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# Migration and Cognitive Health Disparities: The Arab American and Refugee Case

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## Abstract

**Objectives:** This study investigates whether the year of arrival to the United States (U.S.) and birthplace relate to postmigration cognitive difficulties among foreign- and U.S.-born Arab Americans in later life.

**Methods:** We analyzed 19 years (2000–2019) of data from the American Community Survey Public Use Microdata Samples (weighted  $N = 393,501$ ; ages  $\geq 50$  years). Cognitive difficulty was based on self-reported data, and weighted means, percentages, adjusted prevalence estimates, and adjusted odds ratio were calculated.

**Results:** Controlling only for demographics, foreign-born Arabs reported higher odds of cognitive difficulty compared to U.S.-born Arabs across all arrival cohorts ( $p < .001$ ). After accounting for economic and integration factors, those who arrived between 1991 and 2000 had higher odds (odds ratio [OR] = 1.06, 95% confidence interval [CI] = 1.00, 1.19,  $p < .01$ ), while those who arrived after 2001 had lower odds (OR = 0.87, 95% CI = 0.78, 0.97,  $p < .001$ ) of cognitive difficulty. Lacking English proficiency (OR = 1.90, 95% CI = 1.82, 1.98,  $p < .001$ ) was related to higher odds, whereas not being a U.S. citizen was significantly associated with lower odds (OR = 0.89, 95% CI = 0.52, 0.94,  $p < .001$ ) of cognitive difficulty. Yet, results varied by birthplace. Migrants born in Iraq consistently reported the highest odds of cognitive difficulty across all arrival cohorts.

**Discussion:** Migration history and birthplace may be important factors explaining cognitive disparities among the diverse group of Arab migrants and Arab Americans. Future research examining mechanisms underlying these associations and the impact of migration on cognitive health is needed to address cognitive disparities in migrants.

**Keywords:** Alzheimers disease, Health disparities, Migration, Minority aging (race/ethnicity)

Migration is now recognized to be a global phenomenon (Gushulak, 2021) with far-reaching implications for aging and cognitive health (Xu et al., 2018). Yet, it continues to be an understudied social determinant of health. The majority of research in the United States (U.S.) on migration and later life cognitive health considers the case of migrants from Spanish-speaking countries (Garcia et al., 2018). Yet, those who leave their homeland to seek educational or economic opportunities may exhibit different patterns of cognitive function in later life compared to those who seek refuge from political violence or conflict. Migrants from Arabic-speaking countries are increasingly entering the U.S. as refugees fleeing war-torn zones. The number of Americans who claim an Arab ancestry has more than doubled as the Census first measured ethnic origins in 1980 (Zogby, 2010), and today is one of the fastest-growing ethnic groups, increasing by more than 72% between 2000 and 2010 (United States Census Bureau, 2022). The Arab world has produced almost half the world's forcibly displaced populations globally (Bramwell, 2021). The Arab-Israeli conflict, U.S.–Iraq war, Arab Spring, armed conflicts in Yemen, Libya, Sudan and Somalia, and the civil war in Syria have resulted in an exodus of refugees. Exposure to trauma and violent conflict in the sending country can result in compositional differences among arrival cohorts across key factors related to health (Bakhtiari, 2018). Given the variability in Arab migration to the U.S. over time, the Arab American case provides a unique opportunity to uncover important patterns in how the migrant experience is linked to postmigration cognitive difficulties, as well as how to account for and assess migrant experience as a key social determinant of health.

## Background

Migration is a lived experience of social, economic, and political factors that intersect to function as a fundamental and unique social determinant of cognitive health for many individuals across the globe (Castañeda et al., 2015). Arab Americans are one of the fastest growing populations in the U.S. (Alkaid Albuqoor et al., 2019), yet there is limited research on older Arab Americans. Despite research showing discordance between objective and subjective cognitive performance, self-perceived cognitive difficulty is a predictor of Alzheimer's disease and related dementias (Verdelho et al., 2011).

A life course perspective (Elder, 1994) provides key concepts for guiding our investigation of Arab migration and cognitive difficulties, especially that more Arab migrants are arriving as refugees. In particular, we highlight developmental intersections between the person, age at migration and the various contextual factors that influence health (Ajrouch et al., 2020). Arab migration often occurs within the context of noteworthy push and pull factors, including exposure to mental trauma and violent conflict (Sweileh 2018). Additionally, varying levels of human capital and differential

access to resources such as work and health care (Hamilton et al., 2015) are key contexts for understanding how migration influences cognitive health. Finally, it has become increasingly evident that various timing and place factors influence migrant health (Treas & Gubernskaya, 2016). In particular, migrant health may be affected by the migration experience or type, country of origin or birthplace. When a country experiences prolonged political instability, it can influence cognitive health through lack of nutrition and access to medical care, elevated exposure to toxins and environmental hazards (Levy & Sidel, 2013), as well as mental health challenges, including higher rates of depression (Cummings & Miller-Graff, 2015) and social isolation (Treas & Mazumdar, 2002), all of which are established risk factors for Alzheimer's disease and related dementias. These earlier life experiences may each contribute to self-reported cognitive difficulties given the stress and strain they generate (Ajrouch et al., 2020). Furthermore, fleeing war and political instability likely incites migration at older ages (Cummings & Miller-Graff, 2015). Various Arab countries have faced sociopolitical upheavals at different points in time, providing an ideal case study for better identifying how birthplace, arrival cohort, and migration history may influence cognitive difficulties after arrival to the U.S.

Evidence suggests that the conditions of migration may influence the presence of cognitive difficulties. Previous studies of Arab Americans using cross-sectional survey data have investigated whether immigrant status and time of arrival are associated with self-reported cognitive disparities (Kindratt et al., 2022). It may be that including birthplace as a key predictor of cognitive difficulties will advance understanding of how unique migration experiences affect older migrant health. Investigating the experiences among those from different Arab countries at varying time points, who are increasingly arriving in the U.S. as refugees, provides an opportunity to examine migration as a social determinant of health and specifically a possible contributing factor to cognitive difficulties.

## Study Objectives

Our study used the largest nationally-representative data set of Arab Americans in the U.S. to investigate (a) whether self-reported cognitive difficulty varied between U.S.- and foreign-born Arab Americans of diverse countries of birth and time of arrival, (b) whether demographic, socioeconomic, and integration factors may account for differences in cognitive difficulties by migrant time arrival, and (c) whether differences among foreign-born Arabs on cognitive difficulties could be explained by birthplace and/or arrival cohort.

## Method

### Data

We combined and analyzed 1-year data files from 2000 to 2019 of the American Community Survey (ACS) Integrated

Public Use Microdata Sample (IPUMS). The ACS is a nationally representative data set in which, for each IPUMS year, a stratified subsample of the full Census is surveyed, representing about 1% of all housing units in the U.S. The survey collects information across households, including ancestry, year of immigration, and birthplace. Each item on the survey is asked at the family level; therefore, the respondent may serve as a proxy for another household member. Individual responses for the entire survey are linked to each household member identified.

Arab ancestry was ascertained by a single item, “What is this person’s ancestry or ethnic origin?” following the approach used in previous studies (Dallo et al., 2015, 2022; Kindratt et al., 2021). Our sample included those respondents who reported an Arab country as their first or second ancestry: Algerian, Arab, Assyrian/Chaldean/Syriac, Egyptian, Iraqi, Jordanian, Kuwaiti, Lebanese, Libyan, Middle Eastern, Moroccan, North African, Other Arab, Palestinian, Saudi Arabian, Somali, Sudanese, Syrian, and Yemeni. Migrant status was assessed using the survey item for birthplace (i.e., “Where was this person born?”). Those born in the U.S. and also reporting an Arab ancestry were classified as native-born, while those reporting birthplace anywhere outside the U.S. were classified as foreign-born.

To focus our analysis on cognitive difficulties associated with aging, we only included individuals 50 years or older. Although there is inconsistency in using a cutoff age to define “older migrants,” where some studies used 45 as a cutoff (Kindratt et al., 2021), 50 years old is the age at which U.S. immigration policies define an older immigrant (Carr & Tienda, 2013). Moreover, according to data from the Center for Immigration Studies of Census Bureau, the number of migrants aged 50 years or older has seen the largest increase in arrivals, having nearly doubled between the years 2000 and 2019 (Camarota & Zeigler, 2019). Our final unweighted sample size was 393,501 Arab individuals (148,130 native-born and 245,371 foreign-born).

### Cognitive Difficulty

Our main outcome of cognitive difficulty was ascertained by a Yes/No question: “Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions?” Affirmative responses were coded as having a cognitive difficulty (numeric value = 1), with no difficulty as the reference group (numeric value = 0).

### Year of Arrival and Birthplace

Our main predictors of interest were the year of arrival and birthplace. Foreign-born Arabic individuals were divided into four groups and dummy coded based on their answered year of arrival (i.e., “When did this person come to live in the U.S.?): pre-1991 ( $n = 155,934$ ), 1991–2000

( $n = 46,898$ ), 2001–2010 ( $n = 29,689$ ), and 2011–2019 ( $n = 12,850$ ), and compared against the reference group of U.S.-born Arab individuals. Non-U.S. nation responses for birthplace (i.e., “Where was this person born?”) were recoded to quantify the major Arab nations involved in conflicts and a known refugee population in the U.S.: Egypt, Iraq, Lebanon, Jordan, Syria, Somalia, and Israel/Palestine. Those who reported being of Arab ancestry and born in Israel were counted in this latter category. All other non-U.S. birthplaces were categorized as Other. Analyses of foreign-born only identified the reference group for birthplace as those born in Lebanon, given the long history of migration from Lebanon to the U.S., relative stability in the nation across our arrival years of interest, and standardized use in previous studies (Kindratt et al., 2021).

### Demographic, Socioeconomic, and Integration Factors

Demographic factors included age (years, mean-centered); gender (female = reference); and marital status (married = reference, separated/divorced, widowed, and never married/single). Socioeconomic factors included educational attainment (i.e., “What is the highest degree or level of school this person has completed?”; less than high school = reference, high school graduate, some college, and college degree or more), employment (i.e., whether the respondent was a part of the labor force and working [reference] or unemployed, or not part of the labor force), whether or not they had recognized health insurance (yes = reference, no, N/A for data before 2008, as ACS did not include this as an item of the survey prior to 2008), poverty status (401% or above = reference, 139%–400%, 138% and below), and total personal and family income in the last year (i.e., “What was this person’s total income during the past 12 months?”). Income values were adjusted for inflation, presented in 2019 dollars, and  $\log_{10}$  transformed. Integration variables included citizenship status (i.e., citizen/naturalized citizen = reference, not a citizen) and English language proficiency (speaks English very well/well = reference, does not speak English well/at all). For foreign-born Arabs, age of migration was calculated in two steps: age was subtracted by the year of survey completed to receive a birth year, then the birth year was subtracted from the year of migration.

### Statistical Analyses

All categorical variables were dummy coded, and reference groups were assigned a value of “0.” Differences in demographic, socioeconomic, and migrant integration characteristics, as well as the proportion of cognitive difficulty, were compared between native-born (reference group) and each migrant arrival cohort, using Pearson Chi-square tests for two-level categorical variables and two-way independent

sample *t* tests, and between migrant arrival cohorts using analysis of variance followed by pairwise comparisons with Bonferroni adjustments. To examine our first and second objectives, three multivariate logistic regression models were conducted to predict cognitive difficulty. Models 1–3 investigated the odds of cognitive difficulty between native-born and migrant arrival cohorts. Sequential models were constructed to include covariates in three blocks: demographic (i.e., age, gender, and marital status), socioeconomic (i.e., education groups, employment, personal and family income, poverty status, and health insurance), and integration characteristics (i.e., English proficiency and citizenship status). To examine our third objective, four multivariable logistic regression models were conducted per migrant arrival cohort to analyze differences between birthplace, accounting for all demographic, socioeconomic, and integration characteristics, including the age of migration. Bayesian information criterion method was used for model selection. All models controlled for the survey year and included sample weights provided by the ACS to make estimates representative of the U.S. population. SPSS 26.0 was used for all analyses.

## Results

### Sample Characteristics

**Table 1** summarizes the descriptive statistics by nativity and migrant arrival cohort. Foreign-born Arabs had a higher proportion of self-reported cognitive difficulty as compared to U.S.-born Arabs (8.0% vs 5.8%,  $p < .001$ ), with the 2001–2010 arrival cohort reporting the highest proportion of cognitive difficulty (10.1%), followed by the 1991–2000 (9.7%), then the most recent (7.7%) and pre-1991 (7.2%) arrival cohorts.

Across the sample, the average age was in the early 60s. U.S.-born Arabs were more likely to be female (51.7%,  $p < .001$ ), and more recent arrival cohorts were less likely to be male. The average age of migration across foreign-born Arabs was 35.4 years old (standard deviation [SD] = 16.2), and each successive cohort migrated at a significantly older average age than the previous ( $p < .001$ ), with those migrating pre-1991 having the lowest average age of migration ( $M = 27.1$ ). U.S.-born Arabs were more likely to report their race as White compared to all foreign-born Arabs (96.2% vs 88%,  $p < .001$ ). However, with each subsequent cohort, more individuals self-reported their race as Black or Other. Across the sample, about 60% were married, with greater proportion of married individuals among foreign-born Arabs (foreign-born = 65.7%, U.S. born = 59.9%,  $p < .001$ ; **Table 1**).

As for socioeconomic characteristics, about a third in each group had either high school or college or more education, though the two most recent arrival cohorts had the highest proportions of less than high school educational attainment (2001–2010 = 29.6%, 2011+ = 25.2%)

compared to the two earlier cohorts (pre-1991 = 12.7%, 1991–2000 = 22.3%;  $p < .001$ ). U.S.-born Arabs reported higher median income in the last year (\$38,856), and each consecutive arrival cohort reported a lower value than the previous (pre-1991 = \$26,724, 1991–2000 = \$12,270, 2001–2010 = \$8,948, 2011–now = \$4,258;  $p < .001$ ). The same pattern emerged for median family income in the last year (U.S. born Arabs = \$81,350, pre-1991 = \$76,638, and 1991–2000 = \$56,471), although there were no differences between the two more recent cohorts (2001–2010 = \$39,303, 2011+ = \$38,700,  $p > .05$ ). Foreign-born Arabs were more likely to be at (35% vs 32%) or below (27% vs 12%) the poverty threshold than U.S. born Arabs ( $p < .001$ ), have higher proportions of unemployment (3.4% vs 2.5%,  $p < .001$ ) and were more likely to not have health insurance (9.8% vs 2.9%,  $p < .001$ ), with proportions of these three factors increasing with each successive arrival cohort (**Table 1**).

In terms of integration factors, proportions of English proficiency were higher among the earlier arrival cohorts (pre-1991 = 87.3%, 1991–2000 = 64.1%), as the majority of the two more recent cohorts reported not speaking English (2001–2010 = 46.6%, 2011–now = 43.6%,  $p < .001$ ). The majority of individuals in the earliest cohorts reported being U.S. citizens (pre-1991 = 91.5%, 1991–2000 = 70.0%), with the opposite association seen in the most recent arrival cohort (2001–2010 = 47.5%, 2011+ = 12.3%,  $p < .001$ ; **Table 1**).

**Figure 1** additionally depicts percentages of birthplaces by arrival cohort. Most foreign-born Arabs were born in Egypt (11.9%), Iraq (9.9%), and Lebanon (9.7%), with higher estimates of individuals born in Syria in the most recent cohort (2011–now = 13.2%). Over time, the percentage of migrants born in Iraq has increased (pre-1991 = 12.0%, 1991–2000 = 18.8%, 2001–2010 = 26.0%, 2011–now = 28.4%). Higher estimates of Somalian-born migrants occurred between 2001 and 2010 (11.2%). Syrian-born immigrants show a stable yet declining estimates from 1991 to 2010, before increasing to be the third-largest group among the most recent arrival cohort. Migrants from Egypt, Lebanon, Jordan, and Israel/Palestine show declining estimates across all arrival cohorts (**Figure 1**).

### Odds of Cognitive Difficulty by Migrant Arrival Cohort

Multicollinearity analyses of all potential predictors were run, all variance inflation factor (VIF) values were less than 5. **Table 2** depicts the likelihood of self-reported cognitive difficulty between U.S.-born and migrants by arrival cohort and birthplace (Models 1–3). Controlling for average age, gender, and marital status (Model 1), all arrival cohorts had higher odds of self-reported cognitive difficulty compared to U.S.-born Arab Americans, with the 2001–2010 cohort showing the highest odds (odds ratio [OR] = 2.35, 95%



**Table 1.** Participant Characteristics by Nativity and Arrival Cohort Among Arab Americans ages 50 and Older (*N* = 393,501)

	U.S.-Born ( <i>n</i> = 148,130)	Pre-1991 ( <i>n</i> = 155,934)	1991–2000 ( <i>n</i> = 46,898)	2001–2010 ( <i>n</i> = 29,689)	2011+ ( <i>n</i> = 12,850)
Cognitive difficulty, yes %	5.8	7.2 <sup>a,b,c,d</sup>	9.7 <sup>a</sup>	10.1 <sup>a,f</sup>	7.7 <sup>a,g</sup>
<b>Demographics</b>					
Age, M ( <i>SD</i> )	63.6 (10.8)	62.7 (10.0) <sup>a,b,c,d</sup>	60.7 (9.6) <sup>a,e</sup>	61.6 (9.5) <sup>a,f</sup>	61.7 (9.5) <sup>a</sup>
Age at migration, Mean ( <i>SD</i> )	—	27.1 (11.8) <sup>b,c,d</sup>	45.0 (11.5) <sup>e</sup>	53.8 (10.3) <sup>f</sup>	58.8 (9.7) <sup>g</sup>
Male, %	48.3	59.1 <sup>a,b,c,d</sup>	53.2 <sup>a,e</sup>	47.5 <sup>a,f</sup>	46.9 <sup>a</sup>
<b>Race, %</b>					
White	96.2	92.5 <sup>a,b,c,d</sup>	80.8 <sup>a,e</sup>	79.2 <sup>a,f</sup>	84.2 <sup>a,g</sup>
Black	1.4	2.1 <sup>a,b,c,d</sup>	12.4 <sup>a,e</sup>	14.9 <sup>a,f</sup>	8.2 <sup>a,g</sup>
Other	2.4	5.4 <sup>a,b,c,d</sup>	6.7 <sup>a,e</sup>	5.9 <sup>a,f</sup>	7.5 <sup>a,g</sup>
<b>Marital status, %</b>					
Married	59.9	68.8 <sup>a,b,c,d</sup>	62.9 <sup>a,e</sup>	60.3 <sup>a,f</sup>	59.3 <sup>g</sup>
Separated/divorced	19.2	15.6 <sup>a,b,c,d</sup>	18.3 <sup>e</sup>	17.5 <sup>a,f</sup>	17.8 <sup>a</sup>
Widowed	10.9	11.7 <sup>a,b,c,d</sup>	13.7 <sup>a,e</sup>	16.9 <sup>a,f</sup>	18.0 <sup>a,g</sup>
Never married/single	10.0	4.6 <sup>a,b,c</sup>	5.0 <sup>a,e</sup>	5.2 <sup>a,f</sup>	4.8 <sup>a</sup>
<b>Socioeconomic characteristics</b>					
<b>Educational attainment, %</b>					
Less than high school	2.1	12.7 <sup>a,b,c,d</sup>	22.3 <sup>a,e</sup>	26.6 <sup>a,f</sup>	25.2 <sup>a,g</sup>
High school	35.5	30.9 <sup>a,b,c</sup>	32.1 <sup>a</sup>	31.8 <sup>a</sup>	30.3 <sup>a,g</sup>
Some college	21.8	16.0 <sup>a,b,c,d</sup>	11.8 <sup>a,e</sup>	10.5 <sup>a,f</sup>	9.5 <sup>a,g</sup>
College or more	40.6	40.5 <sup>a,b,c,d</sup>	33.8 <sup>a,e</sup>	31.1	34.9
<b>Employment status, %</b>					
Employed	52.0	49.2 <sup>a,b,c,d</sup>	46.6 <sup>a,e</sup>	34.1 <sup>a,f</sup>	26.5 <sup>a,g</sup>
Unemployed	2.5	3.0 <sup>a,b,c,d</sup>	3.6 <sup>a,e</sup>	4.5 <sup>a,f</sup>	5.3 <sup>a,g</sup>
Not in labor force	45.5	47.8 <sup>b,c,d</sup>	49.8 <sup>a,e</sup>	61.4 <sup>a,f</sup>	68.2 <sup>a,g</sup>
<b>Personal total income, median (IQR)</b>					
	\$38,856 (16,605–78,627)	\$26,724 <sup>a,b,c,d</sup> (9,525–70,160)	\$12,270 <sup>a,e</sup> (4,181–38,385)	\$8,948 <sup>a,f</sup> (0–20,224)	\$4,258 <sup>a,g</sup> (0–15,966)
<b>Family total income, median (IQR)</b>					
	\$81,350 (19,051–149,810)	\$76,638 <sup>a,b,c,d</sup> (33,500–146,783)	\$56,471 <sup>a</sup> (23,417–108,500)	\$39,303 <sup>a</sup> (18,039–88,100)	\$38,700 <sup>a</sup> (16,270–80,982)
<b>Poverty, %</b>					
401% or above	56.4	45.2 <sup>a,b,c,d</sup>	27.8 <sup>a,e</sup>	20.4 <sup>a,f</sup>	18.5 <sup>a,g</sup>
139%–400%	31.7	33.9 <sup>a,b,c</sup>	40.1 <sup>a,e</sup>	34.5 <sup>a,f</sup>	33.4 <sup>a</sup>
138% or lower	11.9	21.0 <sup>a,b,c,d</sup>	32.2 <sup>a,e</sup>	45.1 <sup>a,f</sup>	48.1 <sup>a,g</sup>
<b>Health insurance coverage, %</b>					
Yes	63.7	61.7 <sup>b,c,d</sup>	62.6 <sup>a,e</sup>	71.4 <sup>a,f</sup>	71.4 <sup>a</sup>
No	2.9	6.4 <sup>a,b,c,d</sup>	10.6 <sup>a,e</sup>	18.1 <sup>a,f</sup>	28.6 <sup>a,g</sup>
Not collected	33.4	32.0 <sup>a,b,c,d</sup>	26.8 <sup>a,e</sup>	10.6 <sup>a,f</sup>	—
<b>Integration characteristics</b>					
<b>Birthplace, %</b>					
United States	100	—	—	—	—
Egypt	—	19.7 <sup>b,c,d</sup>	19.4 <sup>e</sup>	16.5 <sup>f</sup>	16.6
Iraq	—	12.0 <sup>b,c,d</sup>	18.8 <sup>e</sup>	26.0 <sup>f</sup>	28.4 <sup>g</sup>
Lebanon	—	18.8 <sup>b,c,d</sup>	10.0 <sup>e</sup>	10.7 <sup>f</sup>	7.3 <sup>g</sup>
Syria	—	7.7 <sup>b,c,d</sup>	7.4	6.3 <sup>f</sup>	13.2 <sup>g</sup>
Jordan	—	8.3 <sup>b,c,d</sup>	6.0 <sup>e</sup>	4.5 <sup>f</sup>	4.4
Somalia	—	0.6 <sup>b,c,d</sup>	8.5 <sup>e</sup>	11.2 <sup>f</sup>	5.4 <sup>g</sup>
Israel/Palestine	—	5.0 <sup>b,c,d</sup>	2.0 <sup>e</sup>	1.4 <sup>f</sup>	0.5 <sup>g</sup>
Other	—	27.9 <sup>b,c,d</sup>	27.9 <sup>e</sup>	23.4 <sup>f</sup>	24.2
English language proficiency, Yes %	99.2	87.3 <sup>a,b,c</sup>	64.1 <sup>a,e</sup>	46.6 <sup>a,f</sup>	43.6 <sup>a,g</sup>
U.S. citizenship, %	100	91.5 <sup>a,b,c,d</sup>	70.0 <sup>a,e</sup>	47.5 <sup>a,f</sup>	12.3 <sup>a,g</sup>

*Notes:* Other race includes: two major, three and more major, and not specified. Health insurance coverage only available starting in collection year of 2008. Family and personal income values converted to 2019 dollars. English proficiency, yes includes only English, English very well, and English well categories. IQR = interquartile range; *SD* = standard deviation.

<sup>a</sup>Statistically significant difference at *p* < .05 between the native-born and the arrival cohort.

<sup>b</sup>Between <1991 cohort and 1991–2000 cohort.

<sup>c</sup>Between <1991 cohort and 2001–2010 cohort.

<sup>d</sup>Between <1991 cohort and 2011+ cohort.

<sup>e</sup>Between 1991–2000 cohort and 2001–2010 cohort.

<sup>f</sup>Between 1991–2000 cohort and 2011+ cohort.

<sup>g</sup>Between 2001–2010 cohort and 2011+ cohort.

confidence interval [CI] = 2.25, 2.47,  $p < .001$ ), followed by the 1991–2000 cohort (OR = 2.26, 95% CI = 2.18, 2.36,  $p < .001$ ), then the 2011+ (OR = 1.85, 95% CI = 1.72, 1.99,  $p < .001$ ) and pre-1991 cohorts (OR = 1.49, 95% CI = 1.44, 1.53,  $p < .001$ ).

Adding socioeconomic factors in Model 2 (i.e., education level, employment status, personal and family income, poverty, and health insurance) reduced odds of self-reported cognitive difficulty across all arrival cohorts. Migrants who arrived in 1991–2000 continued to have the highest odds of self-reported cognitive difficulty than U.S.-born Arab Americans (OR = 1.41, 95% CI = 1.34, 1.47,  $p < .001$ ), followed by those who arrived in 2001–2010 (OR = 1.35, 95% CI = 1.27, 1.43,  $p < .001$ ).

After including integration covariates in Model 3 (i.e., English language proficiency and citizenship status), those who arrived in 2011+ had significantly lower odds of self-reported cognitive difficulty, showing 13% lower odds than U.S.-born Arabs (OR = 0.87, 95% CI = 0.78, 0.97,  $p < .001$ ), while those who arrived in 1991–2000 continue to have higher odds of self-reported cognitive difficulty (OR = 1.06, 95% CI = 1.00, 1.19,  $p < .05$ ). Migrants who arrived in other cohorts showed no significantly different odds of self-reported cognitive difficulty compared to those born in the U.S. Notably, in Model 3, among the integration factors, not being proficient in English (OR = 1.90, 95% CI = 1.82, 1.98,  $p < .001$ ) was related to higher odds of self-reported cognitive difficulty, whereas not being a U.S. citizen was significantly associated with lower odds of self-reported cognitive difficulty (OR = 0.89, 95% CI = 0.52, 0.94,  $p < .001$ ).

### Birthplace and Arrival Cohort

To further assess the relationship between year of arrival on the odds of self-reported cognitive difficulty seen among foreign-born Arab Americans once all covariates were included, we ran four models on self-reported cognitive difficulty among foreign-born Arabs only, by arrival cohort (Table 3). We included all blocks of covariates (i.e., demographic, socioeconomic, and integration) in each of the four models, including the age of migration. Multicollinearity analyses of all potential predictors among foreign-borns were run, all VIF values were less than 5. The birthplace reference group per model was individuals born in Lebanon per arrival cohort.

Among the pre-1991 cohort, all birthplaces were significantly associated with higher odds of self-reported cognitive difficulty as compared to foreign-born Lebanese, except for those born in Israel/Palestine (OR = 1.03, 95% CI = 0.93, 1.15,  $p = .55$ ). Those born in Somalia had the highest odds (140%) of self-reported cognitive difficulty compared to those born in Lebanon (OR = 2.40, 95% CI = 1.81, 3.17,  $p < .001$ ), followed by Iraq (OR = 1.60, 95% CI = 1.48, 1.72,  $p < .001$ ), Jordan (OR = 1.54, 95% CI = 1.40, 1.69,  $p < .001$ ), Egypt (OR = 1.41, 95% CI = 1.40, 1.52,  $p < .001$ ),

other (OR = 1.22, 95% CI = 1.14, 1.30,  $p < .001$ ), and Syria (OR = 1.19, 95% CI = 1.09, 1.31,  $p < .001$ ).

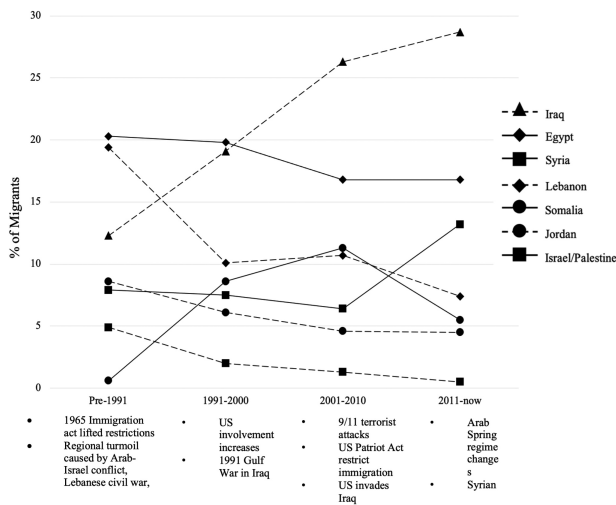
Among those arriving between 1991 and 2000, those born in Iraq continued to have higher odds of self-reported cognitive difficulty (OR = 1.50, 95% CI = 1.31, 1.71,  $p < .001$ ), while those born in Jordan (OR = 0.53, 95% CI = 0.42, 0.67,  $p < .001$ ), Syria (OR = 0.82, 95% CI = 0.68, 0.98,  $p = .03$ ), and Somalia (OR = 0.82, 95% CI = 0.69, 0.97,  $p = .02$ ) had significantly lower odds compared to those born in Lebanon and arriving in the 1991–2000 era. All other birthplaces for the 1991–2000 group did not have significantly different odds of self-reported cognitive difficulty than those born in Lebanon among this arrival cohort ( $p > .05$ ).

Among the 2001–2010 group, those born in Iraq continued to have significantly higher odds of self-reported cognitive difficulty than those born in Lebanon in this cohort (OR = 2.73, 95% CI = 2.17, 3.42,  $p < .001$ ). Among this cohort, those born in Egypt (OR = 1.55, 95% CI = 1.20, 2.02,  $p = .001$ ), Jordan (OR = 1.49, 95% CI = 1.01, 2.18,  $p = .04$ ), and Somalia (OR = 1.33, 95% CI = 1.04, 1.70,  $p = .02$ ) had higher odds of self-reported cognitive difficulty than those born in Lebanon.

Among the 2011+ group, those born in Iraq (OR = 11.12, 95% CI = 4.01, 30.80,  $p < .001$ ), Egypt (OR = 3.68, 95% CI = 1.24, 11.00,  $p = .02$ ), and Somalia (OR = 3.15, 95% CI = 1.07, 9.27,  $p = .04$ ) had significantly higher odds compared to those born in Lebanon in this arrival cohort. Jordan and Israel/Palestine did not have enough individuals in this arrival cohort; therefore, odds ratios were not produced for these groups, and there was no significant difference in odds of self-reported cognitive difficulty between those born in Lebanon and Syria (OR = 1.62, 95% CI = 0.53, 4.98,  $p = .40$ ) in this arrival cohort.

### Discussion

This study used uniquely available nationally representative data of Arab Americans to examine cognitive difficulty among U.S.- and foreign-born Arab American adults and between-groups differences over a 19-year period. Furthermore, differences in cognitive health by arrival cohort and birthplace were examined. Our study supports prior literature showing the high burden of cognitive difficulties among Arab Americans (Kindratt et al., 2021), and advances this literature by examining country of birth in addition to the year of arrival on cognitive health among older Arab Americans accounting for the interplay between demographics and life course socioeconomic and integration factors. Notably, we found that Arab migrants who were largely displaced from war-torn regions during times of political instability and armed conflict were more likely to report cognitive difficulty compared to Arab migrants from politically stable countries. Implications are discussed later.



**Figure 1.** Weighted percent of migrants per birthplace by arrival cohort among foreign-born Arab Americans, ages 50 and older ( $N = 43,667$ ).

### Links Between Demographics, Socioeconomics, Integration Factors, and Cognitive Health

A developmental life course perspective emphasizes the utility of examining intersections between the person, their age, and the contexts that shape their health (Ajrouch et al., 2020). By accounting for demographic, socioeconomic, and integration factors, this study examined the ways by which life course factors illuminate the potential unique effects of migration on cognitive health. After controlling for demographics, the odds of self-reporting cognitive difficulties in foreign-born Arabs were still higher than in those born in the U.S. However, some of these differences may be explained by socioeconomic and integration variables. Socioeconomic factors, such as income and levels of education, were documented in the literature to be strongly correlated with cognitive health in Arabs (Kindratt et al., 2021) and other migrants (Zahodne et al., 2021). Furthermore, in our findings, elements of migrant integration, particularly English language proficiency, appear to benefit cognitive health in Arab migrants to the U.S., while the opposite is true for citizenship status. Unlike other countries in the world, in the U.S., becoming a citizen is a legal status. Lack of legal citizenship does not necessarily impede daily activities such as finding a job or being able to drive or attend school, nor does it restrict one’s ability to integrate within a new society, factors which could otherwise negatively affect cognitive health. However, English language proficiency can increase one’s access to health care, social engagement, and resources necessary to promote and maintain cognitive health. These differential findings between our markers of integration and odds of cognitive difficulty may highlight the significance of measuring more than one type of integration variable to better understand cognitive disparities between foreign- and U.S.-born Arabs. There is, thus, a need to focus on these integration factors when designing interventions that can address cognitive disparities in Arab

Americans specifically, and perhaps migrants from various origins generally. Finally, previous research has suggested discordance between subjective and objective cognitive performance (Jang et al., 2022). It is possible, therefore, that those established cognitive risk factors may not be the same as the ones contributing to the self-perceived cognitive difficulty in our sample, especially for refugees or those migrating due to political instability. Loss of social networks, productive engagement in later life, evolving patterns of work and retirement, sense of stability, and other life course factors may all contribute to how patterns of self-perceived cognitive difficulties are being reported by Arab migrants (Treas & Gubernskaya, 2016).

### Migrating From War-Torn Regions (or Birthplace and Time of Arrival)

Documented migration to the U.S. from Arab countries began in the late 1800s and continues through the present day. Regional political instabilities within these nations, coupled with changes in U.S. migration policy, have altered the national origin composition of Arab migrants entering the U.S. across different arrival cohorts (Sweileh 2018). This study is the first to consider the importance of identifying those who seek refuge from political instability as a critical element of migration and the role it plays on cognitive health in later life. Linking arrival cohort and birthplace to represent conflict and displacement in the Arab world provides a means to recognize that not all migrant experiences are equal.

Sweileh (2018) describe three meaningful periods of migration, the first, pre-1991, witnessed Arab migrants who fled regional turmoil caused by the Israeli–Palestinian conflict, Lebanese Civil War, and Iraq–Iran War (Foad, 2013). Nearly two thirds of Arab migrants arriving during this period were from Egypt, Lebanon, Iraq, and Jordan (Palestinians). The second period, 1991–2001, included economic sanctions in Iraq, along with a rise in religious fundamentalism across the region, which fueled political instabilities and initiated migration to the U.S. from Egypt, Syria, and Iraq (Abdelhady, 2014). The third period, 2001–2010, encompassed the 2003 U.S. invasion in Iraq. Furthermore, heightened hostility toward Arab Americans in the post-9/11 era resulted in more deeply entrenched negative biases that created more challenging integration contexts for this cohort (Haboush & Barakat, 2014). Finally, we identified a fourth period, 2011+, which witnessed continuing upheaval in Iraq, a ripple of regime overthrows during the Arab Spring, and the Syrian civil war. Although refugees entering the U.S. declined over time (Grant, 2020), Iraqis nevertheless comprised almost one third admitted in 2014 (Mossaad, 2016). In 2016, migrants from Syria (12,587), Iraq (9,880), and Somalia (9,020) were among the top five refugee groups admitted to the U.S., in addition to Congo and Burma (Krogstad & Radford, 2017). These four historical periods coincide with global events



**Table 2.** Weighted Odds Ratios of Self- or Informant-Reported Cognitive Difficulty by Arrival Cohort Between Foreign-Born and U.S.-Born Arab Americans Ages 50 and Older ( $N = 393,501$ )

Predictor	Model 1 (demographics, arrival cohort, and birthplace) OR (95% CI)	Model 2 (demographics, socioeconomics, arrival cohort, and birthplace) OR (95% CI)	Model 3 (demographics, socioeconomics, integration, arrival cohort, and birthplace) OR (95% CI)
Arrival cohort			
Pre-1991	1.49 (1.44, 1.53)**	1.13 (1.09, 1.16)**	0.99 (0.96, 1.04)
1991–2000	2.26 (2.18, 2.36)**	1.41 (1.34, 1.47)**	1.06 (1.00, 1.19)*
2001–2010	2.35 (2.25, 2.47)**	1.35 (1.27, 1.43)**	0.97 (0.91, 1.03)
2011+	1.85 (1.72, 1.99)**	1.15 (1.05, 1.26)**	0.87 (0.78, 0.97)**
Age	1.06 (1.05, 1.06)**	1.01 (1.01, 1.01)**	1.01 (1.01, 1.01)**
Male	0.90 (0.88, 0.93)**	1.21 (1.17, 1.25)**	1.25 (1.21, 1.29)**
Marital status			
Separated/divorced	2.12 (2.05, 2.19)**	1.86 (1.79, 1.93)**	1.89 (1.81, 1.96)**
Widowed	2.29 (2.21, 2.37)**	1.92 (1.84, 1.99)**	1.90 (1.83, 1.98)**
Never married/single	2.23 (2.13, 2.34)**	1.81 (1.72, 1.91)**	1.87 (1.77, 1.97)**
Education group			
High school		0.61 (0.58, 0.63)**	0.72 (0.69, 0.75)**
Some college		0.53 (0.51, 0.56)**	0.66 (0.63, 0.70)**
College or more		0.41 (0.40, 0.43)**	0.52 (0.50, 0.55)**
Employment status			
Unemployed		3.10 (2.80, 3.44)**	3.11 (2.80, 3.45)**
Not in labor force		6.87 (6.52, 7.23)**	6.62 (6.29, 6.97)**
Personal income (Log)		0.66 (0.64, 0.69)**	0.68 (0.66, 0.70)**
Family income (Log)		1.48 (1.451, 1.56)**	1.48 (1.44, 1.52)**
Poverty			
139%–400%		1.50 (1.44, 1.56)**	1.50 (1.44, 1.56)**
138% or below		2.11 (2.01, 2.21)**	2.06 (1.96, 2.16)**
Health insurance			
None		0.57 (0.52, 0.63)**	0.59 (0.54, 0.65)**
N/A		1.22 (1.16, 1.29)**	1.23 (1.17, 1.31)**
No English proficiency			1.90 (1.82, 1.98)**
Not a U.S. citizen			0.89 (0.52, 0.94)**
BIC	184,996	142,088	141,172
Sample year	0.97 (0.97, 0.98)**	0.99 (0.99, 1.00)	1.01 (0.99, 1.01)

Notes: Age is centered at  $M = 62.8$ . Reference groups: U.S.-born, female, married, less than high school education, employed, over 401% poverty threshold, have health insurance, does speak English, and U.S. citizen. OR = odds ratio; CI = confidence interval; BIC = Bayesian information criterion method.

\*\* $p < .01$  and \*\*\* $p < .001$ .

and changes in U.S. migration policy that affected the composition and flow of Arab migrants based on their timing of arrival in the U.S.

Our results demonstrate that across arrival cohorts, when controlling for demographic factors, migrants from war-torn countries, particularly Iraq, had significantly higher odds of cognitive difficulty compared to migrants born in Lebanon. Migration from Lebanon to the U.S. has a much longer history than in other parts of the Arab world, dating back to the early 20th century (Abdelhady, 2014). Furthermore, though periodic instabilities have erupted, the end of the Lebanese Civil War in 1990 was followed by relative stability and massive efforts to rebuild, which informed our decision to use Lebanon as a comparator. On

the other hand, over the 19-year data collection period, Arab Americans born in Iraq and Somalia experienced consistent civil unrest and multiple wars.

Our study focused on self-reported cognitive difficulty, as data on cognitive outcomes among MENA (Middle East and North American) and Arab Americans is virtually nonexistent (Ajrouch et al., 2017). There is a growing research need to understand the links between the refugee experience and cognitive difficulties in later life due to risk factors unique to the refugee experience. Literature linking war trauma to cognitive decline is limited to veterans and others experiencing military violence, who are shown to have an increased risk of dementia (Barnes et al., 2018; Capstick & Clegg, 2013; Iacono et al., 2020; Weiner et al.,

**Table 3.** Weighted Odds Ratios of Self- or Informant-Reported Cognitive Difficulty by Arrival Cohort Among Only Foreign-Born Arab Americans Ages 50 and Older (*N* = 245,371)

Predictor	Pre-1991 OR (95% CI)	1991–2000 OR (95% CI)	2001–2010 OR (95% CI)	2011+ OR (95% CI)
<b>Birthplace</b>				
Egypt	1.41 (1.30, 1.52)***	1.03 (0.88, 1.21)	1.55 (1.20, 2.02)**	3.68 (1.24, 11.00)**
Iraq	1.60 (1.48, 1.72)***	1.50 (1.31, 1.71)***	2.73 (2.17, 3.42)***	11.12 (4.01, 30.80)***
Jordan	1.54 (1.40, 1.69)***	0.53 (0.42, 0.67)***	1.49 (1.01, 2.18)*	—
Syria	1.19 (1.09, 1.31)***	0.82 (0.68, 0.98)*	1.21 (0.88, 1.66)	1.62 (0.53, 4.98)
Somalia	2.40 (1.81, 3.17)***	0.82 (0.69, 0.97)*	1.33 (1.04, 1.70)*	3.15 (1.07, 9.27)*
Israel/Palestine	1.03 (0.93, 1.15)	1.08 (0.81, 1.43)	0.42 (0.17, 1.05)	—
Other	1.22 (1.14, 1.30)***	0.91 (0.79, 1.05)	1.15 (0.90, 1.47)	4.34 (1.50, 12.56)**
Age	1.02 (1.01, 1.02)***	1.06 (1.04, 1.07)***	1.02 (1.00, 1.04)	1.07 (0.99, 1.14)
Age of migration	1.00 (1.00, 1.00)	0.97 (0.96, 0.99)***	1.00 (0.98, 1.03)	0.95 (0.89, 1.02)
Male	1.15 (1.09, 1.21)***	1.24 (1.14, 1.36)***	0.84 (0.75, 0.94)**	1.32 (1.05, 1.66)*
<b>Marital status</b>				
Separated/divorced	1.80 (1.67, 1.91)***	1.50 (1.35, 1.67)***	1.56 (1.35, 1.81)***	1.21 (0.90, 1.63)
Widowed	1.91 (1.80, 2.03)***	1.52 (1.36, 1.69)***	1.30 (1.13, 1.49)***	1.58 (1.20, 2.09)**
Never married/single	1.44 (1.30, 1.60)***	1.12 (0.91, 1.38)	2.18 (1.78, 2.68)***	0.55 (0.33, 0.91)*
<b>Education group</b>				
High school	0.67 (0.64, 0.71)***	0.63 (0.57, 0.70)***	0.85 (0.76, 0.96)**	1.17 (0.92, 1.47)
Some college	0.78 (0.72, 0.84)***	0.80 (0.69, 0.93)**	0.52 (0.42, 0.64)***	0.65 (0.44, 0.97)*
College or more	0.46 (0.43, 0.50)***	0.68 (0.60, 0.78)***	0.72 (0.61, 0.85)***	0.48 (0.35, 0.65)***
<b>Employment status</b>				
Unemployed	3.64 (3.07, 4.31)***	3.17 (2.35, 4.28)***	1.55 (1.04, 2.31)*	1.55 (0.69, 3.47)
Not in labor force	6.65 (6.11, 7.24)**	8.56 (7.36, 9.96)***	5.09 (4.14, 6.25)***	16.68 (4.37, 10.21)***
Personal income (Log)	0.73 (0.69, 0.77)***	1.01 (0.91, 1.12)	0.53 (0.46, 0.60)***	0.59 (0.45, 0.77)***
Family income (Log)	1.64 (1.57, 1.71)***	1.14 (1.00, 1.29)*	1.22 (1.05, 1.41)***	2.59 (1.99, 3.37)***
<b>Poverty</b>				
139%–400%	1.74 (1.64, 1.85)***	1.00 (0.88, 1.14)	0.89 (0.74, 1.07)	1.35 (0.87, 1.80)
138% or below	2.25 (2.09, 2.42)***	1.31 (1.10, 1.56)**	0.91 (0.73, 1.13)	3.35 (2.20, 5.11)***
<b>Health insurance</b>				
None	0.64 (0.55, 0.75)***	0.98 (0.78, 1.22)	0.40 (0.30, 0.52)***	—
N/A	1.03 (0.94, 1.12)	2.02 (1.74, 2.35)***	0.72 (0.56, 0.91)**	—
No English proficiency	1.77 (1.67, 1.87)***	2.08 (1.89, 2.30)***	2.19 (1.91, 2.52)***	1.94 (1.52, 2.48)***
Not a U.S. citizen	0.92 (0.86, 0.99)*	0.79 (0.72, 0.87)***	0.77 (0.68, 0.88)***	0.53 (0.40, 0.69)***
BIC	56,710	17,935	11,090	3,181
Sample year	0.99 (0.98, 0.99)***	0.99 (0.97, 1.019)	0.93 (0.91, 0.95)***	0.92 (0.86, 0.97)**

Notes: Age is centered at *M* = 62.8. Age of migration is centered at *M* = 35.4. Reference groups: female, married, less than high school education, employed, over 401% poverty threshold, have health insurance, birthplace is Lebanon, does speak English, and U.S. citizen. OR = odds ratio; CI = confidence interval; BIC = Bayesian information criterion method.

\**p* < .05, \*\**p* < .01, and \*\*\**p* < .001.

2013). A recent systematic review and meta-analysis found a substantially higher burden of mental illness, particularly depression, anxiety, and posttraumatic stress disorder (PTSD), in refugees compared to both nonrefugee populations and to populations living in conflict or war settings, independent of the length of residence (Henkelmann et al., 2020). Another meta-analysis found that survivors of war with PTSD had poorer performance in tasks requiring processing speed, executive function, attention, working memory, and learning (Rehman et al., 2020). Moreover, refugees have a higher prevalence rate of traumatic brain injury (McPherson, 2019), lifetime stress (Sangalang et al.,

2019), sleep disturbances (Richter et al., 2020), and perceived discrimination (Ziersch et al., 2020), which were independently shown to correlate with higher rates of cognitive decline. Studies among Iraqi refugees suggested that this group was at particularly high risk for PTSD and overall health problems (Jamil et al., 2002) and that a longer tenure in the U.S. was associated with increased depression for this population (Taylor et al., 2014), are both associated with an increased risk of dementia (Desmarais et al., 2020; John et al., 2019; Katon et al., 2015). Refugees are likely to have experienced mental health trauma pre, during and postresettlement, each with distinct stressors

related to forced migration that may worsen cognitive health, but the links and mechanisms involved remain a research gap.

Not only do refugees have unique exposures pre, during, and after the migration journey that can increase their risk of cognitive difficulties, but recalling traumatic events can by itself worsen cognitive health (Aydin, 2017). For example, during the asylum and refugee status application process, refugees have the legal obligation to regularly recall abject, degrading, and traumatic details, though these experiences may in themselves increase their chances of having difficulty remembering events (Charlier et al., 2018). Limited details or lack of precision in recounting conditions of exit from a war-torn country of origin is a frequent argument for refusal of granting asylum or political refugee status. Together, these multiple risk factors for cognitive decline that are unique to and prevalent among refugees may explain our findings. Ultimately, supporting findings from prior literature on racialized and minority groups, there is a clear need for racial and ethnic identifiers to measure Arab American health and migration history (Maghbouleh et al., 2022). Only then will health disparities, not only among Arab Americans, but also for other racial and ethnic groups, and migrants generally, be more fully identified (Awad et al., 2022).

### Strengths and Limitations

Despite their growing numbers, Arab Americans are rarely included in cognitive health research in large part due to their historical classification as White (Abuelezam et al., 2018; Awad et al., 2022; Maghbouleh et al., 2022). The strengths of this study are the use of nationally representative data, a large sample size, the ability to disaggregate the foreign-born Arab American population from Arab Americans who were born in the U.S., the year of arrival and the inclusion of survey questions to assess self-reported cognitive difficulties. Use of the ACS allowed for mapping patterns of the major global events of forced displacement in different Arab countries. Given that there is currently no nationally representative data set in the U.S. that collects data on refugee history, and only a handful that collect data on Arab Americans as a distinct group disaggregated from their legal classification as White, using ACS data brings us one step closer to understanding the health characteristics of Arab Americans at a national level.

Despite being among only a handful of papers examining the potential impact of forced displacement as a social determinant of cognitive decline, this paper has notable limitations. First, the data and methods used are cross-sectional, and though we have data gathered at multiple time points, respondents at every year were different across time, which does not permit conclusions regarding causality or temporality. It is possible that cognitive status may influence a person's decision to migrate: perhaps the majority of their family is here, and they require their care, or they might have access to better health care here in the

U.S. than in their country of origin. Future studies among Arab American individuals who migrate to the U.S. should collect individual responses for reasons of migration in order to better understand the migrant experience and its link with cognitive health. However, analyzing ACS data could be particularly useful for racial and ethnic minority groups such as Arab Americans to inform policies and allocate resources to these communities. Second, the ACS allows for one member from each household to respond to the questionnaire on behalf of all other household members, which may result in inaccurate reporting for others in the household, particularly those who cannot read, write, or speak English. Additionally, it was impossible to discern through the ACS whether answers were self- vs informant-report. Third, having comorbidities (e.g., cancer, hypertension, and depression) could affect cognitive health, but the ACS does not collect detailed individual health data. Future research focusing on the cognitive health of Arab American migrants must account for comorbidities. Relatedly, the cognitive difficulty is a single, self-reported item in the ACS, prompting for multiple cognitive domains which could be attributable to multiple factors, and therefore is not the best tool to assess cognitive health. This is a common difficulty in assessing population-level cognitive health through surveys. However, the disability measures developed for the ACS were found to produce an unbiased picture of the population with disabilities (Altman et al., 2017). Fourth, the time period of arrival is confounded with time in the U.S., as time in the U.S. is linked to acculturation into the mainstream culture and cognitive and mental health. While we did not find any significant associations with age of migration on self-reported cognitive decline, future studies would benefit from consistently measuring age at migration and duration in the U.S. among Arab Americans. This approach would advance knowledge about migrant health by allowing for investigations to corroborate whether associations found with cognitive health outcomes among other minoritized groups in the U.S. (Hispanic/Latinos; Garcia et al., 2018) are also evident among individuals with Arab ancestry. Furthermore, there is no way to ascertain a definitive refugee history because the ACS does not collect such data. We have assumed that the majority of those coming from war-torn countries were forcibly displaced due to the political and safety predicaments at that time. There may be individuals from those countries that migrated using other migration mechanisms (e.g., work or education visas). Finally, the factors linking migration and cognitive function are multidimensional and complex; we were not able to include all potential covariates affecting cognition in migrants in our models. Future work will need to explore these psychosocial, behavioral, physical, and environmental relationships (Xu et al., 2018).

### Conclusion

This is the first study to provide estimates of self-reported cognitive difficulties among Arab American migrants in the

context of birthplace and potential indicators of migration history. A developmental life course perspective identifies key levels of analysis to better disaggregate the ways in which the migrant experience influences perceived cognitive difficulties. Currently, all migrants are typically lumped into the “immigrant” group with little attention to collecting data on reasons for migration despite living through all-time high displacement rates. Despite the increased number of global conflict zones, both ethnic and migration history identifiers in most health data sets are still lacking, masking the needs of refugees, asylees, and those who were forcibly displaced. Certain aspects of migrant integration, such as improved English language proficiency, may help reduce cognitive health disparities later in life and inform intervention and policy design.

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## Conflict of Interest

None declared.

## Author Contributions

T. Al-Rousan planned the study, supervised the data analysis, and wrote the article. L. Kamalyan performed all statistical analyses and contributed to revising the article. K. J. Ajrouch helped to plan the study, including the instrumentation, and to revise the manuscript. G. Argeros helped with the data analysis and revised the manuscript. A. Bernstein Sideman, B. Miller, R. AlHeresh, A. Moore, and M. J. Marquine helped with the data interpretation and revised the manuscript.

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