Immigrant generational status and the uptake of HIV screening services among heterosexual men of African descent in Canada: Evidence from the weSpeak study

Irenius Konkor [a,*], Isaac Luginaah [b], Winston Husbands [c], Francisca Omorodion [d],
Roger Antabe [b,e], Josephine Wong [f], Vincent Kuuire [a], Paul Mkandawire [g], Josephine Etowa [h]

[a] Department of Geography and Planning, University of Toronto, Mississauga Campus, Canada
[b] Department of Geography and Environment, Western University, London, Canada
[c] Ontario HIV Treatment Network, Toronto, Canada
[d] Department of Sociology, Anthropology and Criminology, University of Windsor, Canada
[e] Department of Health and Society, University of Toronto Scarborough, Toronto, Canada
[f] Daphne Cockwell School of Nursing Ryerson University, Toronto, Canada
[g] Institute of Interdisciplinary Studies, Carleton University, Ottawa, Canada
[h] School of Nursing, University of Ottawa, Ottawa, Canada

A R T I C L E   I N F O

A B S T R A C T

Objective: Canada became a preferred destination for many non-European and non-American migrants since the introduction of favorable immigration policies in the late 1960 s. Blackimmigrants from the African and Caribbean regions however are a known vulnerable population to HIV infection in Canada. Even though first-generation immigrants might differ from subsequent generations in terms of culture and beliefs which are important for health outcomes and behaviors, research examining disparities in their use of preventative healthcare is limited. This study aimed to examine generational disparities in the uptake of HIV screening services among a sample of heterosexual Black men in Ontario, Canada.

Methods: We used data from a cross-sectional survey sample ($n = 829$) that was collected from heterosexual Black men in four Ontarian cities (Toronto, Ottawa, London and Windsor) between March 2018 and February 2019. We used the negative log-log link function of the binomial family to examine the independent relationship between immigration status and the uptake of HIV testing and the cumulative effect of other predictor variables on HIV testing in nested models.

Results: Findings from multivariate analysis show second-generation immigrants were significantly less likely to test for HIV compared with their first-generation immigrant counterparts. After controlling for theoretically relevant variables, the second-generation immigrants were 53% less likely to test for HIV. We further observed that participants with good knowledge of HIV transmission (OR=1.05; $p > 0.05$) and those who were older were more likely to test for HIV. Those with masculine tendencies (OR=0.98; $p > 0.05$) and those who reported not having sexual partner were less likely to test (OR=0.57; $p > 0.01$). Religion emerged as a significant predictor of HIV testing as Christians (OR=1.62; $p > 0.05$) and other believers (OR=1.59; $p > 0.05$) were more likely to test for HIV when compared to their Muslim counterparts.

Conclusion: HIV prevention policies may need not only prioritize first-generation immigrants, but the wellbeing of their descendants as well. This could be achieved by implementing programs that will enhance second-generation immigrants' use of HIV screening services. Additionally, HIV educational programs would be of relevance and especially so as respondents with good knowledge of HIV transmission consistently demonstrated higher likelihood of testing for their HIV status.

* Corresponding author.
  E-mail address: irenius.konkor@mail.utoronto.ca (I. Konkor).

1. Introduction

Following statutory abolishment of earlier discriminatory immigration policies around the 1960 s in Canada and the subsequent introduction of welcoming programs, Canada has since become a preferred destination for many migrants and especially so for those from non-European countries (Boyd and Vickers, 2000; Branker, 2017; Health-Canada, 2010). Unlike the pre-1960 s era when immigrants from Europe and the United States were preferred, recent immigrants are increasingly from Asia, South America, Africa, and the Caribbean, who tend to have higher educational attainments, skills, and economic statuses (Phythian et al., 2011, Guo, 2015). The 2016 Canada Population Census report show that first-generation immigrants 15 years or older represented 27% of the total population, second-generations accounted for 15.4% and third-generation immigrants constituted 57.6% (Statistics Canada, 2017). The National Household Survey of Canada defines first-generation immigrants as people who were born outside the borders of Canada to non-Canadian parents, while second generation immigrants are those who were born to Canadian parents with at least one of them being born outside of Canada. Third generation immigrants on the other hand are those born in Canada to both parents who were born in Canada to parent(s) or grandparents with immigration histories.

Within the host society, however, some of these immigrant groups and their progenies often tend to suffer severe health outcomes such as HIV infection relative to the general population. Indeed, HIV/AIDS has remained below endemic levels in the past few decades in Canada, but marginalized and racialized groups have been disproportionately burdened. For instance, even though self-identified people with immigration histories from Africa and the Caribbean regions represent about 3.5% of Canada's population, they nevertheless accounted for about a quarter (25.3%) of new HIV infections in 2017 (Haddad et al., 2018). Even more worryingly, new HIV infections at the population level reduced by 6%, but among the Black population, new cases increased by 3.4% between 2016 and 2017 in Canada (Konkor et al., 2021). Elsewhere in Sweden Lindkvist and colleagues (Lindkvist et al., 2015) found that African immigrants tested late for HIV because of fear of social alienation, mistrust of the Swedish healthcare system and misunderstanding of their rights and obligations. Poor knowledge of self HIV positive status due to low HIV testing rate could therefore be a likely reason for the disproportionate burden of HIV within the African, Caribbean, and Black (hereafter referred to as ACB) community in Canada as positive patients may unknowingly infect their sexual partners (Wallace et al., 2011). While behavioral factors could contribute to a low uptake of HIV testing services, earlier studies have shown that heterosexual Black men in Canada encounter structural challenges accessing HIV health services (Antabe et al., 2021). For instance, Konkor et al. (2021) found geographic disparities in access to HIV healthcare across Ontarian cities and Black men who experienced discrimination, had difficulty with the English language, or had no family physician faced difficulties accessing HIV health services.

The Canada HIV surveillance reports usually classify Black immigrants living with HIV as people from HIV endemic origin. As part of this profiling, the Canada immigration policies require that all potential immigrants 15 years or older applying to immigrate temporarily or permanently to Canada must undergo the Canadian immigration medical exam (IME) and in 2002, mandatory HIV screening was integrated into the IME (Government of Canada, 2019). The focus of this policy unfortunately is on the first-generation immigrants. It is however important to note that the health status of second-generation immigrants is as important as the health of the first-generation immigrants and the native born. Moreover, the IME surveillance data commonly rely on variables for geographic regions such as country of origin to quantify migration and HIV. This presents a potential limitation as such data fail to capture successive generation of immigrants born in Canada. There is also the tendency to assume that successive generation of immigrants will have similar health outcomes as the native born because of the

potential access to similar healthcare services. However, previous studies on infectious diseases such as tuberculosis in Germany have shown higher tuberculosis rate among second-generation immigrants compared with the native born (Marx et al., 2015). There is therefore the need to unpack any prevailing HIV health disparities between first and subsequent generation ACB immigrants in Canada to inform policies that might help reduce their HIV vulnerabilities. Even though increasing attention has been paid to HIV among ACB immigrants as a vulnerable group, less attention is paid to the uptake of HIV services among the second and subsequent generations of this immigrant group in Canada. This is particularly important because second and subsequent generation immigrants differ from their first-generation parents in terms of culture, and beliefs that might be crucial for health practices and outcomes. The objective of this study, therefore, was to understand intra-generational (first-generation vs Canadian born) disparities in the uptake of HIV screening services among heterosexual ACB men in Ontario, Canada. We did so by answering the question; is there evidence of intra-ethnic generational disparities in the utilization of HIV screening services among heterosexual ACB men? The research question was answered using data from a community-based study called weSpeak.

The weSpeak study focused on heterosexual Black men because heterosexual contact has been identified as the most common mode of HIV infection within the ACB community in Canada (Bourgeosis et al., 2017). More importantly, earlier researchers have noted that heterosexual ACB men are implicated and blamed problematically especially in the media in the disproportionate prevalence of HIV among ACB women (Husbands et al., 2019). Moreover, other studies suggest the risk of heterosexual men infecting their heterosexual female sexual partners is higher than the reverse situation, meaning that if heterosexual Black men knew their HIV seropositive status, it could drastically reduce the spread of HIV within the ACB communities (Konkor et al., 2020). That notwithstanding, HIV prevention programs in Canada have largely focused on gay men, injection drug users, and heterosexual women. Heterosexual Black men have relatively been ignored both in policy and within the literature. The weSpeak project was funded by the Canadian Institute of Health Research and the Ontario HIV treatment Network to bridge this gap.

2. Methodological approaches

2.1. Study design

The study design is cross-sectional and the data was collected using a carefully designed survey as part of the larger weSpeak project. The main purpose of the weSpeak project was to engage self-identified heterosexual ACB men in a critical dialogue about HIV vulnerabilities and identify pathways to resilience building for a minimized HIV vulnerability. The project was implemented in three phases between 2015 and 2020 across four cities (Toronto, Ottawa, London and Windsor) in Ontario. The first two phases were qualitative (i.e., in-depth interviews and focus group discussions) and the responses and findings subsequently informed the design of the survey for the third (quantitative) phase. The topics covered in the survey include HIV knowledge and beliefs; sexual behaviors; access to and use of healthcare services; HIV-testing, care, and treatment; discriminatory experiences within the Canadian context; and demographic characteristics (e.g., immigration status) of the respondents. The survey was pre-tested for errors and cultural appropriateness before the eventual data collection between March 2018 and February 2019 in the study cities. For the purposes of anonymity, the survey was hosted on a cloud server and the field research assistants would login on a tablet or laptop and hand over to respondents who agreed to participate to self-administer and submit. The inclusion criteria were; respondents had to self-identify as heterosexual African, Caribbean or Black men (including transmen who identify as heterosexual), be at least 16 years old, persons living with

HIV or HIV-negative, be able to communicate in English or French, and reside in Ottawa, Toronto, London or Windsor. Those who started but did not qualify on any of the inclusion criteria questions were automatically logged out. We did not also collect identifying information on those who completed the survey, which further increased anonymity of responses. Ethical clearance was granted by the institutional Research Ethics Boards of the participating universities in Toronto (Ryerson), Ottawa (UOttawa), London (Western) and Windsor (UWindsor).

2.2. Sampling and recruitment

The sample size for each city was estimated based on the total number of HIV tests among ACB men 15 years and older between 2007 and 2011 as a proportion of the total male ACB population in the respective cities as stated in the 2011 National Household Survey, and at a desired level of 5% precision. For example, 15,465 tests were attributed to ACB men in Toronto, which represents 12% of Toronto's Black male population aged 15 and older in 2011. We used this figure to estimate the sample size required for Toronto. Moreover, based on experiences with previous studies (George et al., 2012), we increased the sample size in all four cities by 25% to achieve greater statistical power and make allowance for questionnaires that would not be completed. Our sample estimates are provided in Table 1. The target sample was 1039 self-identified heterosexual ACB men. We contacted 1056 potential respondents during the fieldwork and 879 successfully completed the survey questions for this analysis.

We used peer, community- and venue-based recruitment techniques. We recruited participants from venues such as barber shops, churches, mosques, AIDS service organizations (ASOs), university campuses and other spaces Black people frequent. We also recruited participants from community events such as sporting activities, Black community health fairs and activities commemorating the Black History Month. People who were recruited from these venues and community events could refer one potential participant (peer recruit) to the research assistants. There were also posters with contact information and brief description of the study posted at strategic locations for interested persons to contact. These techniques have been recommended for recruiting hard-to-reach populations (Fanzana and Srunv, 2001) and have proven successful in earlier studies that focused on the ACB community (Baidoo-bonso et al., 2016, Ogilvie et al., 2008). All potential participants were assessed based on the inclusion criteria described above. Those who qualified went on to sign a consent letter and completed the survey. Each respondent was offered an honorarium of CDN $20 at the end of the survey even though they were not informed about it during the recruitment. Standard ethics guidelines of voluntary participation, consent of participation and confidentiality of responses were duly followed.

2.3. Measurement of variables

The outcome variable of interest in this analysis is "HIV testing" which was created from two questions that asked if respondents have ever tested for HIV and a follow-up on the last time they tested if they did. Responses for HIV testing included tested within the last 6 months, 6-11 months ago, 1-2 years ago, and do not know or prefer not to answer. We created the HIV testing variable from these two questions

Table 1
Sample size estimates.

City	Sample estimate	Recruitment target	Actual sample
London	160	200	155
Ottawa	207	259	227
Toronto	324	405	339
Windsor	140	175	158
Total	**831**	**1,039**	**879**

and coded as "Yes" for those who tested within the last six months to two years and "No" for those who indicated never testing. Participants who indicated do not know or prefer not to answer were dropped from this analysis.

The main independent variable is "immigration status". Respondents were asked if they were born in Canada and the responses coded as "Yes" and "No". We recoded as "Canadian born" for those who responded yes, or "immigrant" (first-generation) if they answered no. Several other theoretically relevant variables including HIV transmission knowledge, masculinity, discrimination, number of sexual partners, demographic (marital status, age, religion, and city of residence) and socioeconomic (level of education, employment status and income) characteristics were sequentially adjusted in the analysis.

HIV transmission knowledge, masculine role identity, and discrimination variables were measured as scales. Eighteen items with a Cronbach alpha of 0.88 were combined to create the HIV knowledge variable while five items with a Cronbach alpha value of 0.68 were combined to create the discrimination scale using the simple additive approach in Stata. Some of the items on the HIV transmission knowledge scale include pulling out the penis before a man climax keeps a woman from getting HIV during sex; a woman can get HIV if she has anal sex with a man; using Vaseline or baby oil with condom lowers the risk of getting HIV. Each item was coded as agree or disagree with the correct response given a value of 2 and 1 for a wrong response. Example of items on the discrimination scale include "in your day-to-day life, how often have you received poorer services than other people at restaurants or stores; in your day-to-day life, how often have people acted as if you were not smart". Each item was coded as 0=never, 1=less than once a year, 2=a few times a year, 3=a few times a month, 4=at least once a week, and 5=almost everyday. Similarly, nine items with Cronbach alpha value of 0.82 were combined to create the masculinity scale. Some examples of the masculinity items include being in control in a relationship; having power; and being physically strong, with each item coded as not at all important through to extremely important. These scales have been validated by earlier researchers and used especially in assessing HIV vulnerabilities among the Black population in the North American context (Wutoh et al., 2011, Hammond et al., 2010, Pando et al., 2013).

2.4. Data analytic strategies

The study employed descriptive, bivariate, and multivariate negative log-log analyses in examining the relationship between the uptake of HIV screening and immigration status as well as other independent variables. First, we conducted the descriptive analysis to observe the distribution of the outcome and predictor variables. Secondly, the bivariate analysis was conducted to observe the absolute proportion of the predictor variables in relation to the outcome variable i.e., HIV testing. For instance, the bivariate analysis helped us observe the proportion of immigrants who tested for HIV and whether this relationship is statistically significant. Finally, the multivariate analysis was employed to predict the relationship between immigration status and the uptake of HIV testing in nested models. We used the negative log-log link function of the binomial family to examine both the independent relationship between immigration status and the uptake of HIV testing and the cumulative effect of other predictor variables on HIV testing in sequential models. The negative log-log link function was used because response to the outcome variable is relatively skewed towards those that tested for their HIV status (Yes=64%, vs No=36%). The negative log-log link function was therefore deemed appropriate because it adjusts for skewedness in the distribution of the outcome variable. This means that using other strategies like the logistic regression function which assumes symmetrical distribution of responses to the outcome variable could bias the parameter estimates. We also compared post estimation indices such as the Akaike information criterion (AIC) and Bayesian information criterion (BIC) and found the negative log-log estimates were lower which suggest a better model fit than the logistic regression model.

Four models were sequentially built, with Model 1 containing only the focal independent variable and the outcome of interest. The purpose was to observe the independent relationship between the two variables – immigration status and HIV testing. We introduced cognitive and behavioral characteristics including HIV transmission knowledge, masculinity, number of sexual partners, and experiences of discrimination in Model 2, while we further controlled demographic characteristics in Model 3. Finally, we adjusted for socioeconomic attributes in Model 4. The data collection approaches (venue- and community-based) pose potential source of homogeneity in responses which violates the assumptions of independence of observation in regression models. Hence, we introduced unique identifiers (survey ID) as cluster variable in our models to account for any possible violation of independence of response assumption in standard regression analysis. Results of the multivariate analysis are presented in odds ratios (ORs) with their robust standard errors. An OR less than 1 is interpreted as a category is less likely to have tested for HIV while the converse is true. All analyses were conducted using Stata 14.2 software.

3. Results

3.1. Descriptive statistics

As shown in column 2 of Table 2, 64% of the sample reported testing for HIV and more than two-thirds (69.6%) of all participants identified as first-generation immigrants. The mean scores for HIV transmission knowledge and masculinity were 29.7 and 31.7, respectively. Similarly, the mean score for discrimination was 13.1. About 40% of the sample reported having one sexual partner and half (50%) were single. The 20–29 age group made up the largest proportion (31%) and about 39% of the sample lived in Toronto. In terms of education, nearly half (48%) attained university education and 52% were full-time employed. One in ten people (10%) did not earn regular income. The majority (72%) of respondents identified Christianity as their religion.

3.2. Bivariate results

The bivariate results are presented in columns 3 and 4 of Table 2. Notable significant differences were observed in the uptake of HIV testing. For example, about 77% of first-generation immigrants had tested for HIV as compared with only 23% for the Canadian born. A unit increase in HIV transmission knowledge was significantly associated with higher rate of testing. Similarly, about 45% of participants who reported having one sexual partner indicated they tested for HIV compared with 30% for those with one sexual partner who never tested. In terms of age, the highest proportion of those who reported testing were between the ages of 30 and 39. Also, the highest proportion of income category who reported testing were those who earned less than 20 thousand dollars a year. At city level, 41% of those who lived in Toronto tested for HIV as compared to 35% of Torontonians who did not test. Finally, a higher proportion of those who tested attained university education (~54%; χ2 =33.9210, $p < 0.001$).

3.3. Multivariate results

To examine the relationship between immigration status and the uptake of HIV testing, we employed the negative log-log multivariate link function, and the results are presented in Table 3. We observed that the Canadian born (second-generation immigrants) were significantly less likely to test for HIV compared with their first-generation immigrant counterparts in Model 1 and this relationship remained statistically significant through to Model 4. Specifically, the Canadian born were 47% less likely to test for HIV in Model 1 compared with their first-generation immigrant counterparts and the size of the parameter estimates/odds for not testing increased in subsequent models. In Model 2, where we controlled for cognitive, behavioral, and discriminatory

Table 2

Descriptive and bivariate relationship between HIV testing and the independent variables.

| Variable | Descriptive | Bivariate | | |
	Percent (SD)	No (%)	Yes (%)	χ² value
Tested HIV				
No	36.0	—	—	
Yes	64.0	—	—	
Immigration status				39.1190***
First-generation immigrant	69.6	56.2	77.1	
Canadian born	30.4	43.8	22.9	
HIV knowledge†	29.7 (4.8)	28.0	30.7	90.4903***
Masculinity †	31.7 (5.8)	32.0	31.6	33.1647
Discrimination †	13.1 (6.9)	12.7	13.3	23.9855
Number of sex partners				49.7234***
1 partner	39.6	30.3	44.7	
2 or more	24	17.5	27.6	
None	36.4	52.2	27.6	
Age				122.9429***
16-19	12.8	26.6	5.1	
20-29	31.1	37	27.8	
30-39	25.5	14.5	31.6	
40-49	15.7	6.4	20.9	
50-59	8.4	7.7	8.8	
60+	6.5	7.7	5.8	
Marital status				29.7282
Married	30.3	19.2	36.5	
Single	50.3	60.9	44.4	
In relationship	14.1	13.8	14.3	
Other	5.3	6.1	4.9	
Religion				4.5436
Muslim	11.1	13.8	9.6	
Christian	72	68	74.2	
Other	16.9	18.2	16.2	
City				11.2680*
London	17.5	14.1	19.4	
Ottawa	25	30.6	21.8	
Toronto	39.2	35.4	41.4	
Windsor	18.3	19.9	17.5	
Level of education				33.9210***
University	47.6	37	53.6	
College	20	18.2	21.1	
High school & below	32.3	44.8	25.4	
Employment status				3.3802
Unemployed	9.3	9.1	9.4	
Full-time	52	50.8	52.6	
Part-time	14.8	17.2	13.5	
Student	10.9	9.1	11.8	
Other	13	13.8	12.6	
Income (000)				19.8628**
No income	10.3	8.8	11.1	
<20	17.5	16.5	18	
20-39	12.8	11.8	13.3	
40-59	13.1	10.1	14.8	
60-99	12.1	9.8	13.3	
100+	12.3	13.5	11.7	
Other	22	29.6	17.7	

*** $P < 0.001$,

** $P < 0.01$,

* $P < 0.05$,

† = mean reported (SD=Standard deviation)

experiences, the Canadian born were 49% less likely to test for HIV compared with the first-generation. Canadian born were 50% less likely to test for HIV compared to first-generation immigrants when we accounted for demographic variables in Model 3. In the final model, where we further accounted for socioeconomic factors, the Canadian born were 53% less likely to test for their HIV serostatus compared to their first-generation counterparts.

Other variables were also observed to be significantly associated with HIV testing. In Model 4 for instance, a unit increase in HIV transmission knowledge was observed to be significantly associated with 5% higher likelihood of testing for HIV. Older participants were observed to be more likely to test for HIV in comparison to younger participants.

Table 3

Multivariate negative log–log regression models of the relationship between HIV testing and immigration status and other independent variables.

Variable	Model 1 OR(SE)	Model 2 OR(SE)	Model 3 OR(SE)	Model 4 OR(SE)
Immigration status				
First-generation immigrant	1.000	1.000	1.000	1.000
Canadian born	0.471 (0.06)***	0.494 (0.06)***	0.503 (0.07)***	0.530 (0.08)***
HIV knowledge		1.078 (0.01)***	1.050 (0.01)***	1.050 (0.01)***
Masculinity		0.993(0.01)	0.976(0.01) *	0.977(0.01) *
Discrimination		1.015(0.01)	1.010(0.01)	1.008(0.01)
Number of sex partners				
1 partner			1.000	1.000
2 or more			1.335(0.26)	1.373(0.27)
None			0.609 (0.10)**	0.568 (0.10)***
Age				
16-19			1.000	1.000
20-29			1.882 (0.32)***	2.070 (0.40)***
30-39			3.883 (0.85)***	4.213 (1.03)***
40-49			5.606 (1.59)***	6.147 (1.82)***
50-59			2.205 (0.63)**	2.532 (0.78)**
60+			1.610(0.48)	1.503(0.47)
Marital status				
Married			1.000	1.000
Single			0.853(0.17)	0.765(0.16)
In relationship			0.895(0.22)	0.835(0.21)
Other			0.747(0.23)	0.719(0.23)
Religion				
Muslim			1.000	1.000
Christian			1.484(0.28) *	1.616(0.31) *
Other			1.420(0.33)	1.592(0.37) *
City				
London			1.000	1.000
Ottawa			0.693(0.13)	0.747(0.14)
Toronto			0.868(0.16)	0.892(0.16)
Windsor			0.889(0.19)	0.942(0.20)
Level of education				
University				1.000
College				1.040(0.20)
High school or below				0.927(0.15)
Employment status				
Unemployed				1.000
Full-time employed				0.792(0.18)
Part-time employed				0.946(0.23)
Student				1.402(0.41)
Other				1.189(0.30)
Income (000)				
No income				1.000
<20				1.053(0.28)
20-39				1.066(0.31)
40-59				1.186(0.37)
60-99				1.185(0.36)
100+				0.628(0.19)
Other				0.970(0.25)
N	829.000	827.000	827.000	827.000
Ll	-521.692	-494.729	-432.407	-423.609
Aic	1047.383	999.457	904.815	911.218
Bic	1056.824	1023.046	999.171	1062.188

*** $P<0.001$,

** $P<0.01$,

* $P<0.05$

Although masculinity was not significant in Model 2, the introduction of demographic and socioeconomic characteristics in Models 3 and 4 resulted in every unit increase in masculine tendencies to be associated with lower likelihood of testing. The findings also showed that participants who indicated not having a sexual partner were less likely to test (OR=0.57; $p > 0.01$). Furthermore, religion emerged as a significant predictor of HIV testing with Christians (OR=1.62); $p > 0.05$) and those who identified as belonging to Other religions (OR=1.59; $p > 0.05$), being more likely to test for HIV when compared to the Muslim participants.

4. Discussion

This study examined the generational status of immigrants and the uptake of HIV screening services among heterosexual men of African descent in Canada using a cross-sectional survey. The findings demonstrate considerable significant disparities in the uptake of HIV screening services between the first- and second-generation immigrants. This finding is consistent with earlier studies that examined differences between first- and second-generation immigrants in their use of HIV screening services. For example, Kuehne et al. (2018) found that second-generation immigrants from sub-Saharan Africa in Germany were significantly less likely to test for their HIV serostatus compared with their recent first-generation immigrants counterparts. In Canada, Luginaah and colleagues (Luginaah et al., 2021) also found immigrants were more likely to test for HIV compared with their descendants. While second generation immigrants might be less likely to screen for infectious diseases, Marx et al. (2015) have found higher rates of tuberculosis infection among first-generation immigrants in Germany. This unfortunate situation might not be limited to only infectious health screening services as evidence in Canada show second-generation immigrants are less likely to report good self-rated health compared with their first-generation immigrant counterparts (Omariba and Ng, 2011). This is also consistent with earlier work by Peña et al. (2008) in the United States where second and later generation Latino immigrants were at greater risk of showing depressive symptoms and more likely to attempt suicide compared with their first-generation immigrant counterparts.

Collazos et al. (2019) in a study that examined HIV testing among first- and second-generation Latina/Latino immigrants in Spain and the United States note that both first- and second-generation immigrants face common stressors related to the immigration and integration process as well as daily life challenges. These stressors, they argue, could lead to increase mental health problems, and trigger substance use, which in turn are linked to high-risk behaviors that put individuals at greater risk for HIV and reduce their use of HIV screening services. Stevens et al. (2015) further posit that both first- and second-generation immigrant adolescents are exposed to high risk of bullying and lower life satisfaction, which can increase their stress levels, emotional and behavioral disorders and reduce their uptake of health screening services. Some scholars however argue that first generation immigrants' strong social and ethnic ties, constant consciousness of family obligations back home and the craving for higher achievements may have explained their desire to stay healthy (Stevens et al., 2015, van Geel and Vedder, 2011, Coll et al., 2012). These dynamics could explain the difference in the uptake of HIV testing services among first and later generation immigrants in this study. Furthermore, selected immigrants to Canada from countries where HIV prevalence is high may be more assertive of their own health and aware of their increased risk of contracting HIV, which might incentivize them to test compared with those born in Canada where HIV prevalence rate at the population level has remained relatively lower.

The positive relationship between HIV transmission knowledge and the uptake of HIV testing is congruent with earlier works (Konkor et al., 2020; Haile et al., 2007). This observation shows that ACB men who tested for HIV had significantly good knowledge of HIV and its modes of transmission than those who had not been tested. Invariably, increase in

HIV/AIDS knowledge leads to the ability to access and interpret accurate information about the disease and its modes of transmission. When this happens, many of the myths and misconceptions about HIV/AIDS might be dispelled including the stigma associated with HIV testing. Importantly, immigrants' health behaviors could be amendable to knowledge and awareness about prevailing health conditions. Consistent with Oji-kutu et al. (2016) participants without sexual partners who were less likely to test for HIV may perceive themselves as being at lower risk of HIV infection and were therefore less inclined to test. The significance level for participants without sexual partners even accentuated after accounting for the effect of socioeconomic characteristics in the final model. It is therefore probable that the effect of socioeconomic characteristics such as low or poor educational attainment, unemployment and low income may have exacerbated their relative lower probability of testing. In a similar study that examined the impact of sociodemographic factors on HIV testing among African immigrants in Portugal, Gama et al. (2010) found intermediate to higher educational attainment to be significantly associated with HIV testing. Thus, immigrants with higher education may have better knowledge of HIV and conscious of the importance of testing.

The negative association between masculinity and HIV testing resonates with the conception that ACB men may have viewed HIV testing as a preventative process understood within a social context and relationships they engage in rather than an entirely self-deterministic endeavor. As frequently explained, the reluctance of some men to admit problems tend to be explained by their desire to show that they are in control of affairs including to be strong and resilient (Skovdal et al., 2011) thereby would see no need in this case to seek HIV testing. However, such traits are in direct conflict with HIV public health messages aimed at encouraging people to utilize HIV services such as testing. This conflict between local understandings of manhood and the structural provision of HIV services, may offer a possible explanation as to why some ACB men with masculine ideologies do not make use of HIV testing services (Konkor et al., 2020).

The positive protective effect of religion on HIV testing whereby Christians were more likely to test for HIV is consistent with findings by Berkley-Patton et al. (2010) and Husbands et al., 2021. In a related study Sanchez et al. (2019) found religious social capital was associated with higher levels of social support among immigrants, a phenomenon that reduced their stress level and increased positive health behavior. Oji et al. (2017) also found spiritual advisor contact to be significantly associated with absence of major depressive disorder, and inversely correlated with substance abuse and mental illness symptoms screener, and poor health behaviors. In such situations, religion would provide a positive and protective effect on health-enabling behavior as some religious groups tend to preach health education, which include information delivered directly through faith ministers, religious leaders, and the clergy. In addition, social support and encouragement from church members to get tested for HIV would be likely accepted.

Despite the insightful observations in the relationship between immigration status and the uptake of HIV screening services, the study is not without limitations. For instance, the weSpeak study by design only focused on heterosexual ACB men and the findings may not be generalizable to the entire immigrant population and their descendants. Researchers interested in immigrants' health may want to further explore this relationship at the population level. Moreover, the question on immigration status was whether respondents were Canadian born or foreign-born, which limited the analysis to first-, and second-generation immigrants. Nuances on third or later generation immigrants would have been interesting to observe. Furthermore, although the research assistants were there to assist participants, immigrants with limited language skills may have had hard time understanding the questions which could influence their responses. Finally, HIV remains a sensitive topic with so much stigma especially within and against racialized populations and so participants' responses to HIV testing may have been influenced by social desirability bias. The results therefore need to be interpreted with these limitations in mind. Notwithstanding the potential limitations associated with this study, the findings are insightful and offer relevant policy directions for policy and future research.

5. Conclusion

The overall objective of this analysis was to understand generational differences in the uptake of HIV screening services among heterosexual ACB men in Ontario. The finding that the Canadian born (second-generation immigrants) were less likely to test for HIV compared with the first-generation immigrant counterparts is noteworthy. We recommend HIV service providers to design programs that will help better understand and overcome obstacles that may prevent them from using HIV screening services. To further improve the use of HIV services within the Black community, there is the need for community-based driven initiatives that facilitate safer and supportive social spaces for ACB men to openly discuss social constructions of masculinity and as well renegotiate more health-enabling masculinities within the context of relatively high HIV rates. Additionally, HIV educational programs would be of relevance and especially so as respondents with good knowledge of HIV transmission consistently demonstrated higher likelihood of testing in this analysis. Also, HIV prevention policies may need not only prioritize first-generation immigrants, but the wellbeing of their descendants as well.

Finally, although medical advances in the management of HIV have transformed the virus from its initial conception as fatalistic to a more chronic and manageable condition, the full potential of these discoveries may never be realized if people do not test for their HIV status. The potentials of U=U (undetectable viral load equal un-transmissible) for instance, can only be fully realized when people actively test for their HIV status and those who test positive adhere to the antiretroviral treatment. It is therefore important to encourage testing not only among immigrants who supposedly come from HIV endemic locations but even among the native-born populations.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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