

ORIGINAL RESEARCH

A survey study to determine health disparities among men who have sex with men in Eastern Ontario: looking beyond sexual risk and the gay, urban core

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Abstract

To create health promotion programs and clinical guidelines inclusive of gay, bisexual and other men who have sex with men (gbMSM), a better understanding of the health and social determinants that influence health outcomes for these men is required. Health research on gbMSM, however, has focused primarily on sexual health and HIV (human immunodeficiency virus) with most information coming from men living in large urban centers. To address this limitation and better characterize the overall health of this population, we conducted a survey of gbMSM living in Eastern Ontario, Canada. The survey, completed anonymously, was available from June to October 2015. A total of 674 gbMSM completed the survey; 61% were urban, 23% suburban and 16% lived in small towns or rural settings. The average age was 44.2 years, ranging from 18 to 83 years. Healthcare engagement was high for all groups of gbMSM, though disclosure of sexual orientation to healthcare providers varied based on the gender of sexual partners. Urban men tended to be younger, sexually active only with men, open about their sexual orientation, and more likely to use recreational drugs while men living in small towns and rural settings tended to be older, bisexual and more likely to conceal their sexual orientation. While the physical health of respondents was on par with national averages for men, we found younger men were more likely to suffer from anxiety and use recreational drugs while older men were more likely to develop problem alcohol use. Depressive symptoms were high across all demographic groups. Our data demonstrate that while gbMSM in Eastern Ontario have a high degree of contact with the healthcare system, considerable health inequities remain unaddressed. We also find significant health differences among gbMSM depending on age, area of residence, and degree of disclosure of sexual orientation.

Keywords

Health; Eastern Ontario; Men who have sex with men; Sexual orientation; Urban; Suburban; Rural

1. Introduction

Patient-centered care and population health equity are cornerstones to a healthy society [1], and while most healthcare providers recognize the importance of these goals, many feel uninformed about minority specific health issues and unprepared to address the broader social determinants of health within a specific population. Delivery of healthcare to gay, bisexual and other men who have sex with men (gbMSM) can be one such challenge. Indeed, several studies have shown physicians often feel they lack the skills, knowledge and experience to provide care to sexual minorities [2–4]. At a systems level, gbMSM have also been reported as less likely to have a primary care physician compared to the general population [5] and more likely to perceive bias in physician questions [6] and medical in-take forms [7]. Knowledge on

the broader health needs of gbMSM is also limited. The vast majority of health research in the gbMSM population has focused on HIV and other sexually transmitted infections (STIs) [8–16]. This view of sex as the sole determinant of health in this population has not only contributed to a stigmatized view of sex between men among healthcare professionals but has also allowed other health concerns for gbMSM to be overlooked or ignored [17, 18]. Similarly, while the increased prevalence of depression and anxiety among gbMSM has been well documented [19, 20], these mental health challenges have been consistently investigated in the context of and linked to sexual risk taking and HIV transmission. Only rarely have depression and anxiety among gbMSM been linked to the broader determinants of health. Further, while our knowledge of gbMSM health is largely limited to sexual and mental health, the information we have comes predominantly from samples of

urban men living in large North American cities.

To provide comprehensive and informed patient centered healthcare to gbMSM, a better and broader knowledge base on the health and healthcare needs of these men is required. The current study was designed to help fill this gap. We sought a broader view of gbMSM health including physical health, mental health and sexual health beyond sexual risk. We also sought representation of the wider gbMSM population including older men, and men living in suburban and rural areas. The purpose of this study was purely descriptive to identify areas of health parity and concern across the broader gbMSM population. To that end, we conducted a health survey of gbMSM living in Eastern Ontario, Canada, an area including the city of Ottawa and surrounding suburban and rural regions.

2. Methods

2.1 Survey

The survey was developed in consultation with researchers, local community members and healthcare providers, some of whom self-identified as gbMSM. It was pretested with 16 gbMSM between the ages of 20 and 70 and recommended modifications were made. The final survey contained 51 questions, including demographic information, location(s) where participants obtained healthcare, details about their physical, mental and sexual health, and how participants thought healthcare delivery could be improved. We also inquired about the construct of outness, which we measured by asking participants if people in their families, social networks, workplaces, and where they access primary healthcare were aware that they had sex with men. Within the survey, we embedded the Patient Health Questionnaire-4 (PHQ-4) [21], a validated screening tool comprising the PHQ-2 and General Anxiety Disorder 2-item (GAD-2), which screen for symptoms of depression and anxiety, respectively. This scale had a Cronbach's alpha of 0.871 in our sample, indicating good internal reliability. The survey was available online and in paper format in English and French.

2.2 Sample and sampling

The target area of recruitment was Eastern Ontario, Canada, a region of approximately 18,000 square kilometers and 1.2 million inhabitants. The region includes an urban center (City of Ottawa, population 934,243 in 2016) with a number of surrounding towns and rural areas.

To be eligible to participate, persons needed to be >18 years of age, live in the Eastern Ontario region, identify as male, and report having, or having had, sex with men. There were no exclusion criteria.

Participants were recruited by both network and snowball sampling to yield a convenience sample of gbMSM in the Eastern Ontario region. The survey was advertised and distributed through gay professional networks and social groups (e.g., gay swim team, gay choir, LGBT (Lesbian, Gay, Bisexual, Transgender) seniors' group), and was also advertised on a gay dating website where only members living in the recruitment region received the advertisement banner. The survey was also available in a gbMSM HIV and STI testing clinic in Ottawa.

Recruitment occurred from June to October 2015.

2.3 Data analysis

Data were analyzed using Statistical Package for the Social Sciences (SPSS) Version 24.0 (IBM, Armonk, NY, United States). For variables missing <5% of data points, data were imputed using the multiple imputation method in SPSS. Pairwise deletion was performed for variables missing $\geq 5\%$ of data points. Descriptive statistics were performed to report on the various questions of our survey, including frequencies, proportions, means, and standard deviations. Chi-square tests were performed to determine statistically significant differences between groupings of gbMSM. Categories were collapsed when conducting chi-squares to ensure that the minimum expected cell count of at least 5 was reached (e.g., on self-ratings of physical health, the "Fair" and "Poor" categories were collapsed to obtain the minimum expected cell counts). A p value less than or equal to 0.05 was considered significant a priori. No inferential statistics were performed.

3. Results

3.1 Participant demographics

A total of 674 gbMSM completed the survey. The mean age was 44.2 years (Standard deviation (SD) = 13.7; range = 18–83) with a fairly even distribution of respondents across age groups (Table 1). The majority of respondents had sex with only men (80.4%), while 8.8% reported sex with mostly men and 10.7% reported sex with equally men and women or mostly women. Over half of the men lived in an urban setting (61.2%), whereas 23.0% lived in suburban areas and 15.8% lived in small towns and rural regions. Most men either lived alone (39.4%) or with a partner (31.7%), while 16.2% lived with a friend or roommate and 12.7% lived with family. Over half of respondents lived in some degree of secrecy; only 42.5% were out to everyone including family, friends, peers and co-workers, while 48.6% were out to some people and 8.9% were out to no one. Men were more likely to be out to all their friends (68.3%) and less likely to be out to everyone at work (47.9%) or at school/university (38.6%) (Table 1).

Compared to men living outside an urban setting, men living in the urban core were more likely to be younger ($\chi^2(8) = 38.75, p < 0.001, V = 0.17$), to have sex with only men ($\chi^2(4) = 48.14, p < 0.001, V = 0.19$), and to be out within their social networks ($\chi^2(4) = 41.47, p < 0.001, V = 0.18$). For example, nearly half of urban respondents (46.5%) were 40 years of age or younger whereas only 19.0% of men living in small towns and rural areas were in this age group ($p < 0.001$). Similarly, 55.2% of respondents living in small towns and rural areas were over the age of 50 compared to 31.1% in the urban core ($p < 0.001$). Men in small towns and rural areas were more likely to be bisexual. Whereas only 5.8% of urban men reported having sex with both men and women, 12.7% of men in the suburbs ($p = 0.01$) and 26.7% of men in small towns and rural areas had sex with women and men ($p < 0.001$). Men living in small towns and rural areas were less likely to be open about their sexual orientation. Whereas only 4.0% of men in the urban core were out to no one, this increased to 11.5% for

TABLE 1. Participant demographic information.

	n	%
Age, Mean = 44.2 yr (SD = 13.7)		
18–30	141	20.9
31–40	142	21.1
41–50	148	22.0
51–60	152	22.5
61+	91	13.5
Area of residence		
Urban	412	61.2
Suburban	155	23.0
Small town/Rural	107	15.8
Who do you live with?		
Alone	266	39.4
Friend(s)/roommate(s)	109	16.2
Family	85	12.7
Partner	214	31.7
Who do you have sex with?		
Only men	542	80.4
Mostly men	60	8.8
Equally men and women/mostly women	72	10.7
Who are you out to?		
Everyone	287	42.5
Some people	328	48.6
No one	60	8.9

SD: Standard Deviation.

men in the suburbs ($p = 0.002$) and to 22.6% for men in small towns and rural regions ($p < 0.001$). This was most marked in the workplace where 14.2% of urban men and 44.2% of men in small towns and rural areas were out to none of their co-workers ($p < 0.001$).

3.2 Healthcare engagement

The majority of gbMSM in our sample (87.2%) had a family physician or nurse practitioner for their primary care and of those who had a primary care provider (PCP), 87.3% saw their provider one or more times per year (Table 2). There were no statistically significant differences in these measures of healthcare engagement comparing urban men, men living in the suburbs and those in small towns or rural areas. Notably, the proportion of gbMSM in our survey with a PCP is similar to the provincial average for men in Ontario (90.6%) [22]. The level of contact with primary care, however, exceeded the national average, where only 75% of Canadians report seeing their PCP one or more times per year [23]. In terms of engagement with other sectors of healthcare, 79.2% of survey respondents had seen a dentist in the last year compared to 72%

of men in Canada [24] (Table 2).

Overall, 24.3% of participants had not disclosed to their PCP that they had sex with men. However, disclosure varied markedly with place of residence and whether participants also had sex with women. Men in the urban core were much more likely to be out to their PCP ($\chi^2 (2) = 25.58, p < 0.001, V = 0.21$), as were men who had sex only with men ($\chi^2 (2) = 133.88, p < 0.001, V = 0.48$). Whereas only 17.0% of urban men had not disclosed their sexual orientation to their PCP, 30.4% of suburban men ($p = 0.004$) and 39.8% of men living in small towns and rural regions ($p < 0.001$) had not disclosed. Among men who had sex with only men, 15.1% were not out to their PCP. By comparison, 34.6% of men who had sex with mostly men ($p = 0.001$) and a full 83.9% of men who had sex equally or mostly with women ($p < 0.001$) did not disclose to their PCP that they also had sex with men. While most of the men in our sample (81.8%) were somewhat satisfied or satisfied with the care they received, men who were out to their PCP were more likely to be satisfied with their healthcare (90.4%) compared to men who were not out to their PCP (54.7%) ($\chi^2 (3) = 17.50, p < 0.001, V = 0.17$).

TABLE 2. Healthcare services accessed by gbMSM in Eastern Ontario.

	n	%
Do you have a primary care provider (PCP)?		
Yes	588	87.2
No	86	12.8
How often do you see your PCP? (n = 588)		
4 or more times per year	143	24.2
2–3 times per year	233	39.4
Once a year	140	23.7
Once every 2–3 years	58	9.8
Cannot remember the last time	17	2.9
Is your PCP aware that you have sex with men? (n = 588)		
Yes	445	75.7
No	143	24.3
Satisfaction with level of care from PCP		
Satisfied/somewhat satisfied	481	81.8 ^a
Dissatisfied/somewhat dissatisfied/neutral	107	18.2 ^a
Additional medical services in the last year		
Dentist	506	79.2 ^a
Walk-in clinic	278	48.0 ^a
Massage therapist	218	37.3 ^a
Specialist	164	28.8 ^a
Hospital emergency room	145	25.1 ^a
Physiotherapist	102	18.1 ^a
Psychologist	94	16.8 ^a
Chiropractor	80	14.2 ^a
Psychiatrist	57	10.3 ^a
Dietician	45	8.1 ^a
Naturopath/homeopath	21	3.8 ^a

^aNumber of missing responses varied. Sample sizes are between n = 533 and n = 639. gbMSM: gay, bisexual and other men who have sex with men.

3.3 Physical health

Over three-quarters of the men in our sample (77.0%) rated their physical health as good or excellent. This is somewhat higher than the general Canadian population where 61% rate their physical health similarly [25]. Unsurprisingly, older men were more likely to report their physical health interfered with daily living ($\chi^2(12) = 35.61, p < 0.001, V = 0.13$). Table 3 presents the prevalence of a variety of self-reported health conditions among respondents with high blood pressure (20.6%) and high cholesterol (19.0%) being the most common. All were similar to the prevalence of these conditions among the general Canadians population (Table 4). As expected, older men were more likely to report a diagnosis of high blood pressure, high cholesterol, diabetes, heart disease and cancer (all $p < 0.001$). Most of the men in our sample were HIV negative (79.1%), though 11.8% reported being HIV positive. Men between the ages of 40 and 60 were more likely to report living with HIV compared to men below the age of 40 (χ^2

(4) = 17.38, $p = 0.002, V = 0.16$). Among respondents, 5.6% reported being infected with hepatitis B or hepatitis C.

3.4 Mental health

Approximately two-thirds of the men in our survey (68.8%) rated their mental health as good or excellent, identical to the general Canadian population where 69% rate their mental health similarly [25]. Among survey respondents, 39.7% and 32.6% reported that feelings of anxiety and sadness, respectively, interfered with their daily living half the time or more (Table 3). A third of the sample (30.6%) reported having been diagnosed with depression or anxiety in their lifetime. While 40.2% felt they would benefit from seeing a mental health professional, only 13.5% of participants had seen a psychologist and/or psychiatrist in the last 6 months.

At the time of the survey, 18.8% of respondents scored above the cut-off for anxiety using the GAD-2, and 14.1% scored above the cut-off for depression using the PHQ-2.

TABLE 3. Descriptive physical, mental and sexual health statistics.

	n	%
Physical Health		
Self-perceived physical health		
Good/Excellent	519	77.0
Average	110	16.3
Fair/Poor	47	6.9
Does your physical health interfere with daily living?		
Half the time/frequently/always	141	20.9
Rarely/never	533	79.1
Diagnosis of health conditions		
High blood pressure	139	20.6
High cholesterol	128	19.0
Obesity	60	8.9
Lung disease	54	8.0
Diabetes	53	7.9
Hepatitis B or C	38	5.6
Cancer	35	5.2
Heart disease	34	5.0
Eating disorder	12	1.8
HIV Status		
HIV-positive	80	11.8
HIV-negative	533	79.1
Uncertain/never tested	61	9.1
Mental Health		
Self-perceived mental health		
Good/Excellent	464	68.8
Average	123	18.3
Fair/poor	87	12.9
Do feelings of anxiety interfere with daily living?		
Half of the time/frequently/always	268	39.7
Rarely/never	406	60.3
Do feelings of sadness interfere with daily living?		
Half of the time/frequently/always	220	32.6
Rarely/never	454	67.4
Previous or current diagnosis of depression or anxiety	206	30.6
PHQ-4 screening results		
Anxiety (above cut-off)	126	18.8
Depression (above cut-off)	95	14.1
Anxiety, above cut-off (GAD-2)		
Age 18–30	31/134	23.1
Age 31–40	27/140	19.3
Age 41–50	28/168	16.7
Age 51–60	20/148	13.5
Age over 60	10/84	11.9

TABLE 3. Continued.

	n	%
Sexual Health		
When was your last HIV test?		
Within the last year	401	59.4
More than one year ago	208	30.9
Uncertain/never tested	65	9.7
When was your last STI test?		
Within the last year	376	55.8
More than one year ago	203	30.2
Uncertain/never tested	95	14.0
Satisfaction with sex life		
Satisfied/somewhat satisfied	353	52.4
Dissatisfied/somewhat dissatisfied/neutral	321	47.6
Does sex cause feelings of anxiety/stress?		
Half of the time/frequently/always	175	26.0
Rarely/never	499	74.0
Difficulties getting or maintaining an erection		
Half of the time/frequently/always	238	35.3
Rarely/never	436	64.7
Pre-exposure prophylaxis (PrEP)		
Aware of PrEP	359	53.3
Never heard of PrEP	164	24.3
Considered using PrEP	124	18.4
Have used of use PrEP	17	2.5
Post exposure prophylaxis (PEP)		
Aware of PEP	390	57.9
Never heard of PEP	154	22.8
Considered using PEP	70	10.4
Have used PEP	32	4.7

HIV: Human Immunodeficiency Virus; GAD-2: General Anxiety Disorder 2-item; PHQ: Patient Health Questionnaire; PEP: Post Exposure Prophylaxis; PrEP: Pre-Exposure Prophylaxis; STI: sexually transmitted infections.

TABLE 4. Prevalence of physical health conditions.

	Prevalence among Survey Respondents	Prevalence among males in Canada	Reference
Hypertension	20.6%	24.5%	[26]
High cholesterol	19.0%	23.0%	[27]
Diabetes	7.9%	7.3%	[28]
Heart disease	5.0%	8.3%	[29]
Obesity	8.9%	11.0%	[25]

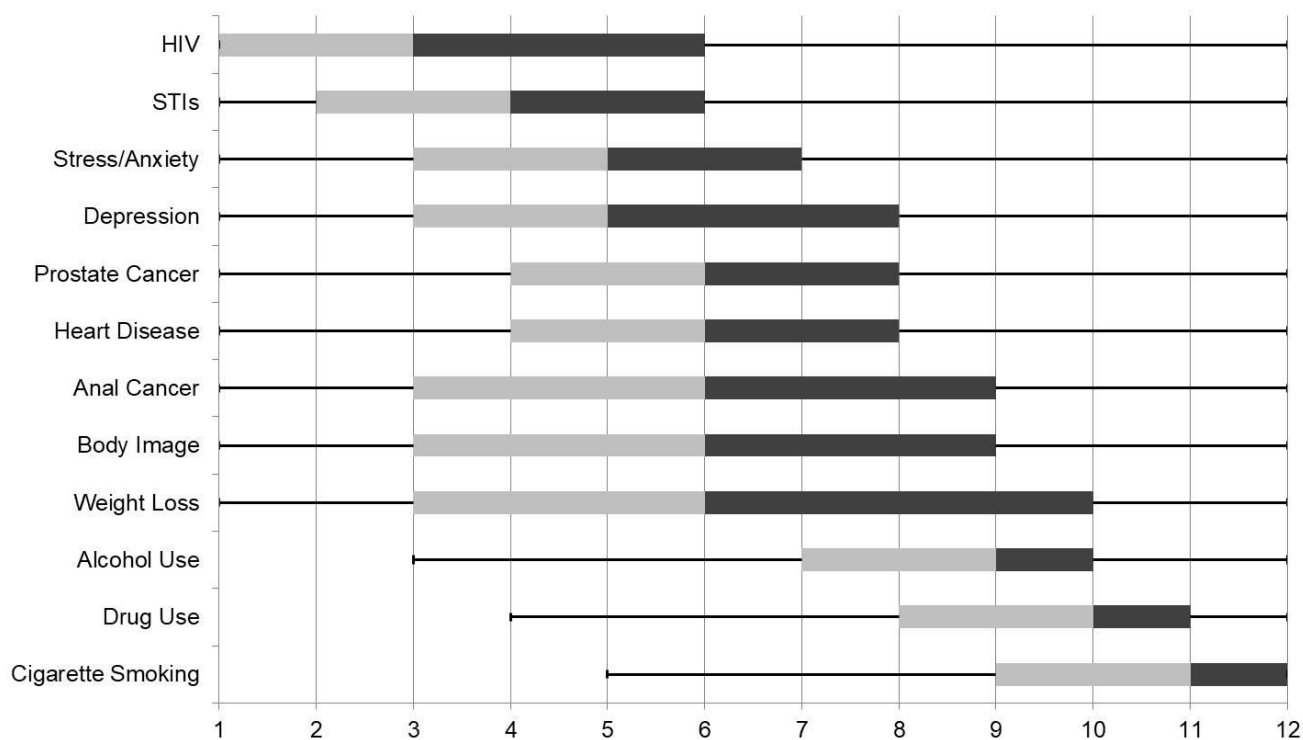


FIGURE 1. Ranking of the perceived importance of a twelve health issues represented by quartiles. The first narrow black bar represents the range of values for the first quartile, the wide pale gray bar the 2nd quartile, the wide black bar the 3rd quartile and the last narrow black bar the 4th quartile. HIV: Human Immunodeficiency Virus; STIs: sexually transmitted infections.

These rates are markedly higher compared to the general population where the point prevalence of depression is 4.7% and anxiety is 2% [30], though direct comparisons are limited by use of different measures. The prevalence of anxiety among survey respondents decreased steadily with age (Table 3) with 21.2% of respondents 40 years of age and under scoring as anxious compared to 12.9% of men over the age of 50 ($p = 0.02$). There were no statistically significant differences in the prevalence of anxiety among respondents with respect to place of residence, sex with only men versus men and women, or level of outness. Based on the PHQ-2, depressive symptoms were relatively stable across each decennial age group. Depression was more common among men who had sex with mostly men (22.8%) compared to those who had sex with only men or equally men and women (12.2%; $p = 0.03$). Men who were out to only some people in their social networks were also more likely to experience depressive symptoms compared to men who were out to everyone or no one ($\chi^2(4) = 10.06$, $p = 0.007$, $V = 0.12$). The majority of participants reported that they felt somewhat or very comfortable talking to health professionals about their mental health (76.0%). When asked to rank the overall importance of 12 health concerns, participants rated anxiety and depression as the third and fourth most important (Fig. 1).

With respect to substance use, cigarette and alcohol use among respondents was at or below national averages, whereas recreational drug use was markedly higher (Table 5). In terms of tobacco use, 18% of the men in our sample were current smokers, on par with the national average (15%) [25]. Among respondents who did smoke, the majority (76.9%)

had attempted to quit in the past. There were no significant demographic differences in our sample with respect to the men who did or did not smoke tobacco. While most respondents (72.7%) drank between 0–5 alcoholic drinks per week, only 5.0% of men reported problem alcohol use defined by Health Canada as more than 15 drinks per week, well below the national average of 17–19% [25, 30, 31]. Notably, problem alcohol use remained at 3.0–5.4% across all age groups except for men over 60 years of age where it increased to 11.9% ($p = 0.003$). Nearly a third of respondents (29.2%) used marijuana in the last 3 months. Notably, illicit drug use was nearly 5 times higher among men in our survey compared to the general population (11.5% vs. 2.4%) [31, 32]. The most common illicit drugs used in the last 3 months were cocaine (5.6%), ecstasy (5.3%), methamphetamine (3.7%), gamma-hydroxybutyrate (GHB; 3.6%) and ketamine (2.2%) (Table 5). Younger men were more likely to use recreational drugs ($\chi^2(4) = 20.05$, $p < 0.001$, $V = 0.27$) with 15.4% of men 50 years of age and under reporting use in the last 3 months compare to 4.3% of men over the age of 50 ($p < 0.001$). Particularly, younger men were more likely to use cocaine ($\chi^2(4) = 20.45$, $p < 0.001$, $V = 0.17$) and ecstasy ($\chi^2(4) = 21.83$, $p < 0.001$, $V = 0.18$). Illicit drug use overall was more common among urban men (14.1%) compared to those outside the urban core (7.6%; $p = 0.015$) as was polydrug use with 7.5% of urban men reporting use of 2 or more illicit drugs in the last 3 months compared to 1.9% for suburban men and men in small towns and rural settings ($p = 0.002$). When asked to rank the importance of 12 health concerns, respondents rated alcohol use, drug use and cigarette smoking as the three least important (Fig. 1).

TABLE 5. Reported substance use among GSM in Eastern Ontario.

	n	%
Do you smoke cigarettes?		
Yes	121	18.0
No	553	82.0
Have you attempted to quit smoking in the past? (n = 121)		
Yes	93	76.9
No	28	23.1
Average weekly alcohol consumption		
0–5 Drinks Per Week	490	72.7
6–10 Drinks Per Week	103	15.3
11–15 Drinks Per Week	47	7.0
>15 Drinks Per Week	34	5.0
Consume more than 15 drinks per week		
Age 18–30	5/134	3.7
Age 31–40	6/140	4.3
Age 41–50	5/168	3.0
Age 51–60	8/148	5.4
Age over 60	10/84	11.9
Urban	16/411	3.9
Suburban	9/158	5.7
Small town and rural	9/105	8.6
Marijuana use in the last 3 months	197	29.2
Recreational drug use in the last 3 months		
Cocaine	38	5.6
Ecstasy	36	5.3
Crystal Meth	25	3.7
GHB	24	3.6
Ketamine	15	2.2

GHB: gamma-hydroxybutyrate.

3.5 Sexual health

With respect to sexual wellbeing, only half of participants (52.4%) reported being satisfied or somewhat satisfied with their sex life (Table 3). Sexual satisfaction was highest among men who had sex with only men (57.2%) compared to men who had sex equally with men and women (35.9%) and men who had sex with mostly men (28.5%) ($\chi^2(8) = 30.21, p < 0.001, V = 0.15$). In addition, younger men reported being satisfied or somewhat satisfied with their sex life more frequently compared to older respondents ($\chi^2(16) = 37.16, p = 0.002, V = 0.12$). For a quarter of the men in our sample (26.0%), sex caused them to feel stressed or anxious half the time or more. This did not differ based on age, place of residence, sexual partners, or level of outness. Just over a third of the men (35.3%) experienced difficulty getting or maintaining an erection half the time or more. As expected, the prevalence of erectile difficulties increased steadily with age ($\chi^2(16) = 81.55, p < 0.001, V = 0.17$). It is, however, noteworthy that 18.1% of men in our sample between the ages of 18 and 30

reported difficulty getting or maintaining an erection at least half the time. This is considerably higher than the reported 8% prevalence of erectile dysfunction in men 20–30 years of age in Europe and North America [33]. Approximately half of survey participants reported condoms decreased their sexual satisfaction (55.5%) and decreased their ability to maintain an erection (44.2%). While 73.3% of participants overall felt somewhat or very comfortable discussing their sex lives with a healthcare provider, men who had sex with only men ($\chi^2(2) = 20.95, p < 0.001, V = 0.18$), those who were out to everyone in their social networks ($\chi^2(2) = 38.50, p < 0.001, V = 0.24$), and those who were out to their PCP ($\chi^2(1) = 40.63, p < 0.001, V = 0.26$) were the most likely to feel comfortable.

Over half of the men in our survey had undergone testing for HIV and/or sexually transmitted infections (STIs) in the last year (59.4% and 55.8% respectively) although 9.7% had never tested or were uncertain when they last tested for HIV and 14.0% had never tested or were uncertain when they last tested for STIs (Table 3). Sexual health testing among respondents

depended on age, the sex of their partners, area of residence, and openness about their sexual orientation. Men were more likely to have tested for HIV in the last year if they were younger ($\chi^2(8) = 21.97, p = 0.005, V = 0.13$), with testing highest among men 18–30 years of age (73.9%), followed by men aged 31–40 (62.1%) and then leveling off at around 53.0% for older age groups. The same trend was seen for STI testing in the last year. Men who had sex with only men were also more likely to undergo HIV and STI testing in the past year (67.7%), compared to men who had sex with mostly men (55.2%) and men who had sex with men and women (35.3%) ($\chi^2(4) = 65.00, p < 0.001, V = 0.22$). In terms of where they lived, men in the urban core were more likely to have tested for HIV in the last year (67.4%) compared to rural men (45.7%) ($\chi^2(4) = 27.13, p < 0.001, V = 0.14$) and men who were out to everyone (68.8%) were more likely to have tested in the last 12 months compared to men who were out to no one (32.0%) ($\chi^2(4) = 80.20, p < 0.001, V = 0.24$). When asked to rank the importance of 12 health concerns, respondents considered HIV and STIs to be the two most important (Fig. 1).

With respect to HIV pre-exposure prophylaxis (PrEP), 53.3% of the men in our sample were aware of it while 24.3% had never heard of it (Table 3). Only 2.5% of participants had used or were currently on PrEP. Those who had used PrEP lived in urban or suburban areas, had sex with only men or mostly men, and were out to everyone or some people in their social networks. Conversely, men who were older ($\chi^2(4) = 31.71, p < 0.001, V = 0.22$), who lived in rural areas ($\chi^2(2) = 9.55, p = 0.008, V = 0.12$), who had sex with both men and women ($\chi^2(2) = 19.84, p < 0.001, V = 0.17$), and who were out to no one in their social networks ($\chi^2(2) = 18.18, p < 0.001, V = 0.17$) were more likely to have never heard of PrEP. Awareness of and considering use of PrEP declined with age. It should be noted, however, that these data were collected in 2015, one year prior to Health Canada's approval of PrEP, which may have affected awareness and use of this HIV prevention intervention. In terms of HIV post-exposure prophylaxis (PEP), 57.9% of the men in our sample were aware of it while 22.8% had never heard of it. Almost twice as many men had used PEP (4.7%) compared to PrEP. Of those who had used PEP, most were between the ages of 18 and 40 (64.4%), were urban (78.1%) and had sex with only men (96.9%), and all were out to everyone or some people in their social networks. Similar to PrEP, men who were older ($\chi^2(4) = 14.99, p = 0.005, V = 0.15$), who had sex with men and women ($\chi^2 = 25.62, p < 0.001, V = 0.20$), and who were not out within their social networks ($\chi^2(2) = 23.59, p < 0.001, V = 0.19$) were more likely to have never heard of PEP.

4. Discussion

This study provides an overview of the health and wellbeing of a convenience sample of gay, bisexual and other MSM in Eastern Ontario, Canada and their engagement with the healthcare system. Compared to the overall Canadian population and to other studies of gbMSM, our study revealed some similarities but also some important differences. Notably, the vast majority of men in our survey had regular contact with healthcare providers. While sexual minorities as a group in

Canada have been reported as being less likely to have a family physician or nurse practitioner for primary care [5], the proportion of gbMSM in our survey with a primary care provider was equivalent to men in Ontario and the proportion who saw their provider at least once per year was somewhat higher compared to Canadians overall. This level of engagement did not differ between gbMSM living in urban, suburban or rural settings. It would thus appear that gbMSM in Eastern Ontario are equally as engaged in healthcare as the general population. Whether this is unique to this geographic area or is a product of sampling in our or other studies is difficult to determine. Regardless, this high level of contact of gbMSM with the healthcare system provides ample opportunity to screen for, identify and intervene in health concerns specific to this population.

Despite this, as discussed below, considerable health inequities exist for gbMSM with mental and sexual health being of particular concern. A significant limitation to delivering population specific care, however, is the fact that a quarter of the men in our survey reported they have not disclosed their sexual orientation or same-sex sexual activity to their healthcare provider. Fear of disclosing sexual orientation to healthcare providers has been a consistent finding in the literature [2, 34–37] and our data suggest this is particularly relevant for men who are bisexual and who live outside urban cores. A qualitative study by our group found gbMSM have a sense of wariness and distrust of the healthcare system and perceive a lack of knowledge among healthcare professionals about issues relevant to their health [38]. This fear of judgement and lack of understanding by professionals may discourage some gbMSM from disclosing their sexual orientation or activity. While healthcare providers working in small towns may need to be particularly aware of this, an awareness of the health issues faced by gbMSM and a supportive approach to sexuality will be important parts to clinical care guidelines.

As anticipated, both demographic features and health concerns for the men in our survey varied markedly depending on whether they lived in an urban, suburban or rural setting. Compared to suburban and rural respondents, urban men tended to be younger, and the vast majority (89%) reported sex with only men. This group was also more open about their sexual orientation and more actively engaged in their sexual health with two thirds having undergone testing for HIV and other STIs in the last year. Recreational drug use and polydrug use, however, was high at 14% and 7.5% respectively. By contrast, men in the suburbs were slightly older and more likely to report sex with both men and women. Men in the suburbs were also less open about their sexual orientation. Finally, men living in small towns and rural settings tended to be older with half over the age of 50 and over a quarter reported sex with both men and women. Compared to urban and suburban men, gbMSM in small towns and rural areas were far less likely to disclose their sexual orientation or same-sex sexual activity, and were less likely to undergo testing for HIV and STIs.

While the physical health of our survey respondents was comparable to the overall Canadian population, mental health was an area of particular concern. Here, we noted considerable differences between men depending on age, where they lived, the sex of their sexual partners and whether they were open about their sexual orientation within their social networks.

Consistent with previous literature [20, 39–50], the prevalence of depression and anxiety in our sample was markedly higher compared to the general Canadian population. Notably, depression was most common among gbMSM who were out to only some people in their social networks and those who have sex with mostly but not exclusively other men. Anxiety was inversely correlated with age and associated with sexual activity, with a quarter of respondents indicating that sex caused them to feel stressed and anxious at least half the time. Despite the elevated prevalence of depression and anxiety, the same proportion of men in our survey as in the general Canadian population rated their mental health as good or excellent, suggesting self-rating of mental health is a poor screening tool. It thus seems prudent for healthcare providers to use validated tools to regularly screen gbMSM patients for depression and anxiety, particularly young men and men who are bisexual.

In terms of substance use, problem alcohol use as defined by Health Canada was low in our sample and well below the national average. Notably, however, it did increase among men over the age of 60. Recreational drug use was nearly 5 times higher among men in our survey compared to that in the general population though lower than has been reported in other studies of gbMSM [40, 51–53]. One important difference that could explain this discrepancy is that our survey asked about recreational drug use in the past three months whereas other surveys have asked about use in the past year. In addition, unlike other surveys, nearly 40% of our survey respondents included men who lived outside the urban core. Indeed, our data indicate recreational drug use is predominantly an urban phenomenon, accounting for twice the rate of recreational drug use compared to suburban and rural areas.

5. Limitations

Our study has a number of limitations. In this iteration of the survey, participants were not asked about income or ethnicity, which can have an impact on the health of gbMSM [38, 54, 55]. As such, it was not possible to perform sub-analyses based on these social determinants of health. As with any survey, there is a risk of self-selection bias and social desirability bias. To mitigate these, participants were recruited through a wide range of community and online sources and surveys were completed anonymously. Of the total, 31% of participants were recruited through a gay men's HIV/STI testing clinic in Ottawa. It is possible these participants represent a group more comfortable disclosing their sexual orientation and sexual practices and so biased the urban sample. Furthermore, participants were recruited specifically from Eastern Ontario including Ottawa. Men living in this region may not be representative of gbMSM living in other parts of Ontario or Canada. Lastly, our data are from 2015. While it is possible some of our findings might no longer apply, there is, to the best of our knowledge, no anecdotal or empirical evidence to suggest that changes have occurred since that time. Routine assessments at our local gbMSM HIV testing clinic have the same proportion of patients reporting that they have not disclosed their sexual practices to their primary care providers, and other metrics such as reported hate crimes

toward sexual minorities only seem to be increasing. While slight differences in the proportions we identified may exist now (versus in 2015), there is nothing to suggest our findings would not still apply today.

6. Conclusions

Using a convenience sample of survey respondents, this study took a comprehensive descriptive look at the health of gbMSM living in Eastern Ontario and their engagement with the healthcare system. Our study brings specific emphasis to the differences within the gbMSM population particularly with respect to place of residence and cautions against generalizations drawn from data acquired in large metropolitan areas. We saw significant differences in the health and healthcare needs of men living in urban, suburban or small towns/rural areas. Urban men tended to be younger, out, and more likely to use recreational drugs while men living in small towns and rural settings tended to be older, bisexual and more likely to conceal their sexual orientation. We found younger men are more likely to suffer from anxiety and use recreational drugs while older men are more likely to develop problem alcohol use. While we encourage healthcare providers to pay particular attention to mental health, sexual wellbeing and the potential for substance use when caring for gbMSM, we also caution against compartmentalization of care where sexual health may be separated from other health care, as this may exacerbate health disparities within this population [17, 18]. As healthcare providers try to provide more comprehensive care that is culturally sensitive and appropriate, understanding the different demographics and healthcare needs within the diverse gbMSM population is likely essential. This study then may provide some guidance in developing informed recommendations on the delivery of healthcare to gbMSM. In particular, our findings highlight the need for greater education among physicians, nurses and trainees noting many gbMSM continue to not feel comfortable or safe disclosing their sexual orientation to healthcare professionals, and that this corresponds with numerous negative health sequelae. Healthcare providers, in turn, need to adapt their spaces to promote disclosure and the provision of comprehensive care. This could include reviewing intake forms and history taking language, and by adding pride flags and language to overtly demonstrate safety and acceptance. Future studies are needed to elucidate the most acceptable and effective strategies.

AVAILABILITY OF DATA AND MATERIALS

The data are contained within this article. The datasets used and analyzed in this study are available on reasonable request from the corresponding author.

AUTHOR CONTRIBUTIONS

PM and PO—developed the study concept and research design. PM—oversaw the acquisition of data. MC and SR—conducted the statistical analyses. MC and PM—drafted the manuscript. All authors contributed to the interpretation of the data. All

authors critically reviewed the paper and approved the final version.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ottawa Health Sciences Network Research Ethics Board (Protocol 20140657-01H). The survey was preceded by an information section describing the purpose of the study, risks, benefits, and assurance of anonymity. Consent was implied when participants proceeded to complete the survey.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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