
Examining Post-Migration Social Determinants as Predictors of Mental and Physical Health of Recent Syrian Refugees in Canada: Implications for Counselling, Practice, and Research

L'analyse des déterminants sociaux post-migration en tant qu'indicateurs prévisionnels de santé physique et mentale chez les récents réfugiés syriens au Canada: implications pour le counseling, la pratique, et la recherche

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ABSTRACT

In response to the increasing number of Syrian refugees being resettled in Canada and worldwide, the present study set out to explore and examine critical post-migration predictors of mental health and physical health of adult Syrian refugees ($n = 235$) living in Windsor, Ontario. Using survey data collected from the national SyRIA-Ith project and grounded in the Social Determinants of Health model, this study tested demographic, contextual, and psychosocial predictors in two regression models of mental health and physical health, respectively. The results showed that both predictive models were significant in explaining Syrian refugees' mental and physical health outcomes, as hypothesized. Specifically, age, gender, satisfaction of health services, perceived control, and perceived stress predicted mental health in significant ways, whereas age, satisfaction of health services, and perceived stress predicted physical health in significant ways as well. Implications for practice and research with Syrian refugees, given the identified risk and protective factors of health, are considered.

RÉSUMÉ

En tenant compte du nombre croissant de réfugiés syriens réimplantés au Canada et ailleurs dans le monde, la présente étude vise à explorer et à analyser des indicateurs prévisionnels cruciaux post-migratoires de la santé mentale et de la santé physique chez des réfugiés syriens adultes ($n = 235$) vivant à Windsor, en Ontario. Grâce aux données recueillies auprès du projet national SyRIA-Ith et en se fondant sur le Cadre des déterminants sociaux de la santé, cette étude a mis à l'épreuve les indicateurs prévisionnels démographiques, contextuels, et psychosociaux selon deux modèles régressifs respectivement de santé mentale et de santé physique. Les résultats ont permis de constater, conformément aux hypothèses, que les deux modèles prévisionnels étaient pertinents pour expliquer l'état des réfugiés syriens sur le plan de la santé mentale et de la santé physique. Plus précisément, l'âge, le genre, la satisfaction à l'égard des services de santé, le niveau de contrôle perçu, et le niveau de stress perçu ont permis des prévisions significatives en ce qui concerne la santé mentale, tandis que l'âge, la satisfaction à l'égard des services de santé, et le niveau de stress perçu ont été des indicateurs prévisionnels significatifs pour la santé physique. On considère les implications pour la pratique et la recherche auprès des réfugiés syriens, en tenant compte du risque identifié et des facteurs de protection de la santé.

At present, our world is living through an epic “refugee crisis” (Rousseau, 2018) at a scale and intensity unprecedented in human history (International Organization for Migration, 2017; United Nations High Commission for Refugees [UNHCR], 2019). According to UNHCR's (2019) most recent report, there were an estimated 70.8 million forcibly displaced people around the world in 2018. Among them, 25.9 million were considered refugees and 3.5 million asylum seekers. Considering the scope of the refugee crisis internationally, numerous mental health governing bodies and experts have warned and called for clinicians and researchers alike to be better equipped in responding to the mental, psychological, medical, and socio-cultural needs of refugees worldwide (American Psychological Association [APA], 2010; Hassan et al., 2015; Kuo et al., 2020).

Such a call holds special relevance to Canadian counselling, psychological, and mental health professionals because Canada represents a leading refugee-receiving country in the world (Kuo, 2018a; UNHCR, 2019). Incidentally, Syrian refugees constitute a major group of the displaced population being resettled in Canada (Government of Canada, 2019a) as well as around the world (UNHCR, 2019) over this past decade. Despite the resilience of Syrian refugees, recent Canadian research has pointed to high levels of unmet health needs among recently resettled Syrian refugees in Canada (e.g., Oda et al., 2017; Tuck et al., 2019).

Available research and empirical knowledge on the relationships between refugees' post-migration stressors and mental and physical health are scarce (Gerritsen et al., 2006; Li et al., 2016). Relatedly, recent refugee health scholars and researchers have advocated for a paradigm shift in advancing refugee health

research by focusing on a broader understanding of the effects of post-migration psychosocial factors and stressors on refugee health than on their existing, pre-migration traumas and vulnerability (Cantekin & Gençöz, 2017; Hynie, 2018b; Li et al., 2016). In particular, the importance of discerning the roles that various “social determinants” or contextual variables play (as risk vs. protective factors) on affecting refugees’ mental and general health and well-being has been advocated explicitly by refugee health practitioners and scholars (APA, 2010; Hynie, 2018a, 2018b).

There is currently scant research on Syrian refugees who have resettled in Canada since 2015, specifically about their psychological and physical health and well-being (Tuck et al., 2019). This is due partly to the relatively recent arrival and presence of members of this refugee group in Canada. Hence, recent health researchers of Syrian refugees have called for evidence-based knowledge to help guide and inform mental health practitioners and researchers in devising more culturally responsive and linguistically appropriate mental health interventions, including counselling and psychosocial support, in working with this refugee community (Clinic Psychology, 2016; Hassan et al., 2015). Incidentally, the use of the Social Determinants of Health (SDH) model has been put forward as a promising conceptual framework to help decipher and discern the health status, condition, behaviours, and health inequity among disadvantaged populations (Arthur, 2018; World Health Organization [WHO], 2020), including Syrian refugees in Canada (Hynie et al., 2019).

As a consequence, there is a critical need for research that examines the effects of demographic variables, post-migration contextual factors, and psychosocial stressors on the health and well-being of recent Syrian refugees in Canada. Therefore, the objectives of the present study were (a) to explore and to present the current mental and physical health statuses of a sample of recent Syrian refugees ($n = 235$) resettled in Windsor, Ontario, and, more importantly, (b) to examine and to identify significant predictors of Syrian refugees’ mental and physical health outcomes. Furthermore, the current research adopted the SDH conceptual framework to help address the research objectives. Based on the study’s findings, we hope to generate initial evidence, interpretations, and recommendations to guide, inform, and improve the practice and the provision of counselling, mental health support, and health services for recent Syrian refugees.

Recent Syrian Refugees in Canada and the City of Windsor

As part of the large scale of the Canadian resettlement program called the “#WelcomeRefugee” initiative, Canada resettled 40,081 Syrian refugees between November 2015 and January 2017 in 350 communities across the country (Government of Canada, 2017). Syrian refugees, as with all other refugees, come to Canada under one of the three different sponsorship types:

(a) government-assisted refugees (GARs) who are supported financially by the Canadian federal government during their first year after arrival; (b) privately sponsored refugees (PSRs), who are supported by private groups; and (c) the Blended Visa Office-Referred (BVOR) program, which provides refugees with financial support from the Canadian government for the first six months and from private sponsors for the remaining six months of their first year in Canada (Government of Canada, 2019a).

The City of Windsor, where the current research took place, is one of the originally designated municipalities for Syrian refugee resettlement in Ontario under the Resettlement Assistance Program (RAP) program (Government of Canada, 2019b). The Government of Canada (2019b) reported that between November 4, 2015, and January 29, 2017, the city had resettled 950 GARs, 152 PSRs, and 17 individuals through the BVOR program. In the section below, we review the existing research literature on post-migration risk and protective factors associated with refugee health.

Post-Migration Factors/Predictors of Refugee Mental and Physical Health

Recent studies of Syrian refugees in Toronto have revealed a significantly higher level of concerns over health and service needs among this refugee group than the general and the migrant populations in Canada (Oda et al., 2017; Tuck et al., 2019). For instance, in a sample of 200 Syrian refugees, Tuck et al. (2019) found that a significant proportion of the refugee participants reported high unmet health care needs, including dental and medical specialist care. These needs occurred both at the baseline when they first arrived in Canada (48.2% of the sample) and at 6- to 12-month follow-up (42.6%). These findings highlight the vital importance of examining the conditions surrounding Syrian refugees' post-migration mental and physical health in Canada, including the relationships between these health outcomes and their post-migration social, economic, and contextual factors (e.g., employment and housing situation; Tuck et al., 2019).

The Associations Between Post-Migration Factors and Refugee Health

An increasing amount of refugee research has also shown that mental and physical health disadvantages among refugees are impacted even more profoundly by a wide array of post-migration factors (Beiser & Hou, 2017; Li et al., 2016), in addition to pre-migration factors such as previous traumas and experience with violence in the country of origin. Post-migratory factors faced by refugees pertain to the social and structural conditions they experienced in their host society, which can include their acculturation experience, receptivity of their host society, and supporting material resources available to them in the host society (Kuo et al., 2020).

Recently published studies have highlighted further the associations between refugees' long-term health outcomes and post-migration psychosocial stressors (Cantekin & Gençöz, 2017) and social determinants of health (Hynie, 2018b). A review by Li et al. (2016) revealed that the impacts of post-migration factors on refugees are significantly associated with adverse mental health outcomes above and beyond the effects of pre-migration trauma. As a result, the importance of investigating post-migration experiences and contributors to Syrian refugees' mental and physical health is highlighted and exemplified in the present study.

Health-Related Post-Migration Factors for Refugees

Conceptually, post-migration variables that have been found to predispose refugees and asylum seekers to psychological and emotional disorders have included (a) socio-economic stressors, (b) social and interpersonal stressors, and (c) stressors related to the asylum process and to immigration policies (Li et al., 2016). In addition, Miller and Rasmussen (2010) have advocated for the need to consider and incorporate refugee daily stressors or "ecological stressors" into research and understanding of the distress of refugees, such as poverty, unemployment, child and spousal abuse, overcrowded and unsafe housing, social isolation, and lack of access to water and medical care—determinant factors embedded in the social and ecological contexts of resettlement.

Also, previous studies have identified that demographic characteristics (i.e., age and gender) and post-displacement contextual factors and conditions (i.e., living accommodation, employment, and economic opportunity) are associated with mental and physical health outcomes of refugees and internally displaced persons to a significant degree (Beiser & Hou, 2017; Cantekin & Gençöz, 2017). As a case in point, the Ryerson University Refugee Resettlement Project (RRP) was a 10-year longitudinal study tracking the experiences of 1,348 Southeast Asian refugees who had arrived in Canada between 1979 and 1981 (Beiser, 2009). In that project, Beiser (2009) found not only a reciprocal relationship between mental health and unemployment but also the negative impact that perceived discrimination exerted on refugees' depression levels, pointing to the contributing effect of post-settlement risk factors on refugee mental health (Hynie, 2018b).

In contrast, in a recent study based on Statistics Canada's 2013 General Social Survey of 651 refugees of diverse national backgrounds in Canada, Beiser and Hou (2017) revealed that the respondents' reports of their "sense of belonging to Canada" were found to be a critical post-migration protective factor for their mental health. In short, these cumulative studies reviewed above underscore the importance of examining the relationships between Syrian refugees' post-migration experiences and their emotional and general health conditions, as embedded and shaped by their social, contextual, and environmental circumstances in their resettled host country.

Theoretical-Conceptual Framework: The Social Determinants of Health Model

The growing social justice movement within the recent literature on multicultural counselling and mental health has redirected counsellors' and psychologists' focus on the root of individuals' psychological distress, from internal functioning to external, social, and structural causes, particularly for disadvantaged populations (Arthur, 2018). The Social Determinants of Health (SDH) framework embodies such a perspective as a distinctive model of explanation for health and for health inequalities pertaining to various groups and communities worldwide (Braveman & Gottlieb, 2014; WHO, 2020), including refugee populations (Hynie, 2018b).

In broad terms, the SDH model posits that contextual and environmental stressors and barriers can exert significant force in shaping the health and well-being of a given group and/or individual, either directly or indirectly (Mikkonen & Raphael, 2010). The World Health Organization (WHO, 2020) defined SDH simply as "the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life." Considering the empirical evidence presented in the last section that links refugees' post-migratory social and contextual factors to their mental health outcomes, the SDH model lends itself naturally and aptly to the study of Syrian refugees (Hynie, 2018b).

A recent literature review of 21 SDH publications by Hosseini Shokouh et al. (2017) identified three broad clusters of personal-structural determinants or indicators: (a) classic factors, including education, income, and occupation; (b) fixed and demographic factors, such as genetics, sex/gender, ethnicity/race, age, marital status, and religion; and (c) proxy factors, such as wealth and assets, social and family support, utilization and access to health care services, health behaviour, housing, and social and family safety.

In a recent study by Wong et al. (2017), the authors adopted an SDH framework in examining the relationships between social determinants and depressive symptoms among African refugees and asylum seekers living in Hong Kong. The study observed that lacking family and social support, having limited access to financial resources and health care services, and experiencing discrimination were all significantly negative determinants linked to high depression scores among these displaced populations. The study concluded that refugees' post-migration conditions often put them in a precarious and disadvantaged position, as hypothesized and predicted by the SDH model.

Other dimensions of health determinants for refugees and asylum seekers have included income, employment, housing, language skills and interpretation, the asylum-seeking process, and social isolation (Hynie, 2018a). Considering the emerging evidence and conceptual propositions presented above,

an additional objective of the current study is to apply and extend the SDH model empirically in order to examine the risk and the protective factors of mental and physical health of Syrian refugees in Canada.

The Present Study

Informed by the SDH framework, the present study aimed to examine and identify predictors of mental health and physical health in a sample of adult Syrian refugees in a community ($n = 235$). To this end, this study tested three sets of determinant factors in two regression models on mental health and physical health measures, respectively, with demographic variables, contextual variables, and psychosocial variables—variables that have been identified by previous SDH researchers (e.g., Hosseini Shokouh et al., 2017; Wong et al., 2017). The study strived to address two broad research questions: (a) *To what extent do demographic, post-migration contextual, and psychosocial factors predict and explain mental health outcomes in the current Syrian refugee sample?* and (b) *To what extent do these same factors predict and explain physical health outcomes in this sample?*

We hypothesized that demographic, post-migration contextual, and psychosocial factors would predict to a significant degree Syrian refugees' scores on measures of mental health (Hypothesis #1) and of general/physical health (Hypothesis #2), respectively. However, given the scarcity of existing research with Syrian refugees in general and those in Canada specifically, no explicit hypotheses were made at the individual predictor level in the regression analyses. In addressing these two research questions above, the study hoped to generate some practical insights to help inform and improve counselling and mental health service provision and research with recent Syrian refugees in Canada.

Method

This current study is part of a larger, multi-year, longitudinal project studying the adaptation and health condition of Syrian refugees across six major cities in Canada, named the Refugee Integration and Long-Term Health Outcomes in Canada (SyRIA-lth) project. For the present study, we used the survey data collected from Syrian refugees in the City of Windsor during the first year of this project, based on a cross-sectional research design.

Procedure

The study received full ethics clearance from the University of Windsor, where this study took place, and from York University, where the overall project is being administered. At the Windsor site, the Syrian refugee participant recruitment process was supported by the Multicultural Council of Windsor-Essex, the major local refugee and immigrant settlement agency in the area.

Contacts with prospective participants were made through direct phone contact, the snowball technique, and a social media platform (i.e., WhatsApp). Consenting Syrian participants were interviewed in their homes in Arabic by one of two trained bilingual (Arabic-English) research assistants, who met and guided the participants individually in completing the online survey using an iPad. The interviews and the data collection took place between April and August 2017. The participant responses were automatically recorded and submitted to the central research team at York University for data storage. Participants received a \$40 honorarium as a token of appreciation from the researchers.

Participants

A total of 235 Syrian refugees (men = 49.4%; women = 50.6%) with a mean age of 36.6 years ($SD = 11.85$) took part in this study (see Table 1). The participants had been in Canada for an average of 12.76 months ($SD = 5.41$) and had been displaced for an average of 39.22 months ($SD = 21.1$), and most of the participants reported having children (77.9%). Concerning the sponsorship statuses, a vast majority of the participants were comprised of GARs (78.7%), as anticipated. On this note, even though recent Canadian studies have suggested that Syrian GARs and PSRs varied on their health experiences (e.g., Oda et al., 2017; Tuck et al., 2019), the small size of PSRs in the current sample ($n = 45$) did not permit running a separate analysis for the two groups. Thus, the entire sample was combined for the study's subsequent analyses. Lastly, Syrian participants reported relatively limited English proficiency with a mean level of 3.17 ($SD = 1.27$) on a 6-point scale, indicating a "poor" level of English ability.

Measures

The measures and questions adopted for the present study are described below. The original survey questionnaire for the overall national project was developed and vetted by a large team of multidisciplinary experts across Canada who are collaborators on the project. The team included experts of Syrian culture and members of the Syrian Canadian community who acted as cultural informants. The scales and questions selected and adopted from the large survey for this current local study were based on their direct relevance to help address the specific research questions of this research, which had to do with hypothesized predictors of Syrian refugees' mental and physical health and the outcome measures.

Of note, the decision on scale selection—such as the use of the RAND-36, the Perceived Control Scale, and the Perceived Stress Scale described below, for this Syrian refugee project—was made based on the measure's previously demonstrated psychometric validities with Arabic-speaking samples. All measures and question items were carefully translated and back translated by two bilingual Syrian Canadians and subsequently pilot tested with 24 Syrian refugees. To ensure the linguistic appropriateness of the survey for the target sample, the original

Table 1
Demographic Information

	<i>M</i>	<i>SD</i>	Minimum	Maximum	
Age	36.6	11.85	18	76	
Number of children under 18	3	1.98	0	9	
Number of relatives in Canada (except children/spouse)	5.11	8	0	30	
Length in Canada (in months)	12.76	5.41	2	24	
Length of displacement	39.22	21.1	0	242	
Sex	Male	Female			
	49.4%	50.6%			
Ethnic group	Arab	Kurdish	Armenian	Other	
	88.9%	8.9%	.4%	1.7%	
Marital status	Married	Single	Separated or divorced	Widowed	
	71.1%	21.7%	2.1%	5.1%	
Educational level	Professional or master's degree	University, college, or trade certificate	High school	Elementary school	None
	1.3%	20.4%	21.3%	52.3%	4.7%
Sponsorship	GAR	PSR	BVOR		
	78.7%	19.1%	2.1%		
Family Income	\$0–\$14,999	\$15,000–\$29,999	\$30,000–\$59,999	Prefer not to answer/N/A	
	22.1%	52.3%	6.4%	19.2%	
Food Burden	Yes	No			
	20.4%	79.6%			

translation of the overall questionnaire was modified wherever necessary, and some additional relevant items were identified and included in the final questionnaire.

Demographic, Social, and Contextual Information

The study's demographic items included questions on Syrian participants' date of birth, educational level, marital status, sex, and English proficiency level. In addition, the questions assessing refugee participants' post-migration social determinants and contextual factors items were adopted from the established nationwide surveys, including the General Social Survey (Statistics Canada, 2010) and the Social Integration Inventory (Hynie, n.d.). As an example, in the survey, the participants were asked: "How satisfied were you using these services: health, employment, settlement, and government services, respectively?" They rated their satisfaction on four incremental options ranging from being *very satisfied* to *not at all satisfied*, plus a *not applicable* option.

RAND 36-Item Health Survey (RAND-36)

The RAND-36 was adopted for the present project/study because it had been translated into Arabic previously and had demonstrated evidence of validity with Arabic-speaking participants (Coons et al., 1998). The original study of the RAND (Vander Zee et al., 1996) comprised of 36 items that could be divided into eight subscales, asking respondents' condition in the previous four weeks: Physical Functioning, Role Limitations Due to Physical Problems, Role Limitations Due to Personal or Emotional Health Problems, General Health Perceptions, Emotional Well-Being, Social Functioning, Bodily Pain, and Energy/Fatigue.

In addition, there is a single-item measure of health change over the past year. All items of the RAND-36 were included in the present research, with higher scores indicating a more favourable health condition. As an example, one item asks: "During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?" The respondent answers on a 5-point Likert scale from 1 (*not at all*) to 5 (*extremely*). After assessing the nature of the eight subscales of the RAND-36, the local research team discussed and separated the subscales into those estimating mental health versus those measuring the physical health of Syrian participants, as described below.

Measure of Mental Health

Four subscales of the RAND-36 that broadly reflect the psychosocial and emotional well-being of Syrian refugees were grouped to estimate the participants' mental health. These included Role Limitations Due to Personal or Emotional Health Problems, Emotional Well-Being, Social Functioning, and Energy/Fatigue. The Social Functioning subscale was included in the measure of mental health because previous literature about Syrian refugees had suggested that social

relationships and support from family and friends are integral components of their psychological well-being (Hassan et al., 2015). The subscales' scores were combined and averaged, and their corresponding Cronbach's alphas suggest good internal consistencies: Role Limitations Due to Personal or Emotional Health Problems ($\alpha = .93$), Emotional Well-Being ($\alpha = .77$), Social Functioning ($\alpha = .74$), and Energy/Fatigue ($\alpha = .80$).

Measure of Physical Health

In contrast, for assessing Syrian refugee participants' physical health, the remaining subscales of the RAND-36 that pertain specifically to the physical and medical aspects of health were grouped. Their scores were combined and averaged, and their corresponding Cronbach's alphas also suggest good internal consistencies: Physical Functioning ($\alpha = .93$), Role Limitations Due to Physical Problems ($\alpha = .94$), General Health Perceptions ($\alpha = .77$), and Bodily Pain ($\alpha = .90$).

Perceived Control Scale. A total of 7 items were adapted from the original 9-item Perceived Control Scale by Bobak et al. (2000). Two items on control over heart attack and cancer, which were deemed not applicable for Syrian refugees in the context of this research, were removed. An example of the scale is: "At home, I feel I have control over what happens in most situations." The responses are scaled on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha for the present study was .53. It is noted that while this alpha was less than desirable, prior researchers have suggested that an internal consistency value of .60 may be considered bordering acceptable in exploratory studies (Hair et al., 2010), which is the case in this study.

Perceived Stress Scale. This scale assesses respondents' perceived stress over the last month. The 10-item Arabic version of the Perceived Stress Scale (Almadi et al., 2012) was used in this study. An example of the measure is as follows: "In the last month, how often have you been upset because of something that happened unexpectedly?" The response is rated on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*very often*). The Cronbach's alpha for the scale was .81 in the current study.

Results

Overall, the scores of mental health and physical health, as measured by the RAND-36, suggest that the health conditions of Syrian refugees in the current study are in the moderate range with a mean of 68.62 ($SD = 24.05$) for the mental health subscales and a mean of 68.09 ($SD = 16.33$) for the physical health subscales (see Table 2).

Correlations Among Variables

Pearson's correlations among key demographic, contextual, and psychosocial variables were examined first, and their correlations with the scores of mental and

Table 2
Mean, Standard Deviation, and Range of the Key Variables in the Study

	<i>M</i>	<i>SD</i>	Minimum	Maximum
RAND-36: Mental Health	68.62	24.05	6.13	100
RAND-36: Physical Health	68.09	26.33	6.25	100
Perceived Control	3.86	.51	2	5
Perceived Stress	2.29	.71	1	4.5
Satisfaction With Health Services	1.75	.86	1	4
Satisfaction With Employment Services	2.42	1.06	1	4
Satisfaction With Settlement Services	1.41	.62	1	4
Satisfaction With Government Services	1.29	.50	1	3
Satisfaction With Quality of Friendship	2.0	.91	1	5

physical health measures were reported in Table 3. Higher levels of mental health scores were related to being male, being younger, being more highly educated, being married, being more proficient in English, having sufficient finances to cover food costs, being employed, perceiving a greater control over their circumstances, reporting less stress, and being satisfied with one's housing, with health services received, and with one's friendship quality (see Table 3). In contrast, a higher level of physical health for the current Syrian sample was related to being younger, being married, being more proficient in English, being employed, perceiving a greater control over their circumstances, reporting less stress, as well as being satisfied with one's housing, health services, employment services, and one's friendship quality (see Table 3).

Models for the Regression Analyses

To address the study's research questions, two separate hierarchical regression analyses were conducted with variables shown to be statistically significant from the correlation matrix with one model predicting Syrian participants' mental health outcomes and the other predicting their physical health outcomes. To do so, conceptually, we categorized the predictor variables in terms of the demographic, the contextual, and the psychosocial blocks, following the general SDH framework stipulated by previous scholars (Hynie, 2018a, 2018b; Hosseini Shokouh et al., 2017).

Regression Model for Mental Health

In the first step of the mental health regression model, four demographic variables were entered into the analysis; the results showed that this demographic

Table 3
Correlations Among Key Variables and Mental Health and Physical Health

	Mental Health	Physical Health
1. Gender	-.20**	-.07
2. Age	-.28**	-.46**
3. Education	.15*	.08
4. Marital Status	-.19**	-.23**
5. Family Income	.04	.03
6. English Level	.23**	.31**
7. Food Adequacy	.18**	.11
8. Employment	-.19**	-.18**
9. Satisfaction With Housing	.23**	.19**
10. Satisfaction With Health Services	.18*	.27**
11. Satisfaction With Employment Services	.10	.15*
12. Satisfaction With Settlement Services	-.01	.04
13. Satisfaction With Government Services	-.10	-.05
14. Satisfaction With Quality of Friendship	.33**	.30**
15. Perceived Control	.40**	.20**
16. Perceived Stress	-.71**	-.42**

Note. * $p < .05$, ** $p < .001$; Food Adequacy refers to having sufficient money to cover food costs.

block predicted the equation to a significant degree, $F(4,112) = 9.89$, $p < .001$. Table 4 shows the results of this regression model. The demographic variables accounted for 26% of the variance in Syrian refugees' mental health scores. Gender and age were the two significant negative predictors in this block, suggesting that those who were men and younger reported better mental well-being.

After demographic variables were controlled for in the equation, the second block (i.e., the contextual variables) emerged as statistically significant, $F(9,107) = 6.07$, $p < .001$, as well. These variables explained an additional 7% of the variance in mental health scores. Satisfaction With Health Services ($p < .05$) was the only significant predictor in this step of the model. Lastly, the psychosocial variables were entered into the third and final step of the regression; these factors increased the predictive power of the mental health equation significantly ($\Delta R^2 = .34$, $p < .001$) by adding 34% of the variance. Perceived Control ($p < .05$)

Table 4
Regression Model Predicting Mental Health

Predictor Variables	B	SE B	β	R ²	Adj R ²	Δ R ²	F
Block 1: Demographic Variables							
Gender	-15.78**	4.43	-.31**	.26	.23		9.83**
Age	-.96**	.21	-.49**				
Education Level	-.43	1.54	-.02				
Marital Status	1.80	2.27	.09				
Block 2: Contextual Variables							
English Proficiency	4.20	2.22	.21	.33	.28	.07	6.07**
Satisfaction With Housing	2.68	2.43	.09				
Food Adequacy	5.16	5.95	.08				
Employment Status	.98	6.71	.01				
Satisfaction With Health Services	5.71*	3.53	.14*				
Block 3: Psychosocial Variables							
Satisfaction With Quality of Friendship	2.38	2.38	.08	.68	.64	.34	18.83**
Perceived Control	10.58**	10.58	.19**				
Perceived Stress	-17.97**	-17.97	-.47**				

Note. * $p < .05$, ** $p < .001$.

and Perceived Stress ($p < .001$) were found to predict mental health to a significant degree over and above the preceding demographic and contextual variables. Taken together, this overall mental health regression model was significant in predicting mental health scores in Syrian refugees, $F(12,104) = 18.83$, $p < .001$. The model accounted for and explained 68% of the total variance in mental health. The results supported Hypothesis #1.

Regression Model for Physical Health

In contrast, Table 5 illustrates the regression results of the predictor model for Syrian refugees' physical health. First, the demographic block is shown to be significant $F(2,110) = 18.77$, $p < .001$, and it accounted for 25% of the total variance on the measure of physical health. Age ($p < .001$) was the only significant negative predictor of physical health, suggesting that younger Syrian refugees have reported better physical health.

Then the five contextual variables, in the second block, further predicted physical health above and beyond for the effects of the demographic variables. The regression model was significant $F(7,105) = 8.61$, $p < .001$ and accounted for an additional 11% of the total variance in the measure of physical health. Satisfaction With Health Services ($p < .05$) was the only significant contributor in this block, however.

Finally, the inclusion of the three psychosocial variables in the equation in the last step was also found to be significant; it further accounted for 18% of the variance in the physical health scores. Perceived stress ($p < .001$) emerged as the significant predictor in this final step. The overall regression model was statistically significant, $F(10,102) = 12.26$, $p < .001$, and it effectively explained 54% of the variance of physical health outcome in the current sample. Hence, Hypothesis #2 was also supported.

Discussion

The primary objective of the present research was to test two hypothesized predictive models of mental and physical health among recently resettled Syrian refugees in Windsor, Ontario, Canada. As such, this current study is among the first to examine empirically and systematically post-migration determinants/predictors of health outcomes of this growing refugee population in Canada, grounded in the SDH framework. The results of the study offer preliminary evidence and knowledge that hold direct relevance to mental health service, practice, and research with Syrian refugees.

Findings of the Mental Health Predictor Model

Regarding the first research question of the study, the results of the hierarchical regression model for mental health supported Hypothesis #1. As postulated,

Table 5
Regression Model Predicting Physical Health

Predictor Variables	B	SE B	β	R ²	Adj R ²	ΔR^2	F
Block 1: Demographic Variables				.25	.24		18.77**
Age	-1.08**	.21	-.52**				
Marital Status	.71	2.28	.03				
Block 2: Contextual Variables				.36	.32	.11	8.61**
English Proficiency	2.88	1.80	.14				
Satisfaction With Housing	3.85	2.50	.13				
Employment Status	-9.37	6.81	-.12				
Satisfaction With Health Services	8.02*	3.50	.19*				
Satisfaction With Employment Services	.22	2.19	.01				
Block 3: Psychosocial Variables				.54	.50	.18	12.26**
Satisfaction With Quality of Friendship	3.89	2.25	.13				
Perceived Control	7.72	4.85	.14				
Perceived Stress	-11.95**	3.52	-.30**				

Note. * $p < .05$, ** $p < .001$.

the variables in the demographic, the contextual, and the psychosocial blocks explained Syrian refugees' mental health scores to a significant degree, both individually at each step of the regression and overall as a predictive model (see Table 4). It is important to note that the overall regression model effectively explained 68% of the variance in Syrian refugees' reported mental health scores.

In terms of demographic risk factors, in the current Windsor sample, Syrian refugee women and older refugees were found to report poorer mental health than refugee men and younger refugees. It was postulated that Syrian female participants in our current Windsor sample might be more socially isolated than their male counterparts. Anecdotally, we learned through interacting with our participants during the interview process and through our observations that, despite the availability of free language classes and social services/programs designed for Syrian refugees, many Syrian women were unable to participate due to significant family duty and workload, such as child care and child-bearing responsibilities.

Concerning the inverted relationship found between age and mental health in this study (older being poorer in mental health), this current result can be interpreted with the insights from WHO's (2018) report. This report observed that worldwide older refugees are most vulnerable to experiencing psychological distress. This is because older refugees, who are often from lower socio-economic backgrounds, are particularly susceptible to the impacts of marginalization, poor housing conditions, low standards of living, and the absence of family and of social support. A similar age effect may be observed among older Syrian refugees in our current sample.

In the contextual block of the mental health predictor model, the regression result shows that variables in this step explained to a significant degree the participants' mental health scores, as hypothesized. Satisfaction With Health Services emerged as the only significant predictor of mental health for Syrian refugees in this step, signalling the pivotal role health and medical support and resources play in affecting the emotional well-being of Syrian refugees. Incidentally, this heightened importance of having access to and satisfaction with health services for our refugee sample was also found in other studies of Syrian refugees in Canada.

For instance, in recent studies by Oda et al. (2017) and Tuck et al. (2019), elevated levels of unmet health needs, which persisted from their arrival in Canada and 6 months to 1 year after, were found among Syrian refugees in Toronto. Taking a cue from this finding, counsellors, mental health professionals, settlement workers, and policy-makers should concentrate their efforts on bridging service gaps, removing barriers, and working to better facilitate Syrian refugees' ability to navigate through the health system, including accessing family doctors, local health and mental health clinics, hospitals, and dental treatments. As an example, one fundamental way to help remove the health access barrier for refugees is to provide language interpretation at various health and medical services for Syrian refugees who speak limited or no English (Kirmayer et al., 2011). Another

example would be assistance and support for refugees on transportation to and from health services and clinics (Kuo, 2018b).

At the final step of the same regression model, the three variables in the psychosocial block explained to a significant degree additional variance in Syrian refugees' mental health outcomes. Perceived control and perceived stress emerged as the two significant predictors, denoting that better mental health was associated with Syrian refugees who had a greater sense of agency and control over their circumstances and with those who were not overwhelmed by high levels of life stress. These findings affirm the positive associations among individuals' perceived "controllability" in stressful situations, stress response and coping capacity, and health outcomes, as found in the general population (Kuo, 2011) and in refugee and immigrant groups (Kuo, 2014). It can be understood that given the high degree of stress reported with Syrian refugees and asylum seekers (Hassan et al., 2015), the capacity to maintain stability and control and to manage stress during the process of resettlement would be of utmost importance to their emotional and psychological wellness and health.

Findings of the Physical Health Predictor Model

In a parallel manner, the hierarchical regression model for physical health was conducted, and the results supported Hypothesis #2. As hypothesized, the variables in the demographic, the contextual, and the psychosocial blocks explained to a significant degree Syrian refugees' scores on physical health measures, both individually at each step and together as a model (see Table 5). This overall regression model effectively explained 54% of the variance in Syrian refugees' physical health outcomes.

Within the first demographic block, age and marital status together accounted for 25% of the variance in Syrian refugees' physical health. As with the mental health predictive model, age emerged as a negative predictor of physical health, suggesting that being older was a significant risk factor for poorer health in this sample. Such an age effect was also found in a previous study of Afghan, Iranian, and Somali asylum seekers and refugees living in the Netherlands (Gerritsen et al., 2006). Specifically, the study showed that older age was related to poorer general health and chronic health problems among these displaced populations in the Netherlands. WHO's (2018) report explained that this age-health inverse relationship is likely due (a) to pre-existing medical conditions and/or injuries experienced by older refugees and (b) to the likelihood of developing physical health problems and illnesses among older refugees after they arrived in the country of resettlement as a function of more rapid health decline associated with later life.

Moreover, the contextual variables entered in the second block of the regression were also found to be significant in explaining additional variance in Syrian participants' physical health scores. Similar to the mental health predictor model, Satisfaction With Health Services was the single significant factor in predicting

physical health at this step. As noted previously, Tuck et al. (2019) found a significant proportion of Syrian refugees in Toronto to have dire unmet health service needs. That study revealed further that Syrian refugees identified health care costs, waiting times, and “the doctors did not think the care was necessary” to be the top contributing barriers to their unmet health service. Considering these observations, it is speculated that Syrian refugees’ perceived unmet health care needs could have led them to feel dissatisfied with the health services either available or unavailable to them. This, in turn, might have negatively impacted Syrian refugees’ perception or assessment of their overall physical health and well-being.

Finally, the psychosocial block was significant in offering further explanation about Syrian refugees’ scores on physical health. Interestingly, comparable to the mental health predictive model, perceived stress emerged as a significant negative predictor of health, but not perceived control. This suggests that Syrian refugees’ level of stress over the past month was a critical determinant or indicator of their physical health. Previous researchers have long established the link between stress coping and physical health (Kuo, 2011) as well as the multi-faceted nature of stress experienced by refugee populations (Kuo et al., 2020; Yakushko et al., 2008). While the exact nature of the stresses and stressors experienced by Syrian participants is beyond the scope of the current research, the finding here underscores the significant effect emotional stress can bear on refugees’ general health well-being (Kuo, 2014).

Implications for Practice and Research

In terms of mental health practice and service, the findings of this study remind counsellors and other mental health professionals that post-migration social determinants, along with Syrian refugees’ demographic and psychological factors, play a major role in affecting and shaping the quality of their emotional and physical health and well-being after resettlement in a new country. Several practical implications can be extrapolated from the results of this research.

First, at the individual level, it was found that being a woman was a risk factor for mental health concerns and being older was a risk factor for both mental and physical health problems in the current Syrian sample. These findings caution counsellors and health professionals to be particularly vigilant when assessing the needs and vulnerabilities of Syrian refugee women and older adults. For example, counsellors should devote greater attention to considering potential social isolation with refugee women and possible post-migration and pre-existing emotional and/or medical health difficulties among older adult refugees.

Second, the study’s results reveal that Syrian refugees who indicated greater dissatisfaction with accessing health services in Canada, a lower level of control over their circumstances, and a higher degree of emotional stress also reported poorer mental health. Consequently, these factors should serve as preliminary cues or warning signs for counsellors and practitioners when screening and assessing

Syrian refugees for emotional and mental health difficulties. Timely advocacy for psychological services and medical health treatments for refugee clients has been stressed in the literature repeatedly as imperative in providing culturally responsive support and intervention to refugee populations (APA, 2010; Hassan et al., 2015; Kuo et al., 2020).

Moreover, the current findings suggest that supporting and empowering Syrian refugee clients in developing a greater sense of agency, mastery, and control in their new environment would be highly beneficial. Adaptive stress-management skills and coping capacities would likely help to improve their mental and physical well-being. For example, during the helping process, counsellors can actively encourage refugee clients to access, build on, and harness the resilience, the adaptive coping strategies, the religious faith, and the identity that refugee clients already possess as resources in responding to their current post-migration challenges (Clinic Psychology, 2016; Kuo et al., 2020).

Third, from the broad contextual-structural perspective, the close connection and association between the refugee participants' various pragmatic/subsistence/logistic factors and social determinants (e.g., language, housing, food, employment, and diverse community and governmental services) and their health statuses were revealed in this study. These findings underscore further the absolute necessity of addressing refugees' immediate material and logistic needs when delivering counselling, mental health intervention, and psychosocial support to refugee populations (Clinic Psychology, 2016; Kuo, 2018b; Kuo et al., 2020). Syrian refugees would benefit greatly from counsellors who can actively educate, coach, and advocate on their behalf to help them negotiate and navigate through the complex labyrinth of the health, social, and government systems in the resettled locale (Hynie, 2018a).

As an additional recommendation, counsellors, mental health professionals, and health care providers would do well to establish collaboration and partnership with a network of local community organizations and social services, government agencies, ethnic/cultural communities, religion and faith-based groups, and institutions to meet refugee newcomers' wide-ranging needs, based on a multidisciplinary or interdisciplinary approach (Beiser & Hou, 2017; Kuo, 2018b; Rousseau, 2018). At the same time, counsellors working with refugees need to engage in social advocacy work on behalf of their refugee clients, such as advocating for refugees' legal, logistic, and subsistence needs (Kuo & Arcuri, 2014; Sue & Sue, 2016). These observations align with Arthur's (2018) assertion that incorporating social advocacy and social determinants of health into psychological and mental health intervention is "a call for counsellors to examine the social systems that surround people and to take action to address inequities and to create more inclusive services" (p. 16).

Finally, concerning research, the hypothesized mental and physical health models in this study have lent additional empirical support to the SDH model,

particularly as applied to refugee health research. Thus, the SDH framework is an empirical and heuristically helpful model to study the emotional well-being and general health of Syrian refugees, as has been previously advocated (Hynie, 2018a, 2018b). However, given that the present research represents one of the few emerging refugee health studies grounded in the SDH framework (Wong et al., 2017), more research is needed.

Future research with Syrian refugees would be enhanced if it was expanded beyond the scope of the present study. Other relevant social determinants and contextual variables implicated in the existing literature should be considered for future studies—for example, Syrian refugees' experience with cultural and language barriers, with discrimination, with acculturation, with social support, with coping capacity, and with religious identity and resource (Beiser & Hou, 2017; Kuo et al., 2020; WHO, 2020).

Furthermore, it would be beneficial to replicate the current study with Syrian refugee samples in other regions or cities in Canada. The results could both help verify the generalizability of the present study's findings elsewhere and help shed light on possible regional differences in Syrian refugees' resettlement experiences across Canada.

Limitations of the Study

The results of the present investigation should be viewed carefully with the following methodological limitations. First, the sample of the study was comprised exclusively of Syrian refugees in the City of Windsor and the participants were not randomly selected. Therefore, as mentioned in the last section, the generalizability of the study's findings to Syrian refugees living in other Canadian cities cannot be ascertained without further replication with different samples.

Second, given the cross-sectional nature of the current study, we cannot assess the change process in Syrian refugees' emotional health and physical well-being over time. It is not clear if or to what extent the relationships between the predictors and the mental and physical health outcomes would change for Syrian refugees following their initial resettlement.

Third, since the relationships between the predictors and health outcome dependent variables were analyzed based on their correlations in the regression analyses, direct causal connections between them cannot be made. Therefore, future research and analysis based on longitudinal and model-testing design (e.g., structural equation modelling) would be needed to address and discern the issues raised in the last two points.

Conclusion

With the ongoing refugee crisis being witnessed around the world today (UNHCR, 2019), it is anticipated that the need and the demand for data and

evidence about refugee health will continue to intensify (Hassan et al., 2015). Empirical research and evidence-based knowledge to help guide and inform counselling, psychotherapy, and mental health support and services for refugees in displacement and resettlement are sorely needed (Kuo, 2018a; Kuo et al., 2020).

This present study has contributed to this limited but growing body of the literature by shedding critical light on the post-migration risk and protective factors associated with Syrian refugees' mental and physical health grounded in the SDH model. Henceforth, we hope that the current study could serve as a catalyst and as a basis upon which further mental health research on recent Syrian refugees and/or other refugee newcomer groups can be built and expanded in Canada and beyond.

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