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Self-rated Health and Medical Conditions in Refugees and Immigrants from the Same Country of Origin

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Abstract

Background Research suggests that refugees are at an increased risk for poor health outcomes as compared to immigrants. However, prior studies have compared refugees and immigrants from different countries and have failed to isolate specific war-related factors.

Objective To compare health outcomes and their determinants in refugees and immigrants from the same country of origin.

Methods A cross-sectional study based on a convenient sample and on self-report participants were conducted at Southeast Michigan during the period September to December 2009. A validated survey was used to examine refugees (n = 75) and immigrants (n = 65) from Iraq. The survey covered socioeconomics, lifestyle, violence exposure, self-rated health, and number of medical conditions (high blood pressure, fatigue, and backache, shortness of breath, gastrointestinal disorders, skin problems, and musculoskeletal problems). Group differences and predictors of health outcomes were assessed.

Results Refugees reported significantly more violence exposure than immigrants ($p < 0.001$). There were no significant differences in self-rated health or medical disorders between groups; however, violence exposure was the main predictor of health outcomes in refugees, whereas age was the main predictor in immigrants. Other predictors also varied by migratory group.

Conclusion Even though migration status did not directly influence health outcomes, results suggest that factors associated with migration status, e.g., violence exposure and age, do impact health. Future studies need to more carefully define and control for country-specific variables.

Key Words Health, Trauma, Violence, Emigrating, Iraq

List of abbreviation: PTSD = posttraumatic stress disorder.

Introduction

Refugees, individuals forced to leave their country of origin due to fear of persecution [(1)] are reported to be at an increased risk to suffer from adverse somatic, psychosomatic, and mental health as compared to immigrants, those who leave their country of origin voluntarily, and the host country population [(2-6)]. Refugees also more frequently rate their health as fair-to-poor as compared to immigrants [(7)]. In terms of somatic chronic diseases, there is a range of studies reporting a greater risk for refugees to suffer from cardiovascular disease, diabetes, arthritis, respiratory diseases, skin diseases and other medical illnesses as compared to non-war exposed immigrants [(8-10)]. Refugees are also more likely to suffer from depression, posttraumatic stress disorder (PTSD), and anxiety [(11-13)].

A major limitation in studies to date is the fact that refugees are typically compared to

immigrants originating from different countries, to the host country population, or to no control group [14,15]. When refugees and immigrants representing different countries are compared, it is more difficult to isolate war-related adverse health effects from factors related to other country-specific risks. For example, cultural, lifestyle and environmental factors of relevance for somatic, mental, and psychosomatic health might differ between the countries of origin for refugees and immigrants [16,17]. Failure to acknowledge such possibilities represents a gap in the literature about the possible differences in health of persons emigrating from the same country of origin but under different circumstances, either as immigrants or as refugees. Individuals from the same war-torn country are not necessarily equivalent in their exposure to the war, which can be examined by explicitly measuring violence exposure; however, other health-relevant factors are more likely to be similar as compared to reference populations coming from entirely different countries. Research suggests that factors which affect health may well differ across countries. For example, persons from different countries often make different attributions of illness, health, disease, symptoms, and treatment [18,19]. Such differences therefore play an essential role in the formation of beliefs concerning health and illness.

It is thus imperative to study persons emigrating from the same country – but during different civil circumstances. This will enable a better understanding of the causality between specific exposures and health among refugees. Furthermore, such a design will address the question of whether there are inequalities in post-migration health between refugees and comparable immigrants. The current study is part of a larger program to investigate health inequalities and factors affecting such differences among refugees that have been forcibly displaced as opposed to immigrants whom voluntarily left their country of origin. This study focuses on self-rated health and reported medical conditions (e.g. high blood pressure, fatigue) in refugees as compared to immigrants, both of whom were from Iraq.

The aims of this study were to:

1. Investigate and explore possible differences in self-rated health and number of medical conditions in refugees versus immigrants.
2. Determine possible contributing factors behind such differences.

We anticipated that refugees would report worse self-rated health and more medical conditions than immigrants, as prior studies have consistently reported such results [6,8,9,12,20]. Furthermore, we predicted that refugees would report higher pre-migration violence exposure. Finally, controlling for migration status, we predicted there would be an association between violence exposure, self-rated health, and number of medical conditions, such that higher violence exposure would predict poorer self-rated health and an increased number of medical conditions.

Methods

Participants and Procedures

A cross-sectional study based on a convenient sample and on self-report participants were conducted at Southeast Michigan during 2010. The sample documented Iraqi immigrants (n=65) and Iraqi refugees (n=75) were compared. Sample sizes in specific analyses may be slightly different due to small amounts of missing data. Migration status was determined by asking participants about their immigration status in the United States. According to United Nations High Commissioner for Refugees, refugee is defined as any person who: owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country". Immigration is defined as the movement of people into a country to which they are not native in order to settle there, especially as permanent or future citizens. Immigrants are motivated to leave their native countries for a

variety of reasons, including a desire for economic prosperity, political issues, family re-unification, escaping conflict or natural disaster, or simply the wish to change one's surroundings. In this paper, we include Iraqi who reports themselves as refugees or immigrant or others.
Inclusion criteria included being at least 18 years of age, being born in Iraq, and having left Iraq to immigrate to the U.S., either as an immigrant or refugee.
Participants were recruited in 2010 through community organizations that provide assistance and services to immigrants and refugees in Southeast Michigan, U.S.A. Several methods of recruitment were used to ensure a representative sample. All participants were Arabic speaking and were recruited from the Arab American and Chaldean Council (ACC; a non-profit organization serving immigrants and refugees), Chaldean and Assyrian Churches, as well as from the Islamic Center of Detroit. Moreover, repeated Arab language announcements by means of mass media (newspapers, organization newsletters) were used for recruitment.
A short notice describing the study, in both written and oral Arabic, was presented to all prospective participants at the various community centers. Interested individuals were scheduled for participation. Prior to data collection, potential participants again received a detailed written and oral description of the study, and were given the opportunity to ask questions. Subsequently, they were asked by the research staff to sign a consent form, and were clearly informed that participation was voluntary. The research staff then administered the survey, with participants responding to the questions in the survey. Once the participant completed the survey, they received a $30 gift card. The study protocol was approved by the Human Investigation Committee of Wayne State University.

Measures

Participants completed a survey comprised of questions regarding demographics (e.g. age, gender) and self-reported exposure to violence [(21)]. In addition, respondents rated their health, and indicated whether or not they had been diagnosed or suffered from a list of medical conditions [(22)]. The survey was translated from English into Arabic by a bilingual professional. The Arab version of the survey was then back-translated by an independent, dual-speaking community translator to ensure accuracy.

Socio-demographics: The socio-demographic section asked participants for background information including migration status, gender, and age, number of years in the U.S., education, health insurance, weight, smoking behavior, and employment status. We categorized educational attainment as “high school or less” and “more than high school” and current employment status as “employed” and “unemployed.”

Self-rated health: Self-rated health was assessed using a five-point scale ranging from poor to excellent. Research suggests that this measure represents a good proxy for prospective health status, including that of minority populations [(22-24)]. The scale was dichotomized as good health (excellent, very good, good) versus poor health (fair, poor). The dichotomized scale was more appropriate for our analyses than treating it as continuous, given that one item measured on a Liker scale represents only ordinal level data.

Medical conditions: Prevalence of medical conditions was assessed by asking a series of questions regarding whether a participant had been diagnosed with or experienced problems with the following medical conditions: high blood pressure, fatigue, and backache, shortness of breath, gastrointestinal disorders, skin problems, and musculoskeletal problems. For instance, the participant was asked “Have you ever been diagnosed with or experienced problems with high blood pressure?” Participants were provided three response options, past, current, or never. Current and past diagnoses of the disorder or problem were counted as equivalent. These conditions were

chosen because they provide a general overview of the participants' health [25]. All affirmative responses, present and past, were summed to create a total health score, which ranged from 0-7, and represented the number of medical conditions afflicting the individual.

Exposure to violence: Pre-migration exposure to violence was assessed using a modified measure based on the Survey of Children's Exposure to Violence [26]. The instrument has been modified and validated for use with adolescent and adult refugees [21], and provides a comprehensive assessment of violence exposure, such as having been arrested, kidnapped, threatened, attacked, sexually abused, or having experienced an explosion. Again, affirmative responses were summed, thereby creating a total pre-migration violence exposure score.

Data Analysis

Chi square analyses and t-tests were used to assess group differences between refugees and immigrants on demographic variables, self-rated health, prevalence of specific medical conditions, and pre-migration violence exposure. The sample sizes used in this study provided adequate power to find an effect between refugees and immigrants on our outcome variables (1-β = 0.84), self-rated health and number of medical conditions.

Three sets of logistic regressions were computed to calculate the odds ratios (OR) and to test the possible associations between the independent variables – migration status and pre-migration violence exposure – and the outcome variable – self-rated health. The first logistic regression tested this association while controlling for gender, age, education, employment, weight, smoking, and years in U.S. for the whole sample. The second and third logistic regressions tested whether associations differed across migration status. In a similar fashion, three linear regression analyses were conducted to explore the association between the independent variables and the number of medical conditions. All statistical analyses were carried out with Statistical Package for the Social Sciences (SPSS) version 19 with a two-tailed statistical significance set at $\alpha = .05$.

Results

Table 1 shows the demographic characteristics of the sample by migration status. A greater proportion of immigrants was male, employed, older, and had lived longer in the U.S than refugees. Refugees, however, reported significantly more pre-migration exposure to violence. No significant differences between the two groups were found with respect to level of education, health insurance, weight, and smoking behavior.

There were no statistically significant differences between the two groups in the prevalence of each of the 7 medical conditions. Overall, 35% of participants reported having high blood pressure, 41% had backache, 21% had gastrointestinal disorders, 63% were suffering from fatigue, 24% suffered from shortness of breath, 29% had musculoskeletal problems, and 10% had skin problems. The groups also did not differ in the number of medical conditions reported (M = 2.50, SD = 1.89; t (137) = 0.47, p = 0.64). Furthermore, no significant differences were found in self-rated health between the two groups. Overall, 35% of the entire sample reported fair or poor health.

Table 2 shows the results of the logistic regression analysis for the predictors of self-rated health. For the combined sample, being younger, having never smoked, and having lower violence exposure were significant predictors of good self-rated health (excellent, very good, and good). However, when the groups were examined separately, pre-migration exposure to violence was the only significant, albeit inverse, predictor of good self-rated health among refugees, while older age was the only significant predictor, also inverse, among immigrants.

Table 3 shows the results of the linear regression analysis predicting the number of medical conditions. Pre-migration exposure to violence and being older in age were significant

predictors of the number of medical conditions in the combined model. In refugees, pre-migration exposure to violence and being older in age were significant predictors for reporting a higher number of medical conditions. Additionally, education emerged as a protective factor for refugees, i.e., higher education predicted fewer reported medical conditions. Of these variables, violence exposure was the strongest predictor for this group, accounting for 16% of the variance in reported number of medical conditions. For immigrants, older age, being female, and having smoked were significant predictors of a higher number of medical conditions. In this group, age was the strongest predictor, accounting for 21% of the variance in reported medical conditions.

Table 1. Socio-demographic Characteristics by Study Group

		Refugee N (%)	Immigrant N (%)	χ2	df	*P*
Gender	**Male**	52(37.1)	31(22.1)	6.76	1	0.009
	Female	23(16.4)	34(24.3)			
Insurance	**Insured**	19(13.7)	25(18.0)	3.01	1	0.08
	Not Insured	56(40.3)	39(28.1)			
Education	**< High School**	32(23.9)	29(21.6)	0.40	2	0.82
	High School	29(21.6)	21(15.7)			
	College	12(9.0)	11(8.2)			
Employment	**Employed**	11(8.1)	29(21.5)	16.16	1	<0.001
	Unemployed	62(45.9)	33(24.4)			
Smoking	**Has Smoked**	62(44.3)	48(34.3)	1.61	1	0.21
	Never Smoked	13(9.3)	17(12.1)			
Self-Rated Health	**Excellent**	9(12.7)	7(10.8)	1.12	4	0.89
	Very Good	14(19.7)	13(20.0)			
	Good	26(36.6)	21(32.3)			
	Fair	15(21.1)	14(21.5)			
	Poor	7(9.9)	10(15.4)			
		***M* (*SD*)**	***M* (*SD*)**	***t***	***df***	***P***
Age		40.93(12.55)	48.5(16.94)	2.98	134	0.003
Years in U.S.		2.69(3.13)	12.52(9.63)	8.35	138	<0.001
Violence		18.12(5.98)	14.15(4.81)	4.28	138	<0.001
No. Medical Conditions		2.57(1.73)	2.42(2.08)	0.47	137	0.64
Weight		146.45(52.89)	153.26(40.98)	0.82	132	0.41

Table 2. Logistic Regression: Predictors of Good Self-Rated Health

Group	Predictor	B	Wald	*P*	O.R.	Lower CI	Upper CI
Combined Sample	Age	-0.06	10.26	0.001	0.94	0.91	0.98
	Gender (male = 0)	-0.37	0.40	0.53	0.69	0.22	2.15
	Years in U.S.	0.02	0.23	0.63	1.01	0.94	1.09
	Weight	-0.01	1.98	0.15	0.99	0.98	1.00
	Smoking (never smoked = 0)	1.46	4.07	0.04	4.30	1.04	17.72
	Employment (unemployed = 0)	1.14	2.84	0.09	3.11	0.83	11.67
	Education (≤ high school = 0)	0.73	1.68	0.19	2.07	0.69	6.24
	Violence Exposure	-0.03	4.00	0.04	0.96	0.93	0.99
	Migration status (immigrant = 0)	0.90	1.52	0.21	2.47	0.58	10.43
Refugees	Age	-0.05	3.79	0.05	0.94	0.89	1.00
	Gender (male = 0)	0.01	0.00	0.99	1.01	0.10	9.73
	Years in U.S.	0.01	0.002	0.96	1.00	0.78	1.30
	Weight	-0.005	0.28	0.59	0.99	0.97	1.01
	Smoking (never smoked = 0)	1.16	1.30	0.25	3.20	0.43	23.53
	Employment (unemployed = 0)	2.20	2.40	0.12	9.10	0.55	148.53
	Education (≤ high school = 0)	0.60	0.42	0.51	1.83	0.29	11.22
	Violence Exposure	-0.05	5.41	0.02	0.94	0.90	0.99
Immigrants	Age	-0.06	5.70	0.02	0.94	0.89	0.99
	Gender (male = 0)	-0.73	0.92	0.33	0.47	0.12	2.15
	Years in U.S.	0.04	1.13	0.29	1.04	0.96	1.13
	Weight	-0.01	0.66	0.14	0.99	0.97	1.01
	Smoking (never smoked = 0)	1.29	1.46	0.22	3.66	0.44	30.13
	Employment (unemployed = 0)	1.07	1.33	0.24	2.93	0.47	18.17
	Education (≤ high school = 0)	1.06	1.59	0.20	2.90	0.55	15.16
	Violence Exposure	0.03	0.57	0.44	1.04	0.94	1.15

Note: df for each component of this analysis is 1; when no reference category is indicated continuous measures were used.

Discussion

In the current study, we examined factors associated with somatic aspects of psychiatric complaints outcomes in refugees as compared to non-refugee immigrants originating from the same country. The study design allowed for a better control of the influence of non-war related exposures on health in refugees in that it allows for control of country-specific factors possibly contributing to poor health. Country-specific factors could include health care systems, general health, behavioral attitudes,

environmental factors, and belief systems. Indeed, prior studies have reported that refugees generally exhibit worse health when compared to immigrants [7]. However, a major limitation in those studies has been the comparison of refugees and immigrants from different countries of origin, since factors other than war-exposure may contribute to health differences [15]. Our study is the first to compare refugees to a control group of immigrants coming from same country, which makes them more likely to share similar traditions, beliefs, and language. Despite differences in pre-migration violence exposure, refugees and immigrants did not differ significantly in self-rated health or reported number of medical conditions. This suggests that factors other than war and conflict contribute to both outcomes.

Table 3. Linear Regression: Predictors of Number of Medical Conditions

				CI				
Group	**R^2**	**Predictor**	**β**	**Low**	**High**	**High**	**t**	***P***
Combined Sample	0.37	**Age**	0.44	0.03	0.08	4.88	<0.001	0.14
		Gender (male = 0)	0.16	-0.10	1.36	1.70	0.09	0.01
		Years in U.S.	-0.06	-0.06	0.03	-0.59	0.55	<.01
		Weight	0.17	<0.01	0.01	1.93	0.06	.02
		Smoking (never smoked = 0)	0.03	-0.61	0.92	0.40	0.68	<0.01
		Employment (unemployed = 0)	-0.17	-1.49	0.04	-1.87	0.06	0.02
		Education (≤ high school = 0)	-0.08	-1.03	0.32	-1.04	0.29	<0.01
		Violence Exposure	0.23	0.01	0.05	2.65	0.01	0.04
		Migration status (immigrant = 0)	-0.15	-1.43	0.21	-1.47	0.14	.01
Refugees	0.36	**Age**	0.26	0.01	0.07	2.30	0.03	.06
		Gender (male = 0)	-0.09	-1.52	0.80	-0.62	0.53	<0.01
		Years in U.S.	0.10	-0.09	0.20	0.80	0.42	<0.01
		Weight	0.15	-0.01	0.01	1.06	0.29	0.01
		Smoking (never smoked = 0)	-0.20	-1.92	0.21	-1.61	0.11	0.03
		Employment (unemployed = 0)	-0.18	-2.02	0.23	-1.59	0.11	0.03
		Education (≤ high school = 0)	-0.26	-1.87	-0.05	-2.11	0.04	0.05
		Violence Exposure	0.44	0.02	0.07	3.86	<0.001	0.16
Immigrants	0.54	**Age**	0.58	0.04	0.11	4.59	<0.001	0.21
		Gender (male = 0)	0.23	0.03	1.97	2.06	0.04	0.04
		Years in U.S.	-0.17	-0.09	0.02	-1.42	0.16	0.02
		Weight	0.12	-0.01	0.02	1.07	0.28	0.01
		Smoking (never smoked = 0)	0.24	0.11	2.28	2.21	0.03	0.05
		Employment (unemployed = 0)	-0.21	-2.08	0.23	-1.61	0.11	0.03
		Education (≤ high school = 0)	0.05	-0.79	1.26	0.46	0.64	<0.01
		Violence Exposure	-0.15	-0.10	0.02	-1.34	0.18	0.02

Note: r = semi-partial correlation; when no reference category is indicated continuous measures were used.

These factors are largely unknown and need further investigation, although post-traumatic stress disorders could be one of the problems developed in patents facing disasters; however, refugees, who have been exposed to violence, may be more inclined to express reactions to trauma through psychological disorders, including PTSD and depression [25]. Therefore, refugees may be reacting to the increased violence exposure via psychological reactions as opposed to somatic reactions [25], which may account for the similarities in self-rated health and number of medical conditions found in the present study.

Predictors of both self-rated health and number of medical conditions differed across groups. Violence exposure was the strongest predictor of poor self-rated health and higher number of medical conditions for the full sample and for the refugees independently. For immigrants, on the other hand, the strongest predictor of poor self-rated health and higher number of medical conditions was increased age. Furthermore, violence was not a significant predictor of poor health for immigrants. This result suggests that the results for the combined model were driven by refugee violence exposure, and that there may be a critical level of violence exposure that must be reached before it causes adverse health effects. The refugee group is much more likely to have reached this critical level of exposure, which may be why violence was only a significant predictor for this group in the present study.

Immigrants and refugees reported similar numbers of medical conditions after adjusting for age, gender, education, employment, smoking behavior, weight, and length of time in the U.S. However, the limited predictive strength of violence exposure on the number of medical conditions (accounting for 16% of the variance) seems to indicate that there are other factors contributing to health outcomes in war-exposed populations, e.g., exposure to hazardous materials, contaminated food, poor quality air, poor mental health, etc. This is consistent with research comparing individuals residing at different distances from a war environment reporting that those closer to a war zone were at higher risk for poor health [27]. Another study examined housing conditions in a refugee camp and found that poor housing conditions (presence of dust, smoke, and mold; burning of biomass fuels; overcrowding; poor ventilation, etc.) were directly related to poor health outcomes [28]. Future studies could examine this possibility more directly, as this was outside of the scope of the present study; however, the participation of immigrants and refugees from the same country of origin make it unlikely that these factors would influence the results of the present study. Recent research also suggests that mental health has an impact on physical health [29]. The low predictive power of violence exposure could therefore be due to mental health particularly posttraumatic stress disorder, not being accounted for in the present study. It may be that individuals exposed to violence develop poor mental health which subsequently causes declines in physical health [29]. Indeed, the medical conditions that were examined in this study were somatic aspects of common mental disorders, albeit not all of the same disorder. This makes it possible that for the refugee sample, participants are expressing mental anguish through somatic complaints. This is unlikely for the immigrant sample, given that violence exposure was not a significant predictor but age was the strongest predictor.

Despite the association between poor health outcomes and higher pre-migration violence exposure in refugees but not in immigrants, both groups had similar self-rated health and objectively measured medical conditions after controlling for demographic variables. Results differ from previous studies which report that refugees are at higher risk for poor health as compared to immigrants [12,30]. Iraqi refugees, in particular, have been found to report more health problems than other Arab immigrants. A recent study had demonstrated that Iraqi refugees reported greater medical complaints in comparison to non-war exposed Yemeni immigrants [20]. Another study reported that

refugee populations in general frequently report greater psychosomatic complaints than other immigrants [6]. Furthermore, previous studies have not measured violence exposure as specifically as the present study, yet those studies concluded that health differences were due to war-exposure [20].

Other studies have also suggested that acculturation processes might contribute to worsening health with increasing time in the host country [31,32]. However, in the current study, years in the U.S., which may be considered a proxy for acculturation [33], was not a significant predictor for our various health measures. In fact, the slopes for time in all models were almost flat when controlling for age. Therefore, time in the U.S. cannot account for the differences across groups, or lack thereof, in any of our models. While the present study is cross-sectional, these results suggest that both self-rated health and number of medical conditions is likely stable over time. Theoretically, it might take a longer time to develop poor health among immigrants due to lifestyle factors in the U.S., as opposed to war exposure in refugees through a mechanism not simply related to years in the U.S. In that case, health status would be similar between the two groups; however, this theory requires prospective data in which both groups have arrived in the host country at the same time to allow for more formal testing. Such data would allow for the separation of war versus post-migration acculturation factors, including lifestyle.

Finally, in each model we statistically controlled for individual characteristics (age, gender, education, employment, weight, and smoking behavior) that are known or purported to be related to health outcomes. Our findings are similar to observations in numerous prior studies of diverse populations [21,34]. For instance, higher education levels have been shown across many studies to be related to better health outcomes [34]. This coincides with the results of the present study, in which education was found to significantly predict number of medical conditions in refugees. Gender was a significant predictor of the number of medical conditions for immigrants, with women reporting worse health than men in this group. This is consistent with prior research in large community based samples, which suggests that women tend to report more somatic health problems than do men [35]. Smoking behavior was also a significant predictor of an increased number of medical conditions reported by immigrants. Smoking has been linked to many negative health outcomes such as, hypertension [36], heart disease [37], and respiratory diseases [38]. Weight, on the other hand, was not found to be a significant predictor of the number of medical conditions or self-rated health for either group. This is contrary to a number of studies which suggest that not maintaining an appropriate weight can have a negative impact on health [39,40].

Strengths, Limitations, and Conclusions

To the best of our knowledge, this is the first study comparing health among individuals from the same country but with different migration status. While some research has examined region of origin, such work has not directly compared the effects of migration status on health outcomes within groups from the same country [6,41]. Our research design allowed for the examination of two groups from same country of origin and thereby reduced the potential impact that country of origin could have on comparative refugee-immigrant health studies.

There were also some limitations to the present study. First, data were collected from convenience samples. The participants were recruited through local community organizations and other gathering places for Iraqis in Michigan. Therefore, it is not clear to what degree the samples are representative of the populations from which they were drawn. Ideally, studies should be based on random samples of newly arrived refugees and immigrants from the same country. A random sample could have provided more accurate measurement of health status among refugees as compared to immigrants

since random sampling reduces systematic bias. Additionally, as in most refugee studies, health outcomes in the present study were based on self-report as opposed to objective clinical assessment and may have been subject to reporting bias; however, there is no reason to believe health status was differentially reported by refugees and immigrants. The samples used in this study could be considered small; however, power analyses revealed that there was sufficient power (1-β = 0.84) to detect differences between these two groups for both self-rated health and number of medical conditions. Sample size was therefore not considered a limitation.

This study contributes important new information related to risk factors among refugees for self-rated and overall health. The fact that refugees reported a similar prevalence of medical conditions compared to immigrants, despite a substantially higher degree of violence exposure, possibly points to the importance of resilience in refugees. Previous research has suggested that high resiliency can be protective following highly aversive events [42].

By comparing persons from the same country, we limit some of the potential factors influencing health and well-being; however, the fact that our models nevertheless were quite poor in predicting outcomes of interests, suggests a need to delve further into the determinants of health in these populations. We do not have sufficient information to conclude that immigrants and refugees were altogether homogenous in terms of cultural background; however, they are more likely to be homogenous, and thus comparable, in this sample compared to prior studies that included refugees and immigrants from different countries. We did, as many other studies have done, control for socioeconomic and behavioral factors.

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Author contributions

Dr. Jamil: supervis data collection, study design and revising the manuscript; Dr. Barkho: collection of data and writing the draft of the manuscript; Drs. Broadbridge and Ventimiglia: acquisition of data, analysis and interpretation of data, statistical analysis; Drs. Arnetz and Lami: participated in the interpretation of the result and revising the manuscript and Dr. Arnetz: study concept or design, interpretation of results and revising the manuscript

Conflict of interest

There are no conflicts of interest for any of the authors of this manuscript and its potential publication.

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