

Health status of newly arrived refugees in Toronto, Ont

Part 2: chronic diseases

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Abstract

Objective To determine the prevalence of selected chronic diseases among newly arrived refugee patients and to explore associations with key demographic factors.

Design Retrospective chart review.

Setting Primary care clinic for refugee patients in Toronto, Ont.

Participants A total of 1063 refugee patients rostered at the clinic from December 2011 to June 2014.

Main outcome measures Demographic information (age, sex, and region of birth) and prevalence of abnormal Papanicolaou test results, anemia, elevated blood pressure (BP), and markers of prediabetes or diabetes (elevated random glucose, fasting glucose, or hemoglobin A_{1c} levels).

Results More than half of our patients were female (56%) and the median age was 29 years. Patients originated from 87 different countries of birth. Top source countries were Hungary (210 patients), North Korea (119 patients), and Nigeria (93 patients). Most patients were refugee claimants (92%), as opposed to government-assisted refugees (5%). Overall, 11% of female patients who underwent Pap tests had abnormal cervical cytology findings, with the highest rates among women from Asia (26%, $P = .028$). The prevalence of anemia among children younger than 15 years was 11%; for children younger than 5 years the prevalence was 14%. Approximately 25% of women older than 15 years had anemia, with the highest rates among African women (37%, $P < .001$). Elevated BP was observed in 30% of adult patients older than 15 years, with higher prevalence among male patients (38%, $P < .001$) and patients from Europe (42%, $P < .001$). Laboratory markers of prediabetes or diabetes were identified in 8% of patients older than 15 years, with higher rates among patients from Europe (15%, $P = .026$).

Conclusion This study found a notable burden of chronic diseases among refugee patients, including anemia, elevated BP, and impaired glycemic control, as well as abnormal cervical cytology findings. These results underscore the importance of accessible, comprehensive primary care for refugees, with attention to prevention and management of chronic diseases in addition to management of infectious disease.

EDITOR'S KEY POINTS

- This is the second article of a 2-part series that examines the health status of newly arrived refugees and refugee claimants in Toronto, Ont, exploring the prevalence of chronic diseases in this population.
- Attention has traditionally centred on infectious disease among refugees; however, the results of this study highlight a notable burden of several chronic conditions, including anemia, elevated blood pressure, impaired glycemic control, and abnormal cervical cytology findings at rates similar to or higher than those among the general Canadian population. These factors tended to vary by geographic region of origin, sex, and age.
- Early screening, prevention, and treatment interventions are key to enhancing the health of these refugee patients. Patient-centred and culturally appropriate interventions are essential.



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Canada accepts approximately 25 000 refugees from around the world each year.¹ However, there is a paucity of Canadian data on the health of this vulnerable population. This is the second article of a 2-part series examining the health status of newly arrived primarily refugee claimants in Toronto, Ont. We examine the prevalence of conditions for which refugee patients are routinely screened, largely based on the 2011 *Evidence-based Clinical Guidelines for Immigrants and Refugees* from the Canadian Collaboration for Immigrant and Refugee Health.² Our first article explored the prevalence of key infectious diseases (page e303).³ In this article, we examine the rates of several chronic diseases and their association with key demographic factors, including sex, age, and region of birth.

Globally, there is a rising burden of chronic disease, including in the low- and middle-income countries from which many refugees originate.⁴ Refugees might also be at increased risk of developing chronic disease as they resettle in Canada and adapt to different lifestyles and diets. Through enhanced understanding of the chronic health conditions affecting this population, we aim to improve clinical care for refugees.

METHODS

We conducted a retrospective chart review of the electronic medical records of 1063 refugee patients at a specialized primary care clinic for refugees in Toronto. Any patient rostered at the clinic between December 1, 2011, and June 23, 2014, with at least 1 clinic visit and country of birth recorded in the electronic medical record was included in our study. Data were drawn from the earliest available standardized screening test results and demographic information recorded in patient charts as part of routine care. Patients were not subjected to, or deprived of, additional testing or treatment. This study was approved by the Women's College Hospital Research Ethics Board.

We collected the following demographic and social data: age at first visit, sex, country of birth, refugee class, and referring organization or contact. For the investigation of chronic diseases, we extracted the following health status data: Papanicolaou test cervical cytology findings, hemoglobin level, blood pressure (BP), and diabetes screening test results (fasting blood glucose, random blood glucose, or hemoglobin A_{1c} [HbA_{1c}] measurement).

Laboratory cutoff values were derived from widely used national and international clinical guidelines. Anemia was defined by World Health Organization (WHO) designations according to age and sex: a hemoglobin level less than 110 g/L for children 6 to 59 months, less than 115 g/L for children 5 to 11 years, and less than 120 g/L for children 12 to 14 years.⁵ Infants

younger than 6 months were not routinely tested for anemia and thus were not included in this analysis. For women 15 years of age and older who are not pregnant, anemia is defined as a hemoglobin level less than 120 g/L. (For pregnant women, anemia is defined as a hemoglobin level less than 110 g/L; however, we did not distinguish pregnancy status and thus used only the cutoff for nonpregnant female patients.) Anemia among male patients 15 years and older is defined as a hemoglobin level less than 130 g/L.

Laboratory abnormalities for prediabetes or diabetes included any one of the following: a fasting blood glucose level of 6.1 mmol/L or greater, a random blood glucose level of 11.1 mmol/L or greater, or an HbA_{1c} level of 6% or greater, as defined by the Canadian Diabetes Association 2013 clinical practice guidelines, in which single-test abnormalities require, at a minimum, further investigation with repeat confirmatory testing.⁶

Elevated BP was defined as a systolic BP measurement of 130 mm Hg or greater, a diastolic BP measurement of 85 mm Hg or greater, or both, based on the Canadian Hypertension Education Program 2013 recommendations for BP measurements that require annual follow-up at a minimum and closer monitoring depending on the severity of BP elevation.⁷ These classifications did not capture patients presenting with controlled BP or glucose levels due to pre-existing antihypertensive or diabetic medications, respectively.

Countries of birth were categorized according to the WHO regional groupings for regional subanalysis.⁸ Given the low number of patients from the Western Pacific Region (namely South Korea and China), it was merged with the South-East Asia Region into one category renamed *Asia*. The 39 patients born in Canada and the United States (US) were excluded from subanalysis, as these were primarily infants born to refugee parents, with demographic and health characteristics differing from refugees born outside of Canada and the US. Age categories for analysis were based on clinical relevance for each health indicator and guided by WHO designations.

We conducted subanalyses using SAS, version 9.2, software and subgroup comparisons with the Fisher exact test; *P* values less than .05 were considered significant.

RESULTS

Basic demographic characteristics of the study population are summarized in part 1 of our 2-part series.³ Briefly, more than half of the patients were female (56%). The median age of patients was 29 years, with an interquartile range of 15 to 39 years; 11% of patients were younger than 5 years of age. Patients reported 87 different countries of birth. Top source countries were Hungary (210 patients), North Korea (119 patients), and

Nigeria (93 patients).³ In terms of regional distribution, 33% of patients were from Africa, 28% were from Europe, 14% were from the Eastern Mediterranean Region, 14% were from Asia, and 8% were from the Americas (excluding 39 patients [4%] born in Canada or the US). Most patients were refugee claimants (92%), as opposed to government-assisted refugees (5%).

More than 1 in 10 female patients (11% of 284 tests) who underwent Pap testing had abnormal cervical cytology findings (Table 1).⁸ Rates of abnormal Pap test results were significantly higher among women from Asia (26%, $P=.028$).

The overall rate of anemia among tested patients ($n=919$), based on age- and sex-specific hemoglobin cutoffs, was 15%, with the highest rates among patients from Africa (23%, $P<.001$). Among all children younger than 15 years, 11% had anemia (Table 2).⁸ Among children younger than 5 years ($n=59$), 14% had anemia; this did not vary significantly by geographic region. Among women 15 years and older, 1 in 4 had anemia, with significantly higher rates among women from Africa (37%, $P<.001$). Only 3% of male patients 15 years and older had anemia.

Data on elevated BP and diabetes screening are summarized in Table 3.⁸ Elevated BP on initial reading was observed in 30% of tested patients older than 15 years of age. Rates were significantly higher among male patients (38% vs 23% in female patients, $P<.001$). Regional variation was significant, with the highest prevalence of elevated BP in refugees from Europe (42%, $P<.001$). Rates increased significantly with advancing

age; 78% of patients older than 60 years had elevated BP ($P<.001$).

Among patients older than 15 years screened with fasting blood glucose, random blood glucose, or HbA_{1c} testing, 8% showed at least 1 laboratory abnormality indicating impaired glycemic control. The prevalence of glycemic abnormalities was significantly higher among refugees from Europe (15%, $P=.026$). Rates increased significantly with age; abnormal results were found in 43% of patients older than age 60 ($P<.001$).

DISCUSSION

Attention has traditionally centred on infectious diseases among refugees; however, our results highlight a notable burden of several chronic conditions. Early screening, prevention, and treatment interventions are key to enhancing the health of these patients.

We found a substantially higher prevalence of abnormal Pap test results (11%) in our female patient population than that in the general Canadian population (5%).⁹ Refugee women might be at particular risk of cervical cancer owing to higher rates of human papillomavirus infection in their home countries, lack of access to routine cervical cancer screening in their regions of origin, exposure to sexual violence, immune compromise from comorbid disease, and other factors.² Current Ontario and Canadian cervical cancer screening guidelines recommend Pap test initiation after age 21 or age 25, respectively, and every 3 years thereafter; further research into optimal screening practices for refugee populations might be warranted, given their unique health and exposure factors and the lack of previous screening.^{10,11} Other research has suggested refugee-friendly care, with translators and integrated social support services, might increase the uptake of cervical cancer screening.¹² Additionally, enhanced access to human papillomavirus vaccination could be particularly beneficial for this patient population.

Previous studies have found substantial morbidity related to iron-deficiency anemia among newcomer children and women.² The rate of anemia among the children and women in our population (21%) was substantially higher than that among Canadian-born children and women, estimated at 2% to 10%, excluding aboriginal populations.² We found lower rates of anemia in preschool-aged children (14%) compared with WHO global estimates ranging from 22% to 68%, with the highest rates in Africa.¹³ The calculated 25% of women with anemia in our study might be an overestimate of true anemia prevalence, as we did not distinguish pregnant women with physiologically lower hemoglobin. Nevertheless, this rate is comparable to WHO global estimates of anemia among nonpregnant women, at

Table 1. Prevalence of abnormal Papanicolaou test results for female patients 15 y and older

VARIABLE	NO. OF POSITIVE RESULTS (NO. OF AVAILABLE RESULTS)	PREVALENCE, %	P VALUE
Total	31 (284)	11	
Age group, y			.09
• 15-29	7 (82)	9	
• 30-44	18 (158)	11	
• 45-59	3 (37)	8	
• ≥60	3 (7)	43	
Region ^a			.028
• Africa	11 (120)	9	
• Americas*	2 (24)	8	
• Asia [†]	12 (47)	26	
• Eastern Mediterranean	1 (21)	5	
• Europe	5 (72)	7	

*Excludes patients born in Canada and the United States.

[†]Asia region includes World Health Organization regions⁸ of South-East Asia and the Western Pacific.

Table 2. Prevalence of anemia among clinic patients

VARIABLE	CHILDREN < 15 Y OLD (HEMOGLOBIN CUTOFF BY AGE*)			FEMALES ≥ 15 Y OLD (HEMOGLOBIN < 120 g/L)			MALES ≥ 15 Y OLD (HEMOGLOBIN < 130 g/L)		
	NO. OF POSITIVE RESULTS (NO. OF AVAILABLE RESULTS)	PREVALENCE, %	P VALUE	NO. OF POSITIVE RESULTS (NO. OF AVAILABLE RESULTS)	PREVALENCE, %	P VALUE	NO. OF POSITIVE RESULTS (NO. OF AVAILABLE RESULTS)	PREVALENCE, %	P VALUE
Total	18 (170)	11		111 (438)	25		8 (311)	3	
Region ⁸			.48			<.001			.99
• Africa	6 (55)	11		64 (172)	37		3 (96)	3	
• Americas [†]	4 (22)	18		4 (34)	12		0 (14)	0	
• Asia [‡]	2 (38)	5		12 (67)	18		1 (36)	3	
• Eastern Mediterranean	2 (12)	17		14 (51)	27		2 (80)	2	
• Europe	4 (43)	9		17 (114)	15		2 (84)	2	

NA—not applicable.

*For children 6–59 mo, anemia was defined as hemoglobin < 110 g/L. For children 5–11 y, anemia was defined as hemoglobin < 115 g/L. For children 12–14 y, anemia was defined as hemoglobin < 120 g/L. Infants < 6 mo were not routinely tested for anemia and so were not included in this analysis.

[†]Excludes patients born in Canada and the United States.

[‡]Asia region includes World Health Organization regions⁸ of South-East Asia and the Western Pacific.

Table 3. Prevalence of elevated BP and impaired glycemic control in clinic patients 15 y and older

VARIABLE	ELEVATED BP (SBP ≥ 130 mm Hg OR DBP ≥ 85 mm Hg)			IMPAIRED GLYCEMIC CONTROL (FBG ≥ 6.1 mmol/L OR RBG ≥ 11.1 mmol/L OR HbA _{1c} ≥ 6%)		
	NO. OF POSITIVE RESULTS (NO. OF AVAILABLE RESULTS)	PREVALENCE, %	P VALUE	NO. OF POSITIVE RESULTS (NO. OF AVAILABLE RESULTS)	PREVALENCE, %	P VALUE
Total	219 (742)	30		58 (684)	8	
Sex			<.001			.10
• Male	119 (316)	38		30 (282)	11	
• Female	100 (426)	23		28 (402)	7	
Age group, y			<.001			<.001
• 15–29	35 (265)	13		4 (225)	2	
• 30–44	89 (329)	27		16 (320)	5	
• 45–59	66 (111)	59		23 (104)	22	
• ≥ 60	29 (37)	78		15 (35)	43	
Region ⁸			<.001			.026
• Africa	72 (258)	28		16 (247)	6	
• Americas [*]	9 (50)	18		3 (47)	6	
• Asia [‡]	22 (100)	22		6 (91)	7	
• Eastern Mediterranean	28 (124)	23		6 (114)	5	
• Europe	88 (210)	42		27 (185)	15	

BP—blood pressure, DBP—diastolic blood pressure, FBG—fasting blood glucose, HbA_{1c}—hemoglobin A_{1c}, RBG—random blood glucose, SBP—systolic blood pressure.

*Excludes patients born in Canada and the United States.

[‡]Asia region includes World Health Organization regions⁸ of South-East Asia and the Western Pacific.

30% overall and ranging from 19% to 48% by region.¹³ The identified burden of anemia and the potential benefits of low-cost iron supplements favour routine screening for women of reproductive age and children.

We found relatively high rates of elevated BP (30%) in adult patients. While data on chronic disease in refugees are limited, a study of adult refugees in Massachusetts reported a lower rate of hypertension (22.6%).¹⁴ By

comparison, approximately 23% of Canadians aged 20 and older have diagnosed hypertension.¹⁵ The higher rate in our study might reflect a more liberal definition of elevated BP (systolic BP \geq 130 mm Hg or diastolic BP \geq 85 mm Hg on first recorded reading vs diagnosed hypertension). Further, there are many factors that might have contributed to elevated BP on a first-time reading, including anxiety. Nevertheless, these individuals might be at risk of developing hypertension and require further monitoring, at a minimum. Additional evaluation of repeated BP measurements, confirmed diagnosis of hypertension, and use of antihypertensive medications would help to clarify the true burden of hypertension in this population.

We found a similar rate of impaired glycemic control (8%) in our adult patient population compared with the estimated 8.7% of Canadian adults (aged 20 years and older) with diagnosed diabetes (types 1 and 2).¹⁶ Our definition might overestimate the burden of prediabetes and diabetes owing to the limitations of one-time screening of glycemic control and possible confounding factors. However, our results draw attention to patients who require further monitoring. Previous research has found that individuals of certain ethnic backgrounds, including those of South Asian, Latin American, and African origin, are at higher risk of developing diabetes, and at younger ages of onset, and can particularly benefit from early screening.^{2,6}

Changes in diet and physical activity during resettlement in Canada, often owing to limited finances, can contribute to development or exacerbation of hypertension, diabetes, and obesity in newcomer populations, further emphasizing the importance of early detection, prevention, and treatment strategies for these chronic conditions.^{2,17,18} Patient-centred and culturally appropriate interventions are essential.²

Limitations

Although this study benefits from a large and diverse patient population, our data are not generalizable to all refugee populations arriving in Canada. It focuses on primarily refugee claimants voluntarily presenting to a downtown Toronto clinic during a particular period in dynamic Canadian refugee migration patterns. Further, owing to the study's retrospective nature, we were restricted to analyzing only a small subset of chronic disease indicators, based on available standardized data. Further analysis of follow-up test results and other health conditions, including in the domain of mental health, would help to elucidate a more comprehensive picture of refugee health and advance clinical care for these patients.

While regional variation was statistically significant for most health conditions, this analysis does not characterize potentially important intraregional, intracountry,

and individual variations. Clinical care should be tailored according to regional epidemiologic patterns, as well as patients' unique histories.

Conclusion

This retrospective study found that a substantial proportion of refugee patients suffer from chronic diseases, including anemia, elevated BP, and impaired glycemic control, at rates similar to or higher than those among the general Canadian population. Refugee women were also diagnosed with statistically significantly higher rates of abnormal cervical cytology, with a potentially higher risk of cervical cancer. This 2-part series highlights the importance of attending to the burden of both infectious disease and chronic conditions among refugee patients through comprehensive primary care. Early screening and management can be pivotal in preventing disease progression and complications. The scarcity of published data on the health of this diverse population highlights a need for ongoing research. Further investigation into chronic disease and mental health conditions, appropriate prevention and treatment, and access to care could greatly enhance the health of refugee patients.

Dr Redditt is Fellow in the Global Health and Vulnerable Populations program in the Department of Family and Community Medicine (DFCM) at the University of Toronto in Ontario. At the time of the study, **Ms Graziano** was a summer research intern at the Crossroads Clinic at Women's College Hospital in Toronto through the Women's College Hospital Institute for Health System Solutions and Virtual Care program. **Dr Janakiram** is a staff physician at the Crossroads Clinic and Lecturer in the DFCM at the University of Toronto. **Dr Rashid** is Director of the Crossroads Clinic and Lecturer in the DFCM at the University of Toronto.

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Contributors

Dr Redditt contributed to the study design, data collection and interpretation, and drafting the manuscript. **Ms Graziano** contributed to data collection and editing the article. **Dr Janakiram** contributed to data interpretation and editing the article. **Dr Rashid** contributed to the study concept and design, data interpretation, and editing the article. All authors approved the final version of the submitted manuscript.

Competing interests

None declared

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