

Article

Understanding the factors associated with HIV and STIs diagnosis among Black heterosexual men in Ottawa and Windsor, Ontario

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Abstract

Background: The African, Caribbean and Black (ACB) men living in Canada share a heightened risk of infection by Human Immunodeficiency Virus and other sexually transmitted illnesses (STIs) and the associated risky behaviours such as suboptimal use of family planning services such as condom use. The African, Caribbean and Black (ACB) heterosexual men living in Canada are disproportionately exposed to HIV and other sexually transmitted infections. The present paper aims to assess the relationship between knowledge, attitude and use of condom with diagnosis of HIV and STIs among ACB heterosexual men in Ontario.

Design and Methods: This was a cross-sectional study on 430 participants consisting of black heterosexual men living two communities, Ottawa and Windsor in Ontario. The outcome variables were ever being diagnosed with HIV (Yes/No) and other STIs (Yes/No). Data were analysed using descriptive, and logistic regression techniques.

Results: Findings indicated that 70.20% did not have good knowledge of HIV, 68.10% had positive attitude towards condom use, and 62.82% were not regular condom user. Men who reported experiencing difficulty in accessing healthcare services had significantly higher odds of reporting HIV and STI diagnosis. Men with positive attitude towards condom use had lower odds of both HIV (odds ratio= 0.48, 95%CI=0.30,0.76) and STI diagnosis (odds ratio= 0.27, 95%CI=0.08,0.90). Similarly, condom users also had lower odds of both HIV and (odds ratio= 0.21, 95%CI=0.09,0.49) STI diagnosis (odds ratio= 0.62, 95%CI=0.39,0.99).

Conclusions: A large proportion of the sample with positive attitude to condom use was not a reflection of the large sample who did not have correct knowledge of HIV. Several factors were also found to be associated with heightened odds of being diagnosed with HIV and other STIs. The most notable of these factors were experiences of difficulty in accessing healthcare and utilisation of condoms.

Introduction

In Canada, the number of people living with human immunodeficiency virus (PLHIV) has been increasing during the last decade,^{1,2} with Ontario accounting for the highest percentage (38.9%) of reported HIV cases.³ The rate of HIV diagnoses increased by 9.3% in the last decade, while 2017 alone saw a 8.2% increase compared with 2017.⁴ This rising trend in HIV diagnosis is attributable to several sociodemographic and healthcare related factors, among which are the increase in the number of HIV-positive immigrants testing positive for HIV for the first time in Canada or are re-tested in Canada.² There is also a clear demographic and socioeconomic pattern in the distribution of the burden of HIV in Canada, with immigrants from countries where HIV is endemic are being disproportionately affected. Accounting for only 2.2% of the total population, they immigrants from HIV endemic countries represent 14% of PLHIV in Canada.⁵ The situation is likely to be most severe among African, Caribbean and Black (ACB) population living in Canada who were previously reported to have a heightened risk of infection by HIV and other sexually transmitted illnesses (STIs) compared with other North American populations.⁶⁻⁸ A large proportion of the PLHIV are not aware of their HIV status, according to Public Health Agency of Canada (PHAC), about 14% of the 68,000+ PLHIV in Canada are unaware of their HIV status.⁹

Previous analyses have reported that the ACB population share a disproportionately higher burden of HIV and other non-communicable diseases in Canada.^{6,10} This stark disparity in health outcomes are believed to be resulting from numerous demographic, socioeconomic, cultural and health system related factors, including inadequate knowledge of and access to the preventive measures, e.g. regular and effective use of condom.¹¹⁻¹⁵ Addressing the unmet need for sexual health needs, including contraception, is a priority area for preventing HIV and promoting sexual health.¹⁶⁻¹⁸ ACB population are at higher risk of HIV and

Significance for public health

In Canada, the African, Caribbean and Black (ACB) men are disproportionately affected by human immunodeficiency virus (HIV) and other sexually transmitted illnesses (STIs). Addressing this situation requires research evidence on the barriers to protective behaviours such as use of condom. This study is the first to assess the relationship between knowledge, attitude and use of condom with diagnosis of HIV and STIs among ACB heterosexual men in Ontario. The findings provide evidence regarding significant racial disparities in diagnosis with HIV and STIs and recommends undertaking tailored strategies for prevention and intervention of the STIs in this vulnerable population.

other STIs that can be largely mitigated through adequate use of contraceptive methods, *e.g.* condoms. Condoms are a cost-effective protective method that have been proven to be highly effective against the spread of HIV;^{19,20} nonetheless, the uptake remains suboptimal due to various individual (knowledge), socioeconomic (affordability), and cultural (attitude) factors.

With increasing global migration, a growing number of studies underscore the need for improving knowledge, attitude and utilisation of condoms use to curb the rising tide of HIV both in developed and developing countries.¹⁹⁻²¹ Despite these growing global concerns, the ACB heterosexual population in Canada remain a largely understudied group in terms of sexual and reproductive health issues. This is particularly concerning given the fact that the proportion of ACB population has been increasing constantly in Canada and represents one of the fastest growing ethnic subpopulations in the country. Therefore, not being able to invest in meeting their healthcare needs can worsen the situation of HIV and other STIs in Canada and can consequently lead to higher healthcare expenditure, lower labour productivity and adverse socioeconomic consequences for the ACB families in the long run.²²⁻²⁴ Our objective was to investigate the factors associated with knowledge, attitude and use as well as diagnosis of HIV and STIs among black heterosexual men in Ottawa and Windsor, Ontario, Canada. This paper is based on weSpeak project^{25,26} which is a five-year multi-site research program. The objectives of this project are to examine: i) assess the sociocultural and socio-political conditions that contribute to HIV related health disparities among ACB men; ii) examine social and behavioural vulnerabilities to HIV among ACB men, including their social identities related to race, class, gender and sexualities; iii) generate, appraise and share new knowledge, and support its translation into intervention and practice. weSpeak is a mixed method study comprising focus groups, in-depth interviews, and a questionnaire survey. Findings from the present study will help develop a better understanding of the factors associated with poor/non-utilization of condom as well the sociodemographics of HIV and other STIs among ACB men, which will aid in evidence-based policy making.

Design and Methods

Sampling and recruitment

We estimate the survey sample size for each city based on the number of HIV tests among heterosexual ACB men over 5 years, 2007-2011, in relation to the total male ACB population 15 years and older in the respective cities from the 2011 National Household Survey, and a desired level of precision of 5%. 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 will double the initial estimated sample size for Toronto. Our sample estimates are as follows: Ottawa: Initial sample size estimate (n=207); recruitment target (n=259), and Windsor: Initial sample size estimate (n=140); recruitment target (n=175). The experiences and perspectives of men living with HIV are germane to the study, but ACB men infected with HIV through heterosexual contact represent less than 2% of the adult male ACB population in various cities in Ontario. This sample comprised of participants who mentioned having any sexual partner during last 12 months.

Variables

The outcome variables were ever being diagnosed with HIV

(Yes/No) and other STIs (Yes/No). This was measured by asking the participants whether they were medically diagnosed with the respective conditions: hepatitis B, hepatitis C, Chlamydia, gonorrhoea, syphilis, human papillomavirus, lymphogranuloma venereum, and genital herpes.

Explanatory variables

A literature review was conducted in PUBMED for articles published on similar topics to identify a list of sociodemographic variables that are associated with condom knowledge, attitude and practice. Based on the results of the review, the following variables were included in the analysis: Age (15-19/ 20-29/ 30-39 40-49/ 50-59/ 60-64/ 65 +); Currently married (No/ Yes); Ethnicity (Black African/ Black Caribbean/ Black Canadian), Education (None/Pre-Highschool/ High school/ College/Pre-University/ Completed university), Employment (No Yes), Local status (Canadian citizen/ Landed immigrant and permanent resident/ Temporary work permit/ Other), Self-reported health (Not good/ Good), No of Partners in last 12 months (1-3/ 4-5/ >5), Sexual health visit in last 12 months (No/ Yes), Experienced any difficulty in accessing sexual healthcare (Yes/no), knowledge about the protective effects of condom use against HIV (Good/not good), attitude towards condom use (positive/not positive), and regular use of condoms (Yes/No).

Knowledge was assessed by the following question: *Condoms are the best way to protect myself from HIV and against other STIs.*

Condoms use attitude was assessed as an aggregate score based on the answers to the following questions: 1) *Condoms are uncomfortable*, 2) *The idea of using condoms does not appeal to me*, 3) *Using condoms make sex un-enjoyable*, 4) *Proper use of condoms enhances sexual pleasure*, 5) *I would avoid using condoms if possible*, 6) *I just do not like the idea of using condoms*, 7) *Men who use condoms show concern and responsibility to their partner(s)*, 8) *Using condoms is unmanly*.

Statistical analysis

Data were cross-checked by two independent researchers before entering into Stata version 14 for analysis. Some of the variables were recoded into smaller categories for the purpose of the regression analysis. Descriptive analyses were performed to present the basic sociodemographic profile of the participants according to their diagnostic status of HIV and other STIs, knowledge, attitude and use of condom. Binary logistic regression models were used to measure the independent association between HIV and STIs diagnostic status and their sociodemographic correlates. Two different models were run for each of the outcome variables: one for condom user and one for non-user. This choice was based on the understanding that condom users share a lower risk of transmission compared with the non-users. Results of regression analyses were presented as odds ratios and 95% confidence intervals. Statistical significance was set at $p < 0.05$.

Results

As shown in Table 1, 6.81% of the participants reported ever being diagnosed with HIV, while 11.38% with any other STIs. Majority of the participants were 30-39 years old (33.26%), were not currently married (54.26%), of Black African ethnicity (56.19%), had completed university degree (50.56%), had employment (91.69%), were Canadian citizen (54.99%), reported being in good health (89.66%), had 1-3 casual partners in last 12 months (79.21%), had no medical sexual health visit in last 12 months (89.05%), and reported experiencing difficulty in accessing sexual

healthcare (79.78%). About 70.20% did not have good knowledge of HIV, 68.10% had positive attitude towards condom use, and 62.82% were not regular condom user.

Factors associated with ever having HIV and STIs were presented in Table 2. Among condom non-users, the odds of HIV diagnosis were higher for those in the age groups of 30-39 years

(odds ratio= 2.00, 95%CI=1.29,3.10), and 50-59 years (odds ratio= 1.78, 95%CI=1.21,2.61), whereas among condom-users the odds were higher only among those aged 60-64 years old (odds ratio= 1.76, 95%CI=1.02,3.02). Those who were currently unmarried had lower odds of having any other STIs (odds ratio= 0.58, 95%CI=0.39,0.87). Among condom users, Black Caribbean had

Table 1. Percentage of sample population ever having HIV and other STIs.

	n	Ever diagnosed with HIV		Ever had any other STI	
		No (93.19%)	Yes (6.81%)	No (88.62%)	Yes (11.38%)
Age groups					
15-19 years old	21	4.43	3.45	3.83	8.06
20-29 years old	141	31.26	0.00	28.71	33.87
0-39 years old	157	33.26	24.14	33.25	29.03
40-49 years old	91	17.52	41.38	19.38	16.13
50-59 years old	42	8.43	13.79	8.85	8.06
60-64 years old	18	3.10	13.79	3.83	3.23
65 years and older	10	2.00	3.45	2.15	1.61
Currently married					
Yes	213	45.74	32.14	45.04	44.26
No	168	54.26	67.86	54.96	55.74
Ethnicity					
Black African	238	56.19	80.00	58.38	52.73
Black Caribbean	92	22.94	12.00	22.63	20.00
Black Canadian	72	18.30	4.00	16.20	25.45
Black American	5	1.29	0.00	1.12	1.82
Black Latin American	6	1.29	4.00	1.68	0.00
Education					
None/pre-high school	8	1.57	3.57	1.69	1.64
High school	70	14.09	25.00	14.98	13.11
College/pre-university	155	33.78	14.29	32.13	36.07
Completed university	242	50.56	57.14	51.21	49.18
Has employment					
No	38	8.31	37.50	10.60	1.92
Yes	363	91.69	62.50	89.40	98.08
Residency status					
Canadian citizen	259	54.99	37.93	52.87	61.29
Landed immigrant or permanent resident	72	14.19	27.59	14.83	16.13
Temporary study/work permit	68	14.63	6.90	15.31	6.45
Other	81	16.19	27.59	16.99	16.13
Self-reported health					
Not good	24	4.66	10.34	5.26	3.23
Good	456	95.34	89.66	94.74	96.77
No of partners in last 12 months					
None	9	2.53	0.00	2.81	0.00
1-3	296	79.21	93.33	80.63	74.51
4-5	30	8.43	0.00	6.88	15.69
>5	36	9.83	6.67	9.69	9.80
Had a medical visit for sexual health in last 12 months					
No	333	89.05	88.89	88.99	89.29
Yes	41	10.95	11.11	11.01	10.71
Difficulty in accessing sexual healthcare					
Yes	61	15.73	17.86	14.37	24.56
No	306	79.78	78.57	81.35	70.18
Knowledge					
Good	140	29.80	29.63	140	29.80
Not good	330	70.20	70.37	330	70.20
Attitude					
Positive	320	68.10	70.37	69.44	60.00
Not positive	149	31.90	29.63	30.56	40.00
Condom user					
Yes	136	37.18	46.67	37.30	39.22
No	226	62.82	53.33	62.70	60.78

Table 2. Factors associated with ever having HIV and STIs among ACB men in Ontario.

	HIV		STI	
	Condom user	Non-user	Condom user	Non-user
Age groups (15-19)				
20-29 years old	0.19 (0.01,4.15)	1.94 (0.19,19.96)	0.19 (0.01,2.60)	9.13 (0.57,146.70)
30-39 years old	1.91* (1.06,3.44)	2.00** (1.29,3.10)	2.05 (0.18,23.45)	1.83 (0.17,19.63)
40-49 years old	2.59 (0.25,26.93)	4.53 (0.43,47.58)	4.18 (0.40,44.13)	4.80 (0.45,51.66)
50-59 years old	5.43 (0.85,34.75)	1.78** (1.21,2.61)	1.86 (0.32,10.91)	1.66 (0.28,9.82)
60-64 years old	1.76* (1.02,3.02)	1.02 (0.59,1.75)	1.70 (0.85,3.37)	2.13 (0.46,9.77)
65 years and older	0.56 (0.30,1.04)	1.49 (0.77,2.87)	1.29 (0.82,2.03)	0.92 (0.06,13.48)
Currently married (Yes)				
No	0.67 (0.30,1.53)	0.53 (0.24,1.20)	0.58** (0.39,0.87)	0.94 (0.15,5.74)
Ethnicity (Black African)				
Black Caribbean	1.94** (1.26,3.00)	0.97 (0.60,1.55)	1.65 (0.70,3.86)	1.13 (0.80,1.58)
Black Canadian	0.91 (0.63,1.31)	0.47 (0.20,1.09)	1.87 (0.39,8.85)	3.82 (0.61,23.88)
Black American	0.58** (0.39,0.87)	1.53 (0.90,2.60)	0.71 (0.43,1.18)	1.64 (0.95,2.83)
Black Latin American	0.58** (0.40,0.84)	1.89* (1.04,3.44)	0.36*** (0.22,0.60)	1.26 (0.82,1.93)
Education (completed university)				
None/pre-high school	2.14*** (1.41,3.25)	2.13** (1.25,3.63)	2.24 (0.88,5.70)	2.22* (1.10,4.48)
High school	3.08 (0.55,17.22)	2.22* (1.18,4.20)	1.31 (0.32,5.32)	3.36 (0.34,33.21)
College/pre-university	0.61* (0.37,1.00)	0.54* (0.32,0.91)	0.28** (0.12,0.64)	0.51* (0.28,0.93)
Has employment (No)				
Yes	1.65 (0.71,3.79)	1.85 (0.81,4.22)	1.11 (0.81,1.53)	1.75** (1.23,2.49)
Residency status (Canadian citizen)				
Landed immigrant or permanent resident	0.41 (0.11,1.51)	0.24* (0.07,0.81)	0.96 (0.61,1.53)	0.40* (0.18,0.88)
Temporary study/work permit /other	0.17** (0.05,0.56)	0.45*** (0.31,0.67)	0.67 (0.42,1.08)	1.04 (0.65,1.67)
Self-reported health (Not good)				
Good	0.66* (0.45,0.97)	0.61 (0.34,1.09)	0.16*** (0.07,0.39)	0.67 (0.11,4.11)
No. of partners in last 12 months (None)				
1-3	0.25 (0.05,1.27)	0.98 (0.23,4.25)	0.92 (0.23,3.68)	0.97 (0.25,3.83)
4-5	1.79 (0.46,6.91)	1.22 (0.32,4.70)	1.68 (0.18,16.00)	0.75 (0.28,2.04)
>5	0.83 (0.36,1.95)	1.03 (0.48,2.22)	2.03* (1.10,3.73)	4.06 (0.44,37.79)
Had a medical visit for sexual health in last 12 months (No)				
Yes	0.63 (0.10,3.84)	0.29 (0.04,1.91)	0.28 (0.04,2.22)	0.36 (0.04,2.92)
Difficulty in accessing sexual healthcare (No)				
Yes	2.30*** (1.41,3.73)	3.25* (1.04,10.20)	1.71 (0.77,3.79)	2.85** (1.37,5.93)
Knowledge (Good)				
Not good	0.95 (0.38,2.40)	0.72 (0.33,1.53)	0.61 (0.32,1.15)	0.67 (0.20,2.22)
Attitude (Not positive)				
Positive	0.48** (0.30,0.76)	0.14** (0.04,0.47)	0.27* (0.08,0.90)	0.59* (0.37,0.95)
Condom user (No)				
Yes	0.21*** (0.09,0.49)	0.61* (0.38,0.97)	0.62* (0.39,0.99)	0.60* (0.39,0.92)

* p<0.05; **p<0.01; ***p<0.001.

higher odds of being diagnosed with HIV (odds ratio= 1.94, 95%CI=1.26,3.00), with the corresponding odds being lower among Black Americans (odds ratio= 0.58, 95%CI=0.39,0.87). Black Latin Americans had lower odds of both HIV (odds ratio= 0.58, 95%CI=0.40,0.84) and STI diagnosis (odds ratio= 0.36, 95%CI=0.22,0.60). Compared with those who had completed university education, those who had no/pre-high school education had higher odds of being diagnosed with HIV, and this was true for both condom users (odds ratio= 2.14, 95%CI=1.41,3.25) and non-users (odds ratio= 2.13, 95%CI=1.25,3.63). In comparison, those who had college-preuniversity education had lower odds in both user (odds ratio= 0.61, 95%CI=0.37,1.00) and non-user groups (odds ratio= 0.54, 95%CI=0.32,0.91). Landed immigrants/permanent residents who were condom non-users had lower odds of HIV (odds ratio= 0.24, 95%CI=0.07,0.81) and STI diagnosis and STI (odds ratio= 0.40, 95%CI=0.18,0.88). Condom users who reported good physical health status had lower odds of HIV (odds ratio= 0.66, 95%CI=0.45,0.97) and STI diagnosis and STI (odds ratio= 0.16, 95%CI=0.07,0.39). Having more than 5 casual partners showed higher odds of STI diagnosis among condom users (odds ratio= 2.03, 95%CI=1.10,3.73). Those who reported experiencing difficulty also had higher odds of HIV and STI diagnosis. Men with positive attitude towards condom use had lower odds both HIV (odds ratio= 0.48, 95%CI=0.30,0.76) and STI diagnosis. (odds ratio= 0.27, 95%CI=0.08,0.90). Similarly, condom users also had lower odds both HIV and (odds ratio= 0.21, 95%CI=0.09,0.49) STI diagnosis (odds ratio= 0.62, 95%CI=0.39,0.99).

Level of multicollinearity among the variables used in regression analyses were assessed using Variance Inflation Factors (VIF). The VIF statistic for the two models of HIV diagnosis were 1.7 and 2.1, respectively, and that for STIs diagnosis were 2.7 and 2.1 respectively. They all indicated acceptable level of multicollinearity (<10).

Discussion

Descriptive findings suggest that more than two-third of the sample population did not have good knowledge of HIV, had positive attitude towards condom use, and were not regular condom users. Among condom non-users, the odds of HIV diagnosis were generally higher for those in the age groups of 20-29, and 30-39. Current marital status showed negative association with diagnosis of STIs among condom users, Black Caribbean men had higher odds of being diagnosed with HIV with the corresponding odds being lower among Black Americans. It is notable that Black Latin Americans had comparatively lower odds of both HIV and STI diagnosis. Similar racial differences in the distribution of STIs were reported in the United States as well.^{27,28} In previous studies, education had a negative association with HIV/STI status.^{27,29} Our findings collaborate these studies by showing that compared with those who had completed university education, those who had no/pre-high school education had higher odds of being diagnosed with HIV regardless of condom use status.

Residency status also showed significant association with HIV and STI diagnosis. For instance, landed immigrants/permanent residents who were condom non-users were less likely to have HIV and STI. Condom users who reported good physical health status had lower odds of HIV and STI diagnosis and STI. Having more than 5 casual partners showed higher odds of STI diagnosis among condom users. Those who reported experiencing difficulty also had higher odds of HIV and STI diagnosis. Men with positive attitude towards condom use had lower odds both HIV and STI diagnosis.

Similarly, condom users also had lower odds both HIV and STI diagnosis. What is the position of previous studies on residency and STIs/HIV diagnosis?

ACB population represent a fast-expanding racial group in Canada. The key factors behind this are generally the need for safety, better livelihood and income opportunities, better health and living conditions, and family reunification.³⁰ Moreover, Canada's healthcare system is one of the most advanced in the world especially for providing an immigrant-friendly labor market and healthcare landscape, which can attract immigrants with chronic sexual health issues. However, there are significant difficulties in providing care for different racial groups due to preexisting conditions and risky behaviour. These are generally coupled with their exposure to risk factors (such as low income and health literacy), which can significantly increase their vulnerability to STIs/HIV and receiving the health service in a timely manner. Several studies have highlighted this complexity linked to immigrants' sociocultural backgrounds, social capital, educational, employment and living conditions and legal statuses with their vulnerability for HIV transmission and other sexual health issues.^{30,31} As such, there is a critical need for expanding the provision and uptake of condom among ACB men.

Our paper makes an important contribution towards understanding the social determinants of HIV and other STIs among ACB men in Canada. Among the strengths of the study were the high participation rate, inclusion of data on a range of STIs and analytical rigor. The findings will be of special interest to the healthcare researchers and policy makers aiming to address health inequality among the visible minorities in Canada. Another important aspect of the study was the findings on condom use attitude and knowledge. Previous studies have demonstrated that ensuring the optimum use of condom is a major challenge for public health workers due to inadequate understanding of the underlying causes of non-use. Part of the larger weSpeak study is dedicated to clarifying the pattern of condom use knowledge and attitude among ACB men, therefore the present findings thus bear several important insights regarding the sociodemographic risk factors of HIV, which should be useful for more in-depth studies in future.

In addition to the strengths, we have several limitations to report. Firstly, this was a cross-sectional study and the data on outcome and exposure variables were collected at the same time. Therefore, the findings only indicate temporal association and cannot be used to infer causal relation between the sociodemographic factors and HIV/STI infection status. Secondly, the present analysis focused only on the social determinants, and not the other aspects such as environmental, cultural, attitudinal healthcare access, which are well-documented risk factors of STIs/HIV. The impact of the quality of living environment on HIV transmission is not a direct one; however, the mutually enhancing deleterious health impacts of an unhealthy environment on one's overall health status and adoption of risky behavior is well-known. Future studies should include environmental risk factors since ACB community are more likely to be deprived from living and working in healthy environments compared to other sociodemographic groups. Finally, the data were collected from two sites viz Ottawa and Windsor, and therefore cannot be generalized for the entire ACB community in the province.

Conclusion

The findings indicated important sociodemographic patterns in condom use knowledge, attitude and behaviour, as well as with STIs/HIV diagnosis. There was evidence of significant racial dif-

ferences in diagnosis with HIV and STIs, which warrants for tailored strategies for prevention and intervention of the STIs in this population. Future research is needed to explore healthcare-related, psycho-social and cultural barriers to the uptake of condom, testing and treatment measures to better tailor interventions for this group.

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Availability of data and material: Data cannot be made available in the public domain as the study participants accepted that only the researchers will have access to the data. The corresponding author can be contacted with reasonable request to access part of the datasets.

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