

# ORIGINAL REPORTS: MENTAL HEALTH

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## FACTORS ASSOCIATED WITH SELF-REPORTED DEPRESSION IN ARAB, CHALDEAN, AND AFRICAN AMERICANS

**Background:** Although depression is a chronic illness with high morbidity and personal and economic losses, little is known about depression in immigrants with an Arab or Chaldean ethnic background.

**Objectives:** Our primary objective was to determine the overall and ethnicity-specific prevalence of self-reported depression in Arab Americans, Chaldean Americans, and African Americans in the Midwest. The secondary objective was to evaluate the associations between potential risk and protective factors and the presence of self-reported depression.

**Method:** A total of 3543 adults were recruited from the Arab and Chaldean communities in Metropolitan Detroit. The sample in this study was restricted to those of Arab, Chaldean, and African ethnic backgrounds, resulting in 81.2% of the original sample ( $n=2878$ ). A health assessment survey questionnaire was administered.

**Results:** The overall rate of self-reported depression was 18.2%. The highest rate of depression was found in Arab American participants (23.2%), followed by African Americans (15%) and Chaldeans (13.3%). Self-reported prevalence of depression by country of origin differed significantly.

**Conclusions:** Our results show the need to provide culturally competent mental health services for Arab Americans and other minority American subgroups. Research is needed to identify risk factors, preferably modifiable factors, and to ascertain which factors are similar and non-similar to the general American population. (*Ethn Dis.* 2008;18:464–470)

**Key Words:** Depression, Arab Americans, Chaldean Americans, African Americans, Prevalence

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From the Department of Family Medicine and Public Health Sciences, Division of Occupation and Environmental Health (HJ), Department of Emergency Medicine (MG), Wayne State University School of Medicine, Detroit; Arab American and Chaldean Council, Southfield (HJ, MF, RK, HF); MPRO, Farmington Hills (JS), Michigan; University of Windsor, Department of Psychology, Windsor, Canada (JHL).

Hikmet Jamil, MD, PhD; Mary Grzybowski, PhD; Julie Hakim-Larson, PhD; Monty Fakhouri, MSCHS; Jessica Sahutoglu, MS; Radwan Khoury, PhD; Haifa Fakhouri, PhD

### INTRODUCTION

Somatic or psychological symptoms of depression and the ability of health professionals to detect it in ethnic minorities vary worldwide.<sup>1</sup> Histories of trauma and stress exposure have been linked to depression in both African Americans<sup>2</sup> and Arab Americans<sup>3</sup> and may account for some of the variance in depression that is typically observed within and across primary care settings in urban communities.<sup>2,3</sup>

The Arab American population is growing because of war and political unrest in the Middle East. At least 3.5 million Arabic-speaking people, including Chaldeans, reside in the United States, and 490,000 Arab Americans live in Michigan alone.<sup>4</sup> As the Arab American population grows, we need to better comprehend the epidemiology of common medical conditions affecting immigrants, such as depression, so that culturally appropriate interventions can be designed and implemented.

In the Arab world, depression has been historically stigmatized.<sup>5,6</sup> Persons suffering from depression relied on those in their immediate social network for help.<sup>7</sup> Only after the failure of these efforts would the family seek outside professional assistance.<sup>8</sup> However, resistance may per-

sist even today because of the associated stigma of potentially heritable mental illness.<sup>9</sup>

Recent reports of depression in clinical samples of Arab Americans have varied from 22.4% to 49%.<sup>3,10,11</sup> Research on non-Arab refugees worldwide has shown that non-Arab refugees often suffer from more symptoms of depression, anxiety, and posttraumatic stress disorder and have more health problems than do those who immigrate for educational, economic, and family reunification reasons.<sup>3,12–16</sup> As refugees from the Arab world assimilate to the United States, whether their health patterns and risk factors, including those associated with depression, eventually mirror those of non-African Americans should be ascertained. For example, the most common factors associated with depression are chronic illness,<sup>17</sup> type 2 diabetes,<sup>18</sup> heart failure, age, sex, and race.<sup>19</sup> Patients with poorly controlled hypertension are more than six times as likely to suffer depression than are nonhypertensive patients.<sup>20</sup> Similarly, African Americans with depression and obesity are significantly more likely to have such chronic diseases as hypertension and diabetes than their non-Hispanic European American counterparts.

The objectives of this study were to determine the overall and ethnicity-specific prevalence of self-reported depression (SR-depression) in an urban sample of African Americans, Arab Americans, and Chaldeans and to evaluate associations between potential risk factors and the presence of SR-depression.

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Address correspondence and reprint requests to: Hikmet Jamil, MD, PhD; Wayne State University; 3800 Woodward Ave, Ste 808; Detroit, MI 48201; 313-577-2048; hjamil@med.wayne.edu

## METHODS

The current study is a sub-sample of participants from a larger project conducted by the Arab American and Chaldean Council and Wayne State University School of Medicine, and detailed methods have been previously described.<sup>21–24</sup> For the current analysis, 3543 participants were eligible. Participants with missing race or depression data were excluded ( $n=382$ ). Among those remaining, 5.4% ( $n=173$ ) Caucasians and 3.5% ( $n=110$ ) “other” ethnicities were also excluded. The final sample was 81.2% of the original sample ( $n=2878$ ). The current analyses were restricted to unique African Americans, Arab Americans, and Chaldeans because of the low prevalence of the other ethnicities. Participants were voluntary and represented 54.5% (127/233) of the zip codes from three southeastern metropolitan counties surrounding Detroit, Michigan. The study period was from August 26, 2005 to October 25, 2005. The Wayne State University Institutional Review Board approved all aspects of this project.

The instrument was self-administered and based on a standardized health status questionnaire. It included basic demographics, socioeconomic status, health care and health statuses, and health behavior questions.<sup>22–24</sup>

The primary independent variable for this study was ethnicity. The remaining independent variables included demographics (age, sex, marital status, country of origin, language, and years in the United States), sociodemographics (education status, employment status, income  $> \$10,000$ , type of house, and health insurance coverage), current health status (years since last physician visit, self-rated health status, and overweight (body mass index [BMI]  $> 25 \text{ kg/m}^2$ ) based on self-reported height and weight), and medical histories (asthma, hypertension, high cholesterol, diabetes, any heart disease, and

smoking status). Age, number of children  $< 18$  years of age, and number of years in the United States were analyzed as both continuous and categorical variables. Categorical variables included age in years ( $< 25$ , 25–34, 35–44,  $\geq 45$ ), ethnicity (African, Arab, Chaldean), marital status (single, married, other), number of children  $< 18$  years in the household (0, 1–3,  $\geq 4$ ), language (English, Arabic, Arabic and English), years since immigrating to the United States ( $< 1$ , 1–4.9, 5–9,  $\geq 10$ ), education status (illiterate, less than high school, high school or more), employment status (employed, disabled, unemployed or retired), type of house (house, apartment, other), time since last physician visit (6 months, 1 year, 2 years, 5 years, don’t know), self-reported health status (excellent, very good, good, fair, not well, don’t know), and smoking status (never smoked, current smoker, former smoker). The dependent variable was SR-depression, assessed with the question, “Have you been diagnosed by your doctor with depression?”

### Statistical Analyses

We calculated point estimates and 95% confidence intervals for the overall and ethnicity-specific prevalence of SR-depression. Missing age values were imputed by calculating the mean age for the sample and applying it to those with missing age. Parametric or non-parametric tests were used to determine differences between groups for continuous and categorical data and reported as means and frequencies. Logistic regression was used to calculate age- and sex-adjusted odds ratios. Three separate logistic regression models by ethnic group were used to determine the relations between SR-depression status and multiple risk factors. For variables with more than two categories, indicator variables were created to assess each categorical level with the reference level so that all categorical variables could be assessed in the

models. Forward stepwise logistic regression was used to develop the models. For each step, the variable with the smallest likelihood ratio  $P$  value was entered. Variables were only eligible for entry if the likelihood ratio  $P$  value was  $< .10$  and the lowest Akaike information criterion could be maintained. All analyses were performed by using SAS version 9.1.3 (SAS Institute, Inc, Cary, NC). For all analyses, a .05  $\alpha$  level was considered, and all tests were two-sided.

## RESULTS

The overall mean age of participants was 38.2 years; 27% were African American, (mean age 30.2 years), 45% were Arab American (mean age 38.7 years), and 28% were Chaldean (mean age 44.8 years). The overall prevalence of SR-depression was 18.2%. By ethnicity, Arab Americans had the highest prevalence of depression (23.2%), followed by Chaldeans (13.3%), and African Americans (15.0%),  $P < .001$ . By country of origin, non-Chaldean Iraqis, had the highest prevalence (36.8%) followed by Palestinians (18.8%), Lebanese (16.2%), Chaldean-Iraqis (13.3%), the Yemenis (12.3%), and Jordanians (12.2),  $P < .0001$ .

Bivariate analyses in Table 1 shows selected characteristics associated with SR-depression by ethnicity. Socioeconomic factors and self-rated health statuses were associated for all ethnicities. Smoking also increased the likelihood of reporting depression, except in Arab Americans. Participants with self-reported histories of asthma, hypertension, high cholesterol, diabetes, and heart disease were all more likely to report depression than were those without these conditions (data not shown).

The logistic models are presented in Tables 2–5. Significant risk factors for depression in Chaldeans included being older (odds increase by 6% per year of

**Table 1. Associations between selected self-reported characteristics and self-reported depression status by ethnicity†**

Characteristics	Depression Status											
	Chaldean			Arab			African American			All		
	Depressed %	OR (95% CI)	Depressed %	OR (95% CI)	Depressed %	OR (95% CI)	Depressed %	OR (95% CI)	Depressed %	OR (95% CI)		
<b>Demographics</b>												
Age												
0-25 years	8.6	13.3	13.8	23.2	15.0	18.2						
25-34 years	8.8	1.0	18.4	1.0	1.0	10.9						
35-44 years	9.4	0.99 (0.37-2.63)	17.6	1.44 (0.83-2.47)	12.9	1.47 (0.83-2.59)	14.2	1.39 (0.97-2.00)				
45+ years	18.3	2.48 (1.03-5.99)*	28.7	2.47 (1.46-4.18)*	16.8	2.01 (1.01-3.97)*	21.1	2.25 (1.56-3.20)*				
Marital status												
Single	16.4	1.0	30.4	1.0	1.0	16.2						
Married	10.8	0.48 (0.27-0.85)*	19.6	0.31 (0.2-0.5)*	16.1	0.82 (0.41-1.66)	16.3	0.66 (0.51-0.86)*				
All Other	25.6	1.13 (0.53-2.39)	39.6	0.95 (0.54-1.69)	28.8	1.92 (0.98-3.75)	33.7	1.94 (1.39-2.73)*				
Children < 18 years in household												
0 children	16.5	1.0	31.7	1.0	1.0	22.6						
1-3 children	7.7	0.59 (0.33-1.05)	19.3	0.48 (0.31-0.74)*	11.7	0.49 (0.09-2.67)	13.9	0.69 (0.5-0.93)*				
4+ children	20.8	1.6 (0.94-2.73)	25.8	0.61 (0.39-0.94)*	21.0	0.92 (0.16-5.1)	23.6	1.2 (0.88-1.62)				
Years in US												
< 1 year	11.4	1.0	4.9	1.0	—	7.2						
1-4 years	1.8	0.15 (0.03-0.84)*	17.0	4.52 (1.31-15.53)*	—	—	10.9	1.55 (0.68-3.53)				
5-9 years	16.0	1.34 (0.47-3.78)	26.6	7.82 (2.38-25.66)*	—	—	22.3	3.5 (1.65-7.42)*				
10+ years	13.6	0.88 (0.32-2.43)	27.5	7.16 (2.2-23.32)*	—	—	21.9	2.97 (1.41-6.27)*				
<b>Socioeconomics</b>												
Employment												
Employed	6.2	1.0	11.7	1.0	10.5	9.7						
Disabled	24.8	3.38 (1.66-6.89)*	58.7	11.98 (7.28-19.71)*	54.5	6.03 (2.77-13.11)*	46.2	7.33 (5.23-10.27)*				
Unemployed /retired	14	2.18 (1.18-4)*	20.3	2.29 (1.5-3.51)*	14.3	1.29 (0.79-2.13)	17.1	2 (1.52-2.64)*				
Income												
< \$10-000	19.3	1.0	34.3	1.0	17.6	26.3						
\$10-000 +	8.7	0.51 (0.3-0.87)*	14.2	0.33 (0.24-0.46)*	14.4	0.63 (0.38-1.06)	12.4	0.41 (0.33-0.52)*				
Health insurance												
No	8.2	1.0	16.5	1.0	16.3	14.0						
Yes	15.7	1.76 (1.03-3.00)*	27.3	1.92 (1.39-2.65)*	14.5	0.9 (0.51-1.61)	20.1	1.61 (1.26-2.05)*				
<b>Health Status</b>												
Self-rated health status												
Excellent	11.8	1.0	2.9	1.0	7.3	5.7						
Very good	5.6	0.41 (0.1-1.65)	9.9	3.25 (1.08-9.78)*	9.9	1.34 (0.54-3.3)	9.2	1.5 (0.82-2.76)				
Good	6.1	0.44 (0.14-1.42)	14.5	4.89 (1.73-13.82)*	13.1	1.49 (0.62-3.58)	11.6	1.87 (1.07-3.29)*				
Fair	13.7	1.04 (0.33-3.22)	35.5	14.36 (5.08-40.57)*	25.8	3.92 (1.61-9.55)*	25.2	4.75 (2.71-8.33)*				
Not well	38	3.67 (1.14-11.79)*	54.4	32.56 (11.21-94.57)*	66.7	15.51 (4.5-53.53)*	49.3	13.69 (7.56-24.8)*				
Don't know	18.2	1.55 (0.34-7.1)	31.9	12.41 (3.95-39.0)*	20.7	2.16 (0.57-8.24)	26.7	4.85 (2.44-9.66)*				
Smoking status												
Never smoked	9.1	1.0	23.4	1.0	11.3	16.1						
Current smoker	23.8	3.5 (1.83-6.69)*	21.2	0.79 (0.55-1.15)	21.3	2.43 (1.46-4.05)*	21.8	1.36 (1.04-1.78)*				
Ex-smoker	18.2	2.5 (1.16-5.4)*	32.4	1.33 (0.86-2.07)	19.5	1.52 (0.84-2.76)	24.4	1.44 (1.06-1.96)*				

Abbreviations: OR- odds ratio; CI- confidence interval.  
 † Data are presented as the number (percent) unless otherwise indicated. All odds ratios are adjusted for age and sex.  
 \* P value and confidence interval significant.

**Table 2. Multiple logistic regression analysis predicting depression among Chaldean Americans (n=284)**

Variable	$\beta$	SE( $\beta$ )	P value	Odds Ratio	95% CI <sub>OR</sub>
Age	0.0592	0.0221	0.0073**	1.06	1.02–1.11
Sex: Male	-1.2479	0.7101	0.0789	0.29	0.07–1.16
Marital: Married	-2.3607	0.6943	0.0007***	0.09	0.02–0.37
Other	-1.6096	0.9808	0.1008	0.20	0.03–1.37
# Children under 18	0.2393	0.0995	0.0162*	1.27	1.05–1.54
Language: Arabic	-0.8345	0.8474	0.3247	0.43	0.08–2.29
Arabic/English	-0.9936	0.7836	0.2048	0.37	0.08–1.72
Number of years in US	-0.0479	0.0374	0.2003	0.95	0.89–1.03
Education: High school or less	0.74	1.0165	0.4666	2.10	0.29–15.37
> High school	0.0445	1.1184	0.9683	1.05	0.12–9.36
Homeowner: Yes	0.8453	0.5211	0.1048	2.33	0.84–6.47
Income: \$10,000+	-0.2513	0.5202	0.629	0.78	0.28–2.16
Insurance: Yes	0.9122	0.7212	0.206	2.49	0.61–10.24
BMI: Overweight	-0.2419	0.5751	0.6741	0.79	0.25–2.42
Smoke: Smoker	1.8728	0.7045	0.0079**	6.51	1.64–25.88
Ex-smoker	1.1366	0.8487	0.1805	3.12	0.59–16.45

Note: Intercept consists of sex=female, marital status=single, language=English, education=illiterate, homeowner=no, home type=house, income=<\$10,000, insurance=no, health=excellent, BMI=healthy, smoke=never smoked.

\* P<.05.

\*\* P<.01.

\*\*\* P<.001.

**Table 3. Multiple logistic regression analysis predicting depression among Arab Americans (n=488)**

Variable	$\beta$	SE( $\beta$ )	P value	Odds Ratio	95% CI <sub>OR</sub>
Age	-0.0233	0.0137	0.0887	0.98	0.95–1.00
Sex: Male	0.6954	0.3291	0.0346*	2.00	1.05–3.82
Marital: Married	-0.8847	0.5116	0.0838	0.41	0.15–1.13
Other	-0.015	0.5948	0.9799	0.99	0.31–3.16
Number of children under 18	-0.068	0.059	0.249	0.93	0.83–1.05
Language: Arabic	-0.5864	0.4652	0.2075	0.56	0.22–1.39
Arabic/English	0.1478	0.5075	0.7709	1.16	0.43–3.14
Country: Iraq	1.357	0.2843	<.0001***	3.88	2.23–6.78
Number of years in US	-0.0003	0.0164	0.9855	1.00	0.97–1.03
Education: High school or less	0.8225	0.4453	0.0647	2.28	0.95–5.45
> High school	0.1533	0.5413	0.777	1.17	0.4–3.37
Employment: Disabled	2.0254	0.4651	<.0001**	7.58	3.05–18.86
Unemployed	0.7638	0.3672	0.0375*	2.15	1.05–4.41
Homeowner: Yes	-0.1251	0.2721	0.6457	0.88	0.52–1.5
Income: \$10,000 +	-0.8958	0.2944	0.0023**	0.41	0.23–0.73
Insurance: Yes	0.5231	0.3263	0.1089	1.69	0.89–3.2
Health: Very good	0.7122	0.7991	0.3728	2.04	0.43–9.76
Good	0.9956	0.7396	0.1783	2.71	0.64–11.53
Fair	1.9142	0.7471	0.0104*	6.78	1.57–29.33
Don't know	2.8148	0.7938	0.0004***	16.69	3.52–79.09
BMI: Overweight	1.1576	0.3715	0.0018**	3.18	1.54–6.59
Smoke: Smoker	-0.3546	0.3319	0.2852	0.70	0.37–1.34
Ex-smoker	-0.2765	0.4053	0.495	0.76	0.34–1.68

Note: Intercept consists of sex=female, marital status=single, language=English, education=illiterate, homeowner=no, home type=house, income=<\$10,000, insurance=no, health=excellent, BMI=healthy, smoke=never smoked.

\* P<.05.

\*\* P<.01.

\*\*\* P<.001.

**Table 4. Multiple logistic regression analysis predicting depression among African Americans (n=405)**

Variable	$\beta$	SE( $\beta$ )	P-value	Odds Ratio	95% CI <sub>OR</sub>
Age	0.0522	0.0228	0.0218*	1.05	1.01–1.1
Sex: Male	–1.8424	1.1618	0.1128	0.16	0.02–1.54
Marital: Married	0.2725	0.4937	0.5809	1.31	0.5–3.46
Other	1.3434	0.501	0.0073**	3.83	1.44–10.23
Number of children under 18	0.1698	0.0837	0.0424*	1.19	1.01–1.4
Employment: Disabled	1.4243	0.6268	0.0231*	4.16	1.22–14.19
Unemployed	0.0367	0.3668	0.9202	1.04	0.51–2.13
Homeowner: Yes	0.0611	0.458	0.8938	1.06	0.43–2.61
Home Type: Apt	0.9864	0.409	0.0159*	2.68	1.2–5.98
Type: Other	–0.1716	1.1236	0.8786	0.84	0.09–7.62
Income: \$10,000+	–0.2498	0.3562	0.4831	0.78	0.39–1.57
Health: Very good	0.5293	0.6186	0.3922	1.7	0.51–5.71
Good	0.0942	0.6234	0.8798	1.1	0.32–3.73
Fair	0.1939	0.6865	0.7776	1.21	0.32–4.66
Don't know	2.4179	0.9449	0.0105*	11.22	1.76–71.51
BMI: Overweight	–1.2789	0.4804	0.0078**	0.28	0.11–0.71
Smoke: Smoker	0.9724	0.3775	0.01**	2.64	1.26–5.54
Ex-smoker	–0.311	0.4762	0.5137	0.73	0.29–1.86

Note: Intercept consists of sex=female, marital status=single, language=English, education=illiterate, homeowner=no, home type=house, income= $\leq$ \$10,000, insurance=no, health=excellent, BMI=healthy, smoke=never smoked.

\*  $P < .05$ .

\*\*  $P < .01$ .

age), having children <18 years of age and smoking (Table 2). Being married was protective against depression. Significant risk factors for Arab Americans included being male, emigrating from Iraq, being unable to work because of disability, being unemployed, describing one's health status as fair or "don't know," and being overweight (Table 3). The only protective factor was reporting an annual income >\$10,000.

Significant risk factors for African Americans included being older (odds increased by 5% per year of age), reporting a marital status other than married or single, having children <18 years of age, being unable to work because of disability, residing in an apartment, describing health status as "don't know," and smoking (Table 4). Being overweight was protective against depression.

Among all participants, Chaldean ethnicity, being from Iraq, having high school or less education, a higher income and health insurance were protective factors for SR-depression (Table 5). Factors positively associated with SR-depression included having more than one child less than 18 years old, being disabled and/or unemployed,

having at least one medical condition, and reporting fair self-reported health status.

## DISCUSSION

We found that 18.2% of our sample reported having depression. In a representative US sample from 1988 to 1994, the lifetime prevalence of major depression was 9.5%.<sup>25</sup> A retrospective study of 375 medical records among Arab Americans attending a community mental clinic showed that 49% had depression as a primary disorder,<sup>3</sup> and given that depression is underreported, our Arab American prevalence of 23.3% may be credible. Another study of 116 Iraqi refugees attending a similar community clinic reported a 22.4% prevalence of depression.<sup>10</sup> In another study, Iraqi Americans who immigrated to the United States after the Gulf War in 1991 were interviewed on their health status, and 38% reported being depressed.<sup>11</sup>

Factors such as having school-aged children, unemployment, disability, and poor health were associated with depres-

sion in our study, and these results are consistent with recent findings among elderly Arab Americans.<sup>26</sup> Previous research that attempted to link social adversity to psychiatric disorders met with mixed findings.<sup>27,28</sup> New findings have shown that Chaldeans and Arab Americans with lower incomes are more likely to have depression.<sup>4</sup> Overall, Arab Americans in our study reported depression more frequently than did African Americans. This finding reflects the high rate of depression in the non-Chaldean Iraqi Arab American subgroup.

The results of past research comparing depression in African Americans to other ethnic groups in the United States have been equivocal, leading to uncertainty about whether or not they are at increased risk, lower risk, or equal risk.<sup>29,30</sup> Our finding of a 15% prevalence in African Americans is fairly consistent with findings from a national survey among non-Hispanic Blacks, in which 16% reported at least one type of mood disorder.<sup>30</sup> Factors that influence depression in African Americans include poor health,<sup>31</sup> obtaining monies during a crisis, transportation,<sup>32</sup> and raising children as a single parent.<sup>28</sup>

**Table 5. Multiple logistic regression analysis predicting depression among all participants (N=1247)**

Variable	$\beta$	SE( $\beta$ )	P-value	Odds Ratio	95% CI <sub>OR</sub>
Ethnicity: Arab	0.1116	0.3949	0.7775	1.12	0.52–2.43
Chaldean	-1.6715	0.4855	0.0006***	0.19	0.07–0.49
Age	0.00106	0.00917	0.9076	1	0.98–1.02
Gender: Male	0.0979	0.244	0.6882	1.1	0.68–1.78
Marital: Married	-0.4374	0.2762	0.1133	0.65	0.38–1.11
Other	0.4465	0.3194	0.1622	1.56	0.84–2.92
Number of children under 18	0.0812	0.0386	0.0357*	1.09	1.01–1.17
Language: Arabic	-0.5361	0.3276	0.1018	0.59	0.31–1.11
Arabic/English	-0.1921	0.348	0.5809	0.83	0.42–1.63
Country: Iraq	1.7501	0.2566	<.0001**	5.76	3.48–9.52
Education: High school or less	1.0218	0.3672	0.0054**	2.78	1.35–5.71
> High school	0.6248	0.4072	0.1249	1.87	0.84–4.15
Employment: Disabled	1.4308	0.2992	<.0001***	4.18	2.33–7.52
Unemployed	0.5293	0.2235	0.0179*	1.7	1.1–2.63
Homeowner: Yes	0.00629	0.1862	0.9731	1.01	0.7–1.45
Income: \$10,000+	-0.4474	0.1943	0.0213*	0.64	0.44–0.94
Insurance: Yes	0.5384	0.245	0.028*	1.71	1.06–2.77
Last physician visit: 1 yr ago	-0.296	0.2316	0.2011	0.74	0.47–1.17
visit: 2 yr ago	0.0424	0.4186	0.9193	1.04	0.46–2.37
visit: 5 yr ago	0.7213	0.6606	0.2749	2.06	0.56–7.51
visit: don't know	0.2365	0.3582	0.5091	1.27	0.63–2.56
Health: Very good	0.7848	0.4899	0.1092	2.19	0.84–5.73
Good	0.7175	0.4726	0.129	2.05	0.81–5.18
Fair	1.1052	0.4877	0.0235*	3.02	1.16–7.86
Don't know	2.0644	0.5291	<.0001***	7.88	2.79–22.23
BMI: Overweight	0.4282	0.2445	0.0799	1.54	0.95–2.48
Medical condition: yes	0.5516	0.2018	0.0063**	1.74	1.17–2.58
Smoke: Smoker	0.4114	0.2151	0.0558	1.51	0.99–2.3
Ex-smoker	-0.1886	0.256	0.4612	0.83	0.5–1.37

Note: Intercept consists of Ethnicity=African American, sex=female, marital status=single, language=English, country of origin=not Iraq, education=illiterate, employment status=employed, homeowner=no, income≤\$10,000, insurance=no, last physician visit=6 months ago, health=excellent, BMI=healthy, medical condition=no, smoke=never smoked.

\* P<.05.

\*\* P<.01.

\*\*\* P<.001.

The difference in depression between the Chaldean (13.3%) and non-Chaldean Iraqi (36.8%) subgroups may be due to their different background experiences. For example, Chaldeans are a relatively homogenous group of Catholic Christians from Iraq, many of whom have had family members who immigrated to the United States, and they may be more likely to be assimilated into American culture despite recent immigration. Our non-Chaldean Iraqi Arab participants were Muslims, and as a group, Iraqi Muslims have been emigrating from Iraq because of wars. Analyses of national survey data on 1513 Arab Americans suggests that Muslim Arabs are more likely to closely maintain an Arab ethnic identity than

are Christian Arabs, and although both groups have reported discrimination, Muslim Arabs may experience more discrimination and fear of backlash after the tragic events of September 11, 2001.<sup>27</sup>

Additional research is needed to explore the reasons for the relatively high rate of depression in the non-Chaldean Iraqi Arab American subgroup (36.8%) as compared with African Americans (15%) and other Arab American subgroups from countries in the Middle East (12.2%–18.8). The immigration process itself may provide some clues. Pre-migration experiences, the migration experience itself, and post-migration experiences each have unique associated stresses and may have

differential influences on the subsequent mental health of immigrants and refugees.<sup>33</sup>

Depression is the second leading cause of disability in the United States,<sup>34</sup> and it is predicted to become the second leading cause of disability after heart disease worldwide by the year 2020.<sup>1</sup> Epidemiologists must ascertain which subgroups of immigrants and ethnicities are most vulnerable to depression and elucidate risk factors, especially modifiable factors, associated with depression in these subgroups. Persons with good pre-migratory motivation to relocate, more social supports, higher self-esteem, and a history of personal achievement may be better able to tolerate the losses, stresses, and

culture shock associated with migration.<sup>28</sup>

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#### REFERENCES

- Bhugra D, Mastrogianni A. Globalization and mental disorders: overview with relation to depression. *Br J Psychiatry*. 2004;184:10–20.
- Alim TN, Graves E, Mellman TA, et al. Trauma exposure, posttraumatic stress disorder and depression in an African-American primary care population. *J Nat Med Assoc*. 2006;98(10):1630–1636.
- Jamil H, Hakim-Larson J, Farrag M, et al. A retrospective study of Arab American mental health clients: trauma and the Iraqi refugees. *Am J Orthopsychiatry*. 2002;72:355–361.
- Arab American Institute. Arab Americans: demographics. Available at <http://www.aaiusa.org/arab-americans/22/demographics>. Accessed July 14, 2007.
- Jumaian A, Alhmoud N, Al-Shunnaq S, et al. Comparing views of medical employees and lay people towards stigma in mental health issues. *Jordan Med J*. 2004;38:80–3.
- Dwairy M. Foundations of psychosocial dynamic personality theory of collective people. *Clin Psychol Rev*. 2002;22:343–60.
- El-Islam F. Some trans-cultural aspects of depression in Arab patients. *Islamic World Med J*. 1984;1:48–49.
- Al-Issa A. ed. *Al-Junun: Mental Illness in the Islamic World*. Madison (Conn): International Universities Press; 2000.
- El-Sendiony M. *The Effect of Islamic Sharia on Behavioral Disturbances in the Kingdom of Saudi Arabia*. Saudi Arabia: Makkah Printing and Publishing; 1981.
- Jamil H, Hakim-Larson J, Farrag M, et al. Medical complaints among Iraqi American refugees with mental disorders. *J Immigr Health*. 2005;7(3):145–152.
- Jamil H, Nassar-McMillan S, Lambert RG, et al. An epidemiological study: health assessment of Iraqi immigrants. *J Immigr Refug Stud*. 2006;4(4):69–73.
- Ai AL, Peterson C, Uebelhor D. War-related trauma and symptoms of posttraumatic stress disorder among adult Kosovar refugees. *J Trauma Stress*. 2002;15:157–160.
- Bhui K, Abdi A, Abdi M, et al. Traumatic events, migration characteristics, and psychiatric symptoms among Somali refugees. *Soc Psychiatry Psychiatr Epidemiol*. 2003;38:35–43.
- Hondius AJK, van Willigen LHM, Kleijn WC, et al. Health problems among Latin-American and Middle-Eastern refugees in the Netherlands: relations with violence exposure and ongoing sociopolitical strain. *J Trauma Stress*. 2000;13:619–634.
- Keyes EF. Mental health status in refugees: an integrative review of current research. *Issues Men Health Nurs*. 2000;21:397–410.
- Steel Z, Silove D, Phan T, Bauman A. Long-term effect of psychological trauma on the mental health of Vietnamese refugees resettled in Australia: a population-based study. *Lancet*. 2002;360:1056–1062.
- Sherina MS. The prevalence of depression among elderly patients attending a government primary care clinic. *Asia Pac J Public Health*. 2002;special issue:52–3.
- Dorsey SM, Rodriguez HD, Brathwaite D. Are things really so different? A research finding of satisfaction, illness and depression in rural South African elderly. *ABNFJ*. 2002; 13:41–44.
- Gottlieb SS, Khatta M, Friedmann E, et al. The influence of age, gender, and race on the prevalence of depression in heart failure patients. *J Am Coll Cardiol*. 2004;43: 1542–1549.
- XVth Scientific Meeting of the Inter-American Society of Hypertension (2003), co-sponsored by the American Heart Association's Council for High Blood Pressure Research in San Antonio, Tex. April 28, 2003.
- Stecker T, Fortney JC, Steffick DE, et al. The triple threat for chronic disease: obesity, race, and depression. *Psychosomatics*. 2006;47(6): 513–518.
- Jamil H, Templin T, Fakhouri M, et al. Comparison of tobacco use and health problems in Chaldeans, Arab Americans, and non-Chaldean/non-Arab American Caucasians. *J Immigr Minor Health*. 2008; March 3.
- Jamil H, Fakhouri M, Dallo F, et al. Disparities in self-reported diabetes mellitus. *J Immigr Minor Health*. 2008;10(5):397–405.
- Jamil H; Fakhouri M, Dallo F, et al. Self-reported heart disease among Arab and Chaldean American women residing in south-east Michigan. *Ethn Dis*. 2008;18(1):19–25.
- Riolo SA, Nguyen TA, Greden JF, et al. Prevalence of depression by race/ethnicity: Findings from the National Health and Nutrition Examination Survey III. *Am J Public Health*. 2005;95(6):998–1000.
- Ajrouch KJ. Resources and well-being among Arab-Americans. *J Cross Cult Gerontol*. 2007;22(2):167–182.
- Nassar-McMillan SC, Lambert RG, Hakim-Larson JA. Discrimination history, backlash fear, and ethnic identity among Arab Americans: post 9-11 snapshots. 2007: Poster presented at the annual meeting of American Psychological Association, San Francisco, California. 2007.
- Bhugra D. Migration and mental health. *Acta Psychiatr Scand*. 2004;109:243–258.
- Carrington CH. Clinical depression in African American women: Diagnosis, treatment, and research. *J of Clin Psychol*. 2006;62(7): 779–791.
- Breslau J, Aguilar-Gaxiola S, Kendler KS, et al. Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. *Psychol Med*. 2005;35:1–12.
- Schulz AJ, Gravlee CC, Williams DR, et al. Discrimination, symptoms of depression, and self-related health among African-American women in Detroit: results from a longitudinal analysis. *Am J Public Health*. 2006;96(7): 1265–1270.
- Siefert K, Finlayson TL, Williams DR, et al. Modifiable risk and protective factors for depressive symptoms in low-income African American mothers. *Am J Orthopsychiatry*. 2007;77(1):113–23.
- Baker W, Howell S, Jamal A, et al. Preliminary findings from the Detroit Arab American study. Available at: <http://www.umich.edu/news/Releases/2004/Jul04/daas.pdf>. Accessibility verified April, 2008.
- Apfeldorf WJ, Alexopoulos GS. Late-life mood disorders. In: Hazzard WR, Blass J, Halter J, et al., eds. *Principles of Geriatric Medicine and Gerontology*. 5<sup>th</sup> ed. New York: McGraw-Hill, 2003;1443–1464.

#### AUTHOR CONTRIBUTIONS

*Design concept of study:* Jamil, Grzybowski, Hakim-Larson, Fakhouri, Khoury, Fakhouri  
*Acquisition of data:* Jamil, Fakhouri, Khoury, Fakhouri  
*Data analysis and interpretation:* Grzybowski, Fakhouri, Sahutoglu, Khoury, Fakhouri  
*Manuscript draft:* Jamil, Grzybowski, Hakim-Larson, Fakhouri, Sahutoglu, Fakhouri  
*Statistical expertise:* Grzybowski, Fakhouri, Sahutoglu, Khoury  
*Acquisition of funding:* Fakhouri, Fakhouri  
*Administrative, technical, or material assistance:* Jamil, Hakim-Larson, Fakhouri, Khoury, Fakhouri  
*Supervision:* Jamil, Fakhouri, Fakhouri