

Estimating the Effects of Immigration Status on Mental Health Care Utilizations in the United States

Jie Chen · Arturo Vargas-Bustamante

Published online: 1 February 2011

© The Author(s) 2011. This article is published with open access at Springerlink.com

Abstract Immigration status is a likely deterrent of mental health care utilization in the United States. Using the Medical Expenditure Panel Survey and National Health Interview survey from 2002 to 2006, multivariable logistic regressions were used to estimate the effects of immigration status on mental health care utilization among patients with depression or anxiety disorders. Multivariate regressions showed that immigrants were significantly less likely to take any prescription drugs, but not significantly less likely to have any physician visits compared to US-born citizens. Results also showed that improving immigrants' health care access and health insurance coverage could potentially reduce disparities between US-born citizens and immigrants by 14–29% and 9–28% respectively. Policy makers should focus on expanding the availability of regular sources of health care and immigrant health coverage to reduce disparities on mental health care utilization. Targeted interventions should also focus on addressing immigrants' language barriers, and providing culturally appropriate services.

Keywords Immigrant · Mental health · Utilizations · Depression · Anxiety

J. Chen (✉)

Department of Political Science, Economics, and Philosophy,
College of Staten Island/City University of New York,
2800 Victory Blvd, Room 2 N-229, Staten Island,
NY 10314, USA
e-mail: jie.chen@csi.cuny.edu

A. Vargas-Bustamante

Department of Health Services, School of Public Health,
University of California, Los Angeles, 650 Charles E. Young
Drive South Room 31-299C, Box 951772, Los Angeles,
CA 90095, USA
e-mail: avb@ucla.edu

Introduction

Disparities in health care utilizations among immigrants and native-born citizens in the United States have been well documented [1–6]. Studies have shown that immigrants' per-capita medical utilizations and expenditures are much lower than those of US-born citizens [3–6]. This problem can be persistent and even aggravated in the treatment of mental health disorders, which are among the most expensive medical conditions in the United States during the last 10 years [7]. Some mental health disorders, such as depression and anxiety disorders, can be effectively controlled using proper treatments, like pharmacotherapy and physician consultations [8–11].

Previous studies show evidences of immigrants' underutilization of mental health services in Canada [12], British Columbia [13], and other areas [14]. However, little is known about mental healthcare utilizations among immigrants in the United States [15, 16]. Such evidences will be critical to compare and evaluate policies geared towards the integration of immigrants into mental health services [17, 18].

Immigrants may face inferior mental health care access compared to the native-born populations. When immigrants arrive to the US, they have to learn about the specifics of healthcare access and utilization in the country that often differ substantially from their native countries. Although adequate access to mental health services can facilitate the adaptation process, lack of health insurance is a major deterrent of mental healthcare utilization for US immigrants [1–6, 19–24]. Medicaid and private insurances are the two dominant financing systems of mental health care services [25]. An individual's nativity will influence his or her Medicaid eligibility or the ability to obtain employer-provided health insurance coverage [24, 26].

Medicaid once played an important role in providing health care coverage for low-income immigrants [24]. Its coverage, however, has been declining for non-US citizens since the 1996 Welfare Reform established a minimum of 5 years of residence in the US to become eligible for the benefits of the program [27]. In this period of time low-income immigrants encounter substantial barriers to mental health care access and utilization. In addition, studies show that only 50 percent of non-US citizen full-time employees had employer-sponsored health insurance, compared to 81 percent of US-born citizen full-time employees did [26].

In addition, culture plays a role as well in aggravating disparities on mental health care utilization between immigrants and US-born citizens. Previous studies show that racial and ethnic minorities are less likely to treat mental disorders or have different preferences in the treatments, given their language barriers, stigma, or other cultural beliefs [28–34]. For example, compared to Whites, ethnic minorities are more likely to believe that antidepressants are addictive and thus less likely to take them [35–37]. Since most immigrants have different cultural, racial, ethnic and socioeconomic characteristics than the native-born white population [23], immigration status could potentially correlate with race/ethnicity to affect mental health care utilizations.

To our best knowledge, none studies have attempted to estimate the direct effect of immigrant status on mental health care utilizations or disentangled its relationship with health care access and race/ethnicity. To bridge this gap, this study took advantage of a national representative data set to estimate the effect of immigrant status on the use of any prescription drug and physician counseling among patients with depression or anxiety disorders. Employing the Blinder-Oaxaca decomposition method [38], we also identified and quantified the importance of specific factors, such as health care access, associated with the utilization disparities between US-born citizens and immigrants. Our findings could provide a baseline for the future evaluation of current health care reform efforts among immigrants living in the US.

Methods

Data and Variables

This study used the linked data sets of Medical Expenditure Panel Survey (MEPS) and National Health Interview Survey (NHIS) from 2002 to 2006. MEPS is a nationally representative dataset of the United States civilians, non-institutionalized population, and is conducted by the agency for healthcare research and quality (AHRQ) [39]. The MEPS consolidated file is a person-year level database, which

contains detailed information on patients' demographics and socioeconomic characteristics. The consolidated file has two components: the household component and the medical provider component. The MEPS household component collects data in each interview on health care utilizations. The medical conditions and associated health care uses reported by the household component respondent were recorded by the interviewer as verbatim text, which were then coded by professional coders to fully-specified ICD-9-CM codes, including medical conditions. The MEPS medical provider component is a follow-up survey that collects data from medical providers (and pharmacies) to validate data on services used reported in the household survey. These variables represent a full year of prescription drug use, physician visits, and other types of service. Using this dataset, we were able to estimate drug use and physician visits for each respondent with self-reported depression (ICD9 = 296, 311) or anxiety (ICD9 = 300) disorders during the survey year.

To capture the effect of immigration status on mental health care utilizations, we linked MEPS data sets to the National Health Interview Survey (NHIS) for each survey year to obtain information on individual citizenship and immigration status [39]. NHIS is also a national representative data set and is conducted by the national center for health statistics. The MEPS database is a sub-sample of the National Health Interview Survey (NHIS). MEPS offers detailed descriptions of the link information. NHIS provides information on respondents' US citizenship status and birth place. Using this information, three mutually exclusive dichotomous measures of citizenship/nativity status were constructed: (1) US-born citizen; (2) naturalized US citizen (if the respondent was a US citizen but was foreign-born); (3) and non-US citizen.

This linked dataset yielded a final sample of 14,658 nonelderly adults aged 18–64 years with diagnose of either depression or anxiety, among whom 12,912 were US-born citizens, 843 were US-naturalized citizens, and 903 were non-US citizens.

Utilization

The analyses used two major cost-effective treatments for depression and anxiety disorders measures: the prescription drug use and physician office visit [8–11]. The main outcome variables for the analyses were thus constructed using dichotomous variables: (1) the probability of having any prescription drug (including both generic drug and brand name drugs) use to treat depression or anxiety during the survey year, (2) the probability of having any physician visit, either general assessment/counseling or psychotherapy, to treat depression or anxiety during the survey year, and (3) the probability of having either prescription drug

use or any physician visit to treat depression or anxiety during the survey year. These measures have been widely used in the previous studies [40, 41].

Conceptual Framework

The conceptual framework for this study was the behavioral model developed by Andersen [42]. According to this model, health care utilizations were determined by predisposing, enabling, and need factors. Predisposing factors included characteristics such as age, gender, marital status, and education. Studies have shown that acculturation (language and citizenship/nativity) can significantly affect mental health care utilization [29]. Individuals who are less English proficient may feel uncomfortable communicating with health care providers in the past. Therefore, they could self-exclude from seeking any mental health care since they have had communication problems in the past. As immigrants experience more time in the host country and improve their communication skills, they would be more likely to seek health care. We constructed a binary variable for language of interview, distinguishing whether the interview was conducted in English (or English and Spanish), and in another language.

Need factors included measures of respondents' clinical appropriateness and mental health need. Following Cook et al. [40] study, we included self-reported health status and a vector of chronic disease conditions to capture mental health care need. Particularly, these variables were self-reported general health status (fair/poor, good, very good/excellent), mental health status (fair/poor, good, very good/excellent), activities of daily living (ADLs) and instrumental activities of daily living (IADLs) limitations, and indicators for each following chronic disease: diabetes, asthma, hypertension, and heart disease (including diagnoses of angina, coronary heart disease, heart attack, or other heart disease). We also included a binary variable indicating whether the respondent had depression or an anxiety disorder.

According to the Andersen model (1995), enabling characteristics included community and personal enabling resources that facilitate mental health care utilization [42]. Enabling factors included in this study were family income (0–99, 100–199, or ≥ 200 percent of the federal poverty level), health care access (i.e., whether the patients had a regular source of care), health insurance (uninsured, public health insurance, and private health insurance), metropolitan area (MSA), and binary variables for US Census Regions. Year dummies were controlled to capture inter-temporal effects on use as well.

Analysis

We first performed bivariate analyses by immigration status, with US-born citizens as the reference group. Chi-

square tests were used to test for significant differences among categorical variables and t-tests were used for continuous variables. Next, we used multivariable logistic regressions to estimate the effect of immigration status on the probability of taking any prescription drug, having any physician visit, or any of these two services to treat depression or anxiety disorders, with odds ratios and 95 percent confidence intervals reported. All regression models used sampling weights provided in MEPS to account for differential selection probability and to ensure that the results correct the estimated variances and reflect a nationally-representative sample of the non-institutionalized civilian US population. We used Stata 10 (StataCorp LP, College Station, TX) to conduct all statistical analyses.

We then employed the Blinder-Oaxaca decomposition techniques to determine the extent to which utilization disparities reflected differences in observable population characteristics, and to identify the most important factors associated with these differences [43–45]. The Blinder-Oaxaca approach is a regression-based method. For example, to decompose the difference in the probability of having any prescription drug use between US citizens and non-US citizens, multivariable logistic regressions for these two groups were estimated separately. The total differences, by subtracting these two estimated equations, could be decomposed into two parts: (1) differences due to all of the observed population characteristics, (i.e., all of the control variables), and (2) differences due to unobserved heterogeneities associated with citizenship, such as cultural background and discrimination. Among the observed population characteristics, disparities associated with each specific factor, such as health care access, language, etc., could also be quantified.¹ We repeated the same procedure to decompose the disparities between US-born and US-naturalized citizens and for the utilizations of physician visits.

Results

Bivariate Analysis

Table 1 summarized the sample statistics for utilizations and population characteristics across immigrant status for the pooled 2002–2006 sample. Non-US citizens were least

¹ Following Fairlie [45], the decomposition for a nonlinear equation, $Y = F(X\beta)$, could be written as:

$$\bar{Y}^B - \bar{Y}^N = \left[\sum_{i=1}^{N^B} \frac{F(X_i^B \hat{\beta}^B)}{N^B} - \sum_{i=1}^{N^N} \frac{F(X_i^N \hat{\beta}^B)}{N^N} \right] + \left[\sum_{i=1}^{N^N} \frac{F(X_i^N \hat{\beta}^B)}{N^N} - \sum_{i=1}^{N^N} \frac{F(X_i^N \hat{\beta}^N)}{N^N} \right]$$

where B stands for US-born citizens and N stands for non-Citizens. The first term on the right-hand-side measures the portion of the difference due to observed population characteristics, and the second term measures the portion of the difference due to unobserved heterogeneities.

Table 1 Summary statistics of sample characteristics

	US-born citizens		US-naturalized citizens			Non-US citizens		
	<i>N</i> = 12,912		<i>N</i> = 843			<i>N</i> = 903		
	Mean	SD	Mean	SD	<i>P</i> ^a	Mean	SD	<i>P</i> ^b
Utilizations (%)								
Any prescription drug use	68.12	46.60	62.51	48.44	***	44.85	49.76	***
Any physician visit	43.01	49.51	46.38	49.90		36.77	48.24	***
Any prescription drug use or physician visit	75.95	43.33	70.34	45.70	**	53.27	49.92	***
Race/ethnicity (%)								
Caucasians	75.81	42.82	23.49	42.42		12.29	32.85	
Latinos	8.26	27.53	62.99	48.31		79.07	40.70	
African Americans	11.40	31.78	3.44	18.24		2.66	16.09	
Other races	4.52	20.78	10.08	30.13		5.98	23.72	
Age (%)								
18–24	9.25	28.98	2.14	14.46		6.09	23.93	
25–34	16.72	37.32	11.27	31.64		21.82	41.32	
35–44	24.03	42.73	23.37	42.34		31.67	46.55	
45–54	29.07	45.41	35.23	47.80		26.02	43.90	
55–64	20.93	40.68	28.00	44.92		14.40	35.12	
Gender (%)								
Female	70.35	45.67	71.29	45.27	*	75.53	43.02	*
Marital status (%)								
Married	44.93	49.74	48.99	50.02		60.02	49.01	
Health status (%)								
Self-reported health								
Fair/poor	34.20	47.44	44.60	49.74		41.53	49.30	
Good	29.75	45.72	24.91	43.28		29.57	45.66	
Very good/excellent	24.27	42.87	20.17	40.15		19.05	39.29	
Self-reported mental health								
Fair/poor	30.96	46.23	33.10	47.08		29.46	45.61	
Good	34.15	47.42	31.67	46.55		34.66	47.62	
Very good/excellent	21.41	41.02	21.12	40.84		19.27	39.46	
ADL								
IADL	3.55	18.52	4.51	20.76	*	1.99	13.98	*
Depression	8.64	28.09	7.35	26.12	***	5.20	22.22	***
Anxiety	63.44	48.16	67.50	46.87	***	71.98	44.93	***
Diabetes	36.56	48.16	32.50	46.87	***	28.02	44.93	***
Hypertension	10.90	31.16	15.30	36.02	***	10.52	30.70	***
Hypertension	31.67	46.52	37.72	48.50	***	26.47	44.14	***
Heart disease	13.20	33.86	13.29	33.96	***	4.65	21.07	***
Asthma	19.14	39.34	15.78	36.47	***	4.98	21.77	***
Education (%)								
No high school degree	25.73	43.72	38.79	48.76		62.35	48.48	
High school degree	46.72	49.89	35.71	47.94		22.92	42.06	
College degree	12.60	33.19	13.29	33.96		6.09	23.93	
Advanced degree	14.95	35.66	12.22	32.77		8.64	28.11	
Family income below federal poverty level (%)								
Less than 100% FPL		***			***			
100–200% FPL	23.66	42.50	26.45	44.13		30.56	46.09	
More than 200% FPL	20.31	40.23	23.96	42.71		34.77	47.65	
More than 200% FPL	56.03	49.64	49.58	50.03		34.66	47.62	
Having usual source of care (%)	87.21	33.40	85.05	35.68	***	71.21	45.30	***

Table 1 continued

	US-born citizens		US-naturalized citizens			Non-US citizens		
	N = 12,912		N = 843			N = 903		
	Mean	SD	Mean	SD	<i>P</i> ^a	Mean	SD	<i>P</i> ^b
Insurance (%)					***			***
Uninsured	11.74	32.19	13.64	34.34		36.54	48.18	
Public insurance	26.49	44.13	37.84	48.53		31.01	46.28	
Private insurance	61.76	48.60	48.52	50.01		32.45	46.84	
Interview language (%)					***			***
English	99.27	8.50	90.98	28.66		93.69	24.32	
Locations (%)					***			***
MSA (urban)	76.80	42.21	93.59	24.50		90.81	28.91	
US census region								
Northeast	14.86	35.57	25.50	43.61		12.07	32.60	
Midwest	24.74	43.15	13.40	34.09		8.08	27.27	
South	38.78	48.73	26.81	44.32		28.02	44.93	
West	21.62	41.17	34.28	47.49		51.83	49.99	
Year dummy (%)								
2002	20.72	40.53	21.83	41.33		20.16	40.14	
2003	18.70	38.99	21.83	41.33		20.16	40.14	
2004	19.42	39.56	18.86	39.14		18.94	39.20	
2005	20.36	40.27	16.84	37.45		19.38	39.55	
2006	20.80	40.59	20.64	40.50		21.37	41.02	

Based on data from Medical Panel Expenditure Survey 2002–2006. The sample includes all the people aged 18–64 years old with either diagnose of depression or anxiety disorder

^a Comparison between US-born citizens and US-naturalized citizens, with US-born citizens as the reference group. Chi-square tests are used for category variables, and *P* values are reported (* 0.01 ≤ *P* < 0.05; ** 0.001 ≤ *P* < 0.01; *** *P* < 0.001)

^b Comparison between US-born citizens and non-US citizens, with US-born citizens as the reference group. Chi-square tests are used for category variables, and *P* values are reported (* 0.01 ≤ *P* < 0.05; ** 0.001 ≤ *P* < 0.01; *** *P* < 0.001)

likely, compared to US-naturalized citizens and US-born citizens, to take any prescription drug (45 vs. 68 percent of US-born citizens, and 63 percent of US-naturalized citizens). The same trend was observed in the case of physician visits (37 vs. 43 percent of US-born, and 46 percent US-naturalized citizens), and any use of prescription drug or physician visits (53 vs. 76 percent of US-born, and 70 percent US-naturalized citizens).

Approximately 76 percent of US-born citizens were Whites. In contrast, 79 percent of non-US citizens were Latinos. Non-US citizens were 14–16 percentages less likely to have regular source of care (71 vs. 85 percent of US-naturalized, and 87 percent of US-born citizens) and 23–25 percentages more likely to be uninsured (37 vs. 14 percent of US-naturalized, and 12 percent of US-born citizens) compared to other cohorts.

Multivariable Regressions

Table 2 showed the results of the multivariable models. US-naturalized citizens and non-US citizens were 28

percent (OR = 0.72, *P* < 0.010) and 40 percent (OR = 0.60, *P* < 0.001) less likely to use prescription drug than US-born citizens after controlling for all covariates. US-naturalized citizens and non-US citizens were also 28 percent (OR = 0.72, *P* < 0.010) and 37 percent (OR = 0.63, *P* < 0.001) less likely to use either prescription drug or physician visit than US-born citizens. However, the likelihood of having any physician visits was non-statistically significant once other covariates were taken into consideration in the multivariate regression analyses.

The effects of racial and ethnic were statistically significant. Whites were most likely to use any prescription drug to treat depression (OR for Latinos was 0.73, *P* < 0.001, and OR for African Americans was 0.45, *P* < 0.001). Individuals with a usual source of care were twice likely to visit doctors, and approximately three times likely to take prescription drugs or have either prescription drug or doctor visits than those without a usual source of care. Uninsured individuals were 41 percent less likely to take prescription drugs and 21 percent less likely to visit a physician, and people covered by public health plans were

Table 2 Multivariable logistic regression results for any prescription drug use, and physician visit during the survey year (entire sample size = 14,658)

	Any prescription drug use			Any physician visit			Any prescription drug use or physician visit		
	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
Citizenship/nativity									
US-born citizens	Ref			Ref			Ref		
US-naturalized citizens	0.72	0.56 0.94	**	0.97	0.77 1.22		0.72	0.54 0.96	*
Non-US citizens	0.60	0.45 0.81	***	0.80	0.63 1.02		0.63	0.46 0.85	***
Race/ethnicity									
Caucasians	Ref			Ref			Ref		
Latinos	0.73	0.60 0.89	***	1.10	0.93 1.30		0.75	0.62 0.91	***
African Americans	0.45	0.37 0.55	***	0.87	0.75 1.01		0.48	0.39 0.59	***
Other races	0.53	0.41 0.68	***	0.87	0.70 1.08		0.56	0.43 0.72	***
Age									
18–24	Ref			Ref			Ref		
25–34	1.44	1.14 1.83	***	1.13	0.91 1.41		1.26	1.01 1.59	*
35–44	1.82	1.48 2.25	***	1.09	0.88 1.35		1.51	1.22 1.87	***
45–54	2.11	1.69 2.62	***	1.02	0.83 1.26		1.81	1.46 2.25	***
55–64	2.14	1.69 2.72	***	0.91	0.73 1.12		1.85	1.44 2.36	***
Gender									
Female	1.18	1.08 1.30	***	0.99	0.90 1.09		1.20	1.08 1.34	***
Marital status									
Married	1.27	1.11 1.44	***	0.85	0.77 0.95	***	1.18	1.03 1.35	*
Health status									
Self-reported health									
Very good/excellent	Ref			Ref			Ref		
Fair/poor	1.13	0.97 1.32		0.95	0.83 1.08		1.13	0.96 1.33	
Good	1.05	0.92 1.20		0.89	0.80 1.00	*	1.01	0.89 1.16	
Self-reported mental health									
Very good/excellent	Ref			Ref			Ref		
Fair/poor	1.29	1.11 1.50	***	2.73	2.38 3.14	***	1.51	1.28 1.79	***
Good	1.15	1.02 1.31	**	1.55	1.38 1.74	***	1.26	1.11 1.44	***
Anxiety									
Depression	0.88	0.80 0.97	**	1.11	1.02 1.22	**	0.79	0.71 0.89	***
ADL	0.86	0.62 1.21		0.86	0.63 1.16		1.09	0.73 1.61	
IADL	1.62	1.29 2.04	***	1.21	0.97 1.52		1.57	1.18 2.09	***
Diabetes	0.96	0.79 1.15		1.11	0.95 1.31		1.22	0.98 1.53	
Hypertension	1.32	1.17 1.49	***	1.00	0.90 1.13		1.33	1.15 1.53	***
Heart disease	1.20	1.02 1.41	*	1.08	0.94 1.23		1.28	1.06 1.54	**
Asthma	1.07	0.94 1.22		1.01	0.90 1.14		1.06	0.92 1.22	
Education									
No high school degree	Ref			Ref			Ref		
High school degree	1.03	0.91 1.17		1.00	0.89 1.13		1.08	0.94 1.24	
College degree	1.03	0.85 1.25		1.15	0.97 1.38		1.13	0.93 1.38	
Advanced degree	0.95	0.79 1.13		1.10	0.94 1.29		1.04	0.86 1.25	
Family income below federal poverty level									
More than 200% FPL	Ref			Ref			Ref		
Less than 100% FPL	0.91	0.78 1.06		1.00	0.87 1.16		0.88	0.75 1.03	
100–200% FPL	0.86	0.76 0.99	**	0.96	0.84 1.10		0.83	0.72 0.96	**
Having usual source of care	2.86	2.47 3.31	***	2.00	1.69 2.36	***	2.93	2.50 3.43	***

Table 2 continued

	Any prescription drug use			Any physician visit			Any prescription drug use or physician visit		
	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>	OR	95% CI	<i>P</i>
Insurance									
Private health plan	Ref			Ref			Ref		
Uninsured	0.59	0.51 0.69	***	0.79	0.66 0.94	**	0.55	0.47 0.64	***
Public health plan	1.22	1.02 1.45	*	1.40	1.22 1.60	***	1.29	1.09 1.53	***
Interview language									
English	0.95	0.63 1.44		1.28	0.85 1.95		1.06	0.71 1.60	
Location									
MSA (urban)	0.81	0.69 0.94	**	1.14	1.01 1.29	*	0.88	0.74 1.05	
US census region									
Northeast	Ref			Ref			Ref		
Midwest	0.90	0.76 1.08		0.78	0.66 0.91	***	0.76	0.62 0.95	*
South	1.26	1.05 1.50	**	0.85	0.71 1.01		1.08	0.87 1.33	
West	0.87	0.72 1.04		0.79	0.66 0.93	**	0.76	0.62 0.94	**
Year dummy									
2002	Ref			Ref			Ref		
2003	0.97	0.85 1.10		0.99	0.87 1.13	**	0.99	0.85 1.16	
2004	1.05	0.92 1.19		0.94	0.82 1.07	***	1.02	0.88 1.18	
2005	1.09	0.94 1.26		0.96	0.82 1.12	**	1.07	0.89 1.27	
2006	1.06	0.90 1.24		0.92	0.80 1.06	***	1.09	0.91 1.31	
<i>R</i> ²	0.09			0.05			0.12		

* 0.01 ≤ *P* < 0.05; ** 0.001 ≤ *P* < 0.01; *** *P* < 0.001

22–40 percent more likely to use prescription drug and have doctor visit respectively.

Blinder-Oaxaca Decomposition

Table 3 top panel showed that 46 percent of the differences in prescription drug uses, and 60% of differences in any treatment, among US-born and US-naturalized citizens could be explained by the observed population characteristics. The differences in race and ethnicity among US-born citizens and US-naturalized citizens over-explained (138%) the disparities in mental health care prescription drug uses among these two groups. In other words, if there were no racial/ethnic disparities among US-born and US-naturalized citizens and other factors were fixed, US-naturalized citizens would be more likely to use the prescription drugs. However, due to differences in other characteristics among these two groups, we still observed that US-naturalized citizens were less likely to use the prescription drugs. For example, US-naturalized citizens had lower health care access compared to US-born citizens, and this difference explained 14% of the disparities. Our results also indicated that if they had lower public sponsored health insurance coverage such as Medicaid, US-naturalized citizens would be further less likely to use prescription drugs, and the disparities between them and US-born citizens would

increase by 12%, with other factors fixed. Our results also showed that race and ethnicity difference was the most important factor (72%) associated with disparities in any treatment, i.e., prescription drug or physician visit, among US-born citizens and US-naturalized citizens, followed by health care access (19%) and health insurances (9%).

Table 3 bottom panel showed the decomposition results among US-born and non-US citizens. Population characteristics explained more than 85 percent of the differences. Differences in race and ethnicity explained approximately 56 percent of the prescription drug uses. Having a regular source of care explained 20 percent of the differences in prescription drug uses and 29 percent of the differences in doctor visits. Insurance status explained 19 and 28 percent of the differences in the prescription drug uses and doctor visits. Language effect also explained 11 percent of the differences in physician visits.

Discussion

Results showed that immigrants’ inferior access to the health care system and poorer health insurance coverage compared to US-born citizens were major factors associated with the disparities in mental health utilizations, particularly for non-US citizens. According to the results, non-

Table 3 Decomposition results of prescription drug use and doctor visit among immigrants

	Prescription drug	Doctor visit	Drug/Doctor visit
<i>US-born citizens (reference group) vs. US-naturalized citizens</i>			
US-naturalized citizens	0.63	0.46	0.70
US-born citizens	0.68	0.43	0.75
Total difference	−0.06	NS	−0.05
Total explained (%)	46.43	–	60.00
Significant factors (% of total explained differences)			
Race/ethnicity	138.83	–	71.91
Usual source of care	13.74	–	18.68
Insurance	−11.16	–	9.43
<i>US-born citizens (reference group) vs. non-US citizens</i>			
Non-US citizens	0.45	0.37	0.53
US-born citizens	0.68	0.43	0.75
Total difference	−0.23	−0.06	−0.22
Total explained (%)	87.90	120.8	91.71
Significant factors (% of total explained differences)			
Race/ethnicity	55.65	–	55.19
English	–	10.55	–
Usual source of care	19.66	29.29	20.13
Insurance	19.24	27.91	14.54

Only significant individual factors with 5% or more contributions are reported. Non-significant results for each decomposition model were excluded for brevity. Among individual factors, positive/negative coefficients indicate the share of explanatory variables positively/negatively associated with disparities in receiving the procedure

US citizens were three times more likely to be uninsured and 15 percentages less likely to have a regular source of care than US-born citizens (Table 1). Results showed that if non-US citizens had the same access to the usual source of care as US-born citizens did, the disparities of mental health care utilizations would reduce by 20–30 percent. Compared to people with private health insurance, individuals enrolled in public plans (mainly Medicaid for people under 65) were 22–40 percent more likely to use services (Table 2). However, federal legislation prevents recent immigrants from qualifying for critical health care services. Immigrants arriving after August 22, 1996 are restricted from federally-funded health care coverage for their first 5 years in the US [46]. As a result, immigrants' fewer coverage from Medicaid induced more barriers to treat their mental disorders. Our results showed that if immigrants had the same health coverage as US-born citizens, the disparities of using prescription drug and visiting the physicians would drop 9–28 percent. Recent health care reform efforts have not changed this barrier to health care access. This healthcare barrier is especially critical during the first years of immigration that tends to be emotionally challenging for most immigrants.

Language differences were also important, particularly for the non-citizen groups. Proper treatments of mental health disorders depend heavily on communication

between physicians and their patients. This is especially true during the physician visit, which is largely accomplished by the “exchange of verbal communications” [47–50]. Lack of bicultural and bilingual mental health providers in the US makes language barriers substantial especially for the immigrants [47].

Results also showed that the disparities in mental health care uses among immigrants and native-born Americans may also reflect the race and ethnicity-related beliefs in treatments for mental health. Givens et al. [35] found significant ethnic differences in medication use for depression. Ethnic minorities were more likely to believe that antidepressants are addictive and are more likely to use prayer and counseling for their depression treatment [36, 37]. Since immigrants were overrepresented among racial and ethnic minorities, it is likely that similar race/ethnicity related belief may partly explain the difference in prescription drug utilization of the major factors explaining immigrants' fewer prescription drugs uses.

Besides observed differences in health care access and insurance, and race and ethnicity-related beliefs, our results showed that unobserved cultural differences associated with immigration status could explain approximately 8–54 percent of assessed disparities between US-born citizens and immigrants. These unobserved heterogeneities may be immigrant-status related cultural beliefs, background, or

preferences, such as possible discrimination, prejudice, or stigma they might have experienced during the acculturation process to the US [51–54], or self-selection from the immigration screening process [55]. Although we were not able to further distinguish these unobserved immigrant-status related heterogeneities, our results showed some evidences that it might be important to understand culturally appropriate health services for immigrants is critical to tackle health care disparities between immigrants and native-born US citizens [51–54].

The results of this study should be interpreted with caution. First, although a number of predisposing, enabling, and need factors related to mental health care uses had been controlled, it is possible that some potentially important factors, such as immigrants' country of origin, experiences in their home country, or immigrant-status related cultural beliefs might had been excluded due to data limitations. Second, this study did not have information on immigrants' legal status. Undocumented immigrants may have the additional psychological tension, such as being caught by migratory authorities in the US. Future immigration and health care reform efforts should take this vulnerable group into consideration to find a mechanism to either grant them with some form of legal status that would allow them to access mental health services more easily or of softening the rules for undocumented immigrants to receive basic mental health counseling since it is one of the most vulnerable groups among immigrants, as they are often low-income, isolated and uninsured [56]. Third, since most immigrants in the United States are Latinos (53.6 percent of foreign-born population in the US) or Asian (26.8 percent of foreign-born population in the US), it will be interesting to see the heterogeneities in mental health care utilization within Latino and Asian subgroups, such as the Mexicans, Korean and other ethnicity [57–61]. Due to the data limitation, we were not able to further distinguish Latino or Asian subgroups. Finally, approximately 98 percent of the interviews were conducted in English (or both English and Spanish). Thus, non-English speaking immigrants might have been inadvertently excluded from the survey, and our results can not be applied to these non-English speaking immigrants.

Conclusion

To reduce disparities on mental health services utilization, policy makers should focus on expanding the availability of a usual source of health care and public health care coverage for immigrants. Policy makers should also focus on decreasing immigrant's barriers to mental health services, and on providing culturally appropriate services.

Open Access This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

References

- Okie S. Immigrants and health care: at the intersection of two broken systems. *N Engl J Med*. 2007;357:525–9.
- Deroose KP, Escarce J, Lurie N. Immigrants and health care: sources of vulnerability. *Health Aff*. 2007;26:1258–68.
- Mohanty SA, Woolhandler S, Himmelstein D, et al. Health care expenditures of immigrants in the United States: a nationally representative analysis. *Am J Public Health*. 2005;95:1431–8.
- Goldman DP, Smith JP, Sood N. Immigrants and the cost of medical care. *Health Aff (Millwood)*. 2006;25:1700–11.
- Ku L, Matani S. Left out: immigrants' access to health care and insurance. *Health Aff (Millwood)*. 2001;20:247–56.
- Ku L. Health insurance coverage and medical expenditures of immigrants and native-born citizens in the United States. *Am J Public Health*. 2009;99:1322–8.
- Roehrig C, Miller G, Lake C, et al. National health spending by medical condition, 1996–2005. *Health Aff*. 2009;28:w358–67.
- US Department of Health, Human Services. *Mental Health. Mental health: a report of the surgeon general—executive summary*. Rockville: US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health; 1999.
- Jonghe F, Hendricksen M, Dekker J. Psychotherapy alone and combined with pharmacotherapy in the treatment of depression. *Br J Psychiatry*. 2004;185:37–45.
- Arean P, Cook B. Psychotherapy and combined psychotherapy/pharmacotherapy for late life depression. *Biol Psychiatry*. 2002;52:293–303.
- Norcross C, Goldfried M. *Handbook of psychotherapy integration (clinical psychology)*. 2nd ed. USA: Oxford University Press; 2005.
- Canadian Research on Immigration and Health. Minister of Public Works and Government Services Canada, 1999. Available at: <http://dsp-psd.pwgsc.gc.ca/Collection/H21-149-1999E.pdf>. Accessed 1 Aug 2010.
- Chen AW, Kazanjian A, Wong H. Determinants of mental health consultations among recent Chinese immigrants in British Columbia, Canada: implications for mental health risk and access to services. *J Immigr Minor Health*. 2008;10:529–40.
- Oppedal B, Røysamb E, Sam DL. The effect of acculturation and social support on change in mental health among young immigrants. *Int J Behav Dev*. 2004;28:481–94.
- Vega W, Kolody B, Aguilar-Gaxiola S, et al. Gaps in Service utilization by Mexican Americans with mental health problems. *Am J Psychiatry*. 1999;156:928–34.
- Hoberman H. Ethnic minority status and adolescent mental health services utilization. *J Behav Health Serv Res*. 1992;19:246–67.
- Capps R, Rosenblum R, Fix M. *Immigrants and health care reform: what's really at stake?*. Washington: Migration Policy Institute; 2009.
- Nam, Immigrants can cheer and jeer for health care reform. Available at: http://news.newamericamedia.org/news/view_article.html?article_id=897b3e1096551c398ec592d116_bf9c66. Accessed 2 Apr 2010.
- Berk ML, Schur CL, Chavez LR, et al. Health care use among undocumented Latino immigrant. *Health Aff (Millwood)*. 2000;19:51–64.

20. Hubbell FA, Waitzkin H, Mishra SI, et al. Access to medical care for documented and undocumented Latinos in a southern California country. *West J Med.* 1991;154:414–7.
21. Marshall KJ, Urrutia-Rojas X, Mas FS, et al. Health status and access to health care of documented and undocumented immigrant Latino women. *Health Care Women Int.* 2005;26:916–36.
22. Huang Z, Yu S, Ledsky R. Health status and health service access and use among children in US immigrant families. *Am J Public Health.* 2006;96:634–40.
23. Ortega AN, Fang H, Perez VH, et al. Health care access, use of services, and experiences among undocumented Mexicans and other Latinos. *Arch Intern Med.* 2007;167:2354–60.
24. Ku L, Waidman T. How race/ethnicity, immigration status, and language affect health insurance coverage, access to care, and quality of care among the low-income population. Washington, DC: Kaiser Commission on Medicaid and the Uninsured; 2003. Available at: <http://www.kff.org/uninsured/kcmu4132report.cfm>. Accessed 7 Oct 2009.
25. Frank R, Goldman H, McGuire T. Trends in mental health cost growth: an expanded role for management? *Health Aff.* 2009;28:649–59.
26. Carrasquillo O, Carrasquillo AI, Shea S. Health insurance coverage of immigrants living in the United States: differences by citizenship status and country of origin. *Am J Public Health.* 2000;90:917–23.
27. Kaiser Key Facts. Immigrants' health care coverage and access. 2003. Available at: <http://www.kff.org/uninsured/upload/Immigrants-Health-Care-Coverage-and-Access-fact-sheet.pdf>. Accessed 7 Oct 2009.
28. Dobalian A, Rivers P. Racial and ethnic disparities in the use of mental health services. *J Behav Health Serv Res.* 2008;35:128–41.
29. Sentell T, Shumway M, Snowden L. Access to mental health treatment by English language proficiency and race/ethnicity. *J Gen Intern Med.* 2007;22:289–93.
30. Zuvekas SH, Fleishman JA. Self-rated mental health and racial/ethnic disparities in mental health service use. *Med Care.* 2008;46:915–23.
31. Jackson JS, Neighbors HW, Torres M, et al. Use of mental health services and respondent satisfaction with treatment among Black Caribbean immigrants: results from the National Survey of American Life. *Am J Public Health.* 2007;97:60–7.
32. Alegria M, Cao Z, McGuire TG, et al. Health insurance coverage for vulnerable populations: contrasting Asian Americans and Latinos in the United States. *Inquiry.* 2006;43:231–54.
33. Alegria M, Mulvaney-Day N, Woo M, et al. Correlates of past-year mental health service use among Latinos: results from the National Latino and Asian American Study. *Am J Public Health.* 2007;97:76–83.
34. Nadeem E, Lange J, Edge D, et al. Does stigma keep poor young immigrant and US-born black and Latina women from seeking mental health care? *Psychiatr Serv.* 2007;58:1547–54.
35. Givens JL, Houston TK, Van Voorhees BW, et al. Ethnicity and preferences for depression treatment. *Gen Hosp Psychiatry.* 2007;29:182–91.
36. Wittink MN, Joo JH, Lewis LM, et al. Losing faith and using faith: older African Americans discuss spirituality, religious activities, and depression. *J Gen Intern Med.* 2009;24:402–7.
37. Cooper-Patrick L, Powe NR, Jenckes MW, et al. Identification of patient attitudes and preferences regarding treatment of depression. *J Gen Intern Med.* 1997;12:431–8.
38. Vargas Bustamante A, Fang H, Ortega A, et al. Understanding observed and unobserved health care access and utilization disparities among us Latino adults. *MCCR.* 2009;66:561–77.
39. MEPS HC-105: 2006 full year consolidated data file. Rockville, MD: Agency for Healthcare Research and Quality; 2008. Available at: http://www.meps.ahrq.gov/mepsweb/data_stats/download_data/pufs/h105/h105doc.pdf. Accessed 29 June 2009.
40. Cook B, Thomas G, McGuire TG, Lock K, Zaslavsky AM. Comparing methods of racial and ethnic disparities measurement across different settings of mental health care. *HSR (Health Serv Res).* 2010;45(3):825–47.
41. Han E, Liu G. Racial disparities in prescription drug use for mental illness among population in US. *J Ment Health Policy Econ.* 2005;8:131–43.
42. Andersen R. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav.* 1995;36:1–10.
43. Blinder AS. Wage discrimination: reduced form and structural estimates. *J Hum Resour.* 1973;8:436–55.
44. Oaxaca R. Male–female wage differentials in urban labor markets. *Int Econ Rev.* 1973;14:693–709.
45. Fairlie R. An extension of the Blinder-Oaxaca decomposition technique to logit and probit models. *J Econ Soc Meas.* 2005;10:305–16.
46. American Psychological Association. The Mental Health Needs of Immigrants. 2009. Available at: <http://www.apa.org/ppo/ethnic/immigranthealth.html>. Accessed 10 July 2009.
47. Fiscella K, Franks P, Doescher MP, et al. Disparities in health care by race, ethnicity, and language among the insured: findings from a national sample. *Med Care.* 2002;40:52–9.
48. Jerant A, Arellanes R, Franks P. Health status among US Hispanics: ethnic variation, nativity, and language moderation. *Med Care.* 2008;46:709–17.
49. Cheng E, Chen A, Cunningham W. Primary language and receipt of recommended health care among Hispanics in the United States. *J Gen Intern Med.* 2007;22:283–8.
50. Flores G. Language barriers to health care in the United States. *N Engl J Med.* 2006;355:229–31.
51. Sue S, Zane N, Young K. Research on psychotherapy with culturally diverse populations. In: Bergin AE, Garfield SL, editors. *Handbook of psychotherapy and behavior change.* 4th ed. New York: Wiley; 1994. p. 783–820.
52. Sussman L, Robins L, Earls F. Treatment-seeking for depression by Black and White Americans. *Soc Sci Med.* 1987;24:187–96.
53. Williams DR, Gonzalez HM, Neighbors H. Prevalence and distribution of major depressive disorder in African Americans, Caribbean blacks, and non-Hispanic whites: results from the National Survey of American life. *Arch Gen Psychiatry.* 2007;64:305–15.
54. Zhang A, Snowden L, Sue S. Differences between Asian and White Americans' help seeking and utilization patterns in the Los Angeles area. *J Commun Psychol.* 1998;26:317–26.
55. Beiser M. The health of immigrants and refugees in Canada. *Can J Public Health.* 2005;96:S30–44.
56. Hovey J. Acculturative Stress, depression, and suicidal ideation in Mexican immigrants. *Cultur Divers Ethnic Minor Psychol.* 2000;6:134–51.
57. Corbie-Smith G, Flagg EW, Doyle JP, et al. Influence of usual source of care on differences by race/ethnicity in receipt of preventive services. *J Gen Intern Med.* 2002;17:458–64.
58. Weinick RM, Jacobs EA, Stone LC, et al. Hispanic healthcare disparities: challenging the myth of a monolithic Hispanic population. *Med Care.* 2004;42:313–20.
59. Chen J, Rizzo J. Racial and ethnic disparities in psychotherapy services—evidence from US national survey data. *Psychiatr Serv.* 2010;61:364–72.
60. Chen J, Rizzo J. Racial and ethnic disparities in antidepressant drug use. *J Ment Health Policy Econ.* 2008;11:155–65.
61. Census Bureau. Race and Hispanic origin of the foreign-born population in the US: 2007. 2010. Available at: <http://www.census.gov/prod/2010pubs/acs-11.pdf>. Accessed 1 Aug 2010.