Relevance of the "Immigrant Health Paradox" for the Health of Arab Americans in California

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Objectives. To assess the validity of the immigrant health paradox among Arab Americans in California.

Methods. We used data from the 2003 to 2017 California Health Interview Survey (n = 1425). We used survey-weighted χ^2 and logistic regression analyses to compare Arabs by immigrant generation on socioeconomic indicators, health behaviors, and health outcomes.

Results. Second-generation Arab Americans had higher odds of binge drinking (adjusted odds ratio [AOR] = 3.26; 95% confidence interval [CI] = 1.53, 6.94) in the past year than did first-generation Arab Americans. Third-generation Arab Americans had greater odds of receiving the influenza vaccine in the past year (AOR = 3.29; 95% CI = 1.09, 9.98) than did second-generation Arab Americans. Third-generation Arab Americans had increased odds of being overweight or obese when compared with first- (AOR = 2.59; 95% CI = 1.02, 6.58) and second-generation Arab Americans (AOR = 3.22; 95% CI = 1.25, 8.29), respectively.

Conclusions. Alcohol use increased across immigrant generations, and we observed no differences in health outcomes, other than obesity. The immigrant health paradox does not appear to apply to Arab Americans in California; mechanisms that generate health in this population should be studied further. (*Am J Public Health.* 2019;109:1733–1738. doi: 10.2105/AJPH.2019.305308)

First-generation immigrants to the United States—those born in another country who immigrate to the United States—have generally been shown to have better health outcomes and behaviors than second-generation (born in the United States to immigrant parents) and third-generation (born in the United States to US-born parents with immigrant heritage) counterparts of the same ethnic background.[1,2] This phenomenon has been termed the "immigrant health paradox" or the "healthy immigrant paradox."

There are 3 predominant explanations for this observation. First, those who are able to immigrate to the United States are likely healthier. Second, when immigrants become unhealthy they may move back to their home countries (salmon bias hypothesis).[3] A third explanation emphasizes changes in risk behaviors between immigrant generations. Risk behaviors differ between immigrant generations, often because first-generation immigrants engage in lower levels of risky behavior than second- and third-generation immigrants who have been acculturated in US culture.[4,5] First-generation immigrants are usually highly capable and healthy individuals who have been able to transplant their lives from one nation to another and have been able to pass formal medical examinations required for visas.[6] They are self selecting into a difficult life transition and less likely to be involved in risky health behaviors, such as substance abuse.[7] It is also possible that immigrants bring with them norms and practices, including living and congregating with other immigrants, that provide protection from high-risk behaviors (called the cultural armamentarium hypothesis).[8] Another possibility is that first-generation immigrants refrain from risky behaviors and substance abuse for fear of deportation or the criminal justice system.[9]

There is evidence that the immigrant health paradox exists for immigrants from Latin America, South America, and Asia.[10] There has been little research, however, that has assessed whether the paradox holds for immigrants from the Middle East and North Africa residing in the United States.[11,12] Immigrants from the Middle East and North Africa who speak Arabic or share ethnic or racial identity with any of 22 Arab League countries are known as Arab Americans in the United States and are one of the fastest growing immigrant groups in recent history.[13] Arab immigrants may have unique health needs because the circumstances of their immigration have changed drastically over the past few decades from one of opportunity to one of need.[14,15] In addition, the strong cultural and religious backgrounds that many Arab immigrants bring to the United States may result in experiencing stigma and discrimination in the current US political and social environment.[16–18]

Some work has been done to identify protective and risky health behaviors and estimate the prevalence of chronic diseases among Arab Americans in Michigan[19,20] and nationally,[21] but little work has been done to understand health behaviors and chronic disease risk among Arab Americans in California, the state with the largest Arab American population (approximately

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820 000 Arab Americans representing 2% of the total Californian adult population).[15] In this study, we aimed to understand whether the immigrant health paradox holds for Arab Americans in California with regard to health behaviors and chronic health outcomes.

METHODS

We used data from the California Health Interview Survey (CHIS). The CHIS uses a landline and cell phone random-digit-dialed sample of the California household population. The 2-stage, geographically stratified design is used to produce a representative sample of the state at 2-year (2001–2009) and 1-year (2011–2017) intervals.[22] For all sampled households, 1 randomly selected adult is asked to answer survey questions. Respondents answer questions about their sociodemographic characteristics, health behaviors, health conditions, and knowledge about health. Interviews are conducted with a computer-assisted telephone interviewing system and take 41 minutes (on average) to complete. CHIS response rates have declined over time from 60.0% in 2003[23] to 47.2% and 44.6% in 2015 and 2016, respectively.[22] We used data from the 2003 to 2017 CHIS survey cycles for this study and expected little overlap of respondents across survey years.

Study Population

Using the CHIS Adult Questionnaire (respondents are 18 years or older), we were able to isolate first-generation Arab Americans from their response to the question: "In what country were you born?" If a respondent indicated 1 of 22 Arab League countries, we coded that individual as a first-generation Arab American respondent. Among those respondents born in the United States, we were able to isolate second-generation Arab Americans from their responses to the questions "In what country was your mother born?" and "In what country was your father born?" An Arab League country response for either mother or father led to a second-generation Arab American categorization. We were able to isolate all other US-born Arab Americans through the question "What languages do you speak at home?" where Arabic language spoken at home was coded as an Arabic language Arab American respondent.

We reasoned that each method of isolation would yield a different generation of Arab Americans for study. Specifically, those identified through their birthplace are first-generation Arab American immigrants who immigrated to the United States from an Arab League country. Those identified through their parent's place of birth are second-generation Arab Americans who were born in the United States to immigrant parents. Those identified through Arabic language use at home are a mix of Arab Americans and may include third- and fourth-generation Arab Americans born in the United States to US-born parents. We will refer to this group as "third+"-generation Arab Americans in this article.

Demographics, Socioeconomic Status, and Acculturation

Demographics examined included gender, age (18–29, 30–49, and ≥ 50 years), and marital status (married vs not married). Socioeconomic status indicators included unemployment status (employed vs unemployed), education level (high school or less vs some college or more), living between 0% and 99% of the 2012 Census federal poverty level, home ownership (owning vs renting), and self-reported uninsured status in the past 12 months. Acculturation variables examined included nativity status (born in the United States vs outside the United States) and citizenship status (citizen vs noncitizen).

Health Behaviors and Risk Factors

We chose health behaviors based on the availability of the data in the CHIS. Health behaviors examined included having been vaccinated against influenza in the past 12 months, drinking 5 or more sodas per week, never smoking, having alcohol in the past 12 months, binge drinking in the past 12 months, having 2 or more sexual partners in past 12 months, and ever thinking about committing suicide.

Health Outcomes

We chose health outcomes such that comparisons can be made to previous studies done with Arab Americans in Michigan and with the National Health Interview Survey.[21,24,25] Health outcomes examined included self-rated poor or fair health, self-reported diagnosis (yes or no) of diabetes or prediabetes, high blood pressure or prehypertension, heart disease, and being overweight or obese.

Analysis

All analyses examined survey-weighted proportions and frequencies. We used χ^2 analysis to compare Arab Americans identified through parent's place of birth, respondent's place of birth, and Arabic language use at home. We used survey-weighted logistic regression models with immigrant generation as the independent variable and each health behavior or outcome as the dependent variable. We compared second- and third+-generation Arab Americans to first-generation Arab immigrants on health behaviors and health outcomes by including a multilevel variable for immigrant generation. In addition, we compared third+- and second-generation Arab Americans by using a separate survey-weighted logistic regression with an indicator specified for this comparison. We adjusted survey-weighted logistic regression models for age (0–40 vs ≥ 40 years), education level (high school or less vs some college or more), and health insurance status (insured vs not insured). We ran all analyses with SAS 9.4 (SAS Institute, Cary, NC) and considered significance at or below a P level of .05.

RESULTS

We isolated a total of 1425 individuals with Arabic heritage or Arabic language use from the CHIS surveys administered from 2003 to 2017 with 34% of these represented in the 2013 to 2017 surveys (Table 1).

First-Generation Arab American Immigrants

We identified a total of 923 first-generation Arab American immigrants from the CHIS with the majority in the 30-to-49-year age range (46.3%) and the 50-years-or-older age range (31.1%; Table 1). Many first-generation immigrants were married (60.9%) and had high levels of education

TABLE 1—Characteristics, Health Behaviors, and Health Outcomes for Arab Americans Stratified by Immigrant Generation Identified Through the California Health Interview Survey: 2003–2017

Variable	First Generation: Respondent Born in Arabic-Speaking Country (n = 923), No. (Survey-Weighted %)	Second Generation: Parent Born in Arabic-Speaking Country (n = 413), No. (Survey-Weighted %)	Third+ Generation: Arabic Language at Home (n = 89), No. (Survey-Weighted %)	Arabic Language or Heritage (n = 1425), No. (Survey-Weighted %)
Survey year				
2003–2007	419 (39.2)	153 (31.8)	55 (69.2)	627 (38.6)
2008–2012	264 (29.3)	117 (24.6)	22 (15.1)	403 (27.0)
2013–2017	240 (31.5)	143 (43.6)	12 (15.7)	395 (34.4)
Demographic				
Male	489 (60.3)	172 (44.4)	39 (63.7)	700 (55.6)
Age, y				
18–29	134 (22.6)	138 (56.7)	12 (15.2)	284 (32.7)
30–49	346 (46.3)	118 (28.3)	38 (58.4)	502 (41.5)
≥ 50	443 (31.1)	157 (15.0)	39 (26.4)	639 (25.8)
Married	596 (60.9)	181 (34.8)	41 (45.9)	818 (52.0)
Socioeconomic status				
Unemployed	360 (27.5)	166 (25.5)	32 (30.9)	558 (27.1)
High school or less	206 (24.1)	117 (29.4)	18 (21.0)	341 (25.5)
0%–99% FPL	153 (17.5)	31 (5.6)	16 (15.5)	200 (13.7)
Own home	551 (54.7)	272 (66.7)	41 (36.0)	864 (57.3)
Uninsured in past y	129 (25.8)	53 (21.4)	14 (15.8)	196 (23.9)
Health behaviors and risk factors				
Influenza vaccine in past y	271 (30.7)	118 (27.3)	26 (37.3)	415 (30.3)
Drinking ≥ 5 sodas per wk	75 (15.4)	33 (8.6)	9 (13.9)	117 (13.3)
Never smoker	582 (63.1)	251 (61.8)	48 (64.7)	881 (62.8)
Alcohol in past y	308 (54.7)	179 (67.9)	30 (38.2)	517 (59.4)
Binge drinking in past y	50 (12.3)	56 (31.3)	4 (6.2)	110 (17.7)
≥ 2 sexual partners in past y	54 (9.7)	40 (17.1)	9 (11.8)	103 (12.1)
Ever thought to commit suicide	28 (5.0)	25 (8.8)	6 (11.8)	59 (6.5)
Health outcomes				
Poor or fair health	135 (12.3)	47 (10.9)	16 (15.2)	198 (12.0)
Diabetes	110 (8.4)	32 (7.3)	13 (12.4)	155 (8.3)
High blood pressure	235 (18.5)	95 (10.9)	28 (18.9)	358 (16.2)
Heart disease	76 (4.7)	34 (3.5)	6 (1.0)	116 (4.1)
Overweight or obese	581 (57.8)	208 (44.5)	57 (77.2)	846 (54.8)

Note. FPL = 2012 Census federal poverty level.

(24.1% high school or less). Among first-generation Arab Americans, 17.5% lived at 0% to 99% of the federal poverty level, and 25.8% were uninsured. Few first-generation Arab Americans had ever contemplated suicide (5.0%) and had 2 or more sexual partners in the past year (9.7%). The prevalence of alcohol use in the past year was 54.7% in this group. Self-reported prevalence of diabetes, hypertension, and heart disease were 8.4%, 18.5%, and 4.7%, respectively (Table 1).

Second-Generation Arab Americans

We identified a total of 413 second-generation Arab Americans through parent's country of birth with the majority in the 18-to-29-year age group (56.7%) and the 30-to-49-year age group (28.3%; Table 1). Of all second-generation Arab Americans, 25.5% were unemployed, 66.7% owned a home, and 5.6% reported living at 0% to 99% of the federal poverty level (Table 1). Among second-generation immigrants, 10.9% self-reported poor health, 7.3% self-reported diabetes, 10.9% self-reported hypertension, and 44.5% reported being overweight or obese. Prevalence of ever

TABLE 2—Survey-Weighted Multivariable Model Results Comparing Second- and Third-Generation Arab American Immigrants to First-Generation Arab Americans on Health Behaviors and Outcomes in the California Health Interview Survey: 2003–2017

	Second vs First Generation		Third+ vs First Generation		Third+ vs Second Generation	
	OR (95% CI)	AOR[a] (95% CI)	OR (95% CI)	AOR[a] (95% CI)	OR (95% CI)	AOR[a] (95% CI)
Health behaviors						
Influenza vaccine in past y	0.85 (0.47, 1.53)	0.79 (0.40, 1.56)	1.54 (0.55, 4.31)	2.06 (0.71, 5.96)	1.82 (0.67, 4.90)	3.29 (1.09, 9.98)
Had alcohol in past y	1.75 (0.97, 3.17)	1.86 (0.94, 3.65)	1.89 (0.54, 6.55)	2.15 (0.58, 7.91)	1.08 (0.29, 4.18)	1.01 (0.22, 4.64)
Binge drinking in past y	3.26 (1.53, 6.94)	2.97 (1.30, 6.78)	0.47 (0.10, 2.26)	0.42 (0.07, 2.42)	0.15 (0.03, 0.77)	0.15 (0.02, 1.08)
≥2 sexual partners in past y	1.92 (0.92, 4.02)	1.66 (0.77, 3.60)	1.31 (0.33, 5.28)	1.53 (0.34, 6.76)	0.68 (0.16, 2.96)	0.84 (0.16, 4.39)
Contemplated suicide	1.81 (0.65, 5.03)	1.61 (0.46, 5.62)	2.51 (0.51, 12.33)	3.60 (0.53, 24.64)	1.39 (0.26, 7.51)	1.78 (0.28, 11.23)
Health outcomes						
Fair or poor self-rated health	0.88 (0.31, 2.47)	1.80 (0.59, 5.54)	1.29 (0.39, 4.19)	1.76 (0.57, 5.47)	1.46 (0.39, 5.45)	1.65 (0.49, 5.55)
Diabetes	0.86 (0.21, 3.57)	1.72 (0.32, 9.09)	1.54 (0.44, 5.55)	1.89 (0.46, 7.69)	1.79 (0.30, 11.11)	1.56 (0.29, 8.33)
Hypertension	0.54 (0.30, 0.98)	0.70 (0.31, 1.61)	1.03 (0.43, 2.50)	1.18 (0.43, 4.55)	1.89 (0.79, 4.55)	1.52 (0.41, 5.56)
Heart disease	0.72 (0.32, 1.62)	0.60 (0.09, 3.99)	0.20 (0.06, 0.60)	0.28 (0.07, 1.13)	0.27 (0.09, 0.85)	. . .[b]
Overweight or obese	0.58 (0.37, 0.93)	0.87 (0.52, 1.48)	2.48 (1.09, 5.62)	2.59 (1.02, 6.58)	4.24 (1.74, 10.34)	3.22 (1.25, 8.29)

Note. AOR = adjusted odds ratio; CI = confidence interval; OR = odds ratio.
[a]Adjusted for age, education, and health insurance status and covariates.
[b]Underpowered.

contemplating suicide was 8.8%, receiving an influenza vaccine in the past year was 27.3%, never smoking was 61.8%, and having 2 or more sexual partners in the last year was 17.1%.

In unadjusted models, second-generation Arab Americans had higher odds of binge drinking (odds ratio [OR] = 3.26; 95% confidence interval [CI] = 1.53, 6.94) than first-generation immigrants (Table 2). Second-generation Arab Americans had lower odds of self-reported hypertension (OR = 0.54; 95% CI = 0.30, 0.98) and being overweight or obese (OR = 0.58; 95% CI = 0.37, 0.93) than first-generation Arab Americans. After we adjusted by age, education level, and insurance status, we found second-generation Arab Americans to have higher odds of binge drinking in the past year (adjusted odds ratio [AOR] = 2.97; 95% CI = 1.30, 6.78) than first-generation Arab Americans.

Third+-Generation Arab Americans

We identified a total of 89 respondents through Arabic language, parent's place of birth in the United States, and respondent's place of birth in the United States representing third- or fourth-generation Arab Americans. The vast majority of these respondents were male (63.7%) and aged between 30 and 49 years (58.4%; Table 1). Of these respondents, 21.0% reported a high-school education or less, 15.8% reported being uninsured, 30.9% reported being unemployed, and 36.0% reported owning their own home. Self-reported poor health prevalence was 15.2%, diabetes prevalence was 12.4%, hypertension prevalence was 18.9%, and overweight or obesity prevalence was 77.2%.

In unadjusted models, third+-generation Arab Americans had increased odds of being overweight or obese (OR = 2.48; 95% CI = 1.09, 5.62) and decreased odds of self-reporting heart disease (OR = 0.20; 95% CI = 0.06, 0.60) when compared with first-generation Arab Americans (Table 2). Third+-generation Arab Americans had increased odds of self-reporting influenza vaccination (AOR = 3.29; 95% CI = 1.09, 9.98) when compared with second-generation immigrants in adjusted models. After adjustment by age, education level, and insurance status, third+-generation Arab Americans had increased odds of being overweight or obese when compared with first-generation (AOR = 2.59; 95% CI = 1.02, 6.58) and second-generation Arab Americans (AOR = 3.22; 95% CI = 1.25, 8.29), respectively.

DISCUSSION

Our analysis examined whether the immigrant health paradox held for Arab Americans in California by comparing health behaviors and health outcomes across 3 immigrant generations observed in multiple cross-sectional surveys. We found little evidence for the immigrant health paradox among immigrants from Arabic-speaking countries in the Middle East and North Africa in California. Our analysis does not support the idea that first-generation Arab American immigrants arrive in their healthiest conditions, as first-generation immigrants in our sample did not have better health outcomes than did second-generation Arab Americans. In adjusted models, we observed no difference in the odds of diabetes, hypertension, and heart disease among first-, second-, and third-generation Arab Americans. This pattern differs from the patterns observed in other immigrant groups in the United States.[1–3,8] Reasons for the differences in observed patterns could be the difficult circumstances under which Arabs were living in their home countries,[15] which may result in poor health upon arrival to the United States. In addition, it is possible that while first-generation immigrants may face high levels of stigma and discrimination that directly affect their health, these levels may decrease in subsequent immigrant generations contributing to better health in second-generation populations.[17]

We did find that positive health behaviors deteriorated across immigrant generations with second-generation Arab Americans

reporting increased odds of high risk behaviors compared with first-generation Arab Americans. The protective health behaviors of first-generation immigrants likely reflect conservative cultural and religious practices seen in many Arabic-speaking countries.[26] Although third+-generation Arab Americans in our sample have high levels of alcohol use, they do show high rates of influenza vaccination, high prevalence of never smoking, and lower proportion with 2 or more sexual partners in the past 12 months, suggesting a middle ground with respect to risk behaviors. This could be an indication that assimilation pressure is strongest for second-generation Arab Americans creating the largest changes to health behavior and that this pressure may be reduced for third-generation Arab Americans.[27,28]

Despite worsening risk behaviors, we saw health outcomes improving in subsequent immigrant generations, suggesting that socioeconomic factors and other social determinants may have a significant impact on health in this immigrant group. Our results show that social determinants of health, especially socioeconomic determinants, vary by immigrant generation. First-generation Arab American immigrants in CHIS were older and more educated, but more likely to be unemployed and live below the federal poverty level when compared with second-generation Arab Americans. Differences in demographics, most specifically age, may be contributing to the differences in the health profiles between immigrant generations in California and between our estimates and those from national[21,24] and Michigan-based surveys.[20]

Obesity was most common among third+-generation Arab Americans and lowest for second-generation Arab Americans in our California-based sample. The obesity prevalence in our sample was higher than that reported by the Michigan Behavioral Risk Factor Survey (25% obese, 34% overweight).[20] There is evidence that obesity prevalence varies by immigrant generation for other immigrant groups in the United States.[29,30] In a national sample of Asian American adolescents, obesity prevalence was observed to have increased between first- and second-generation Asian immigrants.[31] The prevalence of obesity in second- and third-generation adolescents was also significantly different from that found in first-generation Asian immigrants in the same cohort.[31] Obesity is an important risk factor for chronic illness and cardiovascular disease.[32] Second-generation Arab Americans in our sample showed decreased odds of being obese when compared with first-generation immigrants, suggesting improvements from first to second generation but deterioration in third+ generations.

Binge drinking was more prevalent for second-generation Arab Americans when compared with first-generation immigrants. There was an indication of increased odds of alcohol use in the past year among second-generation Arab Americans when compared with first-generation immigrants. We found reduced odds for binge drinking among third+-generation Arab Americans when compared with first-generation Arab Americans, but little difference between third+- and second-generation Arab Americans. Research examining drinking patterns among Arabs living in an ethnic enclave in Dearborn, Michigan, found that English proficiency (a marker for acculturation) was associated with higher prevalence of alcohol use.[33] Alcohol use and misuse across immigrant generations has been studied in other immigrant groups such as Latino adolescent immigrants in the United States. Third+-generation immigrant Latino adolescents were more likely to experience alcohol-related problems than were first- and second-generation immigrants,[34] a pattern different than the one observed in this study. For Latino adolescents, increases in alcohol use across immigrant generations was attributed to a diminishing in family closeness and increased exposure to risky peer environments.[34] More work should be done with Arab Americans to better assess the potential for interventions regarding alcohol use with this population. Another possible explanation leading to alcohol consumption among second- and third-generation Arab Americans is an increase in perceived discrimination leading to alcohol misuse, as reported in other ethnic groups.[35]

Limitations

There are some limitations to this analysis. First, this study relied on multiple cross-sectional surveys conducted over time and did not, therefore, allow us to understand the mechanisms leading to differences in health behaviors and outcomes across immigrant generations. Second, we did not account for age at migration or duration of stay in the United States in our analyses. Arab Americans are diverse and are a heterogeneous group coming from 22 origin countries. As a result, their life experiences and reasons for immigrating to the United States are varied. Early Arab immigrants came to the United States to find economic opportunity, whereas more recent immigrants came to the United States to escape war-torn areas and economically ruined home countries.[14] This could in part explain the poorer health outcomes and socioeconomic status observed among first-generation Arab American immigrants in this sample, although we did not take time since immigration or citizenship or resident status into account in this analysis. The diversity in demographic and socioeconomic factors for immigrants must be taken into account in future analyses, and data should be collected regarding length of stay in the United States and other acculturation factors that may affect health.

Third, all health outcomes and risk behaviors were self-reported by participants in the CHIS. Little work has been done to understand the accuracy of self-report for risky health behaviors among Arab Americans. Fourth, our identification of third+-generation Arab Americans may be flawed, as Arabic language can be spoken at home for individuals without Arabic ethnicity or heritage. The composition of the third+-generation group may therefore be diverse and may actually reflect differences in acculturation status and not generational status. Third+-generation Arab Americans who speak Arabic at home may not be as acculturated as Arab Americans who do not speak Arabic at home and were not identified with our algorithm, which is a limitation of our study design. We will not be able to test this hypothesis or truly understand the composition of this group because of the retrospective and cross-sectional nature of the survey design. The size of this group is also small, resulting in underpowered inferences in comparisons.

Public Health Implications

This is one of the first studies that examined the differences in risk behaviors and

health outcomes for multiple generations of Arab Americans, including third+-generation Arab Americans, that utilized an existing and comprehensive population-weighted sampling frame. This article expands our understanding of Arab American health outside of ethnic enclaves and provides state-representative data for California, which houses the largest population of Arab Americans in the United States.[15] Our analysis shows that Arab Americans are a unique subgroup of the general immigrant population in the United States and that further study will be needed to better understand the health needs and the dynamics that shape them among this growing minority population. AJPH

CONTRIBUTORS

All authors planned the study and the analysis. N. N. Abuelezam performed the analyses and wrote the article with significant input and editing from A. M. El-Sayed and S. Galea. All authors approved the final version of the article and agree to be accountable for all aspects of the work.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest.

HUMAN PARTICIPANT PROTECTION

The Boston College institutional review board reviewed the study and deemed it exempt.

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