



Breast and Colorectal Cancer Screening Barriers Among Immigrants and Refugees: A Mixed-Methods Study at Three Community Health Centres in Toronto, Canada

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Abstract

Mammography and fecal occult blood testing (FOBT) improve the detection, management, and prognosis of breast and colorectal cancer, respectively, but are underperformed in the recent immigrant and refugee population. We aimed to identify barriers to screening and potential solutions in this population. A mixed-methods study involving a retrospective chart review and focus group interviews was conducted, with data analyzed using univariate logistic regression and thematic analysis, respectively. Mammography completion was associated with greater time in Canada ($p=0.01$) and region of origin ($p=0.04$), while FOBT completion was associated with region of origin ($p=0.03$). Barriers included time constraints, language and cultural differences, and poor interprofessional communication. This study of recent immigrants and refugees identifies barriers to screening and supports potential solutions including culturally-congruent peer workers, targeted screening workshops, and visual screening aids. Further work is needed to address the unique healthcare needs of this diverse and growing population.

Keywords Breast cancer · Colorectal cancer · Cancer screening · Immigrants · Refugees · Community health centre · Health promotion

Background

Breast cancer (BCa) and colorectal cancer (CRC) are responsible for significant disease burden [1]. Studies have shown that early detection and treatment of BCa [2–4] and CRC [5–7] effectively reduces morbidity and mortality, with mammography and fecal occult blood testing (FOBTs) forming an integral part of screening programs in all ten

Canadian provinces [8]. In Ontario, mammography is recommended every 2 years for women aged 50–74 [9], while FOBT is recommended every 2 years for asymptomatic people aged 50 to 74 without a family history of CRC [10]. Despite the known benefits of screening, patients continue to present in primary care settings with no prior screening history or already advanced cancer [11, 12].

Recent immigrants and refugees face even more barriers to cancer screening than the general population [13]. For BCa, an Ontario study found that screening rates were lower among more recently arrived immigrants (those who arrived between 1985 and 2010) compared to long-term immigrants (those who arrived before 1985) and Canadian-born women [14]. Factors such as residing in a low income neighborhood, having a male or internationally-trained physician, and not being enrolled in a primary care practice were associated with lower screening rates [14]. Likewise, immigration status, low socioeconomic status, language barriers, and distrust of the medical system are recognized factors associated with reduced CRC screening [15].

Such screening inequalities demonstrate the need for improved screening efforts in these disadvantaged populations. Access Alliance Multicultural Health and

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Community Services (Access Alliance) is a community health centre (CHC) in Toronto, Ontario with three locations that serve vulnerable populations (e.g. recent immigrants from low-income and racialized backgrounds, government-assisted refugees, refugee claimants, and uninsured patients). We conducted this study amongst this population to identify factors associated with poorer rates of BCa and CRC screening and potential solutions. We hypothesized that immigration status, region of origin, low education level, lack of health insurance, and the presence of co-existing chronic medical conditions were factors associated with lack of cancer screening.

Methods

This concurrent mixed-methods study involved a retrospective chart review of client data (quantitative data) and two focus groups (qualitative data) with Access Alliance primary care providers (PCPs). The study flow is illustrated in Fig. 1. This study was approved by both the Access Alliance Research Ethics Board and the University of Toronto Health Sciences Research Ethics Board.

Retrospective Chart Review

Participants

The inclusion criteria were active clients aged 50–74 from all three Access Alliance Toronto sites, who were defined as having had at least one clinic encounter between November 1, 2012 and October 31, 2015 inclusive. For BCa, the exclusion criteria were clients who were male, previously or currently diagnosed with BCa, had a lesion of concern identified on a previous mammogram, had a genetic or family history that placed them at increased risk for BCa [9], or were symptomatic. For CRC, the exclusion criteria were clients who had a previous or current diagnosis of CRC, had a previous lesion of concern, had a genetic or family history that predisposed them to an increased risk of CRC, or were symptomatic [10]. Additionally, clients with grossly incomplete charts including missing demographic data and/or screening information that would preclude meaningful data analysis were excluded.

Data Collection

Data were extracted from client charts into a spreadsheet (Excel 15.0 Washington, USA: Microsoft, 2016) by the

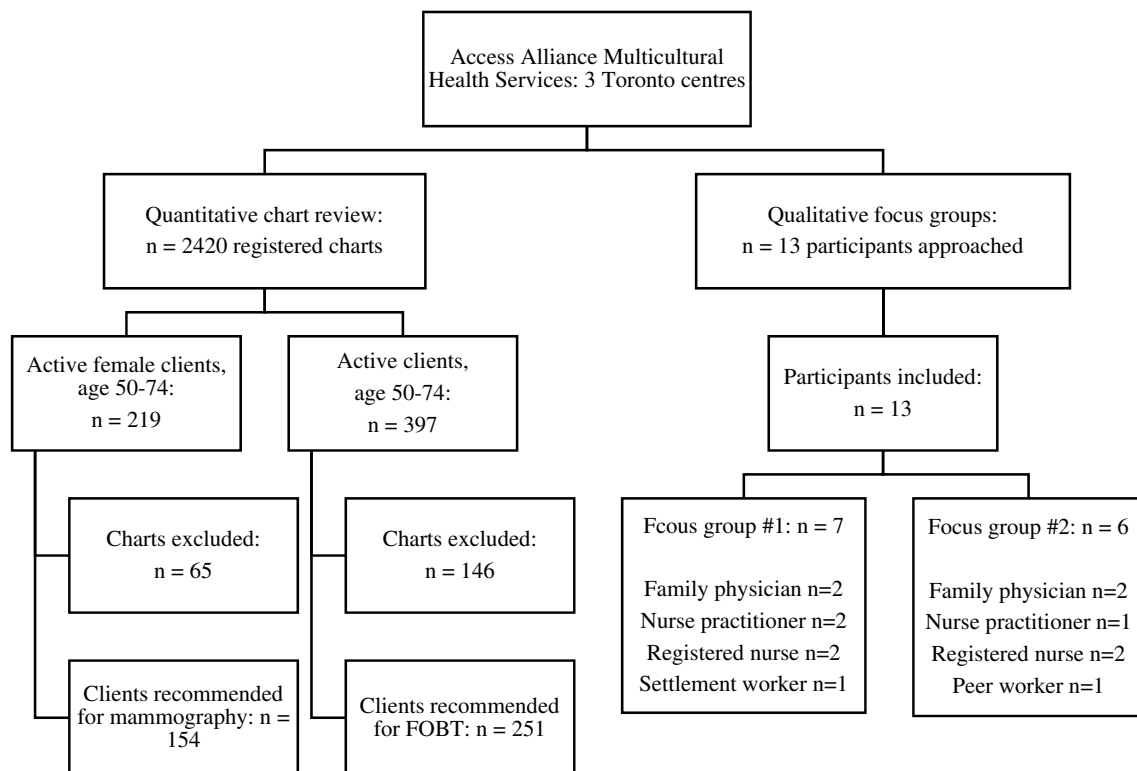


Fig. 1 Diagram illustrating study flow of quantitative and qualitative arms

Access Alliance data manager using a pre-constructed data abstraction protocol and form. The protocol involved retrieving client characteristics including demographics, immigration status, health insurance status, frequency of physician visits, co-morbid health conditions, family history of cancer, and screening test indices. These were linked to corresponding International Classification of Disease and/or Electronic Nomenclature and Classification of Disorders and Encounters for Family Medicine codes to identify relevant data. An initial sample of 50 charts was hand-reviewed against corresponding electronic medical records to ensure accuracy and congruency of the data abstraction protocol. All data were de-identified prior to being provided to the authors. Country of origin was first coded according to the United Nations Geo-Scheme [16], and then further clustered into larger geographical groups based on author consensus around characteristics of the included countries such as economic development and attitudes towards preventative health.

Statistical Analysis

Univariate logistic regression analysis was performed using SAS software (SAS, Cary, NC, USA: SAS Institute Inc., 2015), with the primary outcome being documented mammography or FOBT screening status. For continuous predictor variables (age, co-morbid conditions, physician visits, and time spent in Canada), data normality was first determined by the Shapiro–Wilk Test. For variables not normally distributed, the Wilcoxon Signed Rank was chosen; for normally distributed variables, the Student's *t* test was used. For discrete predictor variables (language, health insurance status, immigration status, level of education, and country of origin), the Chi-Square Test was employed if all values in the frequency table exceeded 5, otherwise Fisher's Exact Test was used. Missing data were assumed to be missing at random. Mean imputation was applied if less than 30% of the data was missing [17]. Variables with greater than 50% of the data missing were excluded.

Qualitative Focus Groups

Participants

Focus groups (FG) were conducted based on accepted guidelines [18, 19]. The study coordinator (NN) purposively recruited FG participants via email from PCPs of Access Alliance. Inclusion criteria were: (i) English-speaking; (ii) involved with client care; (iii) involved with BCa and/or CRC screening; and (iv) able to attend in person. Participants included physicians, registered nurses, nurse practitioners, social workers, settlement workers, and peer workers. We stratified participants according to site and role in a non-blinded fashion and informed consent was obtained.

Focus Group Interviews

FGs were preceded by a presentation on study aims, background on BCa and CRC screening, voluntariness of participation, anonymity and confidentiality of information, and intended use of information. Each group was facilitated by a lead author (AW or EY) with a pre-defined question set focusing on screening climate, barriers, and potential solutions (Appendix). These were developed iteratively based on a review of literature but were not provided to participants. Each group was limited to eight participants and lasted 1 h. The discussion was semi-structured, with participants leading the discussion and the facilitators using the standardized questions to redirect when topic saturation occurred. Field notes were taken, and a 10-min debrief followed the focus groups. Both sessions were audio-recorded and transcribed verbatim.

Analysis and Development of Codes

A transcript-based, constructivist, grounded theory approach was used to generate codes [20]. First, an open coding process was undertaken by each author to characterize relevant lines of text. Repeated statements by the same participant were counted once. In consultation with senior authors (NN, AL), overlapping areas were amalgamated to generate a final set of codes. Transcripts were then re-analyzed to generate any additional findings. If disagreement occurred, consensus was reached first via re-visiting the transcript, then by the senior author (AL). Themes were derived first from the question groupings (screening climate, barriers and facilitators, and solutions) and then modified according to the transcript analysis [21–23].

Results

Retrospective Chart Review

After applying inclusion and exclusion criteria, 154 clients were included in the BCa group and 251 included in the CRC group (Fig. 1). Demographic characteristics are shown in Table 1. Overall, of the 154 clients eligible for BCa screening, 59% (91) were up-to-date on their mammography screening. Of the 251 eligible for CRC screening, 54% (136) were up-to-date on FOBT. The average age of the two groups was similar (61.2 vs. 61.1 years for BCa vs. CRC). Most clients did not identify English as their first language (75% for BCa, 75% for CRC) and the median number of years spent in Canada for both groups was less than 10 years. For current immigration status, in the BCa group 30% (46) were refugee claimants, 12% (18) were citizens, 5% (8) were permanent residents, 5% (8) were non-status, and the

Table 1 Client demographic characteristics

	Total	Mammogram documented	No mammo-gram documented	Total	FOBT documented	No FOBT documented
Number of clients	154	91 (59.1%)	63 (40.9%)	251	136 (54.2%)	115 (45.8%)
Age (average)	61.2	59.8	63.2	61.1	61.0	61.2
Gender						
Male	0	0	0	97	54 (55.7%)	43 (44.3%)
Female	154	91 (59.1%)	63 (40.9%)	154	82 (53.2%)	72 (46.8%)
Years in Canada (median)	8.0	8.5	4.0	7.0	7.0	8.0
Language						
English is first language	39	26 (97.7%)	13 (2.3%)	64	35 (54.7%)	29 (45.3%)
English not first language	115	65 (56.5%)	50 (43.5%)	187	101 (54.0%)	86 (46.0%)
Immigration status						
DK/PNA	74	43 (58.1%)	31 (41.9%)	104	41 (39.4%)	63 (60.6%)
Citizen	18	10 (55.6%)	8 (44.4%)	30	18 (60.0%)	12 (40.0%)
Permanent resident/landed immigrant	8	6 (75.0%)	2 (25.0%)	23	14 (60.9%)	9 (39.1%)
Refugee	46	28 (60.9%)	18 (39.1%)	84	59 (70.2%)	25 (29.8%)
Non-status	8	4 (50.0%)	4 (50.0%)	10	4 (40.0%)	6 (60.0%)
Insurance						
Health insurance	103	65 (63.1%)	38 (36.9%)	173	99 (57.2%)	74 (42.8%)
No health insurance	51	26 (51.0%)	25 (49.0%)	78	37 (47.4%)	41 (52.6%)
Education						
Unknown	37	17 (45.9%)	20 (54.1%)	51	30 (58.8%)	21 (41.2%)
Primary	29	12 (41.4%)	17 (58.6%)	45	24 (53.3%)	21 (46.7%)
Secondary	36	11 (30.6%)	25 (69.4%)	67	32 (47.8%)	35 (52.2%)
Post-secondary	37	19 (51.4%)	18 (48.6%)	66	37 (56.1%)	29 (43.9%)
None	15	4 (26.7%)	11 (73.3%)	22	13 (59.1%)	9 (40.9%)
UN region of origin						
North America & Western Europe	2	0 (0%)	2 (100%)	2	2 (100%)	0 (0%)
Latin America & Caribbean	51	36 (70.6%)	15 (29.4%)	74	32 (43.2%)	42 (56.8%)
Southeastern Europe	30	12 (40.0%)	18 (60.0%)	47	24 (51.0%)	23 (49.0%)
Asia	63	39 (61.9%)	24 (38.1%)	111	71 (64.0%)	40 (36.0%)
Africa	5	2 (40.0%)	3 (60.0%)	13	5 (38.5%)	8 (61.5%)
Unknown	3	2 (66.7%)	1 (33.3%)	4	2 (50.0%)	2 (50.0%)
Total	154	91 (59.1%)	63 (40.9%)	251	136 (54.2%)	115 (45.8%)
Number of psychiatric conditions (median)	0	0	0	0	0	0
Number of non-psychiatric conditions (median)	1	1	1	1	1	1
Physician visits in past 2 years (median)	10	10	11	11	11	10

DK do not know, FOBT fecal occult blood test, OHIP Ontario Health Insurance Plan, PNA prefer not to answer, UN United Nations

remainder indicated they did not know or preferred not to answer (48%, 74). In the CRC group, 33% (84) were refugee claimants, 12% (30) were citizens, 9% (23) were permanent residents, 4% (10) were non-status, and the remainder indicated they did not know or preferred not to answer (41%, 104). The most common regions of origin in both groups in descending order were Asia, Latin America and the Caribbean, and Southeastern Europe.

Univariate analysis results are presented in Tables 2 and 3. In the BCa group, clients with mammography were

significantly more likely to have spent more time in Canada ($p = 0.01$). Region of origin (based UN defined categories) was also found to be a significant predictor of mammography ($p = 0.04$). In the CRC group, the only variable that significantly predicted FOBT screening was region of origin ($p = 0.03$). In both cases, the small sample size precluded any meaningful subgroup analysis. Interestingly, neither health insurance status nor immigration status was found to be associated with screening behaviour.

Table 2 Univariate analysis of the association between continuous predictor variables and mammogram or FOBT completion

Predictor	Mammography			FOBT		
	Test	z-value	p-value	Test used	z-value	p-value
Age	Wilcoxon	1.77	0.08	Wilcoxon	−0.03	0.98
Years in Canada	Wilcoxon	−2.55	0.01	Wilcoxon	1.06	0.29
Number of psychiatric conditions	Wilcoxon	1.52	0.13	Wilcoxon	0.89	0.13
Number of non-psychiatric conditions	Wilcoxon	−1.43	0.15	Wilcoxon	−0.64	0.52
Physician visits in past 2 years	Wilcoxon	0.27	0.79	Wilcoxon	−1.15	0.25

FOBT fecal occult blood test

Table 3 Univariate analysis of the association between the discrete predictor variables and having a mammogram or FOBT

Predictor	Mammography			FOBT		
	Test	Statistic	p-value	Test used	Statistic	p-value
Gender	–	–	–	Chi-Square	0.14	0.71
Language	Chi-Square	1.33	0.25	Chi-Square	0.01	0.96
Immigration status	Chi-Square	0.04	0.85	Chi-Square	0.65	0.42
Health insurance status	Chi-Square	2.08	0.15	Chi-Square	2.08	0.15
Education	Chi-Square	0.26	0.61	Chi-Square	0.20	0.65
UN region of origin	Fisher's Exact	–	0.04	Fisher's Exact	–	0.03

FOBT fecal occult blood test, UN United Nations

Focus Groups

Two focus groups were conducted in parallel in December 2015. A total of 13 PCPs agreed to participate; no participants declined. They were divided into two groups non-randomly ($n = 6$ and $n = 7$), ensuring representation from all three Access Alliance sites in both groups. Participant roles are listed in Fig. 1. Two themes were identified: perceived barriers and potential solutions, each of which comprised several categories (Tables 4, 5).

Barriers to Screening

In the practical domain, time constraints, language barriers, and the need to prioritize the client's primary complaint hindered a screening discussion:

We have 30 minutes per appointment typically, but when they're dealing with seven other issues and language line, interpretation services, you don't necessarily have that much time to explain in detail the importance of screening.

One conceptual barrier was a lack of understanding of screening, especially if the client had come from a country without any formal screening programs:

The patients that are not as open to it, I think, are the ones that [...] don't understand the whole concept of screening as a whole. The ones who think that 'if I feel

well I am well'. And if they're asymptomatic, [...] 'my GI system is working fine', why do I need another test?

Regarding language barriers, providers described the need for interpreters as being important but time and energy consuming. Additionally, participants noted that mammography forms and self-administered FOBT kits are only available in English or French.

Significant cultural barriers involved client discomfort with a potential male mammography technician in Arabic speaking populations, and with openly discussing feces or the steps of performing an FOBT. At the administrative level, providers cited loss to follow-up and poor inter-professional communication between different individuals involved in the screening process as barriers. Clients were noted to move frequently and have unreliable contact information, precluding appointment reminders.

Solutions to Improve Screening

Potential solutions are outlined in Table 5. Systems-level approaches included incentivizing screening and creating culturally and linguistically-specific BCa and CRC screening workshops delivered in a large group setting. Successes from Access Alliance's other health education programs delivered by peer outreach workers could be replicated for BCa and CRC workshops:

...The peer outreach workers [could] identify leaders within their own communities, with the education needed to share the information with their commu-

Table 4 Summary of perceived barriers to screening elicited during focus groups

Practical (20%)	Conceptual (18%)	Language (7%)	Cultural (10%)	Administrative (20%)
<p>Lack of time to discuss or complete screening (PCP)</p> <ul style="list-style-type: none"> • Short appointment times • Competing medical issues • Explaining how to complete a FOBT is a time-intensive process <p>Lack of time to discuss or complete screening (client)</p> <ul style="list-style-type: none"> • Overwhelmed with paperwork as newcomer • Lack of universal childcare • Rushed/incomplete teaching leads to incorrectly collected samples <p>Lack of time to develop adequate client-PCP relationship</p> <ul style="list-style-type: none"> • More difficult to discuss invasive, embarrassing screening procedures 	<p>Lack of understanding of screening purpose/concept</p> <ul style="list-style-type: none"> • First encounter with a screening program • Asymptomatic clients do not see value of screening • “Feel well, am well” paradigm: reluctance to participate in preventative initiatives such as flu shots • Lack of awareness of screening frequency/schedule <p>Perception of pain with mammogram</p> <ul style="list-style-type: none"> • Mammography viewed as painful, uncomfortable, invasive 	<p>Translation/interpretation difficult</p> <ul style="list-style-type: none"> • Utilization of an interpreter compounds time barrier • Forms and instructions all in English • Interpreters not necessarily present at mammography centres • Difficult to perform education around screening through an interpreter 	<p>Attitudes towards male–female dynamic</p> <ul style="list-style-type: none"> • Arabic women uncomfortable with male PCPs performing any invasive screening <p>Attitudes towards feces</p> <ul style="list-style-type: none"> • FOBT test perceived as gross, distasteful <p>Lack of comfort talking about feces openly</p>	<p>Loss to follow-up</p> <ul style="list-style-type: none"> • Migratory population with lack of updated contact information • Inconsistent charting and record keeping <p>Overburdened administrative support staff</p> <ul style="list-style-type: none"> • Inability to keep track of screening requirements • Lack of provincial health insurance coverage and reminders • Inadequate resources to provide childcare facilities <p>Limited access to client information</p> <ul style="list-style-type: none"> • Peer and settlement workers cannot access client screening history

Percentages represent proportion of total coded text belonging to each thematic area

FOBT fecal-occult blood test, *PCP* primary care provider

Table 5 Summary of potential solutions to improve screening elicited during focus groups

Systems-level (7%)	Provider-level (8%)	Client-level (10%)
<p>Incentivizing screening</p> <ul style="list-style-type: none"> • Provide bonuses to PCPs for meeting screening targets • Prioritize screening within health organizations <p>Preventing overdue screening</p> <ul style="list-style-type: none"> • Program automated reminders in client charts • Have nurse create a flag in the chart as clients are seen • Provide clients with appointment reminder cards, screening schedules <p>Developing screening workshops</p> <ul style="list-style-type: none"> • Work with existing community programs (e.g. Toronto Public Health, Access Alliance newcomer workshops) • Use a large group, language- or culture-specific approach 	<p>Taking a multi-disciplinary approach</p> <ul style="list-style-type: none"> • Involve peer workers in screening discussions and education • Integrate screening questions into initial nursing triage • Create role for health professional to identify clients overdue for screening • Give responsibility of screening to all family members <p>Achieving cultural competency</p> <ul style="list-style-type: none"> • Understand and be aware of barriers present in this client population • Develop workshops and approaches to address these barriers • Engage available PCPs to provide culturally-congruent care 	<p>Developing screening education tools</p> <ul style="list-style-type: none"> • Develop visual aids to assist PCP in teaching • Create educational pamphlets for clients to bring home • Raise awareness of screening through posters, computer screensavers, clinic television announcements <p>Providing tools to enhance follow-up</p> <ul style="list-style-type: none"> • Provide clients with transportation tokens to access follow-up appointments, if necessary

Percentages represent proportion of total coded text belonging to each thematic area

EMR electronic medical record, *PCP* primary care provider

nities. So, it's not about patients coming to Access Alliance, it could be more about true outreach in the communities where they're living.

Recommendations for provider-level interventions focused on alleviating time constraints and cultural barriers. A previously successful initiative was hiring a nurse practitioner to perform roster audits and contact clients overdue for screening. A second solution identified was increasing involvement of peer workers, who are Access Alliance staff recruited from or belonging to the same cultural and/or ethnic group responsible for client outreach, health education and health promotion work:

We rely really heavily on the peers, because I find if the patients try to do the fecal occult blood test, lots of times they make mistakes; they don't do it right. So, having the peer explain to them what they did wrong, and to do it correctly, you get a better ability to get them to keep doing it in the following years.

Client-level recommendations included language-specific visual and educational aids, effective appointment and screening reminders, alert systems for electronic medical records, and transportation fare for clinic visits. Effective use of media (e.g. TV in the waiting room) were suggested as time-efficient methods for client education:

I think there are opportunities to really optimize our communication strategies among our patients, like we have a TV in the waiting room, but it's never on. It could [display] messages on breast cancer screenings, diabetes, 'we have this upcoming workshop'. They could tailor the messages in the languages that are needed.

Overall, participants agreed that a multi-modal approach would be most effective in improving screening in such a diverse target population.

Discussion

In this study of recent immigrant and refugee populations and their providers, we found that certain factors were predictive of BCa and CRC screening behaviour. For mammography, region of origin and a longer period spent in Canada were associated with higher rates of completion. For FOBT, region of origin was associated with higher rates of completion. From a qualitative perspective, we identified barriers specific to this population that represent potential targets for solutions such as culturally congruent peer workers, screening workshops, and language-specific visual aids.

Our finding that region of origin was associated with screening behaviour for both BCa and CRC supports current

literature that behaviour varies between different ethnicities within a population [24, 25] as well as on a geographic level [26, 27]. Current literature suggests that screening programs in most regions outside of the western nations are heterogeneous and largely inconsistent in approach, management, and mortality outcomes [28–33]. However, given the small sample size which prevented subgroup analysis, we could not draw conclusions regarding regional differences in screening rates. The overall finding that screening behaviour varies between regional populations supports the need to better understand clients' individual backgrounds during the clinical encounter, and points towards the potential of culturally and regionally-specific screening initiatives.

Interestingly, other predictors of screening behaviour in the general population, such as older age, male gender, lower education, and infrequent contact with health providers or poor healthcare coverage were not significant in our analysis [34, 35]. This may suggest that these barriers are not completely generalizable to our population of clients at an immigrant and refugee-focused CHC. For example, the lack of association between health insurance status and screening behaviour might have been because clients do not need government-funded health insurance coverage to obtain screening through Access Alliance. Similarly, the lack of association between English language proficiency and screening behaviour might have been influenced by the integrated professional interpretation support in place at Access Alliance.

The association between a longer period spent in Canada and mammography completion was in keeping with immigrant screening literature. However, there remains a paucity of studies examining the screening behaviour of refugee claimants. Several studies examining immigrants in the United States (US) found that a higher percentage of lifetime spent in the US was associated with completion of BCa and CRC screening [36–38]. Another study found that immigrants who attained US citizenship were more likely than non-citizens to complete mammography [39]. This finding also reinforces statements from the focus groups that suggested cancer screening was not an immediate medical priority for many recent immigrants and refugees. Nevertheless, the vulnerability of this population to a higher risk of cancer and lower screening rates justifies targeting screening to recent immigrants and refugees from early on as a preventative health priority [40–42].

Focus group findings of cultural variations in screening were also consistent with current literature. A number of previous studies have demonstrated that screening behaviour varies between different cultural and ethnic groups [24, 43, 44], supporting the effectiveness of culturally sensitive screening programs [45–48]. Similarly, the concern expressed by Arabic women around male mammography technicians has been well-documented [49–51]. This barrier

was compounded by concerns about pain and the potential for encountering a male technician, both of which were elicited in our focus groups as well as in the literature [52]. With regards to CRC, barriers to screening identified in our study were again congruent with current literature, including a lack of knowledge about testing [53], inadequate client-provider relationship [54], lack of notable symptoms [54], and embarrassment associated with FOBT [53, 55].

When discussing how to address barriers to screening, incentivizing screening was raised as a suggested solution, which interestingly has demonstrated poor results across Ontario in a prior study [56]. Another suggested approach from the focus groups was employing a nurse practitioner specifically to focus on cancer screening. The intervention perceived to be most useful involved employing culturally-specific screening approaches, which has been effective in Hispanic communities [48], non-English speakers [46], and in Chinese-Americans in the US [45]. Additionally, involving Access Alliance's culturally-congruent peer workers in the screening process is supported by past studies that found the use lay health educators [57] or client navigators [48] to be effective.

Our study had several limitations. Given the difficulty in maintaining regular follow-up, we were restricted by chart completeness. This contributed to the small sample size. Secondly, the retrospective study design carries an inherent risk of bias. Thirdly, this remained a single-centre Canadian study, and conclusions may not be entirely generalizable to other settings. Fourthly, there was potential for conflict of interest with regards to PCPs discussing the screening climate of their employer, although this was mitigated with the emphasis that participation had no bearing on professional standing, and maintenance of strict confidentiality and anonymity. Finally, there was a lack of client participation and input in the focus groups.

Conclusion

This study provides evidence that clients and PCPs face unique barriers when addressing the screening behaviour of recent immigrants and refugees. Culturally specific approaches to screening that leverage existing understanding and employ unique community resources on a client, provider, or systems-level, such as culturally congruent peer workers and educational aids might represent potential solutions. Further work is needed to assess the effectiveness of such interventions and tailor efforts of provincial screening programs to the diverse populations they serve.

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Author Contributions All authors have made substantive intellectual contribution to the development of this article and have reviewed and agree with the content of the article.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Appendix: Standardized focus group question sets used in both sessions

1. Views on the current screening climate at Access Alliance
 - With regards to colorectal cancer screening by FOBT and breast cancer screening by mammography, how do you think Access Alliance is meeting its goals?
2. Barriers to screening at Access Alliance
 - What do you think are some barriers to screening at Access Alliance (please discuss barriers faced by clients, barriers faced by providers, and system-level barriers)?
 - What do you think are some factors that might encourage screening?
3. Potential solutions and tools
 - Do you have any suggestions for a health promotion resource or tool that can improve the rates of cancer screening at Access Alliance?
 - Would you suggest that this tool be aimed at clients, providers, or at the organization level?
 - In the past, have there been other resources or tools that have been used at Access Alliance to improve cancer screening rates? Do you think they were effective?

References

1. Bromfield G, Dale D, De P, Newman K, Rahal R, et al.: Canadian cancer statistics 2015. 2015. <http://www.cancer.ca/~media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2015-EN.pdf?la=en>. Accessed Aug 28 2017
2. Berry DA, Plevritis SK, Fryback DG, Clarke L, Zelen M, Mandelblatt JS, Yakovlev AY, Habbema JDF, Feuer EJ. Effect of screening and adjuvant therapy on mortality from breast cancer. *N Engl J Med.* 2005;353:1784–92.

3. Kalager M, Langmark F, Adami H. Effect of screening mammography on breast-cancer mortality in Norway. *N Engl J Med.* 2010;363:1203–10.
4. Richards M, Westcombe A, Love S, Littlejohns P, Ramirez A. Influence of delay on survival in patients with breast cancer: a systematic review. *Lancet.* 1999;353:1119–26.
5. Jorgensen O, Kronborg O, Fenger C. A randomized study of screening for colorectal cancer using faecal occult blood testing: results after 13 years and seven biennial screening rounds. *Gut.* 2002;50(29):3229–32.
6. Kronborg O, Jorgensen OD, Fenger C, Rasmussen M. Randomized study of biennial screening with faecal occult blood test: results after nine screening rounds. *Scand J Gastroenterol.* 2004;39:846–51.
7. Humphrey LL, Helfand M, Chan BK, Woolf SH. Breast cancer screening: a summary of the evidence for the U.S. preventive services task force. *Ann Intern Med.* 2002;137(5 Part 1):347–60.
8. Behl M, Dawe D, Kennecke H, Kerba M, Kumar E, et al.: The 2016 cancer system performance report. 2016. <https://www.longwoods.com/articles/images/the-2016-cancer-system-performance-report-en.pdf>. Accessed Aug 28 2017
9. Cancer Care Ontario. Breast cancer screening. 2017. <https://www.cancercare.on.ca/pcs/screening/breastscreening/>. Accessed Aug 28 2017
10. Cancer Care Ontario. Fecal occult blood test. 2016. <https://www.cancercare.on.ca/pcs/screening/coloscreening/fobt/>. Accessed Aug 28 2017
11. Decker K, Singh H. Reducing inequities in colorectal cancer screening in North America. *J Carcinog.* 2014;13(12).
12. Yuan Y, Li M, Yang J, Winget M. Using administrative data to estimate time to breast cancer diagnosis and percent of screen-detected breast cancers—a validation study in Alberta, Canada. *Eur J Cancer Care.* 2015;24:367–75.
13. Lofters A, Vahabi M, Glazier RH. The validity of self-reported cancer screening history and the role of social disadvantage in Ontario, Canada. *BMC Public Health* 2015;15(28).
14. Vahabi M, Lofters A, Kumar M, Glazier RH. Breast cancer screening disparities among urban immigrants: a population-based study in Ontario, Canada. *BMC Public Health* 2015;15(679).
15. Gupta S, Sussman DA, Doubeni CA, Anderson DS, Day L, Deshpande AR, et al.: Challenges and possible solutions to colorectal cancer screening for the underserved. *JNCI* 2014;106(4).
16. United Nations Statistics Division. Standard country or area codes for statistical use (M49). 2017. <https://unstats.un.org/unsd/methodology/m49/>. Accessed Aug 28 2017
17. Scheffer J. Dealing with missing data. *Res Lett Inf Math Sci.* 2002;3:153–60.
18. Krueger RA, Casey MA, Donner J, Kirsch S, Maack JN: Social analysis selected tools and techniques. Washington, DC; 2001. <http://siteresources.worldbank.org/INTCDD/Resources/SAtools.pdf>.
19. Debus M. Methodological review: a handbook for excellence in focus group research. Washington, DC: Academy for Educational Development; 1989.
20. Gubrium J, Holstein J, Marvasti A, McKinney K. The SAGE handbook of interview research: the complexity of the craft. Los Angeles: Sage; 2012. 1–613.
21. Boyatzis B. Transforming qualitative information: thematic analysis and code development. Los Angeles: Sage; 1998.
22. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nurs Health Sci.* 2013;15(3):398–405.
23. Attride-Stirling J. Thematic networks: an analytic tool for qualitative research. *Qualitative research.* Los Angeles: Sage; 2001.
24. Ward E, Jemal A, Cokkinides V, Singh GK, Cardinez C, Ghafoor A, et al. Cancer disparities by race/ethnicity and socioeconomic status. *CA Cancer J Clin.* 2004;54(2):78–93.
25. Goel MS, Wee CC, McCarthy EP, Davis RB, Ngo-Metzger Q, Phillips RS. Racial and ethnic disparities in cancer screening: the importance of foreign birth as a barrier to care. *J Gen Intern Med.* 2003;18(12):1028–35.
26. Center MM, Jemal A, Smith RA, Ward E. Worldwide variations in colorectal cancer. *CA Cancer J Clin.* 2009;59(6):366–78.
27. Youlten DR, Cramb SM, Dunn NAM, Muller JM, Pyke CM, Baade PD. The descriptive epidemiology of female breast cancer: an international comparison of screening, incidence, survival and mortality. *Cancer Epidemiol.* 2012;36(3):237–48.
28. Robles SC, Galanis E. Breast cancer in Latin America and the Caribbean. *Rev Panam Salud Pública.* 2002;11(3):178–85.
29. Perry N, Broeders M, de Wolf C, Tornberg S, Holland R, von Karsa L. European guidelines for quality assurance in breast cancer screening and diagnosis. Fourth edition—summary document. *Ann Oncol.* 2007;19(4):614–22.
30. Zavoral M, Suchanek S, Zavada F, Dusek L, Muzik J, Seifert B, et al.: Colorectal cancer screening in Europe. *World J Gastroenterol.* 2009;15(47):5907–15.
31. Sung JJY, Ng SC, Chan FKL, Chiu HM, Kim HS, Matsuda T, et al. An UPDATED Asia Pacific consensus recommendations on colorectal cancer screening. *Gut.* 2015;64(1):121–32.
32. Tan SM, Evans AJ, Lam TP, Cheung KL. How relevant is breast cancer screening in the Asia/Pacific region? *Breast.* 2007;16(2):113–9.
33. Richards M, Love S, Littlejohns P, Ramirez A. Influence of delay on survival in patients with breast cancer: a systematic review. *Lancet.* 1999;353:1119–26.
34. Ioannou GN, Chapko MK, Dominitz JA. Predictors of colorectal cancer screening participation in the United States. *Am J Gastroenterol.* 2003;98(9):2082–91.
35. Beydoun HA, Beydoun MA. Predictors of colorectal cancer screening behaviors among average-risk older adults in the United States. *Cancer Causes Control.* 2008;19(4):339–59.
36. Maxwell AE, Bastani R, Warda US. Demographic predictors of cancer screening among Filipino and Korean immigrants in the United States. *Am J Prev Med.* 2000;18(1):62–8.
37. Samuel PS, Pringle JP, James NW, Fielding SJ, Fairfield KM. Breast, cervical, and colorectal cancer screening rates amongst female Cambodian, Somali, and Vietnamese immigrants in the USA. *Int J Equity Health.* 2009;8(1):30.
38. Brown WM, Consedine NS, Magai C. Time spent in the united states and breast cancer screening behaviors among ethnically diverse immigrant women: evidence for acculturation? *J Immigr Minor Health.* 2006;8(4):347–58.
39. De Alba I, Hubbell FA, McMullin JM, Sweningson JM, Saitz R: Impact of U.S. citizenship status on cancer screening among immigrant women. *J Gen Intern Med.* 2005;20(3):290–6.
40. Miller BA, Chu KC, Hankey BF, Ries LAG: Cancer incidence and mortality patterns among specific Asian and Pacific Islander populations in the U.S. *Cancer Causes Control.* 2008;19(3):227–56.
41. Kem R, Chu KC. Cambodian cancer incidence rates in California and Washington, 1998–2002. *Cancer.* 2007;110(6):1370–5.
42. Ross JA, Xie Y, Kiffmeyer WR, Bushhouse S, Robison LL. Cancer in the Minnesota Hmong population. *Cancer.* 2003;97(12):3076–9.
43. Rodriguez MA, Ward LM, Pérez-Stable EJ. Breast and cervical cancer screening: impact of health insurance status, ethnicity, and Nativity of Latinas. *Ann Fam Med.* 2005;3(3):235–41.
44. Wee CC, McCarthy EP, Phillips RS. Factors associated with colon cancer screening: the role of patient factors and physician counseling. *Prev Med.* 2005;41(1):23–9.

45. Tu S-P, Taylor V, Yasui Y, Chun A, Yip M-P, Acorda E, et al. Promoting culturally appropriate colorectal cancer screening through a health educator. *Cancer*. 2006;107(5):959–66.
46. Percac-Lima S, Grant RW, Green AR, Ashburner JM, Gamba G, Oo S, et al. A culturally tailored navigator program for colorectal cancer screening in a community health center: a randomized, controlled trial. *J Gen Intern Med*. 2009;24(2):211–7.
47. Larkey LK, Gonzalez J. Storytelling for promoting colorectal cancer prevention and early detection among Latinos. *Patient Educ Couns*. 2007;67(3):272–8.
48. Jandorf L, Gutierrez Y, Lopez J, Christie J, Itzkowitz SH: Use of a patient navigator to increase colorectal cancer screening in an urban neighborhood health clinic. *J Urban Health*. 2005;82(2):216–24.
49. Kwok C, Endrawes G, Lee CF. Cultural beliefs and attitudes about breast cancer and screening practices among Arabic Women in Australia. *Cancer Nurs*. 2016;39(5):367–74.
50. Azaiza F, Cohen M. Health beliefs and rates of breast cancer screening among Arab women. *J Women's Health*. 2006;15(5):520–30.
51. Elnekave E, Gross R. The healthcare experiences of Arab Israeli women in a reformed healthcare system. *Health Policy*. 2004;69(1):101–16.
52. Consedine NS, Magai C, Krivoshekova YS, Ryzewicz L, Neugut AI. Fear, anxiety, worry, and breast cancer screening behavior: a critical review. *Cancer Epidemiol Biomarkers Prev*. 2004;13(4):501–10.
53. Janz NK, Wren PA, Schottenfeld D, Guire KE. Colorectal cancer screening attitudes and behavior: a population-based study. *Prev Med*. 2003;37(6 Pt 1):627–34.
54. Lasser KE, Ayanian JZ, Fletcher RH, Good M-JD. Barriers to colorectal cancer screening in community health centers: a qualitative study. *BMC Fam Pract*. 2008;9(1):15.
55. Walsh JME, Kaplan CP, Nguyen B, Gildengorin G, McPhee SJ, Pérez-Stable EJ: Barriers to colorectal cancer screening in Latino and Vietnamese Americans. Compared with non-Latino white Americans. *J Gen Intern Med*. 2004;19(2):156–66.
56. Kiran T, Wilton AS, Moineddin R, Paszat L, Glazier RH. Effect of payment incentives on cancer screening in Ontario primary care. *Ann Fam Med*. 2014;12(4):317–23.
57. Brownstein JN, Cheal N, Ackermann S, Bassford T, Campos-Outcalt D. Breast and cervical cancer screening in minority populations: a model for using lay health educators. *J Cancer Educ*. 1992;7(4):321–6.