Michigan Journal of Public Health

Volume 10 | Issue 1 Article 6

February 2020

The Burden of Chronic Health Conditions among Iraqi Refugees in Michigan

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Cover Page Footnote

None.

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Overview

In 2012, 69% of the refugees coming to Michigan were from Iraq while for all other states Iraqis represent 21% of the refugee population (Office of Refugee Resettlement, 2013). Despite these staggering numbers, the health of Iraqi refugees in Michigan is not well understood. Effective policies and interventions can be designed, implemented and evaluated once the health status of refugees is better understood. The study took place at two locations of a local non-profit community health clinic that provides health, educational and other services to minority, low-income communities in southeast Michigan. The inclusion criteria for the study were refugees who obtained their required US entrance medical exam at the clinic from January 1, 2010 to December 31, 2010 and were 18 years of age or older at the time of the visit. Medical records of 613 refugees were analyzed. Findings suggest they suffer from chronic health conditions. These findings are important because, if health trends of immigrants applies to this group, we can expect the health of these refugees to deteriorate over time as they acculturate to the US culture. To prevent or delay poor health outcomes, the findings of this study can be used to support the appropriate use of resources to tailor effective interventions in this population.

Description

In the years following Operation Iraqi Freedom's initiation on March 19, 2003, the number of Iraqi refugees world-wide was estimated at 4.0 million, and a large number resettled in the United States (US) (Fagen, 2007; United Nations High Commissioner for Refugees, (UNHCR), 2007). Refugees to the US decreased from 94,222 in 2000 to 58,238 in 2012 (Office of Refugee Resettlement, 2013). However, refugees from the 22 countries that comprise the Arab League of Nations increased from 13,108 in 2000 to 18,243 in 2012. Despite comprising only 3.2% of the total US population, Michigan accepted a majority of the refugees from countries in the Arab League of Nations. In 2012, 69% of the refugees coming to Michigan were from Iraq while for all other states Iraqis represent 21% of the refugee population (Office of Refugee Resettlement, 2013).

The Immigration and Nationality Act (INA) and the Public Health Act requires refugees coming to the US to have a health screening in the country of origin to prevent the transmission of communicable diseases to US residents. In addition, it is recommended that refugees receive another more comprehensive exam after arrival in the US, generally within 90 days. The Centers for Disease Control and Prevention (CDC) is the agency tasked with ensuring that state health departments are notified of refugee entry in a timely manner. State health departments, in turn, contract with agencies and clinics to provide refugee care to particular geographic

settlement areas. The two clinics included in this study were the clinics contracted to provide medical exams to refugees settling in Southeast Michigan. The limited health data that has been published on refugees largely comes from clinics that conduct these intake medical examinations.

Overall, health data indicate that displacement has serious effects on refugee health. Studies focused on Iraqi refugees, in particular, have been conducted mainly in California and Michigan. These studies suggest that Iraqi refugees report more symptoms of depression and intense anxiety and meet the DSM criteria for posttraumatic stress disorders compared to non-refugees or other refugee women (Jamil et al., 2002; Jamil, Farrag, et al., 2007; Jamil, Nassar-McMillan, & Lambert, 2007; Johnson-Agbakwu, Allen, Nizigiyimana, Ramirez, & Hollifield, 2014). Other studies found higher estimates for the following conditions when comparing Iraqi refugees to non-refugees: overweight/obesity estimates of 17% and 25%; hypertension at 15.2%, 17.7%, 26% and 44%; diabetes at ~ 13% and 16%, and smoking at 24% (Centers for Disease Control and Prevention, (CDC), 2010; Jamil, Hakim-Larson, et al., 2005; Jamil et al., 2010; Taylor et al., 2014).

These studies are important, but are limited. Some use convenience samples or self-reported information, which may underestimate the prevalence of chronic disease and affect their generalizability to the population of Iraqi refugees living in Michigan or other states (Centers for Disease Control and Prevention, (CDC), 2010; Jamil, Hakim-Larson, et al., 2005; Jamil, Nassar-McMillan, & Lambert, 2005; Jamil et al., 2010). To address these limitations, the main objective of the study was to examine the association between birthplace, age, sex, and smoking history on chronic conditions among Iraqi refugees. It was hypothesized that older age, male sex, smokers and birthplace of Baghdad (versus all other cities) are associated with having a chronic condition. The secondary objective was to report prevalence estimates of chronic conditions by age and sex. It was hypothesized that older individuals and males have a higher prevalence of chronic conditions compared to their counterparts.

Methods

Settings and Participants

The study took place at two locations of a local non-profit community health clinic that provides health, educational and other services to minority, low-income communities in southeast Michigan. The inclusion criteria for the study were refugees who obtained their required US entrance medical exam at the clinic from January 1, 2010 to December 31, 2010 and were 18 years of age or older at the time of the visit. The study was approved by Oakland University's Institutional Review Board. All procedures were in accordance with the ethical standards of the

responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Procedure

This was a cross-sectional, retrospective chart review using a systematic random sample. The charts were located in a locked room in locked filing cabinets at both clinics, and arranged by date of visit. For the year 2010, there were approximately 1,200 charts between the two clinics. Every other chart was pulled for review. If that chart did not meet the inclusion criteria, the next chart was pulled. Seven charts did not meet the inclusion criteria and were not included in the study. There were three subjects under the age of 18 and four had their health screenings outside of the year 2010. A Microsoft Access database was created to parallel the paper medical chart and had direct data entry forms. The database simplified the collection of data and reduced data entry errors. We checked for reliability by randomly selecting and re-entering 10% or 61 charts. Interrater reliability was 60% or higher, which indicates good to excellent agreement (Gwet, 2012).

Instruments

Medical charts included several different standard forms completed by the physician during physical examinations. The data on the forms were then entered into the database, including demographic, health behavior, and medical information, such as medical history, physical examination, chronic and infectious diseases, immunizations, chest x-ray (TB screening), vaccination dates, laboratory results, vital signs, and recommendation for additional testing or follow-up treatment.

Dependent Variables

The dependent variables for this study were body mass index (BMI), measured non-fasting blood glucose, and prior histories of hypertension and diabetes. Height and weight were measured to calculate BMI, and BMI was recorded as a continuous variable. BMI was then recoded into two categories: 1) less than 25 kg/m^2 (underweight/normal); and 2) greater than or equal to 25 kg/m^2 (overweight/obese). Non-fasting blood sugar was recorded as a continuous variable. Non-fasting blood sugar was then recoded into two categories: 1) less than 140 mg/dL (normal); and 2) greater than or equal to 140 mg/dL (abnormal). History of diabetes and hypertension were self-reported dichotomous variables (yes or no).

Independent Variables

The independent variables for this study were birthplace, sex, age and smoking history. The medical charts included an open-ended field capturing place of birth. The entries were coded based on the 18 provinces in Iraq. Given that the majority

of individuals were from Baghdad (n=364), two categories were included in the analyses: Baghdad (reference category) and all other Iraqi locations. Age was calculated from date of birth and date of clinic visit and recorded as a continuous variable. Age categories were also generated using quartiles of age in years: quartile 1 (18-24 years), quartile 2 (25-34 years), quartile 3 (35-48 years), and quartile 4 (49-83 years). Sex was reported as either male or female (reference category). Lastly, charts were reviewed for refugee tobacco use, which was then categorized as current, former, or never use (reference category).

Data Analysis

To describe the sample, frequencies and percentages were used. Sex- and age-stratified prevalence estimates of chronic conditions were calculated and compared using a Chi-square test. Lastly, logistic regression models (odds ratios and 95% confidence intervals) were used to examine associations between the dependent and independent variables. SAS® software version 9.1 (SAS Institute, Inc.: Cary, NC) was used for the analyses.

Evaluation

Of the 613 refugees, 50.4% were male. The mean age of participants was 37.8 years (±15.3). A majority (60.8%) of the participants were born in Baghdad (Table 1).

Table 1: Descriptive Characteristic of Sample of Iraqi Refugees in Michigan, 2010, N = 613

Age (years), mean ± standard deviation	37.8 ±15.3
Sex, n (%)	
Male	304 (50.4)
Female	309 (49.6)
Birthplace in Iraq, n (%)	
Baghdad	364 (60.8)
All other provinces	235 (39.2)

Table 2 displays the estimated prevalence of chronic conditions stratified by age and sex. For both sexes, as the age of the participants increased, the prevalence of overweight/obesity also increased (*p-value* < .0001). For those in age quartile 4 (ages 49-83 years), 21.1% of women and 26.3% of men had a

Table 2: Prevalence (percentages) of Chronic Conditions Overall and Stratified by Sex and Age Quartiles, 2010, n=613

	Both sexes	Women					Men				
Condition	Total	Total	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4
Overweight/obese[a]	65.7	63.0	41.1	53.3	71.2	86.5	68.3	40.0	61.3	83.6	87.0
History of diabetes[a]	6.7	5.3	0	0	0	21.1	8.1	0	0	5.3	26.3
Abnormal blood glucose[a]	8.6	4.0	0	0	4.1	12.0	13.1	1.4	0	17.3	32.9
History of hypertension[a]	18.6	16.8	2.6	1.3	10.7	52.6	20.4	2.8	6.1	16.0	55.0
Smoking status[b]											
Current Smoker	19.7	4.6	0	3.9	6.7	8.0	34.5	29.6	42.0	38.7	27.5
Former smoker	6.2	1.7	0	1.3	1.3	4.0	10.8	2.8	6.2	10.7	22.5
Never smoked	74.1	93.7	100	94.8	92.0	88.0	54.7	67.6	51.9	50.7	50.0

[a]Indicates a p-value of <.05 when comparing males to females and when comparing age groups within each sex.
[b]p-value < .05 by age for males only
Q=Age Quartile: Q1=18-24 years; Q2=25-34 years; Q3=35-48 years; Q4=49-83 years

Table 3: Odds Ratios and 95% Confidence Intervals for Various Chronic Conditions by Place of Birth, 2010, N=613

	Body-Mass Index	History Diabetes	Non-Fasting Blood Sugar	History Hypertension
Place of birth				
Baghdad	1.00	1.00	1.00	1.00
All other provinces	1.18 (0.79, 1.74)	1.31 (0.62, 2.75)	1.25 (0.65, 2.38)	0.77 (0.45, 1.32)
Age (continuous)	1.06 (1.05, 1.08)[a]	1.10 (1.07, 1.13)[a]	1.07 (1.05, 1.09)[a]	1.12 (1.09, 1.14)[a]
Sex (female as referent)	1.26 (0.84, 1.89)	1.46 (0.66, 3.23)	3.99 (1.88, 8.48)[a]	1.48 (0.84, 2.58)
Tobacco use				
Never	1.00	1.00	1.00	1.00
Current	1.00 (0.60, 1.66)	1.58 (0.60, 4.10)	1.08 (0.50, 2.35)	0.87 (0.44, 1.73)
Former	0.95 (0.39, 2.32)	3.19 (1.11, 9.13)[a]	1.92 (0.75, 4.91)	1.63 (0.67, 3.96)

[a]Indicates a p-value of <.05; 95% confidence intervals do not contain 1.0

history of diabetes (*p-value* <. 0001). For both sexes, as the age of the participants increased, so did hypertension estimates (*p-value* < .0001). Males were more likely to smoke than females for every age category (*p-value* = .0011).

Table 3 presents findings from the logistic regression analyses. Older individuals had a statistically significant higher odds of being overweight or obese, having a history of diabetes, having an elevated non-fasting blood glucose and having a history of hypertension. The odds of having an elevated non-fasting blood glucose was four times higher for men (OR=3.99; 95% CI=1.88, 8.48) than for women. Individuals who were former smokers had 3.19 times (95% CI=1.11, 9.13) the odds of reporting a history of diabetes than those who never smoked.

Discussion

The main objective of this study was to examine the associations between demographic characteristics and chronic conditions among Iraqi refugees. We hypothesized that older individuals and males would have a higher prevalence of chronic conditions compared to their counterparts, and both hypotheses were supported by the data. Older individuals were more likely to have a chronic condition compared to younger individuals. For example, among Iraqi refugees between 49-83 years of age, approximately 86% were overweight or obese, 53% had a history of hypertension, and 23% had a history of diabetes. We also hypothesized that older age, male sex, smokers and birthplace of Baghdad (compared to birthplace in any other Iraqi city) would be associated with having a chronic condition. Increasing age was statistically and significantly associated with being overweight or obese. Men had higher odds than women of having abnormal non-fasting blood glucose levels. Compared to never smokers, former smokers had three times the odds of having a history of diabetes. Place of birth was not statistically significantly associated with chronic conditions.

We observed both similarities and differences between our study and previously published studies. Our finding for obesity (31.5%) was higher (data not shown) compared to Iraqi refugees in California (24.6%) (Centers for Disease Control and Prevention, (CDC), 2010). These different estimates may be attributed to differences in: study methodology (the study conducted by the CDC did not provide detailed information about its methodology); sample size (CDC study included 5,100 refugees compared to 613 in the current study); and how the data were analyzed (the current study stratified the health conditions by age and sex).

In our study, 21.1% of women and 26.3% of men reported a history of diabetes compared to 18% of women and 14% of men in the study by Taylor and colleagues (2014). Our estimates may have been higher due to differences in the samples given that Taylor and colleagues' study included refugees from Michigan, California, Texas and Idaho. Furthermore, the study by Taylor and colleagues did not stratify

by age and may have used different definitions of diabetes (2014). Community-based studies of Arab Americans and Chaldeans in Michigan reported similar diabetes estimates of 26% (Kridli, Herman, Brown, Fakhouri, & Jaber, 2005). In our study, approximately 53% of individuals 49-83 years of age reported a history of hypertension. Other studies reported that 44%, 17.7%, and 26% of Iraqi refugees had hypertension (Jamil, Hakim-Larson, et al., 2005; Jamil, Nassar-McMillan, & Lambert, 2005; Jamil et al., 2010). Again, the methodology, definitions of chronic conditions, and how the data were analyzed may have contributed to these differences.

Our findings suggest that for every age category, men were more likely to currently smoke compared to women. National data show that in 2012, 18.1% of the population smoked, which is very similar to our finding (Agaku, King, Dube, & Centers for Disease Control and Prevention, (CDC), 2014). Jamil and colleagues (2010) and Taylor and colleagues (2014) reported that approximately 34% of the sample was a current smoker, which is similar to our finding for men. Although we had information on birthplace, we did not have information about all of the various countries the individual could have lived prior to resettling in the US. Therefore, it is unknown where or when the individual developed the chronic condition(s). The reason we compared Baghdad to the rest of Iraq is many of the war activities occurred in Baghdad. One study showed a dose-response relationship between geographical area of residence and health – the closer the individual lived to the war area, the worse his/her health (Jamil, Hamdan, Grzybowski, & Arnetz, 2011). Our study collected data on place of birth; therefore, we did not have access to migration patterns of the population, which may vary when comparing times of war to peace.

The comparisons above indicate that Iraqi refugees in our study (i.e. Michigan) have worse health outcomes than Iraqi refugees in other states. However, chronic conditions of Iraqi refugees in the current study are comparable to the general population of Arab- and Chaldean-Americans in Michigan. Beyond the reasons of sample size, study design, chronic disease definitions, and approaches to the data analysis, these findings lend themselves to a deeper discussion of why these variations exist. One explanation is refugees tend to be placed where they have family. Given that Michigan is home to the highest percent of Arab- and Chaldean-Americans compared to other states, are chronic conditions “normalized” for refugees? That is, given that the health of Arab- and Chaldean-American immigrants worsens as they acculturate, are the immigrants who have been in the US longer than the refugees negatively influencing the health of new refugees? If Iraqi refugees move to a state where they do not have family, do the refugees establish their own sense of health and wellness with little influence from family members?

It is concerning that the health of Iraqi refugees is poor upon their arrival to Michigan. Studies have shown the health of refugees tends to worsen as they acculturate to US society (Careyva et al., 2015). Therefore, it is highly likely their health will worsen with duration in the US. The current study provides support of the importance of tailored interventions to prevent the onset or complications of chronic conditions.

This study had some strengths and limitations. Two of the strengths in this study was the large sample size (n=613) and that we used a probability sampling design, which increases the generalizability of our findings. Many of the existing studies used either convenience samples, or they had a small sample size (n<150) (Centers for Disease Control and Prevention, (CDC), 2010; Jamil, Hakim-Larson, et al., 2005; Jamil, Nassar-McMillan, Salman, Tahar, & Jamil, 2006; Jamil et al., 2010). One limitation was that our study focused on Southeast Michigan. Collecting data outside of Michigan would improve the generalizability of our findings. Also, charts from the clinics were examined from only one year, which may miss the natural cohort effects that exist based on when and why people seek refugee status. There was a large amount of missing data representing the variability of clinic visits. We cannot be certain that lack of documentation of certain health conditions or health behaviors in the medical chart is truly indicative of its absence. This may have underestimated our findings. Lastly, there were several individuals who worked on abstracting the data. While all were equally trained and the charts were checked for intra- and inter-rater reliability, there may have been random errors that occurred.

Recommendations

Some suggestions for future studies would be to standardize forms among health centers and organizations across the country. If every state and center had a similar form, these kinds of data could be collected and reported in a similar manner. The studies of refugees in San Diego and the one by Taylor and colleagues are most comparable to our study (Centers for Disease Control and Prevention, (CDC), 2010; Taylor et al., 2014). If there was a standardized form and method of collecting data, we could be much more confident in the comparison of the two studies. Findings from preliminary and exploratory studies such as the one presented here should be used to develop tailored interventions for refugees to prevent or delay the onset of chronic conditions, such as obesity, diabetes, and hypertension. One possible model that can be used for the Iraqi refugee in Michigan is the one presented by Nazzal and colleagues, where they described a community-oriented prevention and early intervention model that can be used with newly arrived refugees (Nazzal, Forghany, Geevarughese, Mahmoodi, & Wong, 2014). Their model comprised four steps: (a) advocacy and funding, (b) selection of key community partners, (c) development

and implementation of a prevention and early intervention plan, and (d) monitoring and program evaluation. This model should focus on tailored interventions that address not only chronic conditions but also support for war-related trauma exposure. In addition, some interventions should be geared toward establishing linkages to ensure access to care. Given that there are several organizations that reach out to refugees in Michigan, this model may be feasible to adapt.

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