Mortality Rates Among Arab Americans in Michigan

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Abstract

The objectives of this study were to: (1) calculate age-specific and age-adjusted cause-specific mortality rates for Arab Americans; and (2) compare these rates with those for blacks and whites. Mortality rates were estimated using Michigan death certificate data, an Arab surname and first name list, and 2000 U.S. Census data. Age-specific rates, age-adjusted all-cause and cause-specific rates were calculated. Arab Americans (75+) had higher mortality rates than whites and blacks. Among men, all-cause and cause-specific mortality rates for Arab Americans were in the range of whites and blacks. However, Arab American men had lower mortality rates from cancer and chronic lower respiratory disease compared to both whites and blacks. Among women, Arab Americans had lower mortality rates from heart disease, cancer, stroke, and diabetes than whites and blacks. Arab Americans are growing in number. Future study should focus on designing rigorous separate analyses for this population.

Keywords

Arab; Mortality rates; Surnames

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Mortality rates are important and widely used indicators of the health of a population. In the United States (U.S.), mortality rates vary by race and ethnicity. In 2006, for example, the age-adjusted mortality rates (per 100,000) were: 431.6 for Asians/Pacific Islanders; 550.1 for Hispanics; 1,000.5 for non-Hispanic blacks ("blacks"); and 778.2 for non-Hispanic whites ("whites") [1]. The white racial category, as defined by the U.S. government, is a diverse group consisting of persons having origins in Europe, North Africa, or the Middle East [2]. However, merging heterogeneous groups under the category of "white" may obscure important variations within that category [3, 4]. Arab Americans constitute a distinctive subgroup of whites that is receiving increased attention in health disparities research [5–7]. We use the term "Arab Americans" to include immigrants or individuals born in the U.S. who have descendants from the Arab League of countries in the Middle East and North Africa.

According to the U.S. Census, the Arab American population has increased from 660,000 in 1980 [8] to 1,189,731 in 2000 to over 2 million in 2007 [9, 10], and is larger than the Native Hawaiian and other Pacific Islander population (398,835) [11]. Native Hawaiians and other Pacific Islanders, although smaller in number than Arab Americans, have been recognized by and have achieved racial minority status by the federal government [2]. The Arab American population is also larger than several sub-groups of the Hispanic and Asian American populations, such as Cubans and Chinese, who are specifically identified in national data collection efforts such as the National Health Interview Survey [12]. Because Arab Americans cannot be readily identified via national health surveys, death certificates, and other forms, researchers have developed surname lists [13, 14] to facilitate the process of estimating cancer incidence [14–17] and mammography screening [18]. We are aware of only two published investigations of mortality in this population subgroup, specifically among immigrants. Nasseri [19] used death certificate data and reported proportional mortality ratios comparing Arab Middle Eastern immigrants to U.S. born non-Hispanic whites. Kato and colleagues [20] reported on cancer deaths by cancer site among Arab immigrants compared to U.S. born cases. Neither one estimated mortality rates.

Researchers have been using surname lists to estimate morbidity and mortality rates of small racial and ethnic groups for the past 30 years. These methods have been rigorously tested among several racial and ethnic groups worldwide and provide estimates that are reliable and valid [21–24].

These studies are important and contribute to the growing literature on Arab American health. Dallo and Williams [25], in their recent review of the health literature on Arab Americans, suggest that despite a favorable socioeconomic status profile, the risk of diabetes, certain cancers, and mental health problems are higher among Arab Americans compared to some other ethnic minorities or whites. A majority of these studies were conducted in metropolitan Detroit given that this area has a higher concentration of Arab Americans than any other U.S. city [26]. Some of these studies included blacks in the sample, because Arab Americans and blacks live in close proximity to one another. In fact, because of this demographic pattern, several studies have assessed whether exposure to risk factors similarly influenced the prevalence of chronic conditions for blacks and Arab Americans [5, 7]. Again, however, none of these studies have estimated mortality rates.

Given that Arab Americans are becoming increasingly visible in the U.S. and there is very limited information regarding their health, the current study has two objectives: (1) calculate age-specific and age-adjusted cause-specific mortality rates for Arab Americans 25 years of age and older in Michigan; and (2) compare these mortality rates with the rates for blacks and whites in Michigan.

Methods

Mortality rates for Arab Americans in Michigan were estimated using Michigan death certificate data, an Arab surname list, an Arab first name list, and 2,000 U.S. Census data. To calculate the numerator, the 1999–2001 death record files from the Michigan Department of Community Health's Vital Records and Health Development Section for individuals 25 years of age or older were matched with the name lists that were previously developed and validated at the Metropolitan Detroit Cancer Surveillance System [14]. Several validation steps determined that the names represented self-identified Arab Americans with very few false positives (i.e., the lists were designed to be more specific than sensitive). The decedent's name was considered Arab based on either of two criteria:(1) a match of the decedent's surname to the Arab surname list; or (2) a match of the decedent's surname to the "equivocal" name list (equivocal names are names common to both Arab and European Americans) *and* a match of the decedent's first name to the Arab first name list.

Population denominator data were derived using the Public-Use Microdata Samples (PUMS) from the U.S. 2000 decennial census, which contains information from the U.S. Census Bureau long form [27]. Three items from the long-form—Arab ancestry, birthplace in an Arab League country, or Arabic/Syriac language spoken at home—were used to identify Arab Americans to compute the rate denominator. Rate ratios and p-values were calculated comparing the Arab American rates to the rates for black and white Michigan residents using the exact rate ratio test in the R statistical package (version 1.0–1) [28]. The numerator for all age-specific rates was estimated for 5-year age groups (except for the group 85 years of age or above). Rate ratios and chi-square values were calculated comparing the Arab American rates to the rates for black and white Michigan residents.

To determine age-adjusted cause-specific mortality rates, age-adjusted rates were calculated using the same methodology with the addition of age standardizing the rates to the U.S. 2000 standard million population. Cause-specific rates were calculated using the "underlying" cause of death from the death certificate, and were classified using the Tenth Revision of the International Classification of Diseases (ICD-10) [29]. Rates were calculated for heart disease (ICD-10 codes I00–I09, I11, I13, I20–I51), cancer (ICD-10 codes C00-C97), stroke (ICD-10 codes I60–I69), chronic lower respiratory disease (ICD-10 codes J40–J47), and diabetes mellitus (ICD-10 codes E10–E14). We included only these diseases because of their high disease burden in the general population [30] and because these diseases had at least 10 Arab American deaths on average per year. Confidence intervals were calculated using the Fay and Feuer method, which produces valid confidence intervals even when the number of cases is small [31]. Rate and confidence interval calculations were completed using SAS version 9.2 [32].

Finally, the Michigan Department of Community Health's Vital Records and Health Development Section provided year 2000 mortality rates for white and black Michigan residents age 25 and older using the department's standard methods.

Results

From a total of 215,494 death records reviewed, 2,801 records were considered to be from people of Arab ancestry. Age-specific mortality rates varied among Arab Americans, whites, and blacks (Table 1, panels A–C). For both sexes (panel A), among those 44 years of age or younger and ages 50–54, Arab Americans had lower mortality rates compared to whites; that is, the Arab to white ratio was less than 1.0. However, for individuals 45–49 and 55 years of age or older, the Arab to white ratio was greater than 1.0. For example, the Arab to white mortality ratio was 1.13 for individuals between the ages of 45–49. Of these, the only statistically significant differences in mortality rates between Arab Americans and whites were for ages 75–79 ($p = 0.04$), 80–84 and 85 or older (both p-values < 0.01). When compared to blacks, Arab Americans had lower mortality ratios for ages 25–74 years, but higher mortality ratios at ages 75 years or older (all p-values <0.01, except for ages 75–79). Similar patterns were observed when stratified by sex (see panel B for men and panel C for women).

In general, the Arab American age-adjusted cause-specific mortality rate estimates were in the range of the black and white estimates; however, because of the comparatively low Arab American sample size, the confidence intervals were larger than those of the two other groups (Table 2). The estimated heart disease death rate for Arab American males (637.4; 95% CI = 533.8, 757.9) was higher that of white men (521.6; 95% CI = 514.7, 528.5) and lower than that of black men (657.8; 95% CI = 633.3, 682.3). For cancer, both Arab American men (347.6; 95% CI = 279.5, 431.2) and white men (378.8; 95% CI = 372.2, 385.4) had significantly lower rates than black men (479.4; 95% CI = 456.8, 502.0). Arab and white males had comparable stroke (Arab: 94.6; white: 93.5) and diabetes (Arab: 44.3; white: 44.0) specific mortality rates, but lower than that for blacks (stroke: 117.7; diabetes: 59.5).

Arab American women had lower mortality rates for all causes combined, heart disease, cancer, stroke, chronic lower respiratory disease, and diabetes when compared to white and black women. However, due to the small numbers, the Arab American confidence intervals overlapped with the confidence intervals of white women, except for all cause, heart disease and cancer specific rates (Table 3). The mortality rates for all causes combined, heart disease, cancer, and diabetes were statistically and significantly lower for Arab American than for black women.

Discussion

The objectives of this paper were to present and compare age-specific and age-adjusted cause-specific mortality rates for Arab Americans, blacks, and whites 25 years of age or older in Michigan. In general, Arab American age-specific mortality rates were most similar to whites and lower than blacks, except at the oldest age ranges. The Arab American

mortality rates for the two oldest age categories were significantly higher than both whites and blacks. The possibility of small numbers contributing to instability of the mortality rate estimate must be considered and interpreted with caution.

We found that among Arab Americans, males had higher all-cause and cause-specific mortality rates compared to females. This also was true for white and black males, with the exception of diabetes, where mortality rates were similar for black males and females. In general, all-cause and cause-specific mortality rates for Arab American men were in the range of white and black men. However, Arab American men had lower mortality rates from cancer and chronic lower respiratory disease compared to both white and black men. Among women, Arab Americans had lower mortality rates from heart disease, cancer, stroke, and diabetes than white and black women.

Because this is the first study to report Arab American mortality rates, it is not possible to directly compare our results to other studies. One study by Nasseri reported proportional mortality ratios in California, comparing observed number of deaths for Arab Middle Eastern first generation immigrants to expected number of deaths based on non-Hispanic white U.S. born deaths [19]. While Nasseri's study estimates proportional mortality ratios, the current study estimated mortality rates. Proportional mortality ratios are used when there is a lack of information for the population at risk (i.e. the denominator). We used data from the census, which is currently the most informative, reliable, and representative source of information on Arab Americans [25].

The reasons for the heart disease and diabetes discrepancies between these two studies may be due to differences in: 1) mortality measures (proportional mortality ratios versus mortality rates); 2) time frame (1989–1999 versus 1999–2001); 3) method of identification (country of birth in California and surname lists in Michigan); and 4) immigration status (first generation versus total population). Nasseri's study included only first generation white immigrants in California, whereas our study included Arab Americans, whites, and blacks, regardless of immigration status. In addition, the two samples in Michigan and California may be quite heterogeneous in terms of health due to differences in health behaviors, acculturation, chronic conditions, access to care, and socioeconomic status. Taken together, these variables are powerful determinants of mortality.

Furthermore, as Arab Americans become more "westernized" and adopt U.S. norms of physical inactivity and poor diet, the prevalence of diabetes and obesity may increase. Future studies should better understand the role of health behaviors among Arab Americans given that in 2000, the leading cause of death in the U.S. was tobacco use, followed by poor diet and physical inactivity [30].

The interpretation of reported mortality rates also are influenced by strengths and limitations of our study. The first strength of this study is it uses a validated Arab surname and first name list to match with Michigan death certificate data. Another strength is the use of 2000 U.S. Census data to obtain denominator estimates for Arab Americans. A third strength is we used a tight time interval (1999–2001) to make as accurate comparisons as possible to 2000 data for whites and blacks.

Some limitations include a relatively small sample size for Arab Americans, especially for some of the cause-specific rates. However, averaging three years of data should stabilize the rate estimate. Another limitation is that Arab Americans may be undercounted by the U.S. Census, which would affect the denominator. The authors at the Metropolitan Detroit Cancer Surveillance System have investigated this issue thoroughly and have found that the use of a combined value of ancestry, place of birth, and language spoken provide the best estimate using U.S. Census data, which are the only data available by age for purposes of age stratification and adjustment in this population. Another limitation is we lacked data on length of stay and generational status in the U.S. National mortality data for the U.S. indicates that immigrants of all racial/ethnic groups have better health than their U.S.-born counterparts [33]. However, health tends to worsen with increasing stay in the U.S. [34]. This is an issue we were unable to address with our data. Third, we lacked data on national origin and religion for the Arab American population. Some limited evidence suggests that the health status of Arab Americans may vary by country of origin and religion [5–7].

New Contribution to the Literature

Mortality rates are compelling indicators of health. This study sheds light on mortality rates among Arab Americans, an understudied and underserved population. Future studies should add a separate category for Arab Americans or at least a label under the white category to allow us to design and initiate more rigorous separate analyses for this population group. To truly capture the diversity of the state of Michigan and our nation, it is important to recognize the increasing Arab American population as a group separate from white.

Acknowledgments

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Table 1

Age-specific death rates, rate ratios, and p-values comparing Arabs (1999–2001) to whites (2,000) and blacks (2,000) in Michigan

Age group	Death rate per 100,000			Rate ratio		p-value	
	Arab	White	Black	Arab to white	Arab to black	Arab to white	Arab to black
A. Both sexes							
25–29	67.7	75.6	208.4	0.90	0.32	0.91	<.01
30–34	97.1	94.7	224.2	1.03	0.43	1.00	<.01
35–39	82.4	134.9	338.5	0.61	0.24	0.09	<.01
40–44	191.2	209.6	500.5	0.91	0.38	0.76	<.01
45–49	333.4	296.1	804.6	1.13	0.41	0.55	<.01
50–54	423.9	442.7	1,073.9	0.96	0.39	0.90	<.01
55–59	748.9	737.1	1,367.0	1.02	0.55	0.96	<.01
60–64	1,287.9	1,189.5	1,993.3	1.08	0.65	0.60	<.01
65–69	2,264.8	1,954.8	2,872.3	1.16	0.79	0.22	0.04
70–74	3,432.1	2,981.5	4,100.6	1.15	0.84	0.16	0.08
75–79	5,654.6	4,741.8	5,579.4	1.19	1.01	0.04	0.90
80–84	12,205.4	7,440.9	8,333.3	1.64	1.46	<.01	<.01
85+	27,602.3	15,867.1	14,717.9	1.74	1.88	<.01	<.01
B. Men							
25–29	81.6	102.6	325.1	0.79	0.25	0.75	<.01
30–34	125.8	127.9	291.0	0.98	0.43	1.00	0.01
35–39	105.6	167.4	420.5	0.63	0.25	0.20	<.01
40–44	226.7	261.4	634.2	0.87	0.36	0.69	<.01
45–49	399.5	395.2	1,084.9	1.01	0.37	1.00	<.01
50–54	490.4	549.9	1,457.1	0.89	0.34	0.71	<.01
55–59	943.7	902.6	1,828.7	1.05	0.52	0.87	<.01
60–64	1,227.5	1,443.5	2,459.9	0.85	0.50	0.43	<.01
65–69	3,137.5	2,358.3	3,713.7	1.33	0.84	0.07	0.30
70–74	5,102.8	3,657.5	4,890.9	1.40	1.04	0.01	0.78
75–79	8,422.2	5,826.5	6,731.2	1.45	1.25	<.01	0.07
80–84	17,015.7	9,308.0	9,443.6	1.83	1.80	<.01	<.01

Age group	Death rate per 100,000			Rate ratio			p-value		
	Arab	White	Black	Arab to white	Arab to black		Arab to white	Arab to black	
85+	37,777.8	18,155.5	15,611.1	2.08	2.42		<.01	<.01	
C. Women									
25–29	50.5	48.0	104.9	1.05	0.48		1.00	0.29	
30–34	64.2	60.6	165.3	1.06	0.39		1.00	0.06	
35–39	66.2	102.0	268.1	0.65	0.25		0.53	<.01	
40–44	129.3	157.9	385.6	0.82	0.34		0.76	<.01	
45–49	253.3	196.5	570.2	1.29	0.44		0.49	<.01	
50–54	340.0	336.1	749.6	1.01	0.45		1.00	0.01	
55–59	546.1	576.0	975.7	0.95	0.56		0.97	0.02	
60–64	1,372.2	950.4	1,631.6	1.44	0.84		0.11	0.48	
65–69	1,593.0	1,603.9	2,259.5	0.99	0.71		1.00	0.06	
70–74	2,219.9	2,433.5	3,536.8	0.91	0.63		0.62	<.01	
75–79	4,124.9	3,986.2	4,806.7	1.03	0.86		0.81	0.24	
80–84	9,801.5	6,364.1	7,695.5	1.54	1.27		<.01	0.05	
85+	23,968.3	14,945.4	14,355.0	1.60	1.67		<.01	<.01	

Bold-faced values are statistically significant at the .05 *p*-value

Table 2

Age-adjusted cause-specific mortality rates[a] for Arab, white and black males 25 years of age and older, Michigan

Cause of deaths	Arab male[c]			White male[b]			Black male[b]		
	Average count	Rate[a]	95% CI	Count	Rate[a]	95% CI	Count	Rate[a]	95% CI
All causes	493.7	1,644.5	1,480.3–1,824.8	34,551	1,564.3	1,553.4–1,575.2	5,773	2,083.5	2,045.3–2,121.7
Heart disease	160.1	582.7	483.8–698.3	11,247	521.6	514.7–528.5	1,701	657.8	633.3–682.3
Cancer	122.6	361.2	291.4–446.5	8,751	378.8	372.2–385.4	1,305	479.4	456.8–502.0
Stroke	28.7	109.4	69.1–167.8	1,929	93.5	90.5–96.5	300	117.7	106.7–128.7
Chronic lower respiratory disease	18.0	74.6	41.5–126.6	1,886	87.3	84.2–90.4	161	63.5	55.0–72.0
Diabetes mellitus	18.0	57.4	31.3–101.4	995	44.0	41.7–46.3	161	59.5	51.3–67.7
Pneumonia and influenza	10.4	44.2	19.98–88.0	671	34.2	32.5–35.9	120	46.0	39.2–52.8
Kidney disease	10.3	36.3	15.79–76.0	532	25.8	24.2–27.4	143	56.3	48.6–64.0
Chronic liver disease and cirrhosis	6.3	13.2	4.4–41.2	522	20.1	18.4–21.8	123	35.4	29.3–41.5

[a]Per 100,000,

[b]Rates are for year 2000,

[c]Rates are a yearly average of 2000–2006

Table 3

Age-adjusted cause-specific mortality rates[a] for Arab, white and black females 25 years of age and older, Michigan

Cause of deaths	Arab female[c]			White female[b]			Black female[b]		
	Average count	Rate[a]	95% CI	Count	Rate[a]	95% CI	Count	Rate[a]	95% CI
All causes	451.6	922.7	838.25–1,013.8	37,619	1,109.4	1,101.0–1,117.8	5,732	1,464.5	1,436.4–1,492.6
Heart disease	135.0	289.3	241.9–343.56	12,372	352.4	347.7–357.1	1,878	492.2	474.8–509.6
Cancer	106.9	202.4	165.3–245.9	8,143	256.1	251.0–261.2	1,279	324.2	308.1–340.3
Stroke	33.3	70.7	48.5–100.0	3,089	87.3	84.9–89.7	412	107.7	99.4–116.0
Chronic lower respiratory disease	20.3	41.5	25.2–64.8	2,096	63.1	60.6–65.6	151	38.6	33.0–44.2
Diabetes mellitus	16.6	32.6	18.6–53.5	1,179	35.3	33.5–37.1	235	60.7	53.9–67.5
Pneumonia and influenza	7.9	17.1	7.3–34.6	896	25.1	23.9–26.3	106	27.3	23.2–31.4
Kidney disease	8.3	17.7	7.7–35.3	617	17.8	16.6–19.0	154	40.2	34.9–45.5
Chronic liver disease and cirrhosis	3.4	6.3	1.5–18.8	298	9.9	8.8–11.0	68	15.4	11.7–19.1

[a] Per 100,000,

[b] Rates are for year 2000,

[c] Rates are a yearly average of 2000–2006