Access to and Use of Health Services Among Undocumented Mexican Immigrants in a US Urban Area

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Objectives. We assessed access to and use of health services among Mexican-born undocumented immigrants living in New York City in 2004.

Methods. We used venue-based sampling to recruit participants from locations where undocumented immigrants were likely to congregate. Participants were 18 years or older, born in Mexico, and current residents of New York City. The main outcome measures were health insurance coverage, access to a regular health care provider, and emergency department care.

Results. In multivariable models, living in a residence with fewer other adults, linguistic acculturation, higher levels of formal income, higher levels of social support, and poor health were associated with health insurance coverage. Female gender, fewer children, arrival before 1997, higher levels of formal income, health insurance coverage, greater social support, and not reporting discrimination were associated with access to a regular health care provider. Higher levels of education, higher levels of formal income, and poor health were associated with emergency department care.

Conclusions. Absent large-scale political solutions to the challenges of undocumented immigrants, policies that address factors shown to limit access to care may improve health among this growing population. (*Am J Public Health.* 2008;98:2011–2020. doi:10.2105/AJPH.2006.096222)

Between 1990 and 2000, the United States attracted almost one third of the world's immigrants, and the total number of foreign-born residents in the United States increased by 57%.[1,2] Contributing to the overall increase in the foreign-born population has been a rapid rise in the number of undocumented immigrants living in the United States. Since the mid-1990s, more undocumented than legal immigrants have arrived each year.[3] These trends hold true for people arriving from Mexico, the leading country of birth among foreign-born residents of the United States. As of March 2004, approximately one half of Mexicans living in the United States were undocumented, accounting for 5.9 million (57%) of the 10.3 million undocumented immigrants estimated to be living in the United States.[3]

Identifying and studying undocumented immigrants is so challenging that a paucity of evidence exists about the health status of undocumented immigrants in the United States.[4] The best available evidence suggests that undocumented immigrants may represent a vulnerable population at higher risk for disease and injury than either documented immigrants or native-born US citizens.[1,5–16] Yet, despite early recognition of the potential vulnerability of undocumented immigrants and their rapidly increasing prevalence in the United States, the determinants of access to and use of health services in this group remain poorly understood.[17,18] Most research about access to health services among undocumented immigrants has used samples of immigrants of diverse origins and of varying immigration status; although these studies generally find that the legal status of undocumented immigrants is an important barrier to accessing health services,[6,17,19,20] little is known about the demographic, economic, social, and health-related determinants of access to and use of health services by undocumented immigrants.

We assessed the determinants of access to and use of health services among undocumented Mexican immigrants living in New York City, where the Mexican foreign-born population increased by 275% between 1990 and 2000.[21] The Behavioral Model for Vulnerable Populations[22] was used as a theoretical framework for our hypothesis that the likelihood of health insurance coverage, access to a regular health care provider, and emergency department care among undocumented immigrants living in New York City is shaped by a hierarchy of predisposing characteristics. These characteristics include temporally distal determinants such as sociodemographic factors (e.g., education) and immigration factors (e.g., year of entry into the United States) and are likely to influence access to health services through more proximal enabling (e.g., income) and health-need characteristics.

METHODS

Sample

The sampling frame consisted of adults (18 years or older) from all 5 boroughs of New York City who reported being born in Mexico. Participants were recruited in communities with large populations of Mexican immigrants. Venues were selected by a 2-step procedure. First, we used US Census data to identify the 12 neighborhoods in the city, as defined by the New York City Department of City Planning, with the highest concentrations of Mexican immigrants.[2,21] Second, we conducted at least 2 walk-throughs of all streets in each of the 12 neighborhoods on different days and at different times of day to identify neighborhood venues with heavy volumes of foot traffic that might prove amenable to conducting interviews.

Outreach workers trained in data collection recruited participants between October 8 and December 5, 2004, with street outreach techniques common in research involving immigrant populations[6,23–25] and other hard-to-reach populations.[26,27] Participants qualified for the study if they reported being 18 years or older, born in Mexico, and current residents of New York City.

TABLE 1—Sample Characteristics and Bivariate Associations Between Covariates of Interest and Prevalence of Access to Insurance and Regular Providers and Receipt of Care in an Emergency Department Among Undocumented Immigrants Born in Mexico: New York City, 2004

		Access to Health Insurance		Access to a Regular Provider		Receipt of Care in an Emergency Department	
	Total Sample, No. (%)	%	P	%	P	%	P
Total	431 (100.0)	10.5		36.5		13.0	
Age, y			.22		.24		.37
18–24	104 (24.2)	12.8		36.9		13.9	
25–34	177 (41.2)	9.1		38.9		9.7	
35–44	112 (26.0)	8.0		29.4		16.4	
>44	37 (8.6)	18.9		46.0		16.2	
Gender			<.01		<.01		.04
Men	299 (69.7)	7.7		28.4		10.9	
Women	130 (30.3)	17.5		54.3		18.1	
Education			.84		.90		<.01
Less than high school	358 (83.1)	10.2		36.9		12.5	
High school or GED	43 (10.0)	11.6		34.9		4.9	
At least some college	30 (7.0)	13.3		33.3		30.0	
Marital status			.60		.76		.90
Single	177 (41.1)	10.9		38.5		12.1	
Married	218 (50.6)	11.1		34.9		13.6	
Divorced/separated/widowed/other	36 (8.4)	5.6		36.1		13.9	
Children, no.			.17		.11		.71
None	141 (33.2)	11.3		38.6		15.0	
1	64 (15.1)	17.5		48.4		14.8	
2	95 (22.4)	7.4		35.1		11.7	
3	63 (14.8)	11.3		25.8		14.5	
>3	62 (14.6)	4.9		32.8		8.2	
Other adults in the residence, no.			<.01		.01		.73
1–2	100 (23.6)	21.0		52.0		15.0	
3	80 (18.9)	8.9		60.8		15.2	
4	96 (22.7)	8.4		61.7		11.7	
>4	147 (34.8)	5.5		72.6		11.1	
Year immigrated to United States			.01		<.01		.02
1997–2004	276 (66.0)	8.1		29.2		10.0	
1970–1996	142 (34.0)	16.2		48.6		18.3	
Linguistic acculturation/preference level[a]			<.01		.76		.80
Low	106 (26.8)	16.4		36.9		13.7	
Moderate	160 (40.5)	4.4		34.2		14.5	
High	129 (32.7)	13.2		38.3		11.8	
Social acculturation/preference level[a]			.74		.52		.57
Low	172 (43.7)	9.4		34.1		11.8	
Moderate	106 (26.9)	11.4		41.0		15.7	
High	116 (29.4)	12.2		36.0		15.5	
Total formal income in past year,[b] $			<.01		.01		.12
None	246 (57.1)	7.0		29.6		11.5	
1–10 000	70 (16.2)	15.9		49.3		9.0	
10 001–20 000	34 (7.9)	17.7		50.0		26.5	
>20 000	17 (3.9)	29.4		41.2		17.7	
Legal income not reported	64 (14.8)	9.4		40.3		14.3	

Continued

Twenty-minute interviews were conducted in either English or Spanish by trained and supervised interviewers who used translated and back-translated structured questionnaires. Fewer than 2% of interviews were conducted in English.

Measures

Predisposing factors, defined as characteristics that incline people to use health services, included sociodemographic characteristics and immigration factors. Sociodemographic characteristics included age, gender, educational attainment, marital status, number of children, and number of other adults living at the current residence. We inquired about the respondents' legal status and the year they first entered the United States and dichotomized year of entry as before or after January 1, 1997, to reflect relevant changes in US legislation.[10] We assessed levels of acculturation with a modified version of the 12-item Welfare Reform Baseline Interview acculturation module, developed for use among Hispanic populations.[28] Linguistic acculturation was assessed by 7 of the 8 items that asked about the preference for other languages as compared with English (e.g., "What language do you usually speak with friends?"). The item on "language spoken" was excluded because it lacked variability. We assessed social acculturation with the 4 items that asked about preference for Mexican, Latino, or Hispanic groups as compared with other groups in a variety of social contexts (e.g., "Your close friends are . . .?"). The Cronbach alpha for items used in both scales was 0.92. The linguistic and social acculturation scores were summed and divided into thirds for analysis.

Enabling factors, defined as characteristics that enable or impede use of health services, were measured by asking respondents about their economic and social resources. Respondents reported income earned in the formal economy (i.e., reported and taxed income, including public assistance) and in the informal economy (i.e., nonreported and nontaxed income). For the analysis, we categorized both formal and informal income as none, $1 to $10 000, $10 001 to $20 000, more than

TABLE 1—*Continued*

Total informal income in past year,[c] $			.03		.01		.44
None	112 (26.0)	12.6		47.3		10.8	
1–10 000	135 (31.3)	13.5		34.6		14.6	
10 001–20 000	69 (16.0)	2.9		21.7		8.7	
>20 000	22 (5.1)	22.7		40.9		9.1	
Informal income not reported	93 (21.6)	6.5		36.3		17.4	
Health insurance coverage in past 6 months					<.01		.05
No	382 (89.5)			32.5		11.9	
Yes	45 (10.5)			68.9		22.2	
Day labor employment in past 6 months			.01		<.01		.45
Yes	103 (23.9)	3.9		18.6		10.8	
No	328 (76.1)	12.7		42.1		13.7	
Money sent to family/friends in Mexico			<.01		.03		.74
No	64 (14.9)	20.6		49.2		14.3	
Yes	366 (85.1)	8.8		39.5		12.8	
Social support			.02		.01		<.01
Low	150 (36.7)	6.1		30.6		10.3	
Medium	137 (33.5)	8.9		33.6		8.8	
High	122 (29.8)	16.4		47.5		20.7	
Discrimination experienced[d]			.48		.02		.64
No discrimination	171 (40.6)	13.0		42.9		13.0	
Race	52 (12.4)	9.6		35.3		9.8	
Language	106 (25.2)	7.6		24.8		11.5	
Immigrant status	67 (15.9)	7.6		43.3		16.9	
Other	25 (5.9)	16.0		24.0		20.0	
No. of days activities were limited by poor health in past 30 days			.06		.55		<.01
0	333 (78.7)	9.1		35.1		10.7	
1–5	47 (11.1)	10.6		42.6		10.9	
>5	43 (10.2)	20.9		39.5		32.6	

Note. GED = general educational development.
[a]Assessed with a modified version of the 12-item Welfare Reform Baseline Interview acculturation module.[28]
[b]Formal income is all reported and taxed income, including public assistance.
[c]Informal income is all nonreported and nontaxed income.
[d]Respondents were asked whether they experienced discrimination and, if so, what form most affected their lives.

$20 000, or missing (not reported). We also asked respondents if they had access to health insurance of any sort in the past 6 months, if they had worked as day laborers in the past 6 months, and if they sent money to family or friends in Mexico. To evaluate social support, we asked about emotional (e.g., "someone to love you and make you feel wanted"), instrumental (e.g., "someone to help you if you were confined to bed"), and appraisal (e.g., "someone to give you good advice in a crisis") support in the past 6 months.[29] We summed responses and divided the combined social support score into thirds for analysis. Respondents were asked if they had ever been discriminated against, prevented from doing something, hassled, or made to feel inferior because of age, race, language, immigrant status, gender, sexual orientation, poverty, drug use, having been in jail or prison, religion, mental illness, physical illness or disability, or other reason. We asked respondents to identify the form of discrimination that most affected their life and categorized this as either none or discrimination relating to race, language, immigrant status, or other.

Need factors were used to evaluate respondents' health. We assessed respondents' health status by asking about the number of days that poor physical or mental health limited usual activities in the past 30 days.[30–32] Health status was categorized as 0 days, 1 to 5 days, or more than 5 days for the analysis.

Access to and use of health services was measured by 3 variables. We assessed respondents' insurance coverage by asking if they had health insurance coverage of any sort during the past 6 months. We assessed access to a regular health care provider by asking respondents if they usually went to a doctor's office or clinic, Medicaid or health maintenance organization (HMO), emergency department in a hospital, drug treatment center, nowhere, or other location for medical care. We considered respondents as having access to a regular health care provider if they reported going to a doctor's office or clinic, Medicaid or HMO, emergency department in a hospital, or drug treatment center and seeing the same doctor, nurse, or physician's assistant more than 90% of the time. Respondents were also asked if they had been seen or received care in an emergency department during the past 6 months.

Statistical Analyses

We calculated the overall prevalence and the prevalence according to the covariates of interest of our outcome measures (i.e., insurance coverage in the past 6 months, access to a regular provider, and emergency department care in the past 6 months) and used the 2-tailed χ^2 test to test for bivariate associations.

In multivariable analyses, we developed a series of 3 multivariable logistic regression models for each outcome variable. In the first model, we regressed the outcome variable on predisposing characteristics, in the second model we regressed the dependent variable on predisposing and enabling characteristics, and in the third model we regressed the dependent variable on predisposing, enabling, and need characteristics. This modeling approach allowed for the estimation of overall, adjusted, and direct associations between predisposing, enabling, and need characteristics and our measures of access to and use of health services.[33] For parsimony and to avoid unstable estimates, only variables statistically associated ($P \leq .10$) with a particular outcome variable were retained in subsequent models.[33]

TABLE 2—Multivariable Associations Between Variables of Interest and Access to Insurance Among Undocumented Immigrants Born in Mexico: New York City, 2004

	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)
	Predisposing characteristics		
Age, y			
18–24 (Ref)	1.00	...	...
25–34	0.73 (0.24, 2.16)	...	...
35–44	0.52 (0.14, 1.96)	...	...
>44	1.35 (0.28, 6.60)	...	...
Gender			
Men (Ref)	1.00	...	...
Women	1.97 (0.83, 4.70)	...	...
Education			
Less then high school (Ref)	1.00	...	...
High school or GED	0.54 (0.13, 2.34)	...	...
At least some college	1.25 (0.32, 4.87)	...	...
Marital status			
Single (Ref)	1.00	...	...
Married	1.69 (0.66, 4.31)	...	...
Divorced/separated/widowed/other	0.89 (0.16, 5.17)	...	
Children, no.			
None (Ref)	1.00	1.00	1.00
1	0.86 (0.26, 2.79)	0.79 (0.24, 2.62)	0.83 (0.26, 2.70)
2	0.28 (0.07, 1.10)	0.35 (0.11, 1.18)	0.44 (0.13, 1.46)
3	0.44 (0.11, 1.76)	0.55 (0.16, 1.93)	0.77 (0.24, 2.44)
>3	0.27 (0.05, 1.40)	0.22 (0.05, 1.08)	0.41 (0.10, 1.67)
Other adults in the residence, no.			
1–2 (Ref)	1.00	1.00	1.00
3	0.32 (0.10, 1.05)	0.41 (0.13, 1.30)	0.44 (0.15, 1.30)
4	0.35 (0.12, 1.04)	0.28 (0.08, 0.94)	0.38 (0.12, 1.20)
>4	0.31 (0.11, 0.86)	0.40 (0.13, 1.20)	0.29 (0.10, 0.82)
Year immigrated to United States			
1997–2004 (Ref)	1.00	1.00	...
1970–1996	2.88 (1.18, 7.03)	2.02 (0.79, 5.19)	...
Linguistic acculturation/preference level[a]			
Low (Ref)	1.00	1.00	1.00
Moderate	0.22 (0.08, 0.64)	0.20 (0.06, 0.60)	0.20 (0.07, 0.58)
High	0.58 (0.22, 1.56)	0.55 (0.19, 1.59)	0.53 (0.20, 1.4)
Social acculturation/preference level[a]			
Low (Ref)	1.00	...	...
Moderate	1.24 (0.44, 3.49)	...	...
High	1.09 (0.42, 2.81)	...	...
	Enabling characteristics		
Total formal income in past year,[b] $			
None (Ref)	...	1.00	1.00
1–10 000	...	2.21 (0.66, 7.43)	2.33 (0.76, 7.18)
10 001–20 000	...	3.25 (0.91, 11.64)	4.51 (1.30, 15.67)
>20 000	...	3.82 (0.69, 21.25)	6.20 (1.27, 30.38)
Legal income not reported	...	4.58 (1.11, 18.96)	2.43 (0.73, 8.06)
Total informal income past year,[c] $			
None (Ref)	...	1.00	...
1–10 000	...	1.38 (0.48, 4.00)	...

Continued

RESULTS

Sample Characteristics

We recruited 505 persons for this study. All analyses were restricted to the 431 respondents who were undocumented immigrants (based on self-report of legal status); their characteristics are shown in Table 1. The mean age was 31.7 years, 30.3% were women, 83.1% reported "less than high school" as the highest level of education completed, 50.5% were married, 66.8% had at least 1 child, and 76.4% reported that they lived in a residence with more than 2 other adults. The median year of entry into the United States was 1999.

A majority of respondents (57.1%) reported that they earned no formal income in the past year, 52.4% earned informal income in the past year, 23.9% worked as a day laborer in the past 6 months, and 85.1% sent money to family or friends in Mexico. A majority (59.4%) also reported that they experienced some form of discrimination, with 25.2% identifying language discrimination as most affecting their life. Approximately one tenth of respondents reported that poor physical or mental health limited their usual activities for more than 5 of the past 30 days (10.2%) or that they had health insurance coverage in the past 6 months (10.5%). Slightly more than one third of respondents (36.5%) reported access to a regular provider, and 13.0% received emergency department care in the past 6 months.

Bivariate Analyses

In bivariate analyses (Table 1), health insurance coverage in the past 6 months was associated with being a woman ($P<.01$), living in a residence with fewer other adults ($P<.01$), earlier year of entry to the United States ($P=.01$), levels of linguistic acculturation ($P<.01$), higher levels of formal ($P<.01$) and informal ($P=.03$) income in the past year, not working as a day laborer in the past 6 months ($P=.01$), not sending money to family or friends in Mexico ($P<.01$), and higher levels of social support ($P=.02$).

Women ($P<.01$) and respondents who reported living in a residence with more other adults ($P=.01$), an earlier year of entry to

TABLE 2—*Continued*

10 001–20 000	. . .	0.35 (0.06, 1.97)	. . .
> 20 000	. . .	0.96 (0.15, 6.36)	. . .
Informal income not reported	. . .	0.59 (0.14, 2.42)	. . .
Day labor employment in past 6 months			
Yes (Ref)	. . .	1.00	. . .
No	. . .	2.27 (0.57, 9.04)	. . .
Money sent to family/friends in Mexico			
No (Ref)	. . .	1.00	1.00
Yes	. . .	0.39 (0.15, 1.05)	0.40 (0.16, 1.01)
Social support			
Low (Ref)	. . .	1.00	1.00
Medium	. . .	2.20 (0.69, 7.05)	2.26 (0.77, 6.66)
High	. . .	2.68 (0.88, 8.11)	3.57 (1.25, 10.21)
Discrimination experienced[d]			
No discrimination (Ref)	. . .	1.00	. . .
Race	. . .	0.72 (0.18, 2.86)	. . .
Language	. . .	0.92 (0.30, 2.82)	. . .
Immigrant status	. . .	0.58 (0.15, 2.24)	. . .
Other	. . .	0.92 (0.14, 5.89)	. . .
Health need			
No. of days activities were limited by poor health in past 30 days			
0 (Ref)	. . .	. . .	1.00
1–5	. . .	. . .	1.05 (0.27, 4.19)
> 5	. . .	. . .	4.54 (1.50, 13.74)

Note. OR = odds ratio; CI = confidence interval; GED = general educational development. Model 1 regressed the outcome variable on predisposing characteristics. Model 2 regressed the depend variable on predisposing and enabling characteristics. Model 3 regressed the dependent variable on predisposing, enabling, and need characteristics. Predisposing characteristics incline people to use health services, enabling characteristics enable or impede use of health services, and need characteristics identify need for health care.

[a]Assessed with a modified version of the 12-item Welfare Reform Baseline Interview acculturation module.[28]

[b]Formal income is all reported and taxed income, including public assistance.

[c]Informal income is all nonreported and nontaxed income.

[d]Respondents were asked whether they experienced discrimination and, if so, what form most affected their lives.

the United States ($P<.01$), moderate levels of formal income in the past year ($P=.01$), no informal income in the past year ($P=.01$), health insurance coverage in the past 6 months ($P<.01$), not working as a day laborer in the past 6 months ($P<.01$), not sending money home to family or friends in Mexico ($P=.03$), a high level of social support ($P=.01$), and not experiencing discrimination or experiencing discrimination relating to immigrant status ($P=.02$) were more likely to report access to a regular health care provider (Table 1).

Emergency department care during the past 6 months was more common among women ($P=.04$) and those who reported a higher level of educational attainment ($P<.01$), an earlier year of entry into the United States ($P=.02$), health insurance coverage in the past 6 months ($P=.05$), higher levels of social support ($P<.01$), and poor physical or mental health that limited their usual activities for more than 5 of the past 30 days ($P<.01$).

Multivariable Analyses

In multivariable models (Table 2), health insurance coverage during the past 6 months was associated with living in a residence with fewer other adults (odds ratio [OR] = 0.29 for more than 4 adults compared with 1–2 adults; 95% confidence interval [CI] = 0.10, 0.82), linguistic acculturation (OR = 0.20 for moderate levels compared with the lowest levels; 95% CI = 0.07, 0.58), high levels of formal income earned in the past year (OR = 6.20 for more than $20 000 compared with no formal income; 95% CI = 1.27, 30.38), not sending money to family or friends in Mexico (OR = 0.40 for those who sent money; 95% CI = 0.16, 1.01), higher levels of social support (OR = 3.57 compared with the lowest levels; 95% CI = 1.25, 10.21), and more days in which health limited usual activities in the past 30 days (OR = 4.54 comparing more than 5 days with 0 days; 95% CI = 1.50, 13.74).

In multivariable models (Table 3), having a regular health care provider was associated with being a woman (OR = 2.96; 95% CI = 1.69, 5.16), having fewer children (OR = 0.37 for 3 children compared with none; 95% CI = 0.16, 0.82), entering the United States to live before 1997 (OR = 2.35; 95% CI = 1.33, 4.13), low levels of formal income in the past year (OR = 2.18 for $1–$10 000 compared with no formal income; 95% CI = 1.07, 4.45), health insurance coverage in the past 6 months (OR = 2.96; 95% CI = 1.34, 6.55), and not experiencing discrimination (OR = 0.51 for those who reported discrimination relating to language; 95% CI = 0.27, 0.98).

In multivariable models (Table 4), emergency department care in the past 6 months was associated with higher educational attainment (OR = 3.01 for those who reported at least some college education compared with those who had less than a high school education; 95% CI = 1.20, 7.53), moderate levels of formal income in the past year (OR = 4.12 for $10 001–$20 000 compared with no formal income; 95% CI = 1.54, 11.00), and more days in which health limited usual activities in the past 30 days (OR = 4.75 for more than 5 days compared with 0 days; 95% CI = 2.14, 10.59).

DISCUSSION

Predisposing Characteristics

Social and family networks may be key determinants of access to and use of health services among undocumented immigrants living in urban areas. We found that women were almost 3 times as likely as men to report access to a regular health care provider.

TABLE 3—Multivariable Associations Between Variables of Interest and Access to a Regular Provider Among Undocumented Immigrants Born in Mexico in New York City, 2004

	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)
	Predisposing characteristics		
Age, y			
18–24 (Ref)	1.00	. . .	. . .
25–34	0.91 (0.45, 1.80)	. . .	. . .
35–44	0.66 (0.29, 1.54)	. . .	. . .
>44	1.02 (0.33, 3.14)	. . .	. . .
Gender			
Men (Ref)	1.00	1.00	1.00
Women	3.29 (1.85, 5.85)	3.17 (1.68, 5.97)	2.96 (1.69, 5.16)
Education			
Less then high school (Ref)	1.00	. . .	. . .
High school or GED	0.61 (0.25, 1.49)	. . .	. . .
At least some college	0.46 (0.17, 1.25)	. . .	. . .
Marital status			
Single (Ref)	1.00	. . .	. . .
Married	1.02 (0.55, 1.92)	. . .	. . .
Divorced/separated/widowed/other	0.86 (0.31, 2.40)	. . .	. . .
Children, no.			
None (Ref)	1.00	1.00	1.00
1	0.94 (0.41, 2.15)	1.05 (0.48, 2.29)	1.08 (0.51, 2.30)
2	0.46 (0.20, 1.06)	0.81 (0.41, 1.61)	0.73 (0.37, 1.43)
3	0.21 (0.08, 0.56)	0.37 (0.16, 0.87)	0.37 (0.16, 0.82)
>3	0.54 (0.21, 1.42)	0.64 (0.28, 1.48)	0.60 (0.27, 1.35)
Other adults in the residence, no.			
1–2 (Ref)	1.00	1.00	1.00
3	0.66 (0.31, 1.40)	0.71 (0.33, 1.53)	0.84 (0.40, 1.79)
4	0.62 (0.29, 1.29)	0.83 (0.40, 1.73)	0.84 (0.41, 1.71)
>4	0.44 (0.23, 0.86)	0.55 (0.27, 1.10)	0.65 (0.33, 1.27)
Year immigrated to United States			
1997–2004 (Ref)	1.00	1.00	1.00
1970–1996	2.35 (1.30, 4.26)	2.20 (1.23, 3.93)	2.35 (1.33, 4.13)
Linguistic acculturation/preference level[a]			
Low (Ref)	1.00	. . .	. . .
Moderate	1.16 (0.60, 2.24)	. . .	. . .
High	1.64 (0.81, 3.35)	. . .	. . .
Social acculturation/preference level[a]		. . .	. . .
Low (Ref)	1.00	. . .	. . .
Moderate	1.33 (0.72, 2.45)	. . .	. . .
High	0.85 (0.46, 1.57)	. . .	. . .
	Enabling characteristics		
Total formal income in past year,[b] $			
None (Ref)	. . .	1.00	1.00
1–10 000	. . .	1.83 (0.88, 3.83)	2.18 (1.07, 4.45)
10 001–20 000	. . .	1.94 (0.79, 4.77)	2.33 (0.97, 5.58)
>20 000	. . .	0.66 (0.17, 2.61)	0.76 (0.19, 2.95)
Legal income not reported	. . .	2.49 (1.05, 5.92)	2.02 (0.92, 4.43)
Total informal income in past year,[c] $			
None (Ref)	. . .	1.00	1.00
1–10 000	. . .	0.51 (0.26, 1.03)	0.63 (0.33, 1.21)

Continued

Although it is possible that women's needs for obstetric and gynecologic services may drive some of their greater likelihood of reporting access to a regular provider,[17] evidence suggests that male Mexican immigrants living in New York City are joined by their spouses and children after first establishing themselves,[21] a trend that has been observed more generally among Mexican immigrants to the United States.[34] Therefore, it is possible that more women than men in our sample had the social and economic resources and the attendant stability that may be important to accessing health services. By contrast, research suggests that Mexican immigrants, particularly men who have recently immigrated to the United States, are more likely to live with extended kin and unrelated persons than are US-born Mexican Americans, possibly as a practical solution to changing levels of acculturation, resources, and the need for privacy over the life course.[35,36]

Predisposing characteristics predicted access to and use of health services even after accounting for enabling and need characteristics, including financial and social resources, implying that other mechanisms may be operating here. One potential pathway linking predisposing characteristics to access to and use of health services may be the ability to navigate the convoluted US healthcare system. Our finding that respondents arriving in the United States before 1997 were more likely to report access to a regular health care provider is consistent with previous work that showed that access to health services generally improves with increased time of residence in the United States.[17]

Access to health services among undocumented immigrants may improve with increased time of residence because of increased integration and improved familiarity with the US healthcare system over time. However, our findings may also reflect changes in legislation in the past decade. In 1996, the United States passed legislation that further restricted the provision of many publicly funded services to undocumented immigrants, making it perhaps even more difficult to obtain health services than it was before the legislation.[9,10,18]

TABLE 3—*Continued*

10 001–20 000	...	0.48 (0.21, 1.14)	0.61 (0.27, 1.39)
>20 000	...	0.60 (0.19, 1.93)	0.73 (0.24, 2.28)
Informal income not reported	...	0.48 (0.21, 1.12)	0.56 (0.25, 1.22)
Health insurance coverage in past 6 months			
No (Ref)	...	1.00	1.00
Yes	...	2.34 (1.04, 5.26)	2.96 (1.34, 6.55)
Day labor employment in past 6 months			
Yes (Ref)	...	1.00	
No	...	1.61 (0.82, 3.17)	
Money sent to family/friends in Mexico			
No (Ref)	...	1.00	...
Yes	...	1.39 (0.63, 3.05)	...
Social support			
Low (Ref)	...	1.00	...
Medium	...	1.02 (0.54, 1.92)	...
High	...	1.56 (0.82, 2.98)	...
Discrimination experienced[d]			
No discrimination (Ref)	...	1.00	1.00
Race	...	0.94 (0.43, 2.10)	0.82 (0.37, 1.81)
Language	...	0.56 (0.29, 1.09)	0.51 (0.27, 0.98)
Immigrant status	...	1.02 (0.49, 2.12)	1.01 (0.49, 2.09)
Other	...	0.26 (0.07, 0.93)	0.46 (0.14, 1.51)
Health need			
No. of days activities were limited by poor health in past 30 days			
0 (Ref)	...	...	1.00
1–5	...	...	1.48 (0.68, 3.22)
>5	...	...	1.16 (0.51, 2.60)

Note. OR = odds ratio; CI = confidence interval; GED = general educational development. Model 1 regressed the outcome variable on predisposing characteristics. Model 2 regressed the depend variable on predisposing and enabling characteristics. Model 3 regressed the dependent variable on predisposing, enabling, and need characteristics. Predisposing characteristics incline people to use health services, enabling characteristics enable or impede use of health services, and need characteristics identify need for health care.

[a]Assessed with a modified version of the 12-item Welfare Reform Baseline Interview acculturation module.[28]

[b]Formal income is all reported and taxed income, including public assistance.

[c]Informal income is all nonreported and nontaxed income.

[d]Respondents were asked whether they experienced discrimination and, if so, what form most affected their lives.

We found that respondents who completed at least some college were more likely to receive care in an emergency department in the past 6 months than were respondents with less than a high school education. This observation may reflect greater knowledge about the US healthcare system and the types of health services available among better-educated undocumented immigrants.[10] Previous work suggests that limited English proficiency and lower levels of acculturation may limit access to health services among immigrants.[9,37] Our results did not confirm these findings. However, it is important to emphasize that our analysis focused exclusively on undocumented immigrants, among whom there may be substantially less heterogeneity in acculturation levels than in samples that include documented and undocumented immigrants.

Enabling Characteristics

Our findings suggest that personal resources, including financial and social resources, are important determinants of health insurance coverage and access to a regular provider among undocumented Mexican immigrants, even after accounting for differences in health need. This finding parallels past studies that showed that socioeconomic factors are important determinants of health care use among immigrants[19] and Hispanics[38] in general.

We observed a positive dose–response relationship between the total formal income earned in the past year and the likelihood of reporting health insurance coverage in the past 6 months. Those earning more than $20 000 per year in formal income were more than 6 times as likely to report access to health insurance as those earning no formal income in the past year. We also found that health insurance was the most important predictor of reporting access to a regular provider, a finding also consistent with prior work.[39] By contrast, respondents sending remittances to family and friends in Mexico were less likely to report health insurance coverage, and those earning more informal income were not any more likely to report health insurance coverage or access to a regular health care provider than were those who earned less informal income. Together, these results suggest that undocumented immigrants' financial resources, and specifically their capacity to obtain formal employment, may be central determinants of their access to health services and likely of their health status overall.

Perhaps not surprisingly, delays in seeking care may be related to fears of discovery by government officials. Thus, undocumented immigrants' anxieties about obtaining care may represent a significant barrier to accessing health services in this group[18,40]; this previously was shown among undocumented immigrants with tuberculosis.[15] Although we did not specifically ask about respondents' fears about obtaining services, we found that those with more social support were more likely to report access to health services. Undocumented immigrants with more social resources may be more attuned to the risks involved in accessing specific health services and more likely to overcome the fear associated with such attempts at access. By contrast, those experiencing social insults, such as discrimination, may be less likely to access health services. In our sample, respondents experiencing discrimination with respect to language were less likely to report access to a

TABLE 4—Multivariable Associations Between Variables of Interest and Receipt of Care in an Emergency Department Among Undocumented Immigrants Born in Mexico: New York City, 2004

	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)
Predisposing characteristics			
Age, y			
18–24 (Ref)	1.00	...	...
25–34	0.94 (0.37, 2.43)	...	...
35–44	1.26 (0.43, 3.70)	...	...
>44	1.34 (0.32, 5.60)	...	...
Gender			
Men (Ref)	1.00	1.00	...
Women	1.87 (0.90, 3.87)	1.79 (0.78, 4.11)	...
Education			
Less then high school (Ref)	1.00	1.00	1.00
High school or GED	0.43 (0.09, 1.99)	0.13 (0.02, 1.03)	0.35 (0.08, 1.57)
At least some college	2.40 (0.88, 6.50)	2.03 (0.78, 5.28)	3.01 (1.20, 7.53)
Marital status			
Single (Ref)	1.00	...	...
Married	1.36 (0.60, 3.08)	...	...
Divorced/separated/widowed/other	1.35 (0.38, 4.81)	...	...
Children, no.			
None (Ref)	1.00	1.00	1.00
1	0.69 (0.23, 2.02)	0.76 (0.27, 2.18)	0.94 (0.36, 2.45)
2	0.50 (0.16, 1.51)	0.52 (0.20, 1.38)	0.95 (0.41, 2.22)
3	0.56 (0.18, 1.78)	0.66 (0.24, 1.80)	0.90 (0.36, 2.24)
>3	0.29 (0.07, 1.10)	0.31 (0.09, 1.08)	0.55 (0.19, 1.64)
Other adults in the residence			
1–2 (Ref)	1.00	...	...
3	0.91 (0.34, 2.43)	...	...
4	0.94 (0.36, 2.45)	...	...
>4	0.93 (0.39, 2.23)	...	...
Year immigrated to United States			
1997–2004 (Ref)	1.00	1.00	...
1970–1996	2.15 (1.01, 4.58)	1.75 (0.82, 3.73)	...
Linguistic acculturation/preference level[a]			
Low (Ref)	1.00	...	...
Moderate	1.18 (2.76)	...	...
High	0.70 (1.86)	...	...
Social acculturation/preference level[a]			
Low (Ref)	1.00	...	...
Moderate	1.67 (0.74, 3.77)	...	...
High	1.33 (0.58, 3.03)	...	...
Enabling characteristics			
Total formal income in past year,[b] $			
None (Ref)	...	1.00	1.00
1–10 000	...	0.82 (0.29, 2.32)	0.83 (0.30, 2.28)
10 001–20 000	...	3.31 (1.17, 9.36)	4.12 (1.54, 11.00)
>20 000	...	2.28 (0.44, 11.77)	2.61 (0.60, 11.28)
Legal income not reported	...	0.77 (0.23, 2.51)	1.10 (0.42, 2.86)
Total informal income in past year,[c] $			
None (Ref)	...	1.00	1.00
1–10 000	...	1.55 (0.59, 4.04)	1.69 (0.70, 4.10)

Continued

regular health care provider than were those who did not experience discrimination, suggesting the profound need for linguistically appropriate health services.

Need Characteristics

Undocumented Mexicans in New York City with more health need were more likely to report health insurance coverage and emergency department care, but not access to a regular health care provider. This is consistent with previous research among Hispanics showing that greater health care need is associated with emergency services use.[38]

The dependence on emergency services to address health care needs among undocumented Mexicans, although understandable given the barriers to regular-care access, may exacerbate the burden of pathology in this group because care is delayed until illness is severe enough to warrant emergency care.[20]

Limitations

There were several limitations to this study. We used venue-based sampling to recruit participants and were unable to calculate a response rate. However, our sampling method may have provided a more representative sample than alternative methods such as telephone interviews. The fact that 85% of people recruited for this study were indeed undocumented immigrants suggests that we were successful in identifying areas where undocumented immigrants congregated and in recruiting undocumented immigrants to participate. Furthermore, the demographic profile of our sample was consistent with what is known about undocumented Mexican immigrants living in New York City.[21]

It is possible that undocumented immigrants may underreport key areas of concern. In anticipation of this possibility, we used in-person anonymous interviews that in past research have been shown to be an effective approach to establish the sort of trust necessary to inquire about sensitive topics, such as legal status, and elicit accurate responses.[18] In addition, the cross-sectional design of our survey did not capture temporal changes in the ability of

TABLE 4—*Continued*

10 001–20 000	...	0.75 (0.21, 2.63)	0.96 (0.30, 3.05)
> 20 000	...	1.09 (0.19, 6.22)	1.07 (0.19, 5.96)
Informal income not reported	...	2.79 (0.91, 8.49)	2.44 (0.90, 6.58)
Health insurance coverage in past 6 months			
No (Ref)	...	1.00	...
Yes	...	1.27 (0.49, 3.29)	...
Day laborer employment in past 6 months			
Yes (Ref)	...	1.00	...
No	...	0.78 (0.33, 1.85)	...
Money sent to family/friends in Mexico			
No (Ref)	...	1.00	...
Yes	...	0.86 (0.32, 2.28)	...
Social support			
Low (Ref)	...	1.00	...
Medium	...	0.61 (0.24, 1.55)	...
High	...	1.90 (0.83, 4.35)	...
Discrimination experienced[d]			
No discrimination (Ref)	...	1.00	...
Race	...	0.87 (0.28, 2.78)	...
Language	...	1.30 (0.53, 3.16)	...
Immigrant status	...	1.45 (0.53, 3.94)	...
Other	...	2.00 (0.58, 6.88)	...
	Health need		
No. of days activities were limited by poor health in past 30 days			
0 (Ref)	...	...	1.00
1–5	...	...	1.02 (0.35, 2.94)
> 5	...	...	4.75 (2.14, 10.59)

Note. OR = odds ratio; CI = confidence interval; GED = general educational development. Model 1 regressed the outcome variable on predisposing characteristics. Model 2 regressed the depend variable on predisposing and enabling characteristics. Model 3 regressed the dependent variable on predisposing, enabling, and need characteristics. Predisposing characteristics incline people to use health services, enabling characteristics enable or impede use of health services, and need characteristics identify need for health care.
[a]Assessed with a modified version of the 12-item Welfare Reform Baseline Interview acculturation module.[28]
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[d]Respondents were asked whether they experienced discrimination and, if so, what form most affected their lives.

undocumented immigrants to access health services. Prospective data are necessary to elucidate changes in the ability of undocumented immigrants to access health services over time.

Conclusions

There is substantial debate in US public discourse about how best to frame the issue of undocumented immigration and how best to respond to the challenges it entails. We showed that the use of health services in a sample of undocumented Mexican immigrants living in New York City was limited. Our data strongly suggest that greater ability to navigate the US health care system, greater access to social resources, and engagement of undocumented immigrants in the formal economy are associated with greater access to appropriate health services. Irrespective of political positions, the reality of millions of undocumented immigrants living in the United States suggests that it is imperative for us to understand the barriers to health care access among this group so that we may inform public discourse and develop effective interventions. ■

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Contributors

A. Nandi performed the data analysis and was the lead author. S. Galea, G. Lopez, S. Strongarone, and D. C. Ompad developed the research topic, designed the study, and supervised data collection. V. Nandi made significant contributions to the analysis. All authors helped to originate ideas, interpret findings, and review drafts of the article.

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Human Participant Protection

The study received institutional review board approval at the New York Academy of Medicine and New York University. All study participants provided oral consent during the interview. To preserve participants' anonymity, no identifying information was collected about participants.

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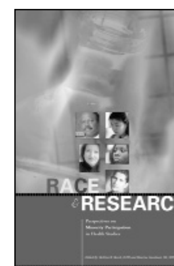
Race and Research

Perspectives on Minority Participation in Health Studies

Edited by Bettina Beech, DrPH, MPH, and Maurine Goodman, MA, MPH



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