Citizenship Status and Prevalence of Diagnosed and Undiagnosed Hypertension and Diabetes Among Adults in the U.S., 2011–2016

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In the U.S., racial and immigrant minorities are at increased risk for hypertension and diabetes mellitus (DM), with undiagnosed hypertension and DM notably higher among these groups (1,2). Noncitizen immigrants (e.g., temporary visa status, undocumented) encounter structural barriers to accessing health care as they are ineligible for health insurance, while at the same time they face multiple vulnerabilities (poverty, low wage jobs), which contribute to adverse health outcomes (3,4). Legal status, and specifically citizenship status, has been considered to be a social determinant of health (3). Citizenship status may be a critical driver of cardiovascular disease (CVD) disparities among immigrants, with noncitizens being especially vulnerable compared with either naturalized citizens or native-born citizens. However, differences between prevalence of diagnosed versus undiagnosed hypertension and DM by citizenship status remain unknown among a nationally representative sample of U.S. adults. The primary objective of the current study was to examine this issue.

We used serial cross-sectional data from the National Health and Nutrition Examination Survey (NHANES) for the current study. NHANES uses a complex, stratified, and multistage probability sampling design to obtain nationally representative estimates of the U.S. noninstitutionalized population. Participants aged <20 years old and adult participants aged ≥20 years old with incomplete data between 2011–2016 were excluded from this analysis, yielding a final sample of 15,201 adults.

Hypertension and DM were assessed using a combination of self-report and laboratory exam measures. Prevalent hypertension was defined as 1) diagnosed if participants were told by a health professional that they had hypertension/high blood pressure or 2) undiagnosed when a self-reported prior diagnosis was lacking but the participant had mean systolic blood pressure ≥140 mmHg or mean diastolic blood pressure ≥90 mmHg. Prevalent DM was defined as 1) diagnosed if the participant self-reported a diagnosis by a health professional or 2) undiagnosed when a self-reported prior diagnosis was lacking but the criteria for DM were met using hemoglobin A_{1c} levels ≥6.5% (≥48 mmol/mol). Country of birth was ascertained via participant self-report responses.

Stata version 14.0 (StataCorp) was used for analysis. NHANES sample weights were applied. We derived odds ratios (OR) from logistic regression models regressing total prevalent hypertension or DM (had a self-reported prior diagnosis and met cutoff criteria for high blood pressure or DM) by citizenship status and multinomial regression models regressing diagnosed and undiagnosed hypertension or DM by citizenship status. Statistical tests were two-sided and statistical significance was considered for $P < 0.05$.

In 2011–2016, a total of 37.3% of adults had hypertension (32.8% diagnosed and 4.5% undiagnosed) (Table 1). A total of 12.0% of U.S. adults had DM (10.0% diagnosed and 2.0% undiagnosed). The mean (SD) age was 47.5 (0.4) years, 52.1% were female, and 14.1% self-reported as Hispanic, 11.3% Non-Hispanic Black, and 8.2% as other in the population-weighted analysis.

For the total prevalence models (Table 1), associations for hypertension and DM, respectively, were nonsignificant for both naturalized citizens (OR 0.97 [95% CI 0.83, 1.14] and 1.04 [0.87, 1.24]) and noncitizens (0.90 [0.72, 1.11] and 0.98 [0.82, 1.17]). When compared with native-born citizens, the odds of undiagnosed hypertension were greater among both naturalized citizens (1.41 [1.01, 1.95]) and noncitizens (1.41 [0.98, 2.03]; $P = 0.07$) after multivariable adjustment. Furthermore, the odds of undiagnosed DM were elevated among both naturalized citizens (1.56 [1.18, 2.06]) and noncitizens (2.01 [1.43, 2.83]). In sum, naturalized citizens and noncitizens were more likely to be undiagnosed for hypertension and DM.

The results of this study underscore the importance of monitoring the prevalence of undiagnosed cardiometabolic conditions among naturalized citizens

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Table 1—Diagnosed or undiagnosed hypertension and DM by citizenship status among U.S. adults, $N = 15,201$

	Total ($N = 15,201$)	Native-born citizen ($N = 10,618$)	Naturalized citizen ($N = 2,381$)	Noncitizen ($N = 2,202$)	P value
Hypertension, N (population weighted %)					<0.001
No hypertension	8,946 (62.7)	5,993 (61.4)	1,386 (63.1)	1,567 (74.3)	
Diagnosed hypertension	5,539 (32.8)	4,190 (34.5)	856 (31.3)	493 (18.6)	
Undiagnosed hypertension	716 (4.5)	435 (4.1)	139 (5.6)	142 (7.1)	
Diabetes, N (population weighted %)					<0.001
No diabetes	12,772 (88.0)	8,968 (88.2)	1,915 (85.0)	1,889 (89.5)	
Diagnosed diabetes	1,999 (10.0)	1,398 (10.1)	377 (12.1)	224 (7.3)	
Undiagnosed diabetes	430 (2.0)	252 (1.7)	89 (2.9)	89 (3.2)	
Crude logistic regression models, OR (95% CI)					
Hypertension (ref. no hypertension)		Ref.	0.93 (0.84, 1.03)	0.55 (0.47, 0.65)	
Diabetes (ref. no diabetes)		Ref.	1.32 (1.16, 1.50)	0.87 (0.75, 1.02)	
Multivariate logistic regression models, OR (95% CI)					
Hypertension (ref. no hypertension)		Ref.	0.97 (0.83, 1.14)	0.90 (0.72, 1.11)	
Diabetes (ref. no diabetes)		Ref.	1.04 (0.87, 1.24)	0.98 (0.82, 1.17)	
Crude multinomial regression models, OR (95% CI)					
Hypertension (ref. no hypertension)					
Diagnosed hypertension		Ref.	0.82 (0.64, 1.05)	0.74 (0.53, 1.04)	
Undiagnosed hypertension		Ref.	1.39 (1.03, 1.87)	1.78 (1.35, 2.34)	
Diabetes (ref. no diabetes)					
Diagnosed diabetes		Ref.	1.24 (1.09, 1.43)	0.71 (0.60, 0.84)	
Undiagnosed diabetes		Ref.	1.74 (1.31, 2.31)	1.81 (1.31, 2.50)	
Multivariate multinomial regression models, OR (95% CI)					
Hypertension (ref. no hypertension)					
Diagnosed hypertension		Ref.	1.06 (0.76, 1.49)	1.28 (0.79, 2.07)	
Undiagnosed hypertension		Ref.	1.41 (1.01, 1.95)	1.41 (0.98, 2.03)	
Diabetes (ref. no diabetes)					
Diagnosed diabetes		Ref.	0.96 (0.78, 1.18)	0.80 (0.64, 0.99)	
Undiagnosed diabetes		Ref.	1.56 (1.18, 2.06)	2.01 (1.43, 2.83)	

Base comparison group: no hypertension or diabetes. Referent (Ref.): native-born citizens. Multivariate models adjusted for race/ethnicity, sex, age, income, marital status, education, smoking status, activity levels, BMI, and health insurance.

and noncitizens in the U.S., as these groups might be at risk for undiagnosed disease and delayed treatment. A recent study found that noncitizens were less likely to seek treatment for CVD risk factors compared with native-born citizens or naturalized citizens (5). Our study builds upon this research by examining differences in undiagnosed conditions by citizenship status. Immigrants are less likely to obtain appropriate health care services (3), and noncitizen immigrants are more likely to live in poverty compared with native-born citizens or naturalized citizens (4), which has adverse consequences for their health. These factors are a result of upstream structural factors, highlighting the need for integrating a social determinants of health approach to reduce CVD disparities among immigrants (3). Given the severe cost burden of delayed diagnosis of hypertension and DM, turning our attention to increasing access to CVD screening and treatment for underserved marginalized groups is of vital importance.

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