THE PREVALENCE OF SELF-REPORTED CHRONIC CONDITIONS AMONG ARAB, CHALDEAN, AND AFRICAN AMERICANS IN SOUTHEAST MICHIGAN

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Objectives: While there is a plethora of research on the prevalence of individual chronic conditions, studies that examine the clustering of these conditions are lacking, especially among immigrant, minority groups.

Design: Cross-sectional, convenience sample.

Setting: A self-administered survey was distributed at churches, mosques, and small businesses.

Participants: Arabs (n=1383), Chaldeans (n=868), Blacks (n=809) and Whites (n=220) in southeast Michigan.

Main outcome measures: We estimated the prevalence of hypertension, high cholesterol, heart disease, diabetes, asthma, and depression. Using a logistic regression model, we estimated odds ratios and 95% confidence intervals for the association between ethnicity and reporting one or more chronic conditions before and after adjusting for demographic, socioeconomic status, health care, chronic conditions, and health behavior variables.

Results: The overall age and sex-adjusted prevalence of having one or more chronic conditions was 44%. Estimates were lower for Chaldeans (32%) compared to Arabs (44%), Whites and Blacks (50% for each group). In the fully adjusted model, Chaldeans were less likely (OR=0.62; 95% CI=0.43–0.89) to report having one more chronic conditions compared to Whites.

Conclusions: Future studies should employ probability samples, and should collect more detailed sociodemographic and acculturation data, which influence the relationship between race/ethnicity and the prevalence of chronic conditions. (*Ethn Dis.* 2009;19:293–300)

Key Words: Arab, Chaldean, Black, Chronic Conditions

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INTRODUCTION

Chronic conditions are a major public health problem in the United States. In 2005, 21% or 63 million Americans reported having more than one chronic condition.[1] Since some chronic conditions disproportionately affect minorities compared to non-Hispanic Whites,[2,3] we can extrapolate from these findings that minorities suffer not just from a single condition, but from multiple chronic conditions, compared to non-Hispanic Whites. However there is a dearth of knowledge in this area. One study focusing on women suggests that non-Hispanic Blacks were more likely to report two chronic conditions compared to non-Hispanic Whites or Hispanics.[4] Even though chronic conditions, such as diabetes and hypertension, are beginning to affect young adults and children,[5,6] most studies examining multiple chronic conditions include only the elderly.[7]

A focus on multiple chronic conditions among women, the elderly, or the general population (ie, Whites) masks variations in other ethnic groups. For example, although Whites are usually used as the reference category for health comparisons in the United States, Whites are a heterogeneous group.[8] According to the Office of Management and Budget, Whites comprise persons having origins in Europe, North Africa, or the Middle East.[8] Therefore, using Whites as the reference group may miss variations in the health status of other groups within the White category, such as individuals from the Middle East.

Whites are assumed to be a homogeneous group. Therefore, little attention has been paid to the health status of subgroups within the White category. For example, Arab and Chaldean (Catholic Iraqis) Americans, subgroups within the White category, may exhibit better or worse health outcomes compared to Whites as a whole.[8–11] Studies find mixed results when comparing the prevalence of various chronic conditions for Arab and Chaldean Americans and Whites or other minorities. In general, compared to Whites, studies suggest that Arab and Chaldean Americans suffer from higher estimates of asthma,[12] depression,[13] and diabetes,[14] but Arab and Chaldean Americans fare better with regard to heart disease,[11] hypercholesterolemia,[15,16] and hypertension.[9] These studies were conducted in Michigan, a state that is home to the highest concentration of Arab and Chaldean Americans than any other US state (approximately 500,000).[17–19]

Findings from these studies are crucial in helping us better understand the health of Arab and Chaldean Americans in Michigan. However, to place the health and disease status of Arab and Chaldean Americans in the

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context of other minority populations in Michigan, it would be important to include African Americans in the discourse. Therefore, using data from the 2005 Health Assessment Survey (HAS), this study has two objectives: 1) to estimate and compare the prevalence of having one or more chronic conditions among Arabs, Chaldeans, and Blacks to Whites in Southeast Michigan; and 2) to examine the association between race/ethnicity and having one or more chronic conditions.

METHODS

Setting and Subjects

We briefly describe the Health Assessment Survey (HAS); detailed information has been published elsewhere.[10,11,20] In general, the HAS assessed the prevalence of, and risk factors for, various chronic conditions among individuals attending the Arab American and Chaldean Council (ACC). The study included 3,543 individuals aged 18 years and older (approximately 5% of ACC attendees/clients-visitors per year), from 127 (54.5%) zip codes of Macomb, Oakland and Wayne counties out of a possible of 233 zip codes in these three counties. The study period was from August 26, 2005 to October 25, 2005. Approval was obtained from Wayne State University institutional review board (#0507002615).

Questionnaire Development

The instrument was based on a standardized health status questionnaire, which was translated into Arabic, pilot-tested, and approved by a team of medical, education, research, and public health professionals. All responses were self-reported.

Procedure

A staff member from each department at various locations of the ACC recruited participants from their departments during business hours. Participants were invited to participate after the study had been explained to them. Structured questionnaires in English or Arabic were either self-administered (among literate participants) or administered by interview.

Of the 3,543 individuals interviewed, we limited the analyses for this article to Chaldean, Arab, African Americans and Whites. Hispanics were included with the White category because of their small sample size (n=28) and because we specified the analyses with and without Hispanics in the sample, and the differences were negligible. We excluded individuals who identified with an ''other'' or did not respond to the ethnicity question and who responded ''unknown'' or did not respond to the chronic conditions questions (n=263). This yielded a final sample size of 3,280 (220 Whites, 809 African Americans, 868 Chaldean Americans, and 1,383 Arab Americans) for the analyses.

Outcome

The outcome for this study was the presence vs absence (referent) of multiple self-reported conditions: asthma, depression, diabetes, heart disease, hypercholesterolemia, and hypertension, collected with the question, ''Have you been diagnosed by your doctor with any of the following?'' Responses were ''yes'' vs ''no.'' We created a count variable for these chronic conditions and dichotomized it as absence (no chronic conditions) vs presence (one or more chronic conditions). The main independent variable was ethnicity, determined by asking, ''Which ethnicity are you?'' Responses for these analyses were Chaldean American, Arab American, African American, or White (referent).

Covariates

Covariates included several demographic (age, sex, marital status, language spoken/written), socioeconomic status (educational level, employment status, income), health care (health insurance, physician visit, self-rated health, and BMI), and health behavior variables (exercise, transportation, smoking status, fruit servings, and vegetable servings). For individuals with missing information for age (n=260), we calculated the mean age for the sample and applied it to those with missing age.

Analysis

First, we calculated descriptive statistics for the entire sample as well as for the four racial/ethnic groups. Second, we estimated the number and proportion of the number of chronic conditions (zero, one, two, or three or more) for the total sample and for each ethnic group. Third, we calculated the prevalence of having one or more chronic conditions by sample characteristics. For all three analyses, we determined significant differences between groups using a t test for continuous variables and a Chi-square for discrete variables. Finally, we specified logistic regression models to estimate the strength of the association between ethnicity and presence or absence of multiple chronic conditions. Specifically, we performed six sets of analyses: (1) crude odds ratios

Table 1. Descriptive characteristics by race/ethnicity, Health Assessment Survey, *n* (%), 2005

Variable	Arab (*n*=1383)	Chaldean (*n*=868)	Black (*n*=809)	White (*n*=220)	Total (*n*=3280)
Demographics					
Age*					
18–39	840 (60.7)	397 (45.7)	724 (89.5)	158 (71.8)	2119 (64.6)
40–54	355 (25.7)	208 (24.0)	68 (8.4)	46 (20.9)	677 (20.6)
≥55	188 (13.6)	263 (30.3)	17 (2.1)	16 (7.3)	484 (14.8)
Female*	854 (62.7)	566 (65.8)	751 (93.4)	162 (73.6)	2333 (71.9)
Married*	1225 (89.8)	712 (82.8)	166 (20.8)	89 (41.4)	1864 (57.5)
Language*					
Speak English	207 (15.8)	109 (12.7)	800 (98.9)	151 (71.9)	1267 (39.7)
Speak/read/write Arabic	832 (63.4)	338 (39.3)	0 (0)	29 (13.8)	1201 (37.6)
Speak Arabic and English	266 (20.3)	389 (45.2)	2 (0.2)	27 (12.9)	682 (21.4)
Socioeconomic status					
Less than high school*	622 (46)	377 (44.2)	64 (8.1)	44 (20.5)	1107 (34.5)
Unemployed/disabled/retired	1005 (73.7)	577 (67.0)	488 (60.5)	108 (50.2)	1826 (56.3)
Income <$10,000*	515 (48)	205 (32.4)	330 (54.8)	51 (31.9)	1101 (44.6)
Health Care					
Health insurance (Yes)*	884 (66.9)	593 (70)	649 (82.9)	149 (70.3)	2275 (71.9)
Physician visits*					
In the past year	1057 (76.4)	674 (77.6)	690 (85.3)	155 (70.5)	257 (78.5)
In the past 2–5 years	120 (8.7)	72 (8.3)	73 (9)	34 (15.5)	299 (9.1)
Don't know	206 (14.9)	122 (14.1)	46 (5.7)	31 (14.1)	405 (12.3)
Self-rated health*					
Excellent/very good/good	816 (59.0)	449 (51.7)	622 (76.9)	160 (72.7)	2047 (62.4)
Fair/Poor	493 (35.6)	394 (45.4)	154 (19.0)	55 (25.0)	1096 (33.4)
Don't know	74 (5.4)	25 (2.9)	33 (4.1)	5 (2.3)	137 (4.2)
Chronic conditions					
Hypertension*	278 (21.2)	220 (26.3)	108 (13.7)	23 (10.8)	629 (20.0)
High cholesterol*	297 (23.1)	238 (26.6)	64 (8.2)	19 (9.0)	618 (19.9)
Heart disease*	112 (8.6)	68 (8.2)	14 (1.8)	4 (1.9)	198 (6.3)
Diabetes*	118 (9.1)	98 (11.8)	41 (5.2)	17 (8.0)	274 (8.7)
Asthma*	124 (9.4)	45 (5.4)	115 (14.4)	29 (13.6)	313 (9.9)
Depression*	302 (23.2)	107 (13.3)	116 (15.0)	58 (29.0)	583 (18.9)
BMI >25 kg/m^2*	945 (81.0)	596 (76.3)	643 (90.4)	158 (84.0)	2342 (82.3)
Health Behaviors					
Ever smoked*	641 (57.9)	331 (59.3)	469 (58.8)	82 (42.3)	1523 (57.3)
Physically inactive*	890 (64.4)	463 (53.3)	186 (23.0)	71 (32.3)	1610 (49.1)
Have car for transportation	786 (58.2)	534 (62.7)	504 (62.6)	155 (71.1)	1979 (61.4)
Fruit servings/day (none)*	62 (13.5)	34 (14.8)	75 (11.9)	28 (18.4)	199 (13.6)
Vegetable servings/day (none)*	49 (10.7)	15 (6.5)	37 (5.9)	16 (10.5)	117 (8.0)

* $P<.01$.

Table 2. Number and prevalence of respondents having zero, one, two, and three or more chronic conditions; Health Assessment Survey, *n* (%), 2004

Number of Chronic Conditions	Arab (n=1383)	Chaldean (n=868)	Black (n=809)	Whites (n=220)	Total (n=3280)
0	769 (55.6)	487 (56.1)	510 (63.0)	126 (57.3)	1892 (57.7)
1	271 (19.6)	157 (18.1)	197 (24.4)	58 (26.4)	683 (20.8)
2	165 (11.9)	112 (12.9)	62 (7.7)	22 (10.0)	361 (11.0)
3+	178 (12.8)	112 (13.0)	40 (4.9)	14 (6.4)	344 (10.6)

Table 3. Prevalence of having one or more chronic condition for each ethnicity by sample characteristics, Health Assessment Survey 2005, *n* (%)

Variable	Arab (*n*=614)	Chaldean (*n*=381)	Black (*n*=299)	White (*n*=94)	Total (*n*=1388)
Demographics					
Mean age (+SD)*	(45.48, 14.28)	(54.62, 15.70)	(31.9, 9.8)	(35.86, 15.44)	(44.1, 15.9)
Age*					
18–39	250 (29.8)	85 (21.4)	248 (34.3)	66 (41.8)	649 (30.6)
40–54	205 (57.7)	92 (44.2)	39 (57.4)	18 (39.1)	354 (52.3)
>55	159 (84.6)	204 (77.6)	12 (70.6)	10 (62.5)	385 (79.5)
Sex*					
Female	362 (42.4)	232 (41.0)	271 (36.1)	66 (40.7)	931 (39.9)
Male	240 (47.2)	145 (49.3)	25 (47.2)	28 (48.3)	437 (47.9)
Marital status*					
Married	423 (40.2)	356 (57.2)	65 (65.0)	53 (59.6)	760 (40.8)
Single	67 (47.2)	45 (30.4)	226 (35.7)	45 (45.0)	383 (37.4)
Other	119 (69.2)	65 (72.2)	33 (50.0)	13 (50.0)	230 (65.0)
Language*					
Speak English	71 (34.3)	33 (30.3)	296 (37.0)	69 (45.7)	469 (37.0)
Speak/read/write Arabic	416 (50.0)	174 (51.5)	0 (0)	11 (37.9)	601 (50.0)
Speak Arabic and English	84 (31.6)	152 (39.1)	3 (42.9)	7 (25.9)	243 (35.6)
Socioeconomic status					
Education*					
Less than high school	332 (53.4)	208 (55.2)	26 (40.6)	20 (45.5)	526 (52.9)
High school or more	266 (36.5)	163 (34.2)	270 (37.1)	71 (41.5)	769 (36.5)
Work status*					
Employed	109 (30.2)	77 (27.1)	109 (34.3)	42 (42.0)	336 (31.6)
Unemployed/disabled/retired	495 (82.0)	298 (79.5)	189 (63.4)	50 (54.3)	1032 (47.2)
Income*					
<$10,000	299 (58.1)	120 (58.5)	138 (41.8)	19 (37.3)	576 (52.3)
>$10,000	194 (34.8)	138 (32.2)	101 (37.1)	51 (46.8)	484 (35.4)
Health care					
Health insurance*					
No	163 (37.6)	79 (31.1)	47 (35.1)	18 (28.6)	308 (34.6)
Yes	430 (48.6)	292 (49.2)	244 (37.6)	75 (50.3)	1041 (45.8)
Physician visits*					
In past year	502 (47.5)	334 (49.6)	258 (37.4)	70 (45.2)	1164 (45.2)
In past 2–5 years	34 (28.3)	22 (30.6)	25 (34.2)	16 (47.1)	97 (32.4)
Don't know	78 (37.9)	25 (20.5)	16 (34.8)	8 (25.8)	127 (31.4)
Self-rated health*					
Excellent/very good/good	210 (25.7)	94 (20.9)	196 (31.5)	60 (37.5)	560 (27.4)
Fair/poor	373 (75.7)	276 (70.1)	92 (59.7)	34 (61.8)	775 (70.7)
Don't know	31 (41.9)	11 (44.0)	11 (33.3)	0 (0)	53 (38.7)
Body mass index*					
<25 kg/m^2	82 (36.8)	51 (27.6)	23 (33.8)	11 (36.7)	167 (33.0)
>25 kg/m^2	444 (47.0)	294 (49.3)	246 (38.3)	72 (45.6)	1056 (45.1)
Health behaviors					
Smoking status					
Never smoked	288 (44.9)	101 (30.5)	153 (32.6)	38 (46.3)	580 (38.1)
Current or ex-smoker (Smokers)	228 (48.8)	119 (52.4)	144 (43.9)	47 (42.0)	538 (47.4)
Physical activity*					
Active	59 (12.0)	177 (38.2)	224 (26.0)	64 (43.0)	624 (37.3)
Inactive	455 (51.1)	204 (44.1)	75 (40.3)	30 (42.3)	764 (47.5)
Car for transportation*					

Table 3. Continued

Variable	Arab (*n*=614)	Chaldean (*n*=381)	Black (*n*=299)	White (*n*=94)	Total (*n*=1388)
No	287 (50.8)	183 (57.7)	104 (34.3)	24 (38.1)	599 (48.1)
Yes	313 (39.8)	187 (35.0)	193 (38.3)	69 (44.5)	762 (38.5)
Fruit servings/day*					
One or more	130 (32.8)	63 (32.1)	186 (33.6)	56 (45.2)	435 (34.3)
None	28 (45.2)	13 (38.2)	25 (33.3)	12 (42.9)	78 (39.2)
Vegetable servings/day*					
One or more	139 (34.0)	72 (33.5)	199 (33.6)	60 (43.8)	470 (34.8)
None	19 (38.8)	4 (26.7)	13 (35.1)	8 (50.0)	44 (37.6)

* $P<.01$.

(ORs) and their 95% confidence intervals (95% CI) between ethnicity and presence of one or more chronic conditions; (2) ORs (95% CI) adjusted for demographic characteristics; (3) ORs (95% CI) additionally adjusted for socioeconomic status characteristics; (4) ORs (95% CI) additionally adjusted for health care characteristics; (5) ORs (95% CI) additionally adjusted for health behaviors. Data management procedures were carried out with SPSS (SPSS, Chicago, Ill.).

RESULTS

The overall age- and sex-adjusted prevalence of having one or more self-reported chronic conditions was 44% (95% CI, 0.41–0.46). Estimates were lower for Chaldeans (32%; 95% CI, 0.29–0.36) compared to Arabs (44%; 95% CI, 0.41–0.47), Whites (50%; 95%CI, 0.42–0.57) and Blacks (50%; 95% CI, 0.46–0.55). The age-adjusted prevalence of having one or more chronic conditions was the same for males and females (44%, $p=.786$) (results not shown).

Table 1 shows descriptive characteristics for the sample. Compared to Whites and Blacks, Chaldeans and Arabs were older, more likely to be married, to have less than a high school education and to be unemployed (all $Ps<.001$). While 54.8% of Blacks reported an income of $10,000 or less, they were more likely to have health insurance compared to Chaldeans, Arabs, and Whites. Chaldeans were less likely to rate their health as excellent/very good/good and more likely to have hypertension and high cholesterol compared to Arabs, Blacks and Whites. In addition, heart disease was most prevalent among Arabs and Chaldeans, while depression was highest among Whites. Finally, Blacks were more likely to report being overweight or obese compared to other groups (all $Ps<.0001$).

Table 2 presents the frequency and proportion of individuals with zero, one, two, and three or more chronic conditions. Arabs (19.6%) and Chaldeans (18.1%) were less likely to have one chronic condition compared to Blacks (24.4%) or Whites (26.4%). However, Arabs (12.8%) and Chaldeans (13.0%) were more likely to have three or more chronic conditions compared to Blacks (4.9%) or Whites (6.4%).

Table 3 presents the prevalence of having one or more chronic conditions by race and ethnicity for each covariate. For all racial/ethnic groups (except Whites), the prevalence of having one or more chronic conditions increased with age (all $Ps<.01$). Chaldeans and Arabs with less than a high school education were more likely to have one or more chronic conditions compared to those with a high school diploma or higher ($P<.01$). Chaldeans and Arabs with an income of $10,000 or less were more likely to have one or more chronic conditions compared to their counterparts ($P<.01$). Chaldeans, Arabs and Blacks who reported being physically inactive were more likely to have one or more chronic conditions than their counterparts ($P<.01$). Chaldeans and Arabs who reported using a car for transportation were less likely to report having one or more chronic conditions compared to those who did not use a car for transportation. However, African Americans and Whites who reported using a car for transportation were more likely to report having one or more chronic conditions compared to those who did not use a car for transportation.

Table 4 presents the unadjusted and adjusted odds ratios with their 95% confidence intervals for the prevalence of one or more chronic conditions by race and ethnicity. In the unadjusted model, Chaldeans and Arabs were more likely, while Blacks were less likely to have one or more self-reported chronic conditions compared to Whites; however, these findings were not statistically significant. A closer examination shows when adjusting for age, sex, marital status, and language in model 2, Chaldeans were approximately 38% less likely (OR=0.62; 95% CI, 0.43–0.89) to report having one or more chronic conditions than Whites. This association remained statistically significant when adjusting for all covariates in model 5 (OR=0.46; 95% CI, 0.31–0.68).

DISCUSSION

Our goal in this study was two-fold: The first was to estimate and compare

Table 4. Unadjusted and adjusted odds ratios (95% confidence intervals) for presence of chronic conditions by race/ethnicity, Health Assessment Survey, 2005

Race/Ethnicity	Crude: Model 1 OR (95% CI)	Model 2 OR (95% CI)*	Model 3 OR (95% CI)*	Model 4 OR (95% CI)*	Model 5 OR (95% CI)*
White	1.00	1.00	1.00	1.00	1.00
Arab	1.07 (0.80–1.43)	0.92 (0.65–1.29)	0.79 (0.55–1.11)	0.78 (0.54–1.13)	0.76 (0.52–1.11)
Chaldean	1.05 (0.78–1.41)	0.62 (0.43–0.89)	0.57 (0.40–0.83)	0.46 (0.31–0.68)	0.46 (0.31–0.68)
Black	0.79 (0.58–1.06)	0.93 (0.67–1.31)	0.83 (0.59–1.17)	0.76 (0.53–1.10)	0.77 (0.54–1.11)

Model 1 unadjusted; Model 2 adjusted for age, sex, marital status and language; Model 3 additionally adjusted for education, employment status, and income; Model 4 additionally adjusted for health insurance, physician visits, self-rated health and BMI; Model 5 additionally adjusted for, smoking status, physical activity, transportation, fruit servings, and vegetable servings.

We found that in a fully adjusted model, Chaldeans were less likely than Whites to report having one or more chronic conditions.

the prevalence of having one or more chronic conditions among Arabs, Chaldeans, and Blacks to Whites in Southeast Michigan. We found that a higher proportion of Arabs, Chaldeans, and Whites reported having one or more chronic conditions compared to Blacks. Our second goal was to examine the association between race/ethnicity and having one or more chronic conditions. We found that in a fully adjusted model, Chaldeans were less likely than Whites to report having one or more chronic conditions.

It is not possible to compare our findings to other studies because, to our knowledge, this is the first study on Arab Americans (aged≥18 years) that included Whites and Blacks in the sample. However, according to research groups that used the same dataset,[10,11,20] when adjusting for possible confounders, one group found there was no difference in the prevalence of self-reported diabetes when comparing Chaldeans, Arabs and Blacks to Whites in Michigan.[10] Another group suggested that Arab or Chaldean ethnicity was not significantly associated with self-reported heart disease among women.[11] And, the third group found that the overall rate of self-reported depression was 18.2% but the highest rate of depression was among Arab American participants (23.2%), followed by African Americans (15%) and Chaldeans (13.3%).[20] Therefore, it appears even though Arab and Chaldean ethnicity may not be associated with specific chronic conditions, ethnicity may matter when there is a clustering of chronic conditions, as we found in our study.

Other research on Arab and Chaldean Americans suggest that Chaldeans are older,[21] more likely to have diabetes,[10] and hypertension[22] than other Arab American subgroups and minorities. However, this was not the case in our study. The crude bivariate analyses showed that Chaldeans were similar to Whites and Arabs (approximately 43% in each group) but more likely than Blacks (37%) in reporting having one or more chronic conditions. In a logistic regression model adjusted for age, sex, marital status, and language spoken (Table 4, Model 2), Chaldeans were less likely than Whites to report having one or more chronic conditions.

Table 3 may help provide an explanation for these findings. Among individuals with one or more chronic conditions, Chaldeans are more likely to be older and to be widowed, divorced, or separated compared to Arabs, Blacks, or Whites. In addition, Chaldeans are less likely to speak English compared to Arabs, Blacks, or Whites. This latter finding implies that because Chaldeans are less likely to speak English or to have a partner, they may be less likely to have access to care, so they may have an undiagnosed conditions. Our study would not have captured those individuals, since we used self-reported data.

One of the strengths of this study is that it addressed limitations of other studies (did not compare their estimates to other minority groups, used dated information, or had a small sample size).[9,14,21,23–25] As mentioned earlier, neither the state level study[26] nor the local community studies[14,21,23–25] compared Arab and Chaldean estimates to Whites or minority groups. Our study is unique in that it includes Whites and Blacks as comparison groups, which is important given that these groups live in the same areas and may be exposed to the same risk factors for these chronic conditions. In addition, the large sample size in our study allowed us to control for numerous potential confounders. More specifically, the ACC staff members approached 3,575 individuals. Of these, only 32 refused to participate, with a 99% response rate. The most common reasons given for not participating were lack of time and/or lack of interest. Information is not available on those who did not participate, but given the low refusal rate, we are confident if those who refused did participate, the findings from our study would not have changed.

It is also important to acknowledge the shortcomings that may have affected

our results. The first is that this study was a convenience sample; therefore, perhaps only healthy (or unhealthy) individuals or those who were available during the study times and days may have volunteered (ie, selection bias). Arab and Chaldean Americans are an understudied group in health research, and what is available is in its nascency. Although we used a convenience sample for this study, we feel it is important to generate preliminary results for future studies on this population. Our findings are indicative of the sample we interviewed. However, our findings are not generalizable to the Arab and Chaldean population at large, but that was not the goal of this study. The second limitation is that of self-reported chronic conditions. However, self-report data for diabetes and hypertension, for example, are highly correlated with physician's records.[27–29] Therefore, if any difference in reporting these diseases were to occur, it would have been nondifferential, underestimating the study's results.

Future studies should utilize a random probability sample in order to account for the reasons why individuals volunteer, and to be able to generalize the findings to the greater Arab and Chaldean American population at-large. For example, one of the reasons for the observed older age among Chaldeans is that the younger groups may have been working during the days and times that the study was offered. In addition, the survey was distributed at churches, mosques, and small businesses, and perhaps older Chaldeans were more likely to attend these places compared to younger Chaldeans.

This study underscores the importance of heterogeneity among Arab Americans in Michigan. Specifically, our study shows that Chaldeans are less likely to report having one or more chronic conditions compared to Arabs, Whites, or Blacks. Future studies should include a probability sample of Arabs, Chaldeans, Blacks and Whites, because such studies would remove the inherent biases in convenience samples, such as self-selection. Other than Chaldeans, future studies should include individuals of Lebanese ancestry given that they comprise a high proportion of Arabs in Michigan.[18,19] In addition, future studies should include robust measures of sociodemographic variables, since these seem to differ drastically by racial and ethnic group. To move our findings to the state level, the state of Michigan should include ethnic identifiers for Arab Americans on vital statistics, and any other health forms in hospitals or clinics, or used for research purposes. Only then can we develop and implement targeted intervention and prevention programs to reduce the prevalence of chronic conditions among under-served individuals.

ACKNOWLEDGMENTS

The ACC research team would like to recognize and thank all Arab American and Chaldean Council staff and community members (Dr. Evone Barkho and Nuha Jamil) for volunteering their time to collect and enter the data.

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