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Risk Factors for Gastrointestinal Disorders Among Iraqi Americans in Southeast Michigan, United States

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Abstract

Objective: To study the prevalence of gastrointestinal disorders, understand the compliance to treatment among Iraqi Arabs and Iraqi Chaldeans, and predict risk factors for gastrointestinal disorders.

Methods: 350 random samples of Iraqi Americans, who immigrated to United States from Iraq at different times reported gastrointestinal disorders. Compliance to treatment was evaluated. Chemical environmental exposure and Non-Chemical environmental exposure scores were calculated. Different tests of significance were used.

Results: In general, the prevalence rate of all subgroups of gastrointestinal disorders for the total population was 72.1%, while for Arab, it was 83.7%, and for Chaldean 58.2%, and the difference was significant. Age, employment, health insurance, and smoking status were a significant difference between the two groups. There were significant differences between Arabs and Chaldeans in the prevalence of gastrointestinal disorders and its subgroup, except in GI diseases, Chemical environmental, and Non-Chemical environmental exposure scores, and compliance to treatment. Chemical and Non-Chemical Environmental exposure and self-rated health were risk factors for gastrointestinal disorders and its subgroup, and there were different risk factors according to type of subgroup of gastrointestinal disorder.

Conclusion: The prevalence of gastrointestinal disorders was significantly lower among Chaldeans compared to Arabs. Arabs were more compliant to gastrointestinal disorders treatments. Several risk factors were predicted for each of the gastrointestinal disorders in which the Chemical and Non-Chemical environmental exposure and self-rated health were common among all.

Keywords

Chemical environmental exposure, Non-chemical environmental exposure, Ethnicity, Arab, Chaldean, Prevalence rate, Compliance rate to treatment

Abbreviations

GID: Gastrointestinal Disorders; US: United State; GI Diseases: Gastro Intestinal Diseases; GI Functional: Gastrointestinal Functional Disorders; GI Psycho: Gastrointestinal Psycho-Somatization Symptoms; SRH: Self-Rated Health; H. pylori: Helicobacter Pylori; ChE: Chemical Environmental Exposure; NChE: Non-Chemical Exposure/Stressor; Ch+NCh: Combine both ChE and NChE

Introduction

Gastrointestinal disorders (GID) have different prevalence rates among ethnic groups, irrespective of their country of origin [1-4]. The multiracial communities in the United States (US), although living together, have exclusive habits, cultural practices, and lifestyles peculiar to their own culture, which could affect presentation of gastrointestinal symptoms according to Miwa and Hongo [5,6]. However, the study results of Holmboe-Ottesen and Wande differ

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from ours, because they studied low income South Asians who migrated to Europe [7]. GID is a common complaint among people in the US, with differences in the presenting symptoms of these disorders [8]. The pattern of GID varied according to cultural differences between those ethnic groups [9]. Other concerns pertaining to GID in different ethnic groups are people's ability to access medical healthcare and treatment [10]. The Arab and Chaldean population has been increasing during the past three decades (660,000 in 1980 to 1,189,731 in 2000 - an 80% increase). Michigan is home to the highest concentration of Arabs and Chaldeans compared to any other state [11]. According to US Census data in the year 2000, > 100,000 people living in Michigan identified themselves as Chaldean or Arab [11]. One of the major drawbacks of studying different ethnic groups is that some groups were not clearly defined and identified as a separate entity for categorization in major studies in which those groups where arbitrarily allocated to wider scoped groups [12]. Although "White" is usually used as the reference category for health comparisons in the US, Whites are a heterogeneous group [13]. According to the Office of Management and Budget, "Whites" are persons having origins in Europe, North America, or the Middle East [13]. 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. Because of the homogeneity assumption assigned to the White category, little attention has been paid to the health status of subgroups within the White category. Arabs/Chaldeans, a subgroup within the White category, may exhibit better or worse health outcomes compared to Whites as a whole [14,15]. The relationship between ethnicity and GID could be in part related to genetics [16], medication use habits such as "NSAIDS" [17], and bacterial colonization such as in H. pylori [18]. H. pylori is the most prominent cause of GIulcers [19,20] in which stress [21] and life events [22] could also play a role. GI functional disorders occur among people of all races, but it seems to affect Whites disproportionately [23]. Lifestyle and stress can also affect gastrointestinal function [24,25]. De Vries found gastritis varies among different ethnic groups [26], and Lipowski found similar variations in enteritis and colitis [27]. Other symptoms of GI somatization disorders could relate to substantial emotional stress [28,29,24]. Escobar showed a high prevalence of gastrointestinal somatization in immigrants, especially among those who were of lower socioeconomic status and a lower level of education [24]. Latinos [30-32] have a higher risk of gastrointestinal somatization compared to Caucasians in the US. There is a large Iraqi immigrant community in southeast Michigan. There are mainly two ethnicities living in this community, Iraqi Chaldeans, who are Christians, migrated to the US in the late 50 s and early 60 s. They represent much of this community. Iraqi Arabs, who are mostly Muslims, in large, migrated after the 1991 gulf war. There are vast cultural, lifestyle, and diet differences between the two groups; for example, Muslim people do not eat Pork or any other animal meat unless it is butchered according to their religious ways. Participants, mostly, do not drink alcohol. Note that many Arabs in the study are Muslim, and alcohol is prohibited by religious texts. In addition, many Muslims try to avoid gatherings of different sexes, especially in their homes, while Chaldean take no issue with everything mentioned above. The aim of the work was to: 1) estimate the prevalence of GID among Iraqi Arabs and Chaldeans, 2) examine the compliance rate to treatment, 3) identify risk factors of GID among Iraqi Arabs and Chaldeans.

Methods

In 2004-2005, an elaborate community-based project was initiated to identify Iraqis residing in Southeast Michigan, US, home to one of the largest populations of Iraqi immigrants and refugees in the country. The project was announced in Arabic and English using several means of communication, such as Arabic radio and television channels. Flyers with project information were handed out at various Arab and Chaldean American community centers and faith-based facilities, convenience stores, restaurants, gas stations, hair salons, and community centers. The local Iraqi directory was also used in identifying potential participants.

Participants

A list of 5490 possible Iraqi addresses was constructed, coded, and entered into an SPSS program. A 7.5% random sample was generated. Of 411 addresses selected, 44 residents did not fit the study criteria (Male or Female, Age 18 years and above, Born in Iraq, and resident in Southeast Michigan). Of 367 eligible candidates, 17 (4.6%) declined participation. The reasons were: nine due to lack of time, seven due to lack of interest in the study, and one no reason provided. A total of 350 qualified people, representing a response rate of 95%, accepted to participate in the study. Thirteen Iraqi participants were dropped from the study; they were not considered Arab or Chaldean. The final participants were 337 Iraqi Americans classified into 153 Chaldeans and 184 Arabs.

Survey

A cross-sectional self-reported study was conducted among these participants at the home, and an outreach research assistant trained for such data collection was present. The data used in this study was part of a health assessment survey. The questionnaire was developed initially through collaboration between an Iowa Persian Gulf war study group and the Center for Disease Control, and it was used among American veterans and Iraqi immigrants/refugees [33,34]. The survey questionnaire was used in a series of studies [35-37]. All survey ques-

tions were administered in Arabic by two Iraqi-born, Arabic-speaking physicians. The inclusion criteria were that participants were Iraqi born and 18 years of age or older when they arrived from Iraq. We chose one person from each household, based on the first eligible person we got in contact with after the household door was opened. The survey contained 33 medical conditions, including gastrointestinal disorders (GID). The participant had to state whether any medical condition had been diagnosed by a primary health care physician and if they received any treatment for that condition. After that, GID were subgrouped into three groups: gastro intestinal diseases (GI diseases), which include ulcer, gastritis, enteritis, and colitis; gastrointestinal functional disorders (GI functional), which include nausea and upset stomach, abdominal pain, vomiting, diarrhea; and gastrointestinal psycho-somatization symptoms (GI Psycho), which include chronic headaches, migraines, chronic fatigue syndrome, difficulty breathing, and sleep disturbance. Participants indicated if they were taking any medications related to their GID. Participants were asked to rate their health at the time of the interview, based on the self-rated health (SRH) scale, which is a Likert-type scale ranging from one for poor health to five for excellent health. It has been shown to predict future health and mortality in healthy persons [12,38]. The responses were grouped into two categories: responses of excellent to good were given code "1" vs. responses of fair to bad were given code "0". The survey included questions related to Non-Chemical Exposure (NChE) and some may refer to psychosocial stressors and Chemical Environmental exposure (ChE) [36]. The validated exposures were aggregate NChE dose and aggregate ChE dose [38]. The NChE scale comprises eight questions. Each question consists of two parts (a & b); part (a) asked if the person was exposed to certain stress. If the answer was yes, code "1" was assigned; if the answer was no, code "0" was assigned. Part (b) of the question was answered only if the person marked yes for part (a) of the question. Part (b) asked about the period of exposure (code "1" indicates the period is five or less days, code "2" indicates the period range from six to thirty days, and code "3" indicates the period is thirty-one or more days). Question examples were: having been under small arms fire, witnessed anyone dying, exposure to dead bodies, etc. The range of the stressor scale was 0 to 24 points.The ChE scale included fifteen questions (Each question also comprised two parts, and each part follows the pattern of stressor exposure). Example of questions: smoke from oil well fires, chemicals, and other petrochemical fuels. The range of the scale for ChE was 0 to 45 points.

Ethical Clearance

Study protocol was submitted to the Wayne State University Institutional Review Board. Review and approval was obtained from the Human Investigation Committee (HIC #: 086903B3E).

Statistical Analysis

For independent continuous variables, we used t-test and chi-square test for independent discrete variables. Several Binary logistic regression analyses were used to predict the risk factors of all types of GID (GI diseases, GI functional and GI psycho), separately and combined, and for SRH. The NChE and ChE scales exhibited excellent psychometric properties with a Cronbach's alpha of > 85. The ChE score and ChE score (ChE+ChE) were combined to be used in the Binary logistic regression analysis, because it was found that no significant predictor came out if we used them separately in any one analysis. However, it showed significant predictors if we entered them individually or combined them. The period of living in the US was used, because it may affect the results of different dietary habits among these groups.

Table 1: Demographic variables by ethnicity of Iraqi Americans.

Item	Chaldeans [n = 153]	Arabs [n = 184]	Total [n = 337]
	Mean (SD)	**Mean (SD)**	**Mean (SD)**
Age	47.9 (6.90)	43.6 (7.25)	45.5 (7.39)
Years in US***	21.8 (10.71)	12.2 (6.78)	16.5 (9.99)
ChE***	2.01 (3.534)	6.34 (6.133)	4.4 (5.54)
NChE***	1.11 (1.887)	3.54 (3.183)	2.4 (2.93)
Total (ChE+NChE)***	3.12 (5.344)	9.88 (9.132)	6.8 (8.35)
Variable	**No. (%)**	**No. (%)**	**No. (%)**
Male	91 (59.5)	99 (53.8)	190 (56.4)
Married*	128 (83.7)	168 (91.3)	296 (87.8)
High school and above*	67 (43.8)	69 (37.5)	136 (40.4)
Employed***	106 (69.7)	76 (41.3)	182 (54)
Have health insurance***	89 (58.2)	141 (76.6)	230 (68.2)
Smoker	58 (37.9)	53 (28.8)	111 (32.9)
SRH (Excellent to good)***	113 (73.8)	80 (43.4)	193 (57.3)

*P < 0.05, ***P < 0.001.

Results

The prevalence rate of all subgroups of GID for the total population was 72.1 (GI diseases 22.6%, GI Functional 22.6%, and GI Psycho 59.1%). Demographic variables are noted in table 1. There were significant differences between the two ethnic groups in their ChE and NChE scores and the number of years lived in the US (Table 1). Table 2 illustrates the prevalence rate of all subgroups of GID by ethnicity. It also shows prevalence of GID by different demographic variables between the two ethnic groups. The prevalence of all GIDs was significantly higher among Arabs (83.7), compared to Chaldeans (58.2%). GI psycho and GI Functional were also significantly higher among Arabs, while there were no significant differences in GI diseases among the two groups. There were significant differences in the prevalence rate of GID between the two ethnic groups when tested for age, employment status, health insurance, smoking status, and SRH. Table 3 illustrates the treatment compliance rate of each subgroup of the GID. There were no significant differences between the two groups regarding treatment compliance in all GI diseases, although the compliance rates varied between the two groups. There were significant differences between the two groups in GI Functional disorders, where Iraqi Arab had a significantly higher treatment compliance rate for sore throat, nausea, and abdominal pain. With GI Psycho- treatment compliance, Iraqi Arabs had a significantly higher treatment compliance rate for sleep disturbance, chronic fatigue, and difficulty breathing (Table 3). Binary logistic regression analysis was performed to identify risk factors for all GID, GI diseases, GI functional, and GI psycho. Only significant risk factors are noted in table 4. Adjusting for different demographic variables and ChE+NChE exposure, being an Iraqi Arab was the highest risk factor (OR 2.5, 95% CI 1.34-4.80). When each GID subgroup was analyzed, risk factors were different. The combined ChE+NChE were a

Table 2: Prevalence rate of gastrointestinal disorder (GID), GID subgroups and demographic variables of participants by ethnicity with chi-square test.

GID and its subgroups	Chaldean (n = 153)	Arab (n = 184)	Total (n = 337)
	No. (%)	No. (%)	No. (%)
GID***	89 (58.2)	154 (83.7)	243 (72.1)
GI diseases	29 (19)	47 (25.5)	76 (22.6)
GI functional disorders**	36 (23.5)	69 (37.5)	105 (31.2)
GI psyche-somatic symptoms***	72 (47.1)	127 (69)	199 (59.1)
Prevalence rate of GID by demography variables			
Age group* **			
32-39 Years	11 (12.4)	53 (34.4)	64 (26.3)
40-49 Years	37 (41.6)	64 (41.6)	101 (41.6)
50-57 Years	41 (46.1)	37 (24)	78 (32.1)
Gender			
Male	52 (58.4)	77 (50)	129 (53.1)
Female	37 (41.6)	77 (50)	114 (46.9)
Marital status			
Married	76 (85.4)	140 (90.9)	216 (88.9)
Single	13 (14.6)	14 (9.1)	27 (11.1)
Education level			
Less than high school	55 (61.8)	92 (59.7)	147 (60.5)
High school or above	34 (38.2)	62 (40.3)	96 (39.5)
Employment status* **			
Unemployed	24 (27)	101 (65.6)	125 (51.4)
Employed	65 (73)	53 (34.4)	118 (48.6)
Health insurance**			
No health insurance	34 (38.2)	35 (22.7)	69 (28.4)
Have health insurance	55 (61.8)	119 (77.3)	174 (71.6)
Smoking status*			
Never smoke	54 (60.7)	111 (72.1)	165 (67.9)
Smoke	35 (39.3)	43 (27.9)	78 (32.1)
Self-rated health (SRH)* **			
Fair/Bad health	31 (34.8)	101 (65.6)	132 (54.3)
Excellent to good health	58 (65.2)	53 (34.4)	111 (45.7)

*P < 0.05, **P < 0.01, ***P < 0.001.

Table 3: Rate of treatment compliance and test of significant between Iraqi Chaldeans and Iraqi Arabs.

GID Subgroups	Iraqi Chaldeans (n = 153)			Iraqi Arabs (m = 184)		
	# With disorder	# Compliant with treatment	Treatment compliance rate (%)	# With disorder	# Compliant with treatment	Treatment compliance rate (%)
GI Diseases						
Ulcer disease	3	3	100	16	13	81.3
Gastritis	21	13	61.9	40	26	65.0
Enteritis	5	2	40.0	5	2	40.0
Colitis	7	3	42.9	6	4	66.7
GI/Functional disorders						
Sore throat*	16	9	56.3	37	25	67.6
Nausea**	11	3	27.3	37	17	45.9
Vomiting	6	1	16.7	10	4	40.0
Chronic diarrhea	8	3	37.5	16	12	75.0
Abdominal pain*	5	1	20.0	19	6	31.6
GI/Psycho-somatization symptoms						
Chronic headaches	12	9	75.0	66	58	87.9
Migraines	5	4	80.0	39	28	71.8
Sleep disturbance***	52	4	7.7	100	58	58.0
Chronic fatigue*	23	6	26.1	54	27	50.0
Difficulty breathing**	12	1	8.3	21	13	61.9

*P < 0.05, **P < 0.01, ***P < 0.001.

Table 4: Binary logistic regression analysis for GI medical conditions to predict risk factors.

Binary logistic regression analysis	B	Sig.	Odd ratio	95% C.I. for OR	
				Lower	Upper
likelihood of having one or more GID*					
SRH/Excellent to good (Ref.)	2.05	0.000	7.79	3.56	17.01
ChE+NChE scale (higher is bad)	0.39	0.008	1.47	1.11	1.96
Arab vs. Chaldean (Ref)	0.93	0.004	2.53	1.34	4.80
Years in US [Lowest = 2 years, Highest = 46 years]	0.04	0.022	1.04	1.01	1.08
Likelihood of having one or more GI disease*					
ChE+NChE scale (higher is bad)	0.48	0.000	1.62	1.25	2.11
SRH/Excellent to good (Ref.)	0.91	0.008	2.47	1.27	4.83
Employed vs. Unemployed (Ref.)	0.85	0.020	2.34	1.15	4.77
Female vs. Male (Ref.)	0.75	0.028	2.12	1.08	4.14
Years in US [Lowest = 2 years, Highest = 46 years]	0.06	0.010	1.06	1.01	1.10
Likelihood of having one or more GI Functional disorders*					
ChE+NChE scale (higher is bad)	0.40	0.000	1.48	1.19	1.85
Age in year	-0.04	0.049	0.96	0.93	1.00
SRH/Excellent to good (Ref.)	0.62	0.039	1.87	1.03	3.38
Likelihood of having one or more GI Psychosomatic symptoms*					
SRH/Excellent to good (Ref.)	2.09	0.000	8.10	4.23	15.51
Female vs. Male (Ref.)	0.62	0.049	1.86	1.00	3.44
Single vs. Married (Ref.)	-0.78	0.056	0.46	0.20	1.02

Variables enter the equation in each of the four tests above were as follows: Ethnicity, age, gender, marital status, employment status, health insurance, years in US, smoking status, total of ChE+NChE and SRH.

Note: Only significant results were presented in each analysis.

predictor for GID, GI diseases, and GI Functional; while SRH was a predictor in all GIDs and its subgroup, other risk predictors were found. Some share in more than one analysis or only found in one analysis. The Arab was predictor in GID, female was predictor in GI diseases and GI Psychosomatic symptoms, years in US in GIDs and GI disease, employment in GI disease and age in GI Functional disorders, and married in GI Psychosomatic symptoms (Table 4).

Discussion

The overall results of this study show GID overall are more prevalent among Iraqi Arabs (83.7%), compared to Iraqi Chaldeans (58.2%). This was based on a random

sample of two ethnic groups, who immigrated from the same country, share a common culture, a common lifestyle, and reside in Southeast Michigan, but are different in religion, as Chaldean are Christian, while the Arab was mainly Muslim. There were no significant differences between the two ethnicities concerning compliance to treatment for GI diseases but for other disorders. Iraqi Arabs were more likely to comply with GI Functional symptoms, GI psycho, Ethnicity, and most of the GI disease. SRH were risk factors when testing all GIDs. When GID subgroups were tested, risk factors were identified. SRH (Worse to Bad) was a risk factor among all GIDs and its subgroup.

The prevalence rate of all subgroups of GID in our study group was 72.1%. However, the prevalence rate of GID in the Arab group was higher (83.7%) than in the Chaldean group (58.2%), and the difference was significant. One explanation is that most of the Iraqi Arabs who live in the US entered the country after the 1991 Gulf War. This could explain the significant differences of the combined ChE and NChE exposure between the two ethnic groups. Although 76.6% of Iraqi Arabs have health insurance, compared to 58.2% of Iraqi Chaldeans, the prevalence rate of all types of GID was significantly higher among Arabs. Such differences were in agreement with Zuckerman (1996), who found a significant difference in health-care-seeking behaviors related to bowel complaints between Hispanics versus non-Hispanic whites. Doll's (1951) study showed differences in ethnicity in relation to gastric and duodenal ulcers and concluded differences could be related to genetic predisposition, while Gurjeet (2003) showed differences could be related to distribution of H. pylori infection among Endoscope patients in the North Eastern Peninsular of Malaysia. On the other hand, Antony's [39] study showed no relation between ethnicity and pressure ulcers. Gastritis has also been shown to vary between different ethnicities [3,4] and Gurjeet [40] showed difference in GI disorders among different ethnic groups, while Campbell showed a significant difference in H. pylori rate of colonization regarding ethnicity. In addition, certain ethnicities are more prone to certain GI diseases, such as colitis, compared to people of other ethnicities [41,42]. The significant differences between those two ethnic groups concerning all subgroups of GID and their risk factors and most subgroups of the GID will help primary health care, public health institutes, and non-profit community organizations consider the results when they deal with the Iraqi Arab/Chaldean community, in particular, and other ethnic groups, in general, or in establishing educational programs to help the community. This was the recommendation from De Vries's (De Vries, 2008) study, which showed migrant communities constitute a possible target population for primary prevention of H. pylori-related complications in low incidence countries, and Ekblad [43] showed the importance of immigrant status in health care and social insurance and its effects on the community.

Limitations and Strength of the Study

The survey of the original study assessed the health of the Iraqi community in Southeast Michigan. Several questions, which could relate to identified risk factors for GID, were not included in the survey. Also, the responses of the participants were, naturally, self-reported answers. However, the strength of the study was based on having a random sample of participants. Iraqi Arabs and Iraqi Chaldean (the two groups of the study) descend from the same country, share a common culture, and reside in Southeast Michigan. The only difference between the two groups was in ethnicity.

Conclusion

The study was based on a random sample of participants who emigrated to the US from Iraq at different times, and although they share a lot of common things, they differ in ethnicity (Arab and Chaldean). The data analysis of the participants indicates differences between the two ethnic groups in most of their demographic variables, ChE, NChE exposure, and even in reporting SRH. The prevalence rate of all GID was 72.1%; however, there was a significant difference in GID, including GI functional symptoms and GI psycho between Iraqi Arabs and Iraqi Chaldeans, with Chaldeans having a lower prevalence rate in all subgroups of GID. Significant impact differences of ChE and NChE exposure on the two ethnic groups could explain the difference impact on GID. Also, treatment compliance was different between the two groups in some GI psycho, where Iraqi Arabs were more compliant, but Chaldeans reported better health than Arabs at the time of the interview. The difference was significant. Applying Binary logistic regression analysis for each GID and each of its subgroups showed several risk predictor factors, such as age, gender, marital status, years in the US, which should be considered in any educational preventive program for the community and could help primary healthcare when dealing with such problems.

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