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Mental disorders among English-speaking Mexican immigrants to the US compared to a national sample of Mexicans

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Abstract

Our understanding of the relationship between immigration and mental health can be advanced by comparing immigrants pre- and post-immigration with residents of the immigrants' home countries. DSM-IV anxiety and mood disorders were assessed using identical methods in representative samples of English-speaking Mexican immigrants to the US, a subsample of the US National Comorbidity Survey Replication (NCSR), and Mexicans, the Mexican National Comorbidity Survey (MNCS). Retrospective reports of age of onset of disorders and, in the immigrant sample, age of immigration were analyzed to study the associations of pre-existing mental disorders with immigration and of immigration with the subsequent onset and persistence of mental disorders. Pre-existing anxiety disorders predicted immigration (OR=3.0; 95% CI 1.2–7.4). Immigration predicted subsequent onset of anxiety (OR=1.9; 95% CI 0.9–3.9) and mood (OR=2.3; 95% CI 1.3–4.0) disorders and persistence of anxiety (OR=3.7 95% CI 1.2–11.2) disorders. The results are inconsistent with the “healthy immigrant” hypothesis (that mentally healthy people immigrate) and partly consistent with the “acculturation stress” hypothesis (i.e., that stresses of living in a foreign culture promote mental disorder). Replication and extension of these results in a larger bi-national sample using a single field staff are needed.

Keywords

Migration; Epidemiology; Anxiety disorders; Mood disorders; Migrant selection

1. Introduction

Immigrants from Mexico, who comprise the largest group of immigrants in the United States, had lower risk for mood and anxiety disorders than US-born Mexican-Americans in two large national studies (Ortega et al., 2000; Grant et al., 2004) and in two smaller regional studies of Mexican-American communities (Burnam et al., 1987; Vega et al., 1998). This finding suggests that environmental factors to which US-born descendants of Mexican immigrants are exposed lead to an increase in risk for common psychiatric disorders (Rogler et al., 1991). However, without comparable data on the Mexican general population, studies conducted exclusively within the US are unable to directly address the relationship between immigration from Mexico and risk for psychiatric disorders among immigrants (Rogler, 1994; Odegaard, 1932).

We are aware only of one study which compared a sample of Mexican immigrants to the US with a sample of the population of Mexico. That study compared data obtained in community epidemiological surveys of Mexican-Americans living in Fresno County, California and residents of Mexico City (Vega et al., 1998). Lifetime prevalence of mental disorders was found to be lowest among recent immigrants to the US (1–12 years in the US), intermediate among residents of Mexico City and highest among less recent immigrants to the US (13+ years in the US).

This observed pattern can be interpreted as showing that immigrants are better off initially in comparison with their compatriots in Mexico, possibly due to selective migration of people with good mental health (Burnam et al., 1987; Grant et al., 2004), but that this advantage reverses with time, possibly as a result of acculturation stress (Rogler et al., 1991). A methodological interpretation of these findings is also possible, though, due to the lack of control for pre-migration factors, such as family socioeconomic status, that predict both migration and mental disorder (Rogler, 1994; Gilman et al., 2002).

The current report compares a nationally representative sample of English-speaking Mexican immigrants to the US ($N=75$) with a nationally representative sample of Mexicans living in Mexico ($N=2326$). The two samples were interviewed in coordinated community epidemiological surveys carried out as part of the WHO World Mental Health (WMH) Surveys (Demyttenaere et al., 2004). Using retrospective reports of age of onset of mental disorders and information on the age of immigration from Mexico to the US, we examined differences between the samples within particular time periods. First, we directly tested for selective migration by examining whether disorders with onset prior to immigration predict immigration from Mexico. Second we examine whether migrants have higher risk for onset and persistence of mental disorders after they migrate to the US, the period during which environmental stressors could have an impact.

2. Methods

2.1. Sample

The World Health Organization's World Mental Health Survey Initiative consists of nationally or regionally representative household surveys carried out in 28 countries around the world including the Mexican National Comorbidity Survey (M-NCS) in Mexico and the National Comorbidity Survey-Replication (NCS-R) in the US (Demyttenaere et al., 2004) (detailed information on this initiative is available at www.hcp.med.harvard.edu/wmh). The M-NCS is a stratified, multistage area probability sample of household residents age 18 to 65 years in Mexico who live in areas with a population of at least 2500 people. Interviews were conducted from September 2001 through May 2002. The response rate was 76.6% with 5826 respondents interviewed. The analysis reported here uses a probability subsample of 2326 M-

NCS respondents on whom more detailed covariate data, including the important variable of parental education, were collected.

The NCS-R is a nationally representative survey of English-speaking household residents age 18 and older in the coterminous US. Interviews were conducted from February 2001 through April 2003. The response rate was 70.9%. A total of 9282 respondents were interviewed. Questions on nativity and ethnic origin were used to select the subsample of 76 respondents who were born in Mexico and were of Mexican or Mexican–American ethnicity. One of these respondents was excluded from this analysis due to missing data on age at immigration. Questions regarding nativity were not asked of the entire sample, resulting in a smaller than expected sample of individuals identified as Mexican-born. Changes to the instrument were introduced between replicates of the total sample so that the subsample on which data is available is also representative of the target population (Heeringa et al., 2004).

2.2. Measures

Diagnostic Assessment: Both surveys assessed DSM-IV disorders with Version 3.0 of the WHO Composite International Diagnostic Instrument (CIDI) (Kessler and Ustun, 2004), a fully structured lay-administered diagnostic instrument used in face-to-face interviews. The WHO translation protocol was used to translate the instrument and all training materials. Part I anxiety disorders included panic disorder, agoraphobia without panic disorder, specific phobia, social phobia, and generalized anxiety disorder. Part I mood disorders included major depressive disorder, dysthymia, bipolar I disorder and bipolar II disorders. As described elsewhere (Kessler et al., 2004), blind clinical re-interviews with the Structured Clinical Interview for DSM-IV (SCID) (First et al., 2002) found generally good concordance with CIDI diagnoses of these disorders.

Age of onset—Retrospective age of onset reports were obtained using a question series designed to avoid the implausible response patterns obtained using the standard CIDI age of onset question (Simon and VonKorff, 1995). The sequence began with a question designed to emphasize the importance of accurate response: “Can you remember your *exact age* the *very first time* you (had the syndrome)?” Respondents who answered “no” were probed for a bound of uncertainty by moving up the age range incrementally (e.g., “Was it before you first started school?” “Was it before you became a teenager?” etc.). Age of onset was set at the upper end of the bound (e.g., age 12 for respondents who reported that onset was before they became teenagers). Experimental research shows that this question sequence yields responses with a much more plausible age of onset distribution than the standard CIDI age of onset question (Knauper et al., 1999).

Socio-demographic variables—Data on the highest educational attainment of respondents’ parents (or chief breadwinner in childhood) were coded using the standard categories in the Mexican educational system: none or some elementary education (0 to 5 years), completed the bulk of elementary education (6–8 years), completed some secondary education (9–11 years), and completed high school (12+ years). Missing values for parental education were imputed using data on parental occupation. We also controlled for sex, age at interview (18–29, 30–44, 45–59, 60+), and, among immigrants, age at immigration (0–5, 6–12, 13+) and duration of residence in the US (0–15, 16–24, 25+). The latter two variables were trichotomized to have roughly equal numbers of respondents in each category. Age of immigration was determined by asking respondents not born in the US: “How old were you when you first came to the United States?”

2.3. Analysis methods

Data from both surveys were weighted to reflect the complex sampling design and each country's socio-demographic profile based on census data. Differences in disorder prevalence between migrants and non-migrants were examined with chi-square tests. Associations of prior disorders in predicting immigration were examined with discrete-time survival (Allison, 1982; Efron, 1988) using person-year as the unit of analysis, mental disorders as time-varying (depending on age of onset) predictors, and immigration as the dependent variable. Differences in risk of onset of disorders between migrants and non-migrants were also examined with discrete-time survival analysis using immigration as a time-varying predictor and first onset of mental disorders as the dependent variables. More elaborate survival models were also estimated in which distinctions were made about age of immigration and time since immigration to evaluate whether these variables improve prediction of disorder onset. Chi-square tests were used to assess variation in the relationship between migrants and non-migrants by age of immigration and time since immigration. Differences between migrants and non-migrants in disorder persistence were examined using logistic regression models predicting 12-month prevalence among respondents with a lifetime disorder, controlling for age of onset and time since onset.

3. Results

3.1. Socio-demographic variables

A comparison of socio-demographic characteristics of the Mexican immigrant sample in the NCS-R and the Mexican national sample in the M-NCS (Table 1) shows that immigrants are somewhat younger than the Mexican population as a whole, but do not differ significantly from the Mexican population either in sex or in parental education, although there is a trend for higher parental education among immigrants than non-immigrants.

3.2. Disorder prevalence

Immigrants have significantly higher lifetime and 12-month prevalence of mood and anxiety disorders than the Mexican sample, with a lifetime prevalence of any anxiety or mood disorder twice as high among immigrants (33.0%) as Mexican residents (16.3%, $\chi^2_1=10.7, P=0.001$) and a 12-month prevalence close to three times as high among immigrants as Mexican residents (27.6% vs. 9.9%, $\chi^2_1=10.5, P=0.002$) (Table 2). Subgroup analysis (results available on request) failed to find evidence of significant variation in prevalence among immigrants as a function either of age at immigration ($\chi^2_2=0.1 - 2.6, P=0.973-0.277$) or of duration of residence in the US ($\chi^2_2=1.8 - 4.0, P=0.409-0.138$).

3.3. Pre-existing disorders and subsequent immigration

Only anxiety disorders had earlier enough ages at onset to analyze meaningfully for impact on subsequent immigration. After controlling for socio-demographics (age, sex, parental education), the odds-ratio (OR) of anxiety disorders predicting subsequent immigration was 3.0 with a 95% confidence interval (95% CI) of 1.2–7.4 ($P=0.018$). Subgroup analysis found very similar ORs in the upper two-thirds of the age at immigration distribution (ages 6–12: OR=3.0, 95% CI=1.0–8.9, $P=0.051$; ages 13+: OR=3.1, 95% CI=0.6–16.8, $P=0.176$), while the number of respondents who reported a pre-existing anxiety disorder in the first third of the age at immigration distribution (ages 0–5) was too small to estimate an OR.

3.4. Immigration and subsequent disorder onset

Immigration is significantly and positively related to the subsequent first onset of DSM-IV anxiety and mood disorders after controlling for socio-demographics, with ORs in the range

1.9–2.3 (Table 3). Age at immigration ($\chi^2=370.9, P<0.001$) and duration of residence in the US ($\chi^2=249.2, P<0.001$) are both significantly related to onset of anxiety disorder. A positive association between immigration and anxiety among those who immigrated early in life and during the initial post-immigration periods was reversed among those who immigrated at the oldest ages and in later periods of residence in the US. A trend relationship of a similar sort exists between duration of residence in the US and onset of mood disorder ($\chi^2=4.7, P=0.098$).

3.5. Immigration and disorder persistence

Immigration is positively related to persistence of anxiety and mood disorders after controlling for age of onset, time since onset, and socio-demographic variables with ORs in the range 2.0–3.7 (Table 4). Greater persistence of anxiety disorders among immigrants is associated with older age at immigration and longer duration of residence in the US.

4. Discussion

Given several important limitations of these data, these findings should be considered preliminary until they receive further replication. First, because the NCSR was conducted exclusively in English, we were limited to a sample of English-speaking Mexican immigrants. Since proficiency in English is strongly related to duration of residence in the US (Espinosa and Massey, 1997), our sample is likely to under-represent immigrants who return to Mexico after short periods of residence in the US and over-represent more acculturated immigrants who settle in the US for long periods of time. Since studies have found that more acculturated Mexican-Americans are at higher risk for psychiatric disorder (Ortega et al., 2000), our sample may overestimate risk for disorders in this group. Future studies which include comparable Spanish language interviews in Mexico and the US are needed to replicate and extend the findings of this study.

Second, the sample of Mexican immigrants in the NCS-R was small, limiting the depth with which the association between mental health and immigration could be examined. For instance we could not examine gender differences in the effect of migration which have been found in some previous studies (Vega et al., 1998). The fact that we found statistically significant differences despite the small sample of immigrants attests to the magnitude of these effects.

Third, the Mexican sampling frame did not include the most rural parts of the country. To the extent that immigrants come from areas not represented by the Mexican sample, our ability to control for pre-migration factors is limited. Fourth, despite the comparable interview schedule, the fundamental survey conditions of the two surveys differed in several ways, including language of interview and auspices of the survey. We cannot rule out the possibility that these methodological differences contributed to the observed differences in prevalence estimates in the NCS-R compared to the MNCS. Fifth, the results are not generalizable to other immigrant groups.

The existence of two coordinated surveys which used the same instrument to assess psychiatric disorders in the general population, one conducted in Mexico and one conducted in the US, provided an opportunity to investigate the relationship between immigration to the US and risk for and persistence of anxiety and mood disorders. The study provided the first direct test of the ‘healthy migrant’ hypothesis, suggested as a potential explanation for the low lifetime risk for psychiatric disorders among Mexican immigrants compared with US-born Mexican Americans (Burnam et al., 1987; Grant et al., 2004; Alegria et al., 2006). Our findings contradict the healthy migrant hypothesis: prior to immigration, immigrants had higher rather than lower risk for psychiatric disorder compared with the Mexican general population. This finding should be interpreted in light of the finding of lower prevalence of anxiety and mood

disorders in the Mexican general population than in the US population. The NCS-R, for instance, found lifetime prevalences of 28.8% and 20.8% for anxiety and mood disorders in the US (Kessler et al., 2005). In light of this comparison, our findings add support to the hypothesis that low levels of risk among Mexican immigrants relative to US-born Mexican-Americans is due to the low prevalence of these disorders in the Mexican population in general and not to factors specific to immigrants.

This study also found that compared with the Mexican general population, English-speaking Mexican immigrants in the United States are at higher risk for first onset of an anxiety or mood disorder. Moreover, compared with people in Mexico who have anxiety or mood disorders, English-speaking Mexican immigrants with these disorders are more likely to have persistent disorders. In both regards, these findings are consistent with the acculturative stress hypothesis, the suggestion that stressors associated with being an immigrant increase risk for psychopathology (Rogler et al., 1991; Vega et al., 1998; Escobar and Vega, 2000; Ortega and Rosenheck, 2000; Grant et al., 2004). These findings are also consistent with studies in the US (Odegard, 1932; Malzberg and Lee, 1956), Europe (Harrison et al., 1997; Selten et al., 1997; Selten et al., 2001; Zolkowska et al., 2001; Cantor-Graae and Selten, 2005), and Australia (Krupinski and Stoller, 1965) that have found increased risk for psychotic disorders among immigrants.

Our findings also suggest that risk for first onset of psychiatric disorder is elevated among immigrants in the first 25 years post-immigration. After 25 years of residence in the US, no differences in risk between immigrants and Mexicans were found. This finding is inconsistent with models of acculturative stress that suggest a cumulative impact over time of the stressors of life in a new country.

Our findings are inconsistent with the acculturative stress hypothesis with regard to age of immigration. Acculturative stressors such as loss of social networks and difficulty in communication in the new cultural setting are likely to be more acute for immigrants who arrive in the United States as adults (Rogler, 1994; Rumbaut, 2004). However, elevated risk among immigrants in the United States was more pronounced for those immigrants who arrived as children (age 0–12) than for those who arrived later in life. This finding suggests that increased risk for disorders may result from early socialization within the US, in addition to distinctive stressors that are associated with the acculturation experience.

The findings in this study should be replicated in larger samples that include Spanish-speaking immigrants in the United States as well as measures of potential mediators that could be used to provide more direct tests of suggested causes of increased risk for psychiatric disorder among immigrant to the US, such as economic hardships and other psychosocial stressors. In particular, it would be important to assess the impact of barriers to receiving effective treatment on the persistence of mental disorders among immigrants. It would be especially valuable to have such a survey carried out in border areas by a single bilingual interview staff that could carry out interviews both in Mexico and in the US to control for any methodological effects on results due to differences in survey implementation.

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Table 1
Socio-demographic characteristics of the samples

	Mexican residents (M-NCS)		Immigrants (NCS-R)	
	%	(se)	%	(se)
Age				
18–29	41.3	(1.5)	43.5	(5.6)
30–44	34.6	(1.3)	44.7	(5.1)
45–59	18.9	(1.0)	8.0	(4.9)
60+	5.2	(0.6)	3.9	(2.5)
χ^2_3 (P-value)		12.4 ^a (0.008)		
Sex				
Female	52.3	(1.8)	55.0	(13.1)
Male	47.7	(1.8)	45.0	(13.1)
χ^2_1 (P-value)		<0.1 (0.835)		
Parent education				
0–5	46.5	(1.6)	33.5	(8.3)
6–8	31.6	(1.4)	29.4	(5.7)
9–11	9.9	(0.9)	12.3	(4.6)
12+	12.1	(1.0)	24.8	(6.0)
χ^2_3 (P-value)		5.3 (0.161)		
(n)	(2362)		(75)	
Person-years ^b	76,350		2184	

^a Significant difference between samples at the 0.05 level, two-sided test.

^b Person-years include all years up to the earlier of the age at onset of first psychiatric disorder or the age at interview.

Table 2
Lifetime and 12-month prevalence of DSM-IV anxiety and mood disorders

	Mexican residents (M-NCS)		Immigrants (NCS-R)		χ^2	(P-value)
	%	(se)	%	(se)		
I. Lifetime prevalence						
Anxiety	10.7	(0.8)	24.7 ^a	(6.6)	6.5	(0.012)
Mood	9.3	(0.7)	19.3 ^a	(4.1)	5.2	(0.025)
Either	16.3	(1.0)	33.0 ^a	(5.8)	10.7	(0.001)
II. Twelve-month prevalence						
Anxiety	7.0	(0.6)	21.9 ^a	(6.1)	8.3	(0.005)
Mood	4.8	(0.4)	13.6 ^a	(4.3)	4.3	(0.041)
Either	9.9	(0.7)	27.6 ^a	(6.3)	10.5	(0.002)
(n)	(2362)		(75)			

^aSignificant difference between samples at the 0.05 level, two-sided test, adjusting for differences in age, sex, and parental education.

Table 3
Immigration as a predictor of the subsequent first onset of DSM-IV anxiety and mood disorders

	Anxiety			Mood			Either		
	OR	(95% CI)	(n ₁ /n ₂) ^I	OR	(95% CI)	(n ₁ /n ₂) ^I	OR	(95% CI)	(n ₁ /n ₂) ^I
I. Total	1.9	(0.9–3.9)	(66/1214)	2.3 ^a	(1.3–4.0)	(75/1521)	1.9 ^a	(1.2–2.9)	(66/1170)
II. Age of immigration									
0–5	1.9	(0.7–5.6)	(23/445)	2.3	(1.0–5.4)	(23/547)	2.3 ^a	(1.0–5.4)	(23/432)
6–12	2.8	(0.9–8.8)	(18/346)	2.0	(0.8–4.8)	(12/489)	2.1	(0.9–4.9)	(18/335)
13+	0.0 ^a	(0.0–0.0)	(25/423)	2.7	(0.8–9.5)	(30/485)	0.8	(0.2–3.5)	(25/403)
χ^2_2 (P-value) ²	370.9 (<0.001)			0.1 (0.930)			1.3 (0.511)		
III. Duration (years) of residence in the US									
0–15	1.9	(0.9–4.1)	(66/822)	2.5 ^a	(1.4–4.7)	(75/995)	2.0 ^a	(1.2–3.5)	(66/792)
16–24	2.3	(0.4–13.6)	(33/227)	3.3 ^a	(1.1–10.5)	(43/309)	2.4	(0.9–5.9)	(30/218)
25+	0.0 ^a	(0.0–0.0)	(17/165)	0.3	(0.1–2.0)	(22/217)	0.4	(0.1–3.0)	(16/160)
χ^2_2 (P-value) ²	249.2 (<0.001)			4.7 (0.098)			2.5 (0.284)		

^I Coefficients were estimated from discrete-time survival models in which person-year was the unit of analysis. The entries in the (n₁/n₂) column represent the number of immigrants (n₁) in each category and the person-years in the lives of these immigrants from their age at immigration up to and including the earlier of the two following ages: age at interview and age of first onset of the outcome disorder (n₂).

² χ^2_2 tests evaluate variation in OR across levels of the stratifying variable.

^a Significant difference between samples at the 0.05 level, two-sided test, adjusting for differences in age, sex, and parental education.

Table 4
Immigration as a predictor of the persistence of DSM-IV anxiety and mood disorders

	Anxiety		Mood		Either	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
I. Total	3.7 ^a	(1.2–11.2)	2.0	(0.6–7.1)	2.5 ^a	(1.1–5.9)
II. Age of immigration						
0–5	1.4	(0.3–7.3)	1.3	(0.1–14.7)	2.4	(0.3–17.9)
6–12	3.0 ^a	(1.7–5.1)	0.6	(0.1–5.8)	1.8	(0.7–4.4)
13+	— ²		5.7	(0.5–62.6)	4.3	(0.7–26.1)
χ^2 (P-value) ³	—		0.7 (0.492)		0.3 (0.737)	
III. Duration (years) of residence in the US						
0–15	1.2	(0.1–17.6)	0.5	(0.0–6.4)	2.4	(0.4–14.2)
16–24	2.1	(0.2–19.9)	2.4	(0.3–16.4)	1.7	(0.4–7.0)
25+	— ²		2.8	(0.3–23.4)	4.8	(1.0–24.2)
χ^2 (P-value) ³	—		0.3 (0.778)		0.1 (0.879)	

¹ Persistence was defined indirectly as 12-month prevalence among lifetime cases, controlling age of onset and time since onset as well as sex and parental education.

² All immigrants with a lifetime anxiety disorder who immigrated at 13 or more years of age or had been in the United States for 25 years or more also had a 12-month anxiety disorder.

³ χ^2 tests evaluate variation in OR across levels of the stratifying variable.

^a Significant difference between samples at the 0.05 level, two-sided test, adjusting for differences in age, sex, and parental education.