING MAJOR DEPRESSIVE DISORDER

Several risk factors for MDD have been determined. These include sex and marital status, as well as having a family history of depression [American Psychiatric Association, 1994]. The epidemiological research on depression indicates that women are twice as likely as men to experience MDD. This holds for both adults and adolescents [Angold et al., 1998], and although women are commonly believed to express their emotions more than men, this sex difference is not due to a reporting bias [Horwath andWeissman, 1995]. Being married decreases the chances of MDD, as compared to being never married, divorced, widowed, or separated. MDD is 1.5–3.0 times more common for those with a first-degree relative with the disorder [American Psychiatric Association, 1994].

Other predictors of MDD include trauma and life stress [Kessler and Magee, 1994]. Childhood trauma may be more related to first onset of depression than to recurrent episodes [DeMarco, 2000]. The highest prevalence of current MDD falls in the 25- to 44-year-old age group, with the lowest prevalence in those over age 65 [American Psychiatric Association, 1994]. More than 80% of those with a history of MDD will have recurrent episodes [Kessler, 2002a]. One major depressive episode (MDE) makes the occurrence of the second episode more likely, and two episodes make the third even more likely [American Psychiatric Association, 1994; Lewinsohn et al., 1989].

EPIDEMIOLOGY OF MDD IN MEXICAN AMERICANS AND OTHER LATINO POPULATIONS

Early research on the prevalence of MDD in Mexican Americans found levels similar to those reported for non-Hispanic individuals [Hough et al., 1983]. Subsequent research initiated a belief that Mexican Americans tend to have lower prevalence of MDD (4.9%) than non-Hispanic Americans (8.4%) [Burnam et al., 1987b; Karno et al., 1987]. Mexican Americans born in Mexico showed lower lifetime prevalence of MDD (3.3%) than Mexicans born in the United States (6.9%), and men had lower prevalence than women, 3.8% and 6.3%, respectively. Using the Diagnostic Interview Schedule [DIS; Robins et al., 1981], Canino et al. [1987] presented lifetime prevalence of MDD in Puerto Rico at 4.6%, and current past year MDD at 3%. Vega et al. [1998], using diagnostic protocols similar to the CIDI, reported lifetime prevalence of 7.8% in Mexico City.

More recently, the Mexican American Prevalence and Services Survey (MAPSS) used the CIDI to assess prevalence of lifetime MDD and reported prevalences of 5.2% for immigrants and 14.4% for those native to the United States [Vega et al., 1998]. In the NCS, the lifetime prevalence of MDD for Hispanic adults was much higher at 18.3% [Kessler et al., 1994; Vega et al., 1998]. Kessler has argued that the reasons for this difference in prevalence are similar to those for overall prevalence [Kessler, 2002a; Kessler et al., 1994]. Another possible reason for these differences is that, unlike MAPSS, the NCS only included English-speaking persons and

sampled Hispanic adults regardless of country of origin [Vega et al., 1998]. The ICPE also assessed MDD prevalence in Mexico [WHO World Mental Health Survey Consortium, 2004], yet a recent publication [Andrade et al., 2003] reports on the data from Mexico City [Vega et al., 1998]: 8.1% lifetime prevalence and 4.5% for 12-month prevalence.

From the paucity of available data, it becomes obvious that more information is needed on MDD in Latinos outside of the United States. The current data are provided to expand our knowledge of depression in Mexico. Our study drew participants from four cities in diverse regions of the country. It was predicted that prevalences of MDD in Mexico would be slightly lower than found in the United States, and that women would display higher prevalences of MDD than men. Descriptive data are presented as a profile of depression in Mexico. Further analyses examine the predictors of MDD in this sample.

METHODS

SAMPLE AND SAMPLING PROCEDURES

In brief, a multistage probability sampling design was used to draw a sample of adults 18 and older, representative of four cities in Mexico: Oaxaca, among the poorest cities located in the southern mountains in Mexico (n=576; response rate, 79%); Guadalajara, Mexico's second largest city, a commercial center and a modern industrial city in the central region (n=713; 82%); Hermosillo, a city in close proximity to the United States in northwestern Mexico (n=618; 76%); and Mérida, a city in the Yucatan Peninsula, with a rich colonial history (n=602; 70%). A more detailed description of this sample and sampling procedures can be found in Norris et al. [2003]. The Oaxaca Guadalajara data were collected in 1999; the Hermosillo and Mérida data, in 2001. By using the Mexican equivalent of census data, 10% of the total numbers of census tracts in each city were randomly selected; household units in numbers proportional to the population size of the tract area were subsequently chosen, and the male or female head of the household was asked if the household would participate in the study. All research underwent human subjects review and was approved by internal review boards at both U.S. and Mexican universities.

Respondents were asked to complete an initial sociodemographic interview (about 1 h) regarding household members. One adult resident was then randomly selected from each of these participating households and asked to participate in an in-depth psychological interview (about 2 h). Interviews were completed in private by trained, local interviewers in the respondent's home and checked by fieldworkers.
Demographic and psychological interviews were typically completed on separate days, and most were audiotaped. In addition, each participating household was revisited to deliver a letter of thanks and to ask the respondent for his or her impressions of the interview and interviewer.

The total sample across all four cities was composed of 1,602 women and 907 men, and the gender distribution was approximately the same in each city. At 64%, women are over-represented in the sample with psychological interviews, but the reason for this is not clear. On average, women had a higher probability of selection, because men comprised a very small fraction of adults living alone (28%). However, weighting the data by the number of adults in the household changed the sex distribution of the sample only marginally (from 63.8% to 62.3%

women). A previous analysis of these data [Norris et al., 2003] showed that the female sample was quite representative of the larger population of women, but the male sample under-represents younger, lower income, less educated men. The magnitude of this bias was relatively small, with effect sizes usually less than 0.10. To derive an unbiased population estimate and correct the sex distribution to a 55:45 ratio of women to men, weights of 0.86 for women and 1.25 for men were applied.

MEASURES

The presence of major depression was determined by using the CIDI, version 2.1 for DSM-IV, Module E, developed and translated into Spanish by the World Health Organization [1997]. The CIDI has been used widely in prior epidemiological studies [Andrade et al., 2003; Andrews and Peters, 1998; Tacchini et al., 1994; Vega et al., 1998]. During administration of the CIDI, once a criterion is not met, the interviewer skips that item and continues with the other modules. Because of this, full criteria data were only available for those who met all criteria for diagnoses. For the sake of brevity, exclusion criteria for manic-depressive disorder were not assessed.

Generalized anxiety disorder (GAD), panic disorder (PD), and posttraumatic stress disorder (PTSD) were also assessed with the CIDI. The event component of the PTSD module provided the measure of childhood trauma. For any event experienced, participants were asked if that event occurred before age 12.

ANALYSES

Descriptive data are provided on the four-city Mexican sample, including w2 tests of differences in prevalence across groups defined by key demographic variables. Logistic regressions identified predictors of lifetime MDD and current (past year) MDD in the entire sample and in the subset of those who have experienced lifetime MDD.

RESULTS

SAMPLE CHARACTERISTICS

The sample ranged in age from 18 to 92. Mean age was 39.3 (SD=16.1). The sample averaged 9 years of education (SD=4.7), with 16% having less than 6 years of school, and 36% completing 12 or more years. The average household had 2.8 adults (SD=1.4) and 2.5 children (SD=2.4). Sixty-one percent of the sample was married, 26% had never married, and 13% were divorced, widowed, or separated. Seventy-six percent of the sample reported having experienced at least one traumatic event in their lifetime, and 21.5% reported a traumatic event during childhood.

PREVALENCE OF MAJOR DEPRESSIVE DISORDER IN MEXICO

Lifetime prevalence for MDD in Mexico, and prevalences of single and recurrent episode (repeated episodes with an interval of at least 2 consecutive months in which criteria are not met for a major depressive episode) are presented in Table 1. The lifetime prevalence in this four-city sample was 12.8%. The current data set included adults ages 18–92, whereas the data sets for the

NCS only included persons up to age 55, and in Mexico City, up to age 59. Reanalysis of the current data within these age restrictions led to lifetime prevalences of 12.7% and 12.9%, respectively. Prevalence varied by city [X^2(3, N=2,509)516.49, P<.001], with Oaxaca at 15.8%, Guadalajara at 14.9%, Hermosillo at 11.0%, and Mérida at 9.3%. With Mérida as the reference group, Hermosillo showed similar prevalence, [odds ratio (OR)51.2, nonsignificant] yet Oaxaca and Guadalajara had higher prevalences [OR=1.8, and 1.7, P's<.001]. This pattern held in logistic regression analysis that controlled for sex, age, marital status and education. The pattern held for both single-episode and recurrent-episode MDD (statistics not reported here).

Women showed a higher prevalence of lifetime MDD than did men [X^2 (1, N=2,509)=26.70, P<.001]. This sex difference occurred for both single episode (MDE) [X^2 (1, N=2,509)=20.25, P<.001] and recurrent forms of the disorder [X^2 (1, N=2,508)=5.41, P<.05]. Similar analyses revealed that education level was not significantly related to MDD, single or recurrent episodes. Current prevalences of MDD are also reported for 6 and 12 months in Table 1. These prevalences also varied by city: for 6-month prevalence [X^2 (3, N=2,507)=14.96, P<.01]; for 12-month prevalence [X^2 (3, N=2,510)=10.69, P<.01]. By city, current 6-and 12-month prevalences were as follows: Oaxaca, 7.0% and 8.2%; Guadalajara, 5.3% and 7.1%; Hermosillo, 3.5% and 5.2%; and Mérida, 2.7% and 4.2%, respectively.

TABLE 1. Prevalence of MDD in Mexico

	Total Sample[a]			Men (n = 1,129)			Women (n = 1,380)[b]		
	%	(*SE*)	95% CI	%	(*SE*)	95% CI	%	(*SE*)	95% CI
Lifetime MDD	12.8	(0.7)	11.4–14.2	9.0	(0.9)	7.2–10.8	15.9	(1.0)	13.9–17.9***
Single episode MDE	8.7	(0.6)	7.6–9.8	6.0	(0.7)	4.6–7.4	10.9	(0.8)	9.2–12.6***
Recurrent MDD	4.1	(0.4)	3.3–4.9	3.1	(0.5)	2.1–4.1	4.9	(0.6)	3.7–6.1*
MDD in last 6 months	4.6	(0.4)	3.8–5.4	3.3	(0.5)	2.2–4.4	5.7	(0.6)	4.5–6.9**
MDD in last 12 months	6.1	(0.4)	5.1–7.1	4.3	(0.6)	3.1–5.5	7.6	(0.7)	6.2–9.0**

[a]Total sample is weighted to correct gender bias, whereas individual sex results are not.
[b]Higher than men; *$P<0.05$; **$P<0.01$; ***$P<0.001$.

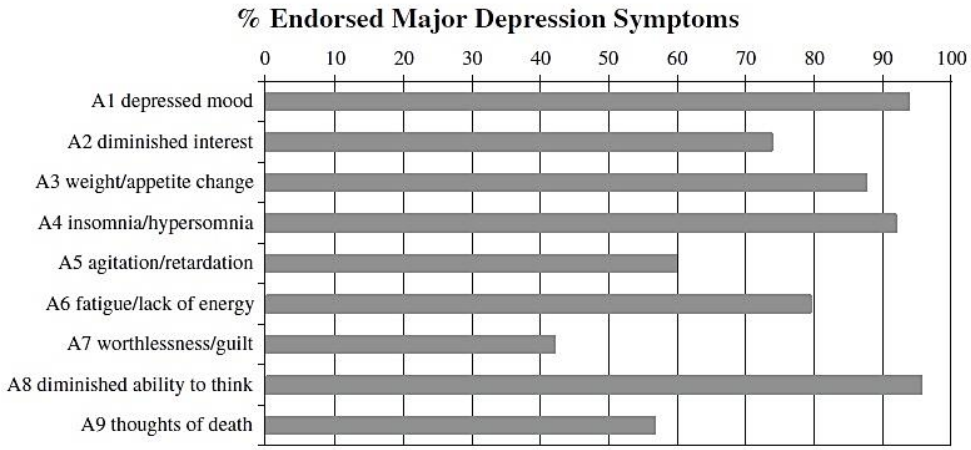

Figure 1. Prevalence of specific symptom criteria for participants who met all criteria for MDD.

TABLE 2. Comorbidity of MDD with other DSM-IV disorders

	Total Sample		Men		Women	
	MDD % (*SE*)	No MDD % (*SE*)	MDD % (*SE*)	No MDD % (*SE*)	MDD % (*SE*)	No MDD % (*SE*)
Met all criteria for lifetime GAD	5.3 (1.3)	2.0 (0.3)[a]	5.9 (2.3)	1.4 (0.4)	5.0 (1.5)	2.6 (0.5)
Met all criteria for lifetime PD	5.6 (1.3)	0.7 (0.2)[a]	3.9 (1.9)	0.6 (0.2)	6.4 (1.7)	0.8 (0.2)[a]
Met all criteria for lifetime PTSD	24.6 (2.4)	9.3 (0.6)[a]	16.7 (3.7)	6.1 (0.7)[a]	27.9 (2.5)	12.0 (1.0)[a]

[a]Nonoverlapping intervals of 2 standard errors.

THE NATURE OF MDD IN MEXICO

The mean number of separate depressive episodes for the entire sample was 1.8 episodes, with far more participants reporting single (67.9%) than recurrent (32.1%) episodes in their lifetime. This pattern was similar across all four cities, as well as for both men and women. Experiencing five or more episodes was more likely for women (11%) than men (7%) [X^2 (1, N=35)=15.11, P<.001].

The modal age of onset of MDD was 25 years, whereas the average age of onset was 30 years, with no statistical differences in centrality found between men and women. Differences between sexes in the distribution of age of onset for MDD in Mexico were discovered. Both men and women showed peak onset in their late teens and early 20s, with another peak in their 40s. In addition, women in this sample showed an approximately 17% increase in depression between ages 10–14 and 15–19, occurring simultaneously with the onset of puberty. This pattern was not visible in men (approximately a 7% increase at that age). This same pattern held for single-episode and recurrent MDD.

Although the prevalence of lifetime MDD did not vary by age, the prevalence of past-year MDD did. The 18- to 24-year-old and the 45- to 54-year-old groups showed higher current prevalence than did other age groups: X^2 (4, N=2,508)=12.68, Po.01, OR50.64 for 25- to 34-year-olds, OR=0.45 for 35- to 44-year olds, and OR=0.70 for ages 55+, as compared to the youngest group; all P's<.05.

A breakdown for the endorsement of the various symptoms of MDD is provided in Figure 1. To meet criteria for MDD, an individual must have five symptoms within the same 2-week period; one of those five symptoms must be depressed mood or diminished interest. Slightly more Mexican individuals endorsed depressed mood than endorsed diminished interest. Of the other symptom criteria, diminished ability to think and sleeping disturbances appeared to be the most prevalent symptoms. There were significant sex differences in the reporting of diminished interest [X^2 (1, N=320)=3.87, P<.05] and thoughts of death [X^2 (1, N=320)55.12, P<.05], with women endorsing these items more than did men. Having feelings of worthlessness and guilt was the symptom endorsed by the fewest respondents.

Comorbidity of MDD with the other psychological disorders assessed in this sample—GAD, PD, and
PTSD—is shown in Table 2. Out of the 12.8% of the entire sample with depression, 8.8% of the sample experienced MDD alone, whereas the remaining 4% met criteria for MDD and at least one other psychological disorder.

PREDICTING MDD IN MEXICO

A series of logistic regressions was conducted to identify risk factors for lifetime and past-year MDD. Predictors entered included demographics and childhood traumatic life events.

Lifetime MDD. Demographic factors of age, sex, marital status, city, and education were entered, along with the number of childhood traumas experienced (see Table 3). City of residence was a significant predictor of lifetime MDD, with those living in Oaxaca and Guadalajara showing higher prevalence of MDD than those in Mérida or Hermosillo. Sex was also a significant predictor throughout analyses, with depression being 1.8 times more prevalent in women than in men. Divorced, widowed, or separated adults were 1.5 times more likely to have been depressed than were married or never married adults. Childhood trauma was also significantly predictive of lifetime MDD.

TABLE 3. Predictors of lifetime MDD

	B	OR	95% CI
Mérida (reference)		1.0	
Oaxaca	0.63***	1.88	(1.31–2.71)
Guadalajara	0.59***	1.80	(1.26–2.56)
Hermosillo	0.23	1.26	(0.86–1.83)
Male (reference)		1.0	
Female	0.61***	1.83	(1.41–2.37)
Ages 18–24 (reference)		1.0	
25–34	−0.05	0.95	(0.65–1.38)
35–44	−0.30	0.74	(0.49–1.13)
45–54	0.03	1.03	(0.66–1.62)
55+	−0.11	0.90	(0.56–1.44)
Education	−0.01	0.99	(0.96–1.02)
Married (reference)		1.0	
Divorced/seperated/widowed	0.40*	1.49	(1.04–2.13)
Never married	0.03	1.03	(0.74–1.43)
No. of childhood traumas	0.24**	1.27	(1.08–1.50)
(Constant)	−2.65***		

Final model: χ^2 (12, $N = 2{,}506$) = 61.24, $P < 0.001$.
$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

TABLE 4. Predictors of current (past year) MDD

	Entire sample			Lifetime cases[a]		
	B	OR	95% CI	B	OR	95% CI
Mérida (reference)		1.0			1.0	
Oaxaca	0.65**	1.91	(1.15–3.20)	0.17	1.19	(0.58–2.44)
Guadalajara	0.53*	1.70	(1.02–2.82)	−0.18	0.84	(0.41–1.69)
Hermosillo	0.22	1.25	(0.72–2.14)	−0.15	0.86	(0.40–1.85)
Male (reference)		1.0			1.0	
Female	0.59**	1.80	(1.25–2.58)	0.15	1.16	(0.68–1.97)
Ages (18–24 reference)		1.0			1.0	
25–34	−0.37	0.69	(0.43–1.12)	−0.70	0.50	(0.23–1.07)
35–44	−0.73*	0.48	(0.27–0.86)	−0.95*	0.39	(0.16–0.91)
45–54	−0.33	0.72	(0.40–1.30)	−0.74	0.48	(0.20–1.15)
55+	−0.94**	0.39	(0.20–0.77)	−1.53***	0.22	(0.08–0.55)
Education	−0.05*	0.96	(0.92–1.00)	−0.07*	0.93	(0.88–0.99)
Married (reference)		1.0			1.0	
Divorced/ separated/ widowed	0.50	1.65	(0.98–2.78)	0.17	1.18	(0.61–2.28)
Never married	0.37	1.44	(0.93–2.23)	0.71*	2.03	(1.02–4.04)
No. of childhood traumas	0.12	1.12	(0.90–1.41)	−0.21	0.81	(0.59–1.12)
(Constant)	−2.85***	0.06		1.09	2.97	

Sample final model: χ^2 (12, 2,509) = 47.62***. Lifetime final model: χ^2 (12, 336) = 30.12**.
[a]$n = 336$ unweighted, *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

Parallel regressions were conducted for single- and recurrent-episode MDD. The findings for MDE approximated those for both types combined, with childhood trauma still leading to over 1.3 times the prevalence of MDE. Findings for recurrent depression were similar except that childhood trauma did not increase the likelihood of this form of MDD.

Current MDD. The model examining current depression was the same as for lifetime. As shown in
Table 4, city, sex, age, and education were significant predictors of current MDD, and the effect of marital status approached significance. As with lifetime MDD, living in Oaxaca or Guadalajara, being female, and being divorced, widowed, or separated increased probability of the disorder. Higher education level was associated with lower prevalence of current MDD. Age was significantly related to current MDD, with those in the youngest age group (18–24) showing the highest prevalence. Those in the 35- to 44-year-old age group experienced about half the prevalence of MDD as those in the youngest group, and those in the oldest bracket (551) showed the lowest prevalence. The number of childhood traumatic events had no influence.

Predicting current cases among those with lifetime MDD. A final regression analysis was conducted to examine predictors of current MDD among those with lifetime MDD (see Table 4). This analysis was included to explore whether the variables that may contribute to the development of major depression are the same as those that may serve to sustain it. For those adults who have had depression sometime in their lives, city of residence and sex were no longer predictive of current depression. Never being married was now related to higher prevalence of current MDD. Age and educational level were predictive in both cases: 35- to 44-year-olds and those over age 55 showed the lowest prevalence, and higher education was related to lower prevalence of MDD. Number of childhood traumatic events was not predictive of current MDD in either case.

DISCUSSION

Data available in this study allowed the first estimates of lifetime and current prevalence of MDD from diverse urban areas of Mexico. Sex differences were confirmed, and high comorbidities of other psychological disorders with MDD were revealed, as well as variables related to the development and sustenance of MDD.

At 13%, the prevalence of lifetime MDD across these four cities in Mexico was lower than the prevalence estimates for the United States in the NCS [17%; Kessler et al., 1994] and the NCS-R [16%; Kessler
et al., 2003], as well as lower than prevalence estimates for Hispanics in the NCS [18%; Kessler et al., 2003; Vega et al., 1998], but it was higher than the prevalence of MDD reported for Mexico City [8%; Andrade et al., 2003; Vega et al., 1998]. Even within this sample, prevalences varied by location: Me´rida and Hermosilla differed little from Mexico City, whereas Oaxaca and Guadalajara showed substantially higher rates. Although the differences are less dramatic when standard errors are taken into account (see Fig. 2), more research is needed to explore and interpret the patterns of depression across cities and regions in Mexico and elsewhere. No study can provide a single value that describes depression for this large and diverse country.

Factors that have been used to explain differences in prevalence in previous findings, such as urbanicity and immigration status, cannot fully explain the differences present here. Past research has shown a relationship of urbanicity to depression [Kessler, 2002a; Vega et al., 1998]. The degree of Guadalajara's urbanicity compared to Mérida and Hermosilla may explain its higher relative prevalence, but this rule does not hold for Oaxaca, which is much smaller than Guadalajara, nor for Mexico City, which is a far larger urban center. We can posit that higher prevalence in Guadalajara and Oaxaca may be due to ethnographic differences between the cities. Guadalajara, the second largest city in Mexico, is a busy urban center [Gonza´lez de la Rocha, 1986] and Oaxaca is an isolated, poor city in one of the poorest, if not the poorest, states in Mexico. Poverty and insecurity are rampant among the population. Most homes do not have water or sewer lines [Murphy et al., 1998]. In comparison, Mérida is in the state of Yucatan, which has seceded from Mexico several times in its history. Also, it is relatively prosperous compared to Oaxaca. Hermosillo, much like Mérida, is very different from the rest of Mexico. It represents the prosperous northwest of Mexico, full of opportunity [Selby et al., 1994]. Prosperity and optimism are potential variables that may aid in understanding patterns of depression across regions.

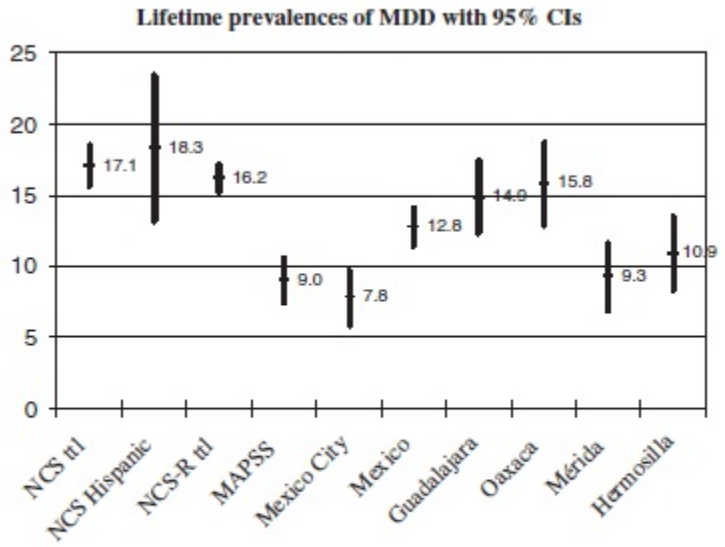

Figure 2. Lifetime prevalences of MDD across studies with 95% confidence intervals.

It is not clear why some prevalences in our study are higher than those found in Mexico City. Vega et al.
[1998] reported that they also used the CIDI but modified it to be like the NCS version, presenting the screens in the beginning. This should have led to higher prevalence in Mexico City, but it did not. In our study we did not exclude subjects for manic episode. Prevalence of manic episode in Mexico City was an additional 1.3%, which accounts for some of the difference. Nonetheless, the lifetime prevalence in

Guadalajara was higher than the prevalence reported previously for Mexico City [Vega et al., 1998], although Guadalajara is probably the closest in nature to Mexico City.

Perhaps some of the proposed factors involved in differences in prevalences found between Mexican
American immigrants and U.S.-born Mexican Americans underlie these differences [Pole et al., 2005]. Vega et al. [1998] proposed that the intact family structures found in Mexico help Mexican American immigrants to be more resilient to depression than their native-U.S.- born counterparts. If family structures have also begun to break down within Mexico's own cities, an increase in the prevalence of depression could have occurred with the passage of time. (Data were collected in Mexico City a few years prior to our data.) Any differential progress of this phenomenon within cities could also explain the between-city variations in prevalences. This is an empirical question that our data unfortunately cannot address.

In keeping with previous findings [Kessler, 2002a], Mexican women were more likely than Mexican men to experience MDD. The number of childhood traumas experienced by participants was significantly related to lifetime but not current MDD. Education did not influence prevalence of lifetime MDD in Mexico, although it was predictive of current MDD. On the other hand, a broken marriage (being divorced, widowed, or separated) was related to a 1.5 increase in lifetime MDD, but was not significantly related to MDD in the past year.

The age of onset of MDD was slightly older in this Mexican sample than has been reported for U.S. samples. The onset of MDD primarily occurred early, in young adulthood, but another peak occurred in midlife. To our knowledge, research in the United States has not shown this midlife onset. This finding is worthy of further examination. In this Mexican sample, age predicted current but not lifetime MDD.

As in other epidemiological studies, MDD was comorbid with all other psychological disorders measured. The chronology of this relationship is unclear. Nonetheless, MDD is a serious mental health issue that more often than not indicates the presence of another disorder in Mexican adults.

Some of the findings presented here are unique to the depression literature. We examined the prevalence of specific symptom criteria to aid in understanding the phenomenology of this disorder cross-culturally. Presently, there are no other published data against which to compare these findings. In this study, diminished ability to think and sleep disturbances were the most prevalent symptoms among those who had MDD in their lifetime, followed closely by weight and appetite difficulties. Of all the depression criteria, these symptoms are the most somatic in nature, and may represent a more somatic expression of depression in Hispanic culture [Escobar et al., 1989; Golding et al., 1991; Kolody et al., 1986; Myers et al., 2002]. Having feelings of worthlessness and guilt was the symptom endorsed by the fewest respondents, less than 50% of those with lifetime MDD. We hope to instigate the publication of similar symptom analyses, so that future studies can examine whether the pattern of symptoms is universal or culturally defined.

Generalizability of these findings is limited by the fact that this study was conducted in four cities and did not include rural areas. However, 75% of Mexico's population lives in urban areas and 25% in rural areas [Central Intelligence Agency, 2002]. In addition, the main purpose for collecting these data went far beyond the goal of describing the nature of depression. Because of this, the data available restricted our ability to study other dimensions of the depressive syndrome that might also prove culturally relevant. Unfortunately, no measure of family history of psychological disorders was available, so this predictor could not be assessed. Although great care was taken in translating and back-translating the measures used in this investigation, some of the measures have yet to be cross-culturally validated. As with the majority of epidemiological studies, the cross-sectional design precludes examination of the time course of other psychological disorders, and data are retrospective. Prospective research is needed to determine the causal sequence of these disorders and observed relationships.

CONCLUSION

This study expands our cross-cultural understanding of MDD, but more must be done. In particular, longitudinal research needs to be conducted to combat the biases present in cross-sectional designs. Efforts need to continue toward cross-culturally validating existing measures, as well as validating the nature of the disorders themselves.

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