

Pre- and post-displacement stressors and time of migration as related to self-rated health among Iraqi immigrants and refugees in Southeast Michigan

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The objective of this study was to determine whether perceived health status of Iraqi immigrants and refugees residing in the United States was related to pre-migration environmental stress, current unemployment, and if they had emigrated before or after the 1991 Gulf War. A random sample of Iraqis residing in Southeast Michigan, US, was interviewed using an Arab language structured survey. The main outcome measure was self-rated health (SRH). Major predictors included socioeconomic status, employment status, pre-migration environmental stress, and health disorders. Path analysis was used to look at mediating effects between predictors and SRH. We found that SRH was significantly worse among participants that had left Iraq after the 1991 Gulf War. Unemployment and environmental stress exposure were inversely related to SRH. There was a direct path between Gulf War exposure and poor health. In addition, there were indirect paths mediated through psychosomatic and psychiatric disorders to SRH. Another path went from Gulf War exposure, via environmental stress and somatic health to poor health. Unemployment had a direct path, as well as indirect paths mediated through psychiatric and psychosomatic disorders, to poor self-rated health. In conclusion, these results suggest that pre- as well as post-migration factors, and period of migration, affect health.

Keywords: environmental stress; health, displacement; war; Iraqi

Introduction

Numerous studies have reported that refugees, as compared to non-forced displaced immigrants, are at a dramatically increased risk of suffering from

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somatic, psychosomatic, and psychiatric disorders, including depression, anxiety, and post-traumatic stress disorder (PTSD)¹⁻¹⁶. However, studies to date have major methodological shortcomings. These include the fact that most recent studies comparing refugees to immigrants are based on convenient and not randomly selected samples. Many lack pertinent reference groups. Those that include reference groups rarely make use of immigrants representing similar cultural, ethnic, and religious backgrounds. Finally, little attention is given to the fact that pre-migration societal conditions might influence the long-term well-being of post-migration people, not least refugees. The notion that societal factors above and beyond trauma exposure *per se* might influence persons' health is supported by recent findings that US war veterans returning from Iraq and Afghanistan indicating that they report more severe psychiatric sequelae as compared to prior conflicts^{17,18}.

Iraq's citizens have faced sustained trauma and socioeconomic stressors for a long period of time. However, the nature of these stressors has varied substantially dependent on the time period studied. Thus, prior to Saddam Hussein's takeover in late 1979, citizens faced predominantly financial concerns and religious conflicts. Citizens who emigrated during this time period were predominantly driven by fear of worsening future prospects. Following the takeover by the Hussein regime, citizens faced additional threats, including harshening of governmental control over its citizens as well as having their sons drafted for the eight-year-long Iraq-Iran war. This war, although never directly exposing all Iraqis to war activities (since it took place in the border regions to and within Iran) nevertheless resulted in substantial losses of Iraqi citizens. Finally, following Iraq's invasion of Kuwait in 1990, and sustained and repeated counter-measures by the Allied forces, Iraqi citizens were not only exposed to severe macro-level conditions, including a repressive regime and lack of food, medicine, and financial resources, but also directly to war activities, including bombings and air pollutants resulting from bombs as well as burning oil wells^{19,20}.

It has been suggested that Iraqis leaving the country following the invasion of Kuwait and the subsequent Gulf War of 1991 represent a new wave of immigrants from the Middle East region¹⁹. Iraqis leaving their country before 1991 were not defined as refugees, except a few that received political asylum. Not only did people leaving after the 1991 Gulf War suffer from more accumulated, severe, and sustained trauma and environmental stressors in Iraq; compared to those leaving before 1991, they have also been reported to suffer to a greater extent than prior immigrants from a host of physical and mental health disorders.

Not only did Iraqis arriving during the different periods discussed above face drastically different macro-level conditions in Iraq, their route to the US resulted in different additional hardships and trauma dependent on when they left Iraq. For example, most of the pre-Hussein era emigrants left

directly for the US. They thus suffered little known systematic trauma during their transition to the US. In contrast, citizens leaving after Saddam Hussein came into power, increasingly left the country 'illegally' by means of Turkey and Iran.

Iraqis leaving after the Kuwait invasion and the Gulf Wars also left 'illegally' but they typically had to stay for a substantial period of time in camps in Syria and Saudi-Arabia prior to being allowed to enter the US. They were also faced with severe domestic as well as transitional hardships, including spending significant amounts of time in under-resourced refugee camps in the greater Middle Eastern region, as well as violence, rape, and political persecution¹⁹. Then, what appears to represent drastically different pre- and post-migration conditions, may well have influenced post-migration somatic and mental health differentially. Furthermore, little is known about the inter-relationship between socioeconomic and personal trauma and environmental stressor exposure, and macro-level societal conditions on one hand, and, on the other hand, health effects.

The *aims* with the current study were:

- First, to determine whether a random-sample of Iraqi post 1991 refugees (as compared to socio-culturally similar immigrants) suffered from more somatic, psychosomatic and/or psychiatric disorders.
- Second, to determine whether post-migration health among Iraqis in the US was related to the time period they had left Iraq.
- Third, it was hypothesized that post-1991 refugees, arriving after the Kuwait invasion and the Gulf Wars, would have higher health care utilization due to worse overall psychosocial well-being.
- Fourth, possible direct and indirect pathways linking post-1991 entrants' status, the period after leaving Iraq, and socioeconomics to self-rated health were explored.

Such knowledge will contribute to an understanding of the importance of personal versus societal risk factors and their implications for post-migration health, which is vital in the design of effective public health refugee policy.

Methods

Participants

The project was announced using several community communication channels. Local Arabic media, including radio and television, provided a public service announcement about the study and the researchers' interest in contacting potential participants for further information about the project. Flyers about the project were disseminated at various Arab and Chaldean American community centers, targeting those areas most heavily frequented

by Iraqi Americans (e.g., faith-based facilities, convenience stores, restaurants, gas stations, hair salons, and community outreach centers). Workers at these establishments were also asked to disseminate written and oral information about the project. Potential participants were targeted to be representative of various geographic areas and cities within the greater Detroit metropolitan area. This was done in order to make sure the ultimate sample was representative of subareas with vastly different socioeconomic conditions.

The process resulted in a list of 5490 addresses which were collected from various sources (in Iraqi American organizations, local markets, Iraqi American directories and Arab American organizations), representing people with a high likelihood of being of Arabic inheritance based on their names or their participation in various Arabic entities and social organizations. The list of 5490 addresses was coded and entered into a SPSS program to randomly select a sample of 7.5%. Of 411 addresses selected, 44 residents did not fit the study criteria (e.g., not Iraqi-born, or had moved at the time of the research visit). The inclusion criteria for the current study was that participants were 18 years of age or older at the time they emigrated from Iraq. If the emigration had taken place in 1991 or later, we also required that the person had been residing in Iraq during the time 1991 period, and was 18-years-old or older in 1991, or during the post-1991 time period spent in Iraq. Out of 367 eligible candidates, 17 (4.6%) declined to participate. The reasons were: lack of time ($n = 9$), lack of interest in the study ($n = 7$), or no reason provided ($n = 1$). Thus, the final list of participants that consented to take part in the study consisted of 350 people, representing a response rate of 95%.

Based on the year the participant immigrated to the US, the study populations were classified into three groups, to reflect the various periods with dramatically different potential trauma and environmental stressor exposure and societal conditions in Iraq discussed in the introduction. The first group, post 1991 (G1, $n = 205$), represented the group that had been exposed to both war exposure conditions and severe financial constraints. We considered this group the one with the highest accumulated trauma and environmental stressor exposure. Although most participants in the G1 group entered the US as refugees, there may have been a few that entered the country as regular immigrants. However, we did not address this possibility specifically in the survey. Regardless of immigrant status, the G1 group had experienced the harshest conditions in Iraq prior to leaving. However, we know to a great degree of certainty that there should be no refugees in the G2 and G3 groups. It was only following the 1991 war, United Nations assigned refugee status to Iraqis. Furthermore, during the interviews with participants, done in the participant's home, the interviewers were able to determine refugee/immigrant status, although there was no specific question addressing status in the survey. The second group, those who immigrated to

US during the period of 1981–1991 (G2, $n = 80$), represented persons exposed to harsh regime conditions within Iraq as well as the potential threat of being drafted for the Iraq–Iran war or seeing family members being drafted. However, this group was not directly exposed to war, since the Iraq–Iran war took place at the border or within Iran. We considered this group to be the intermediate exposure group in terms of trauma and environmental stressor exposure. Finally, the third group represented those that had immigrated to US before 1981 (G3, $n = 65$). They were assigned the reference status in our analysis, with the least amount of trauma and environmental stressor exposure, although they faced increasingly difficult financial hardships and prospects in Iraq due to a negative overall economic development in the country.

Measures

The structured survey questionnaire, used in all interviews, was adapted from a validated instrument that has been used in a series of large-scale surveys, including US Gulf War veterans, Iraqi civilians and soldiers still residing in Iraq, as well as Iraqi immigrants and refugees in the US^{21–25}. In addition to several questions regarding demographic and background information, the survey contained questions as to the existence, frequency, and intensity of the 33 specific medical conditions listed in Table 3. For each of the 33 questions, the respondent was instructed to respond to three columns (1: whether or not they had/have had the specific disorder; 2: if yes, whether they had had it prior to 1991; and, 3: whether they received treatment for the disease). The environmental stress score was calculated by aggregating the respondent's answers to 12 specific environmental stress questions. This environmental stress scale was converted into a percentage scale with 100% representing the highest possible environmental stress level, and 0% representing the lowest environmental stressor exposure.

There was also a global question asking the participants to rate their self-rated health (SRH), and another question to compare the respondent's self-rated health at the time of interview with that one year earlier. Responses were typically provided using a Likert-type scale ranging from '1', 'poor health', to '5', 'excellent health'. The SRH scale is well-validated and shown to predict future health and mortality in currently healthy subjects²⁶.

Interview process

Following detailed written and oral information, participants were asked to complete and sign the informed consent form. They were informed that all participation was voluntary, that they could rest if they so desired during the interview process, and had the right to stop any further participation in the interview without any further explanation or consequences. Questions were

asked by Arab speaking research assistants following a structured survey with all text written in Arabic. The interviews took between two and three hours each. Participants received a gift certificate for \$25.00 at the completion of the interview. Participant's questionnaires were identified by a code number only. No individual identifying information was recorded except a code number which was kept in a file that was stored in a locked cabinet at the principle investigator's office.

Statistical analysis

We contrasted individual pairs of groups, for example, G1 versus G2, for all discrete variables, such as, gender, employment status, and self-rated health. We calculated the prevalence for each medical condition (Table 3) by identifying the presence versus absence of self-reported medical conditions. Chi square tests were used to identify possible differences across groups and socioeconomic categories for discrete variables. Furthermore, we calculated the aggregate number of medical conditions, and compared participants with no medical conditions versus those with five and more conditions. We combined members of the G2 and G3 groups since there were few differences between them in reported health, so we count them as pre-1991 migration group. The most interesting contrast was between those leaving before as opposed to after 1991. This revised grouping was used in subsequent analysis, including logistic regression, path analysis, as well as looking at the possible relationship between aggregate number of symptoms and group status.

A composite environmental stressor exposure score was calculated for each participant based on the number of days exposed to eight different environmental stressors instead of the original 12. This was based on applying verimax factor analysis on the 12 different environmental stressors, e.g., contaminated water, gun shots, seeing severely injured or dead persons, and threats to one's life. The Cronbach's alpha for the scale was 0.87.

For the final analysis the dependent variable was the response to the question 'How would you rate your current health?' We used a path analysis model to explore direct and indirect relationships between, on the one hand, period of immigration (pre-1991 vs. 1991 and later), environmental stress exposure, unemployment, gender, and education, and, on the other, self-rated health. Because of the large numbers of zero responses in the environmental stress scale, we dichotomized the scale into some (180 persons) or no exposure (170). The dichotomization of the environmental stress exposure revealed that 83.4% of the post-Gulf War group was exposed as opposed to only 6.2% among those that had emigrated before the war.

Table 3 depicts which medical conditions were allocated into the respective aggregate categories used in the path analysis. For this purpose,

the path analysis model included significant demographic variables as exogenous variables and the medical system category scores as mediating variables. Data analysis was carried out with SPSS version 16 and SAS PROC CALIS. All statistical significance was set at $p < .05$, two-sided. The study was approved by the Wayne State University Human Investigation Committee.

Results

As depicted in Table 1, there were significant differences between the three immigration period groups in terms of age, marital, occupation, income, and number of years in US and health insurance status. There were no differences across groups, however, with regard to gender, educational attainment, and smoking habits. Additional analyses revealed that the only remaining statistical differences between groups were for age and health insurance status when contrasting G2 versus G3.

Table 2 reveals that significantly more participants in the G1 group rated their health as poor (59.5%) as compared to G2 (25%), and G3 (12.3%). Furthermore, fewer in the G1 group rated their health as excellent/very good (13.7%) as compared to G2 (42.5%) and G3 (50.8%). In the regression analysis, using G3 as the reference group and adjusting for all covariates, the odds ratios for poor self-rated health versus fair/good health was significantly higher for G1 versus G3. However, odds ratios for G2 versus G3 was also significantly increased but less so as compared to G1 versus G2, following adjustment for covariates.

In rating changes in their self-rated health during the last year, 40.5% of G1 rated it to be much worse, compared to 21.3% for G2 and 12.3% for G3 ($p < 0.001$). In terms of medical conditions, the G1 group displayed an across the board higher proportion of psychosomatic and psychiatric disorders (Table 3). For somatic disorders, the prevalence was higher for 18 out of 26 medical conditions in the G1 group as compared to the other two groups. However, apart from musculoskeletal disorders, urinary tract infections, chronic ear infections, asthma and arthritis there were no statistical differences for somatic medical conditions across the group. However, 24.9% of G1 have five or more medical conditions, compared to 8.8% in G2 and 9.2 in G3. In contrast, only 13.7% of G1 had no somatic condition, compared to 31.3% for G2 and 15.4% for G3 ($p < 0.001$). Logistic regression for those who have no medical condition vs. five or more was done comparing G1 to the combined G2 and G3 group, adjusting for age, gender, marital status, education, occupation and income. The LR, using G2/G3 as a reference group, was 5.1; 95% confidence interval 1.14–22.83. The aggregate environmental stressor scale revealed significant differences across the three groups in the percentage scale scores (G1 – 83.4%; G2 – 13.8%, and G3 – 0%).

Table 1. Demographic characteristics of study groups by period of immigration.

Variable	Post-1991 [G1 = 205]	1980-91 [G2 = 80]	Pre-1980 [G3 = 65]	Total [n = 350]
Age/mean [SD]*	44.8 [7.69]	44.2 [6.97]	49.6 [5.78]	45.6 [7.45]
Years in US/ mean [SD]*	9.4 [3.17]	21.9 [3.99]	32.7 [4.95]	16.6 [9.96]
	No. [%]	No. [%]	No. [%]	No. [%]
Age group*				
32 - 40 Y	70 [34.1]	18 [22.5]	4 [6.2]	92 [28.3]
40 - 49 Y	69 [33.7]	42 [52.5]	30 [46.2]	141 [40.3]
50 - 57 Y	66 [32.2]	20 [25.0]	31 [47.7]	117 [33.4]
Gender				
Male	106 [51.7]	49 [61.3]	41 [63.1]	196 [56.0]
Female	99 [48.3]	31 [38.8]	24 [36.9]	154 [44.0]
Marital status*				
Married	190 [92.7]	61 [78.3]	56 [86.2]	307 [87.7]
Single	15 [7.3]	19 [23.8]	9 [13.8]	43 [12.3]
Educational level				
< H.S.	91 [44.4]	24 [30.0]	24 [36.9]	139 [39.7]
=> H.S.	114 [55.6]	56 [70.0]	41 [63.1]	211 [60.3]
Employment status*				
Employed	84 [41.0]	55 [69.6]	53 [81.5]	192 [55.0]
Unemployed	121 [59.0]	24 [30.4]	12 [18.5]	157 [45.0]
Annual income*				
< \$10,000	28 [40.6]	6 [18.8]	1 [4.3]	35 [28.2]
\$10,000+	41 [59.4]	26 [81.3]	22 [95.7]	89 [71.8]
Health insurance*				
Yes	156 [76.1]	38 [47.5]	43 [66.2]	237 [67.7]
No	49 [23.9]	42 [52.5]	22 [33.8]	113 [32.3]
Smoking status				
Smoker	62 [30.2]	34 [42.5]	21 [32.3]	117 [33.4]
Never smoked	143 [69.8]	46 [57.5]	44 [67.7]	233 [66.6]

Note. One way ANOVA test for age and years in USA and Chi-square test for all other;
* $p < 0.001$.

Since there were no significant differences between participants in the G2 and G3 groups, respectively, they were combined into one group in a subsequent path analysis, comparing Iraqis entering the US after 1991 as compared to before 1991. The path analysis model is shown in Figure 1. The final model shown was determined by using modification indices in a stepwise elimination procedure. Only variables with one or more significant paths are shown in Figure 1. All the coefficients shown were significant at the $p < .05$. Variables initially considered for the model, which had no significant paths and thus discarded, were gender, education, and marital status.

Exogenous variables with significant direct paths to the current self-rated health were: age, employment status, and period of migration (pre- vs. post-Gulf War). Endogenous factors with direct effects were all three health

Table 2. A. Self-rated health [SRH] by study groups [X^2 test for any two groups was significant ($P < 0.01$ or $P < 0.001$)] and B. Logistic regression for SRH [Excellent/very good/Good = 1 vs Fair/poor = 0].

A. Current SRH	Post-1991 [G1 = 205]	1980-91 [G2 = 80]	Pre-1980 [G3 = 65]	Total [n = 350]
	No. [%]	No. [%]	No. [%]	No. [%]
Excellent	9 [4.4]	9 [11.3]	12 [18.5]	30 [8.6]
Very good	19 [9.3]	25 [32.3]	21 [32.3]	65 [18.6]
Good	55 [26.8]	26 [32.5]	24 [36.9]	105 [30.0]
Fair	83 [40.5]	19 [23.8]	7 [10.8]	109 [31.1]
Poor	39 [19.0]	1 [1.3]	1 [1.5]	41 [11.7]
Total	205	80	65	350

B. Likelihood for SRH	Sig.	Odds Ratios	95.0% C.I. for OR	
			Lower	Upper
G1 Vs G2 Vs G3	0.001			
G1 Vs G3 (Reference)	0.001	33.776	6.021	189.465
G2 Vs G3 (Reference)	0.015	9.189	1.543	54.722
Age	0.001	1.131	1.051	1.217
Unemployment (code = 1) vs employment	0.008	4.471	1.481	13.501

Logistic regression adjusted for age, gender, marital status, education, occupation, income and health insurance.

disorders. Indirect effects of migration period on SRH included those mediated through psychosomatic and psychiatric disorders. Another indirect path from period of migration to SRH is mediated in turn consecutively through the environmental stressor score and somatic. Finally, there are two indirect effects from unemployment on SRH mediated by psychiatric and psychosomatic disorders. The model fits the data well on all three main fit indices (chi-square [8.53, $df = 7$, $p = 0.29$], GFI [0.98], RMSEA [0.048]). The R^2 for prediction of SRH model was 0.49.

Discussion

Although past studies have documented worse somatic and mental health among refugees as compared to non-displaced immigrants, there is a void of studies based on random samples, especially when comparing immigrants with that of immigrants from countries with similar cultural, ethnic, and religious backgrounds. Moreover, there is a void of studies assessing the possible health impact of sustained but varied pre-immigration societal conditions.

We used a thorough strategy to identify addresses where Iraqis to a high degree of likelihood resided. This endeavor involved active involvement of

Table 3. Prevalence of self-reported physician diagnosed medical conditions during the last year by period of immigration.

	Post-1991 [G1 = 205]	1980-91 [G2 = 80]	Pre-1980 [G3 = 65]	Total [n = 350]
Medical Condition	%	%	%	No. [%]
Psycho-Somatic				
Sleep Disturbance*	53.7	32.5	36.9	160 (45.7)
Memory disturbance*	44.9	10.0	12.3	108 (30.9)
Recurrent Headaches*	34.6	8.8	3.1	80 (22.9)
Chronic fatigue*	30.2	8.8	16.9	80 (22.9)
Migraines*	19.5	3.8	1.5	44 (12.6)
Psychiatric Disorder				
Depression*	38.0	12.5	10.8	95 (27.1)
Other disorders*	36.6	5.0	1.5	80 (22.9)
Somatic Illnesses				
Musculoskeletal.*	42.4	18.8	26.2	119 (34)
U.T.I.*	16.1	6.3	1.5	39 (11.1)
Chronic Ear infection*	10.2		4.6	24 (6.9)
Asthma**	8.8	7.5		24 (6.9)
Arthritis**	23.9	12.5	16.9	70 (20)
Back disorder	49.3	42.5	40.0	161 (46)
High B.P.	21.0	10.0	16.9	62 (17.7)
Rhinitis	20.0	13.8	10.8	59 (16.9)
Gastritis	19.0	11.3	23.1	63 (18)
Diabetes	15.6	6.3	16.9	48 (13.7)
Difficulty breathing	11.2	10.0	7.7	36 (10.3)
Anemia	10.7	2.5	6.2	28 (8)
Chronic sinusitis	10.2	12.5	6.2	35 (10)
Bronchitis	8.8	6.3	6.2	27 (7.7)
Peptic Ulcer	7.3	6.3	3.1	22 (6.3)
Kidney disease	6.8	2.5	6.2	20 (5.7)
CVD	5.4	1.3	1.5	13 (3.7)
Enteritis	4.4	2.5		11 (3.1)
Thyroid disorder	4.4	3.8	7.7	17 (4.9)
Colitis	3.9	6.3		13 (3.7)
Skin disorder	3.4	5.0	1.5	12 (3.4)
Pneumonia	2.4		1.5	6 (1.7)
Epilepsy	1.5			3 (0.9)
Tuberculosis	0.5			1 (0.3)
Lymphoma		1.3		1 (0.3)
Other cancer			3.1	2 (0.6)

Test among the three groups: * $P < 0.001$; ** $P < 0.05$.

community stakeholders, such as churches and mosques. Following the compilation of addresses, we randomly selected 7.5% for personal visits. At these visits, two research assistants fluent in Arabic explained the study, and asked for consent. The response rate among eligible participants was very high, over 95%. Participants were asked a series of socioeconomic and

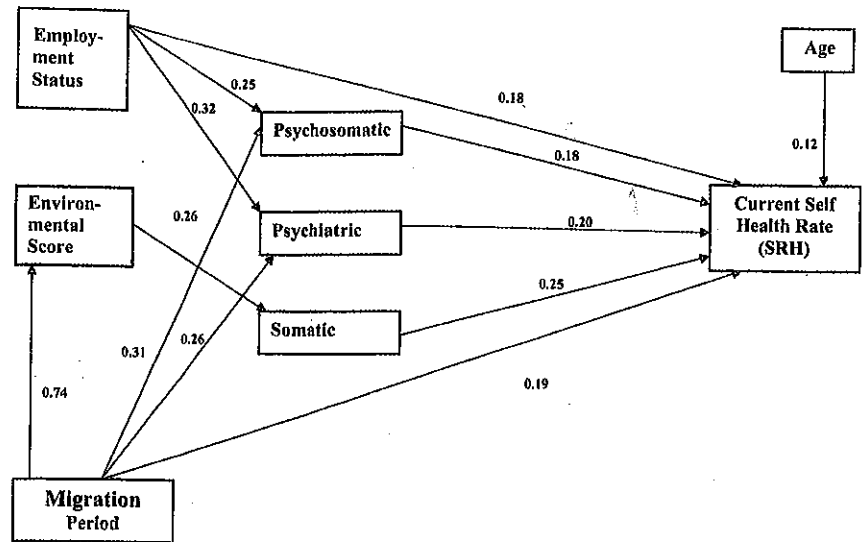


Figure 1. Predictors of self-rated health (SRH). *Note.* Path model relating hypothesis direct and indirect effect between migration period, environmental score exposures, health disorders (e.g., somatic) and SRH. Coding scheme: 0 = reference category. Code = 1 for the following outcomes: migration period (post 1991); unemployed; have disease (somatic, psychosomatic & psychiatric); have environmental exposure. SRH coded as follow: 1 = excellent, 2 = very good, 3 = good, 4 = fair and 5 = poor.

health questions, using a standardized survey that had been previously translated into Arabic.

We believe the elaborate mechanisms to ensure a truly random sample of immigrants did perform satisfactorily. Results confirm that post-1991 entrants as compared to prior to 1991 immigrants exhibit worse psychosomatic and psychiatric health²⁷⁻³². Furthermore, when comparing participants that had arrived after the 1991 Gulf War initiation and subsequent sustained conflicts (G1), with those either arriving after Saddam Hussein took over, but before the Gulf War (G2), or before Hussein took over (G3), adjusting for relevant covariates, such as age, gender, marital status, employment and educational attainment, health insurance and income, G1 fared consistently the worst. This finding held true for self-rated health and for the psychosomatic and psychiatric measures even after adjusting for a range of covariates using logistic regression. However, in terms of somatic health, differences across groups, all groups reported high levels, although G1 consistently reported the highest levels here as well compared to the other two groups. G1 also reported the highest stress levels based on our aggregate environmental stressor score scale.

These findings suggest that participants having sustained trauma and environmental stress exposure following the 1991 Gulf War and subsequent

invasion were at an increased risk for psychiatric and psychosomatic disorders. The reason for this might be due to a multitude of factors. The level of trauma and environmental stressors that Iraqi citizens were exposed to increased in nature, frequency, and intensity from the pre-1980 period to the post 1991 period. Initially, it concerned fears about diminishing future financial prospects³². Following the rise of Saddam Hussein, additional trauma and environmental stressors were added. These include a harsh regime, decreased access to food and medicine, aggravated by the United Nation's initiated trade embargo, and the Iran-Iraq war³³. Families risked seeing their sons, who were 18 years of age and older, forcibly selected and sent to the front, where death was an almost certainty³³. Finally, following the Gulf War and subsequent invasion by the Allies, conditions worsened dramatically in terms of employment, food, medical services, and increased frequency of terrorism and ethnic conflicts³⁴. At this time regular Iraqis did not only hear about the war at the frontier, they were typically personally exposed to the terror of war and subsequent deterioration of the physical, chemical and psychosocial environment. Thus, many objective indicators suggest that the post 1991 entrants to the US were exposed to the highest cumulative environmental stress and trauma load.

Our study points to the importance of not viewing refugees as a homogenous entity. Rather, their trauma and environmental stressor exposure history might vary widely. This derives not only from recognized individual trauma and mental health risk factors, such as threat to one's life or rape, but also on macro-environmental societal conditions. This fact is rarely recognized in studies to date. We applied a path model to identify possible mechanisms explaining the relationship between, on the one hand, of period of entry to the US, and on the other self-rated health, after taking other known risk factors into consideration. We found, as expected from prior psychiatric epidemiological studies, that employment was protective and related to better self-rated health. It is well known from other studies, including prospectively controlled, that unemployment is a risk factor for poor physical as well as mental health³⁶. Thus, the current study demonstrates the importance of post-migration stressors, such as unemployment, for refugee and immigrant health, not merely pre-migration environmental stressors. After controlling for those known factors, entrants arriving after 1991 were at a substantially worse health risk. Interestingly, there was not only a direct effect of entry year on self-rated health; there were also indirect effects passing through all three aggregate medical indices (somatic, psychiatric, and psychosomatic). The same held true for employment.

Our study supported the supposition that one of the main differences between the two groups were the cumulative exposure to environmental stressors in Iraq. Those arriving after the 1991 Gulf War had significantly higher levels of environmental stressor exposure.

Conclusion

Although there are numerous studies of health risk factors among immigrants in general and in refugees in particular, less is known about how pre- and post-migration factors give rise to their health effects. The current study points to both direct and indirect effects from pre-migration environmental stressors, current unemployment, as well as period of migration on self-rated health. Interestingly, some of these effects are mediated by mental and somatic health disorders. The study points to the importance of considering both pre- and post-migration individual exposures as well as general societal conditions in the country of origin.

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