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Does Age Matter? Sexual Event-Level Analysis of Age-Disparate Sexual Partners Among Gay, Bisexual and other men who have sex with men (GBM) in Vancouver, Canada

K Closson[1,2], **NJ Lachowsky**[1,3,4], **Z Cui**[1], **S Shurgold**[1], **P Sereda**[1], **A Rich**[1], **DM Moore**[1,5], **EA Roth**[4,6], and **RS Hogg**[1,2]

[1]Epidemiology and Population Health, British Columbia Centre for Excellence in HIV/AIDS, Vancouver, Canada

[2]Faculty of Health Science, Simon Fraser University, Burnaby, Canada

[3]School of Public Health and Social Policy, University of Victoria, Victoria, Canada

[4]Centre for Addictions Research British Columbia, University of Victoria, Victoria, Canada

[5]Faculty of Medicine, University of British Columbia, Vancouver, Canada

[6]Department of Anthropology, University of Victoria, Victoria, Canada

Abstract

Background—To determine factors associated with age-disparate sexual partners among Vancouver gay and bisexual men (GBM).

Methods—Sexually-active GBM aged ≥16 years were recruited from 02/2012–02/2014. Participants self-completed a questionnaire on demographics, attitudes, and sexual behaviour and substance-use at last sexual event with five most recent partners. Two generalized linear mixed models identified factors associated with: 1) “same-age” (referent), “younger” or “much-younger”, and 2) “same-age” (referent), “older”, or “much-older” partners. Statistical interactions between age and HIV status were tested.

Results—Participants (n=719) were predominantly gay (85.1%), White (75.0%), HIV-negative/unknown status (72.9%) with median age of 33 years (Q1,Q3: 26,47). A minority of sexual events were reported with much older/younger partners (13.7%). In the multivariable models GBM reporting older partners were more likely to be Asian or Latino, have greater Escape Motivation scores, report their partner used erectile dysfunction drugs (EDD), and have received something for sex; compared with condom-protected insertive anal sex, participants with older partners were more likely to report condomless insertive anal sex with a sero-discordant or unknown status partner or no insertive anal sex. GBM reporting older partners were less likely to be bisexual-

Corresponding Author: Nathan J Lachowsky, BC Centre for Excellence in HIV/AIDS, 608-1081 Burrard Street, Vancouver, Canada, V6T 1Y6, nlachowsky@cfenet.ubc.ca.

CONTRIBUTORS

RSH and DM are co-principal investigators for this study and take responsibility for the integrity and accuracy of the data, and have the final decision in the submission of the manuscript. EAR is a co-investigator for this study, and developed the event-level questionnaire matrix. KC, NJL and RSH conceptualized the idea for the analysis, PS prepared the dataset and ZC ran the analysis. KC and NJL interpreted the results from the analysis and wrote the initial draft with contributions from all authors.

identified, have given something for sex, and report event-level alcohol and EDD use. GBM reporting younger partners were more likely to have annual incomes >$30,000 and have met their partner online. As per significant statistical interactions, age-disparate relations were more common for younger HIV-positive and older HIV-negative GBM.

Conclusions—Differences among age-disparate partners highlight important targets for health promotion and future research.

Keywords

sexuality; intergenerational relations; sexual partners; HIV; sexual health; health promotion

INTRODUCTION

Gay, bisexual, and other men who have sex with men (GBM) represent a priority demographic within the HIV epidemic globally, and in Canada.[1] In Vancouver, 18% of GBM live with HIV.[234] In 2010, Vancouver GBM HIV prevalence was 7% among those aged under 30, 19% among those 30–44, and 34% among those 45 and older.[3] As such, intergenerational sexual relations appear as significant contributors to elevated HIV transmission,[56] perpetuating levels of discrimination and marginalization of older gay men, regardless of their HIV status.[7]

Despite persistently higher prevalence of HIV in older GBM,[48] a critical gap remains in understanding the sexual health implications of intergenerational relationships. Analyses have focused mainly on risks for young GBM,[7] with less known about older men with younger partners. In one study, GBM who reported older partners experienced a higher likelihood of engaging in condomless anal sex (CAS), and had increased risk of acquiring HIV.[9] Another study found that compared with HIV-negative GBM who had same-aged partners, men who acquired a primary HIV infection had partners on average 6 years older than themselves.[4] Other studies looking at age differences in GBM sexual partnerships, however, have found no association between partner age difference and HIV acquisition or CAS.[59]

Globally, within generalized HIV epidemics, transactional sex (e.g. when money, goods, drugs, or housing is exchanged for sex) and low agency in condom negotiation are strong predictors of HIV acquisition, particularly for young women in intergenerational relationships.[10] These determinants have not been widely explored within GBM sexual networks or sexual health promotion efforts within North America. In Canada, one study noted that one in ten GBM reported giving or receiving money, drugs or other goods for sex.[11] Furthermore, a recent systematic review found that transactional sexual involvement within GBM networks globally was significantly associated with HIV seroconversion.[12] These findings highlight the need for a broader understanding of power-imbalances and the influence of factors such as transactional sex, substance use, ethnicity, and socio-economic status on HIV risk behaviour (e.g. CAS with partners of sero-discordant or unknown HIV status) within age-disparate GBM relationships.[59]

We sought to identify the prevalence of age-disparate sexual partnering among GBM participating in the Momentum Health Study in Vancouver, Canada, and the individual and event-level socio-demographic, psychosocial, relational and sexual behavioural factors associated with self-reported older or younger partners.

METHODS

Study Design

Baseline cross-sectional data from the Momentum Health study, a longitudinal prospective-cohort study of HIV-positive and negative GBM living in metro-Vancouver, Canada, were used to assess socio-demographic, psychosocial, relational and sexual behavioural factors associated with event-level age-disparate sexual partnerships. The study site is located within the heart of the gay community in downtown Vancouver. Eligible participants were recruited through respondent-driven sampling (RDS)[1314] between February 2012 and February 2014 (see Moore et al., 2016 for more details).[15] Eligibility criteria included: gender-identify as a man, report sex with another man in the past 6 months, aged at least 16 years, living in Vancouver or surrounding areas, and able to complete a questionnaire in English. Participants completed a computer-assisted, self-administered (CASI) and nurse-administered questionnaire and clinical visit with biological specimen collection for HIV, syphilis and Hepatitis C virus (HCV) testing. HIV and viral load data were provided through a linkage with HIV/AIDS Drug Treatment Program administrative data at the BC Centre for Excellence in HIV/AIDS.[16]. Participants were provided with $50 honouraria for completing the study visit (or the equivalent value in draw tickets for a larger prize such as a electronics gift card or travel voucher) and an additional $10 for each subsequent participant recruited who was eligible and completed the study protocol. Written informed consent was obtained from all participants prior to completing their study visit. This study protocol was approved by Research Ethics Boards of Simon Fraser University (2011s0691), University of British Columbia/Providence Health (H11-00691), and the University of Victoria (11-459).

Outcomes: Partner age difference

To determine factors associated with sexual partners of self-assessed relative age difference participants were asked, “What is the approximate age of this sex partner compared with your age?” without any numeric anchors for each of their five most recent sexual partners in the past 6 months. We used two outcomes with three levels each including: 1) “same-age” (referent) versus “younger” or “much-younger”, and 2) “same-age” (referent), versus “older”, or “much-older”.

Explanatory Factors

Independent variables included socio-demographics including age, race/ethnicity, sexual orientation, neighbourhood, annual income, and current relationship status. HIV variables included having been tested in the past 2 years and clinically-confirmed HIV status. Event-level sexual behaviour variables included length of time since first sexual encounter for each sexual partner, the number of sex acts with each sexual partner in the past 6 months, where they met each sexual partner, and about transactional sex exchange (giving or receiving) during their reported sexual event. Participants reported their own substance use and their

partners' substance use during or within 2 hours of sex. Sexual event-level sexual behaviours by sexual position included any insertive or receptive anal sex, and if so, whether a condom was used and their awareness of their partner's HIV status. This results is two four-level variables for each sexual position: no insertive/receptive anal sex, condom-protected insertive/receptive anal sex, condomless insertive/receptive anal sex with a sero-concordant partner, and condomless insertive/receptive anal sex with a sero-discordant or unknown HIV status partner.

Psychosocial measures were assessed using a number of previously validated scales. Van de Ven's 2000 HIV treatment optimism-scepticism scale (range=12–48, with higher scores indicating greater treatment optimism, study Cronbach's $\alpha = 0.85$) asked participants to respond on a 4-point Likert-scale to 12 statements regarding viral load testing and HIV treatment.[17] McKirnan's 2001 Escape Motive Scale range=12–48, with higher scores indicating greater sexual escapism, study Cronbach's $\alpha = 0.90$), asked participants about perceptions regarding their sexual behavioural practices.[18] Other psychosocial measures included Kalichman and Rompa's 1995 sexual sensation seeking (revised) (range=11–44, study Cronbach's $\alpha = 0.73$, higher scores indicating higher sexual sensation seeking),[19] and an adapted version of Rosenburg's 1965 self-esteem scale (range=0–21, higher scores indicating lower self-esteem, study Cronbach's $\alpha = 0.87$).[20]

Statistical analysis

Individual-level and event-level descriptive statistics were generated. To account for interdependent responses by participants and their partners, bivariate and multivariable generalized linear mixed modeling with logit link function was used to identify factors associated with progressive increases in subjective measures of self-reported partner age difference for each of younger and older partnerships (3-level ordinal outcome). SAS® Version 9.4 PROC GLIMMIX procedure created separate models for younger and older partners, both compared with same-aged partners. A RDS recruitment chain clustering variable was added to the model to account for interdependence introduced through the recruitment strategy.[15] Explanatory variables of interest were selected from the univariate models for inclusion into the multivariate models, using a backward methodology based on Akaike information criterion (AIC) minimization. Age and HIV status interactions were tested at the univariable and multivariable level.

RESULTS

Overall, 719 GBM reported 2,513 sexual events with up to their 5 most recent sexual partners. A minority of sexual encounters were with same-aged partners (35.3%). The majority (66.7%) of reported sexual encounters were with age-disparate partners, either younger (25.4%), much-younger (7.4%), older (25.5 %) or much-older (6.5%). Table 1 presents overall descriptive statistics for the individual- and event-level factors. Participants had a median age of 33 years (Q1,Q3: 26,47), and the majority identified as gay (85.1%), White (75.0%), had some post-secondary education (77.6%), made less than $30,000 CAD per year (63.6%), had no current partner (62.0%), tested for HIV in the past 2 years (60.5%), and were HIV-negative (72.3%). The median number of anal sex events reported with each

partner in the past 6 months was 1 (Q1,Q3: 0,3). There were 764 (30.5%) events where no anal sex was reported, 619 (24.7%) where only receptive anal sex was reported, 637 (25.4%) where only insertive anal sex was reported, and 357 (14.2%) events where both receptive and insertive anal sex were reported. Overall, 294 (11.7%) condomless receptive anal sexual events were reported with a sero-discordant or unknown partner and 267 (10.6%) condomless insertive anal sexual events were reported with a sero-discordant or unknown partner.

Table 2 shows descriptive statistics reported among same-aged (n=886) and much-younger partners (n=185), and the results from a univariable ordinal regression analysis. Compared with men with sexual partners about the same age as themselves, men reporting much younger partners were on average more likely to be older (47 versus 31), live downtown Vancouver (64.3% versus 47.9%), and make over $30,000 CAD/year (52.4% versus 35.0%). Treatment optimism scores were higher among those reporting younger partners compared to same-aged partners. In the univariable analysis of younger partners, there was no statistically significant differences in reported number of anal sex events, insertive anal sex, and receptive anal sex. In the multivariable model, men with younger partners were significantly less likely to meet at a sexualized space (AOR=0.69, 95%CI=0.50-0.94) and more likely to have an annual income of greater than $30,000 (AOR=1.59, 95%CI=1.18-2.13).

Table 3 shows descriptive statistics of events reported among same-aged (n=886), and much older partners (n=162), and the univariable and multivariable ordinal analyses of factors associated with having an older partner. Compared with men with sexual partners about the same age as themselves, men reporting older partners were on average more likely to be younger (26 versus 31), Asian (14.8% versus 8.4%), HIV-negative (83.3% versus 72.5%), to have received something for sex (16.1% versus 3.3%), to have met their partner online (55.6% versus 45.2%) and to report their partner using EDD (13.0% versus 5.7%). Univariable results found men reporting older sexual partners were more likely to report any receptive anal sex and less likely to report any insertive anal sex, compared to GBM with same-aged sexual partners. No statistically significant difference was found between number of anal sexual events reported in the last 6 months among men with older compared to same-aged sexual partners. In the adjusted model factors positively associated with having older partners included being Asian versus White, Latino versus White, having increased cognitive escape scores, receiving something for sex, and reporting a partner using EDD. Furthermore, men with older partners were more likely to report no event level insertive anal sex, or condomless insertive anal sex compared to condom protected insertive anal sex. Sexual encounters with older partners were negatively associated with being bisexual versus gay, giving something for sex, and using event-level EDD.

After controlling for significant variables in each of the respective multivariable models, interactions between age and HIV status were significant. Older HIV-negative GBM were more likely to be with younger partners (AOR=1.10,95%CI:1.08–1.12) than older HIV-positive GBM (AOR=1.06,95%CI:1.03–1.10) (refer to Figure 1, left panel) while younger HIV-positive GBM were more likely to be with older partners (AOR=0.92,95%CI:0.89–

0.95) than younger HIV-negative GBM (AOR=0.96,95%CI:0.95–0.98) (refer to Figure 1, right panel).

DISCUSSION

The majority of sexual events reported within this study were among men of different ages. Of those, only 7.4% and 6.4% were with much younger and much older, respectively. Partnerships with wider age discrepancies were more common among GBM self-identifying as Asian or Latino as well as younger HIV-positive and older HIV-negative GBM. An important univariable result was that those reporting older sexual partners were more likely to report receptive anal sex. However, at the multivariable level a variable on condom use and sero-concordency during receptive anal sex was not selected. With older partners, participants were more likely to report comdomless insertive anal sex with a sero-discordant or unknown status partner. This important finding adds to the limited research highlighting heightened sexual risk for young GBM involved in age-disparate partnerships.[59] Given our broad population sampling, we expected reciprocal reporting between men with younger and older partners. However, some of our findings were complimentary and others were discrepant. Event-level alcohol- and EDD-use were found to be reciprocal; and discrepant results indicated that those with older partners were nearly four times more likely to have received something for sex, compared with same-aged partners, while men with younger partners did not report any statistically different levels of giving something for sex.

Our results further present discrepancies surrounding the reporting of HIV risk-behaviour (e.g. sero-sorting, sexual positioning, partner status disclosure, and condom use during anal intercourse). There are a number of potential reasons for these discrepancies that have important methodological and epidemiological implications: 1) men with younger and older partners perceive age discrepancies between themselves and their sexual partners differently, 2) our recruitment strategy and 5 partner matrix included in the questionnaire may not have captured the older partners of participants receiving transactional money, drugs or goods and HIV-risk behaviours (e.g. insertive or receptive CAS with sero-discordant or unknown HIV status), and 3) event-level sexual behaviours (e.g. sexual positioning and condom use) may have been reported differently for those involved in transactional sexual exchanges. For example, those receiving transactional sexual exchanges may be in a lower position of power to question their sexual partners about HIV status compared to those giving. To increase understandings of the mediating factors between transactional sex and HIV-acquisition, future analyses should explore reasons for inconsistencies in reporting.

Strengths and weaknesses of the study

This event-level ordinal analysis included a large number of sexual encounters among men reporting subjective age difference (younger and older) with up to 5 partners in the past 6 months. Our findings add to a limited body of literature examining intergenerational sex among GBM and present a number of important socio-demographic, psychosocial, relational and sexual behavioural factors associated with having age-disparate partners. The unique sampling strategy which included community mapping and RDS incentive-based strategies [13] allowed us to capture diverse sexual networks; however, results may not be

representative of the entire Vancouver GBM population. Furthermore, we did not explicitly ask about partnership dynamics within the event-level matrix, which limits our ability to distinguish between partnership types across the age-disparate relationships. Analysis used baseline cross-sectional data; therefore, it is not possible to determine directionality or causality in our findings.

Age, HIV-Status and Sexual Risk

When testing for an interaction between HIV-status and age we found younger HIV-positive men more likely to have older sexual partners compared with younger-aged HIV-negative men. Older-aged HIV-negative men were more likely to engage in sexual relationships with younger men compared with older HIV-positive men. Previous research indicated that compared with older GBM, younger positive GBM are less likely to be engaged in HIV care and virally suppressed.[23] These findings have important epidemiological and public health implications that may threaten current treatment as prevention efforts within GBM,[2425] and may further run contrary to typical intergenerational trends where older partners are assumed to be the index patient in HIV transmission between sero-discordant couples.[26] Our results, and discrepancies in the reporting of sexual event-level behaviours, highlight an important area for future research to identify population level trends in HIV transmission, as well as key targets for HIV prevention efforts within GBM sexual networks.

Transactional Sex and Relationship Power

Participants with older partners reported significantly higher levels of receiving goods, money or drugs for sex compared with same-aged partners, which has previously been found to increase HIV seroconversion odds among GBM globally.[1227] Due to highly ‘ageist’ norms and attitudes within GBM communities, young men may hold greater sexual power in age-disparate relationships.[728] This runs contrary to traditional notions of power where younger partners are often economically dependent and have reduced agency in sexual decision-making within their sexual relationships, including the ability to question partner’s HIV status and negotiate condom use, with older men.[522] Goltz and colleagues, 2014, found older GBM strongly desire younger partners and are willing to pay for this “commodity”, yet may feel “foolish, pathetic, and ridiculous” for engaging in these behaviours (p. 1512).[28] More research is needed to explore the dyadic nature of power and transactional sexual exchanges within intergenerational partnerships and the implications that it holds in the context of HIV-risk.

Ethnicity

Compared with White participants, those of self-reported Asian or Latino ethnicities were more likely to report having older partners. This finding aligns with previous work that found ethnic minority GBM were more likely to engage in age-disparate sexual partnerships,[529] and that Asian GBM preferred mature partners when choosing online dates.[30] While previous research has found that Asian GBM are generally younger and less likely to be living with HIV,[31] the number of new HIV cases among GBM in British Columbia has increased among self-identified Asian GBM (from 5.3% in 2004 to 18.1% in 2012).[4] Through increased immigration of Asian people to Canada, as well rural to urban migration, [32] Asian GBM in Vancouver make up an increasingly greater proportion of the

population. As the number of HIV cases reported among Asian GBM has increased, it is imperative that research and prevention efforts be aimed at understanding relationship dynamics and HIV risk-behaviour among young Asian men engaged in intergenerational relationships.

Implications

Our findings provide insight into subjective age differences among younger and older GBM, which are important for informing public health understanding and targeting of age- and culturally-appropriate interventions. Traditionally within the global HIV literature, intergenerational relationships are often framed as risky, which perpetuates HIV stigma and generational discrimination between younger and older GBM.[5622] Ageism and broken connections between generations result in missed opportunities for important community connectedness and peer support,[42628] as mentorship relationships between older and younger GBM often have positive social- and community-level benefits beyond sexual relationship satisfaction.[3334] Furthermore, our finding regarding increased odds of intergenerational partnerships among Asian and Latino GBM in Vancouver has important implications, and highlight a need for increased sexual health promotion messaging and further research examining sexual relationships and behaviour partners among racial and ethnical minorities of GBM. It is imperative that interventions and community initiatives aim to combat deeply entrenched age- and HIV- related stigma through the promotion of positive and safe sexual relationships between GBM of all ages, ethnicities, regardless of HIV status. As participants reporting younger and older partners were more likely to meet via the Internet, this may be an important point for interventions. The combination of peer- and internet-based methods should be further explored to improve community dynamics, bridging generational divides,[35] and promote the uptake of HIV prevention behaviours including sero-adaptive strategies, condom use and improved treatment uptake and adherence for young positive men within age-disparate partnerships in GBM communities.

CONCLUSIONS

We found younger HIV-positive GBM as well as Asian and Latino GBM were more likely to have older partners while older HIV-negative men were more likely to have younger partners. In line with the literature, those with older partners were more likely to report sexual encounters with greater potential for HIV transmission (e.g. condomless insertive anal sex with partners of sero-discordant or unknown HIV status). However, caution should be taken in framing these relationships as “risky”. Further research is needed to examine discrepancies in event-level reporting of behaviours such as CAS and transactional sexual exchanges between younger and older partners that run contrary to accepted epidemiological trends, and notions of power. Increased efforts are needed to reduce stigma surrounding age-disparate partnerships and promote positive and safer sexual relationships between younger and older GBM.

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Key Messages

1. Gay, bisexual and other men who have sex with men (GBM) reported one-third of their sexual partners as older and another third as younger
2. Condomless anal sex was more likely with older partners who were sero-discordant or whose HIV status was unknown
3. Age disparate relationships were more common among younger men living with HIV and older HIV-negative men
4. Sexual health promotion, which includes condom use and sero-adaptive strategies, should further support positive and safe sexual relationships between younger and older GBM.

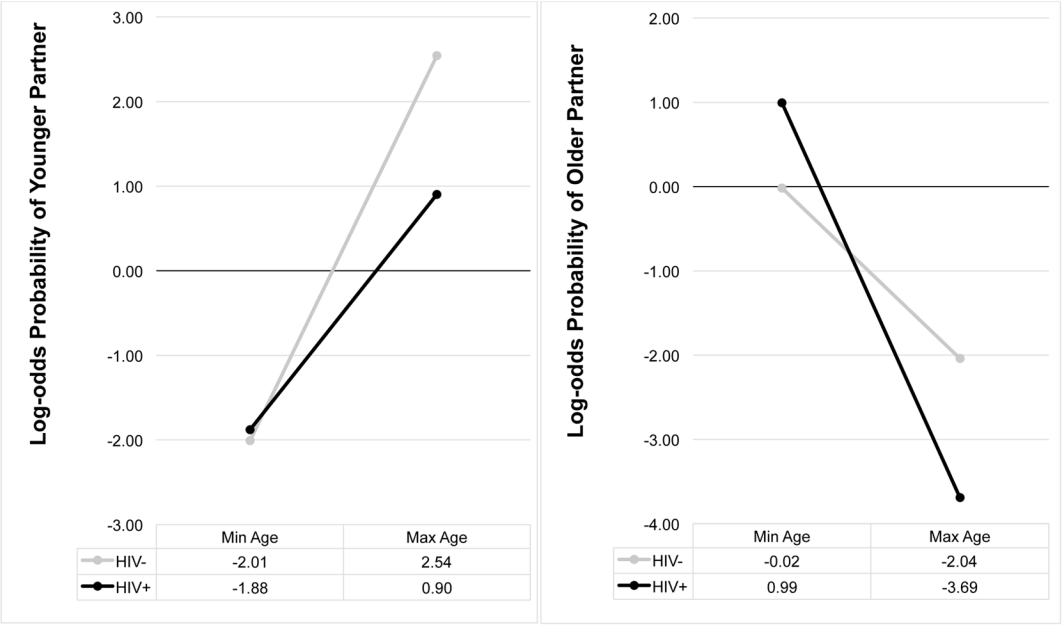

Figure 1.

HIV status and age interaction in men reporting younger partners (**left)** and HIV status and age interaction in men reporting older partners (**right**) after controlling for other variables in each respective multivariable model.

Table 1

Sample descriptive statistics of demographic, behavioural and attitudinal factors at the individual (n=719) and event-level (n=2513) among men participating in the Momentum Health Study.

	Individuals (n=719)		Events (n=2513)	
	n	%	n	%
INDIVIDUAL-LEVEL FACTORS				
Age: median (Q1, Q3)	*33*	*(26, 47)*	*32*	*(25,46)*
Sexual Identity				
Gay	612	85.1	2185	87.0
Bisexual	66	9.2	194	7.7
Other	41	5.7	134	5.3
Ethnicity				
White	539	75.0	1899	75.6
Asian	72	10.0	264	10.5
Aboriginal	50	7.0	133	5.3
Latino	31	4.3	93	3.7
Other	27	3.8	124	4.9
Neighbourhood				
Downtown	356	49.5	1237	49.2
Vancouver	223	31.0	785	31.2
Outside Vancouver	140	19.5	491	19.5
Education				
Completed high school or less	158	22.4	480	19.5
Some post-secondary	547	77.6	1988	80.6
Annual Income				
<30K	457	63.6	1530	60.9
≥30K	262	26.4	983	39.1
Tested for HIV in the past 2 years				
No	89	12.4	278	11.1
Yes	435	60.5	1587	63.2
Self-reported Positive	195	27.1	648	25.8
HIV Status				
Negative	520	72.3	1677	66.7
Positive	199	27.7	648	25.8
HIV Treatment Optimism Scale (Median Q1, Q3)	*25*	*21,28*	*24*	*21,28*
Sexual Sensations Scale (Median Q1, Q3)	*31*	*28,34*	*31*	*28–34*
Escape Motives Scale (Median Q1, Q3)	*29*	*25,33*	*29*	*25–33*
Self-Esteem Scale (Median Q1, Q3)	*7*	*3,9*	*7*	*4–9*
EVENT-LEVEL FACTORS				
Length since first sex (Median Q1, Q3)			*4*	*1,17*
Number of times had anal sex with partner in the last 6 months (L6M) (Median Q1, Q3)			*1*	*0, 3*
Where partner was first met				

	Individuals (n=719)		Events (n=2513)	
	n	%	n	%
Online			1222	48.8
Sexualized space			500	20.0
Non-sexualized space			569	22.7
Other			214	8.5
Transactional Sex Factors				
Gave something for sex (ref: didn't give)			34	1.4
Received something for sex (ref: didn't receive)			112	4.5
Substance Use (by participant, ref: none**)**				
Any alcohol			891	35.7
Any marijuana			584	23.5
Any poppers			452	18.2
Any erectile dysfunction drug (EDD)			243	9.8
Any crystal methamphetamine			209	8.4
Any gamma hydroxyl-butyrate (GHB)			117	4.7
Any ecstasy/MDMA			88	3.5
Substance Use (by partner, ref: none)				
Any alcohol			827	38.3
Any marijuana			493	23.9
Any poppers			450	20.8
Any erectile dysfunction drug (EDD)			125	6.4
Any crystal methamphetamine			190	9.5
Any gamma hydroxyl-butyrate (GHB)			106	5.3
Any ecstasy/MDMA			72	3.6
Ever had al sex with each partner				
No anal sex			764	30.5
Only receptive			619	24.7
Only insertive			637	25.4
Both receptive and insertive			484	19.3
Receptive Anal Sex				
None			1481	58.9
Yes, with condom			468	18.6
Yes, condomless with sero-concordant partner			270	10.7
Yes, condomless with with sero-discordant/unknown partner			294	11.7
Insertive Anal Sex				
None			1524	60.6
Yes, with condom			436	17.4
Yes, condomless with sero-concordant partner			286	11.4
Yes, condomless with sero-discordant/unknown partner			267	10.6

Items in italics are continuous measures

Table 2

Descriptive statistics of events of same-aged (n=886), and much younger partners (n=185) and ordinal univariate regression results of sexual events reported among men in the Momentum Health Study

	Much younger (n=185)		About the same (n=886)		OR (95%CI)
	n	%	n	%	
INDIVIDUAL-LEVEL FACTORS					
Age: median (Q1, Q3)	*47*	*(39, 54)*	*31*	*(25,45)*	*1.06 (1.05–1.08)*
Sexual Identity					
Gay	165	89.5	752	84.9	1.00
Bisexual	16	8.7	83	9.4	0.85 (0.50–1.45)
Other	4	2.2	51	5.8	0.44 (0.21–0.94)
Ethnicity					
White	152	82.2	694	78.3	1.00
Asian	15	8.1	74	8.4	0.96 (0.57–1.62)
Aboriginal	8	4.3	52	5.9	0.58 (0.28–1.22)
Latino	2	1.1	43	4.9	1.49 (0.67–3.28)
Other	8	4.3	23	2.6	0.76 (0.36–1.58)
Neighbourhood					
Downtown	119	64.3	424	47.9	1.00
Vancouver	31	16.8	301	34	0.53 (0.37–0.75)
Outside Vancouver	35	18.9	161	18.2	0.84 (0.56–1.25)
Education					
Completed high school or less	25	14	184	21	1.00
Some post secondary	154	86	694	79	1.31 (0.89–1.92)
Annual Income					
< 30K	88	47.6	576	65	1.00
≥ 30K	97	52.4	310	35	2.00 (1.47–2.71)
Tested for HIV in the past 2 years					
No	18	9.7	109	12.3	1.00
Yes	113	61.1	538	60.7	1.14 (0.70–1.85)
Self-reported Positive	54	29.2	239	27	1.44 (0.85–2.44)

	Much younger (n=185)		About the same (n=886)		OR (95%CI)
	n	%	n	%	
HIV Status					
Negative	131	70.8	642	72.5	1.00
Positive	54	29.2	244	27.5	1.24 (0.89–1.75)
HIV Treatment Optimism Scale: median (Q1, Q3)	*25*	*(22, 31)*	*24*	*(21, 28)*	*1.03 (1.01–1.06)*
Sexual Sensations Scale: median (Q1, Q3)	*31*	*(29, 34)*	*31*	*(28, 34)*	*1.00 (0.97–1.03)*
Escape Motives Scale: median (Q1, Q3)	*30*	*(25, 34)*	*29*	*(25, 33)*	*1.00 (0.98–1.02)*
Self-Esteem Scale: median (Q1, Q3)	*7*	*(4, 10)*	*7*	*(3, 9)*	*1.01 (0.97–1.04)*
EVENT-LEVEL FACTORS					
Length since first sex: median (Q1, Q3)	*3*	*(1, 10.5)*	*4*	*(1, 15)*	*1.00 (1.00–1.00)*
Number of anal sex acts with partner in the past 6 months (P6M): median (Q1, Q3)	*1*	*(0, 3)*	*1*	*(0, 3)*	*1.00 (0.99–1.01)*
Where partner was first met					
Online	99	53.8	399	45.2	1.00
Sexualized space	29	15.8	194	22	0.77 (0.56–1.07)
Non-sexualized space	36	19.6	226	25.6	0.87 (0.65–1.18)
Other	20	10.9	64	7.3	1.27 (0.82–1.98)
Transactional Sex Factors					
Gave something for sex (ref: didn't give)	6	3.3	11	1.2	1.90 (0.76–4.76)
Received something for sex (ref: didn't receive)	4	2.2	29	3.3	0.70 (0.34–1.44)
Substance Use (by participant) (ref: none)					
Any alcohol	57	36.5	308	40.4	0.81 (0.63–1.04)
Any marijuana	33	21	181	24.8	0.94 (0.69–1.28)
Any poppers	33	20.1	151	19.7	0.95 (0.68–1.32)
Any EDD	6	4.1	40	5.7	1.42 (0.94–2.13)
Any crystal methamphetamine	21	14.3	52	7.4	1.54 (0.96–2.46)
Any GHB	6	4.1	33	4.7	1.21 (0.66–2.20)
Any ecstasy/MDMA	6	4.1	22	3.1	0.64 (0.33–1.26)
Substance Use (by partner) (ref: none)					
Any alcohol	57	36.5	308	40.4	0.94 (0.73–1.22)
Any marijuana	33	21	181	24.8	0.91 (0.67–1.24)
Any poppers	33	20.1	151	19.7	1.15 (0.83–1.59)

	Much younger (n=185)		About the same (n=886)		OR (95%CI)
	n	%	n	%	
Any EDD	6	4.1	40	5.7	0.75 (0.41–1.38)
Any crystal methamphetamine	21	14.3	52	7.4	1.48 (0.90–2.44)
Any GHB	6	4.1	33	4.7	0.94 (0.50–1.75)
Any ecstasy/MDMA	6	4.1	22	3.1	0.88 (0.43–1.79)
Any Receptive Anal Sex (ref: none)	61	33.0	355	40.1	0.82 (0.64–1.05)
Receptive Anal Sex					
None	124	67.0	531	59.9	1.31 (0.95–1.81)
Yes, with condom	26	14.1	174	19.6	1.00
Yes, condomless with sero-concordant partner	17	9.2	92	10.4	1.12 (0.70–1.77)
Yes, condomless with sero-discordant/unknown partner	18	9.7	89	10.1	1.19 (0.76–1.86)
Any Insertive Anal Sex (ref: none)	86	46.5	355	40.1	1.17 (0.92–1.48)
Insertive Anal Sex					
None	99	53.5	531	59.9	0.82 (0.61–1.12)
Yes, with condom	41	22.2	161	18.2	1.00
Yes, condomless with sero-concordant partner	11	6.0	107	12.1	0.74 (0.48–1.15)
Yes, condomless with sero-discordant/unknown partner	34	18.4	87	9.8	1.18 (0.76–1.81)

Items in italics are continuous measures

EDDs, erectile dysfunction drugs; GHB, gamma hydroxyl-butyrate.

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Table 3

Descriptive statistics of events of same-aged (n=886), and much older partners (n=162) and ordinal univariate regression results of sexual events reported among men in the Momentum Health Study

	Much older (n=162)		About the same (n=886)		OR (95%CI)	aOR (95%CI)
	n	%	n	%		
INDIVIDUAL-LEVEL FACTORS						
Age: median (Q1, Q3)	*26*	*(23,33)*	*31*	*(25,45)*	*0.95 (0.94–0.96)*	
Sexual Identity						
Gay	137	84.6	752	84.9	1.00	1.00
Bisexual	6	3.7	83	9.4	0.55 (0.33–0.91)	0.41 (0.24–0.71)
Other	19	11.7	51	5.8	1.56 (0.93–2.63)	1.59 (0.95–2.66)
Ethnicity						
White	107	66.1	694	78.3	1.00	1.00
Asian	24	14.8	74	8.4	2.00 (1.33–3.00)	1.84 (1.23–2.75)
Aboriginal	10	6.2	52	5.9	1.37 (0.81–2.34)	1.43 (0.84–2.43)
Latino	7	4.3	43	4.9	2.45 (1.21–4.93)	2.31 (1.16–4.59)
Other	14	8.6	23	2.6	1.20 (0.66–2.18)	1.13 (0.62–2.04)
Neighbourhood						
Downtown	73	45.1	424	47.9	1.00	
Vancouver	56	34.6	301	34	1.07 (0.80–1.44)	
Outside Vancouver	33	20.4	161	18.2	1.24 (0.87–1.75)	
Education						
Completed high school or less	40	25	184	21	1.00	
Some post secondary	120	75	694	79	0.99 (0.72–1.37)	
Annual Income						
<30K	95	58.6	576	65	1.00	
≥ 30K	45	27.8	310	35	0.86 (0.65–1.13)	
Tested for HIV in the past 2 years						
No	12	7.4	109	12.3	1.00	
Yes	123	75.9	538	60.7	1.39 (0.88–2.20)	
Self-reported positive	27	16.7	244	27.5	0.81 (0.48–1.36)	

	Much older (n=162)		About the same (n=886)		OR (95%CI)	aOR (95%CI)
	n	%	n	%		
HIV Status						
Negative	135	83.3	642	72.5	1.00	
Positive	27	16.7	244	27.5	0.64 (0.48–0.87)	
HIV Treatment Optimism Scale: median (Q1, Q3)	*25*	*(21,28)*	*24*	*(21,28)*	*1.01 (0.98–1.04)*	
Sexual Sensations Scale: median (Q1, Q3)	*31*	*(29,35)*	*31*	*(28,34)*	*1.02 (0.99–1.06)*	
Cognitive Escape Scale: median (Q1, Q3)	*29*	*(26,35)*	*29*	*(25,33)*	*1.02 (1.00–1.04)*	*1.02 (1.00–1.04)*
Self-Esteem Scale: median (Q1, Q3)	*7*	*(5, 9)*	*7*	*(3, 9)*	*1.03 (0.99–1.07)*	
EVENT-LEVEL FACTORS						
Length since first sex: median (Q1, Q3)	*5*	*(2, 16)*	*4*	*(1, 15)*	*1.00 (1.00–1.00)*	
Number of anal sex acts with partner in the past 6 months (P6M): median (Q1, Q3)	*1*	*(1, 4)*	*1*	*(0, 3)*	*1.00 (0.99–1.01)*	
Where partner was first met						
Online	89	55.6	399	45.2	1.00	
Sexualized Space	27	16.9	194	22	0.73 (0.54–0.98)	
Non-sexualized Space	31	19.4	226	25.6	0.67 (0.51–0.89)	
Other	13	8.1	64	7.3	0.99 (0.65–1.49)	
Transactional Sex Factors						
Gave something for sex (ref: didn't give)	0	0	11	1.2	0.42 (0.13–1.44)	0.27 (0.08–0.96)
Received something for sex (ref: didn't receive)	26	16.1	29	3.3	3.99 (2.41–6.60)	3.75 (2.30–6.13)
Substance Use (by participant) (ref: none)						
Any alcohol	53	38.4	308	40.4	0.73 (0.58–0.93)	0.72 (0.56–0.91)
Any marijuana	23	17.6	181	24.8	0.69 (0.51–0.94)	
Any poppers	40	29.2	151	19.7	1.14 (0.85–1.54)	
Any EDD	16	13	40	5.7	0.68 (0.44–1.05)	0.55 (0.32–0.96)
Any crystal methamphetamine	16	12.1	52	7.4	1.10 (0.70–1.71)	
Any GHB	9	6.8	33	4.7	1.33 (0.79–2.23)	
Any ecstasy/MDMA	10	7.6	22	3.1	1.15 (0.64–2.08)	
Substance Use (by partner) (ref: none)						
Any alcohol	53	38.4	308	40.4	0.82 (0.64–1.04)	
Any marijuana	23	17.6	181	24.8	0.82 (0.62–1.10)	
Any poppers	40	29.2	151	19.7	1.17 (0.87–1.59)	

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	Much older (n=162)		About the same (n=886)		OR (95%CI)	aOR (95%CI)
	n	%	n	%		
Any EDD	16	13	40	5.7	2.15 (1.31–3.53)	3.82 (2.12–6.88)
Any crystal methamphetamine	16	12.1	52	7.4	1.53 (0.97–2.42)	
Any GHB	9	6.8	33	4.7	1.23 (0.72–2.09)	
Any ecstasy/MDMA	10	7.6	22	3.1	1.49 (0.79–2.81)	
Any Receptive Anal Sex (ref: none)	83	51.2	355	40.1	1.26 (1.01–1.57)	Not Included *
Receptive Anal Sex						
None	79	48.8	531	59.9	0.9 (0.68–1.18)	
Yes, with condom	33	20.4	174	19.6	1.00	
Yes, condomless with sero-concordant partner	17	10.5	92	10.4	1.16 (0.77–1.73)	
Yes, condomless with sero-discordant/unknown partner	33	20.4	89	10.1	1.36 (0.92–2.02)	
Any Insertive Anal Sex (ref: none)	58	35.8	355	40.1	0.79 (0.63–0.99)	Not Included *
Insertive Anal Sex						
None	104	64.2	531	59.9	1.60 (1.17–2.19)	1.67 (1.21–2.30)
Yes, with condom	15	9.3	161	18.2	1.00	1.00
Yes, condomless with sero-concordant partner	15	9.3	107	12.1	1.36 (0.87–2.10)	1.37 (0.87–2.18)
Yes, condomless with sero-discordant/unknown partner	28	17.3	87	9.8	1.75 (1.13–2.72)	1.80 (1.15–2.83)

* Items were not included in the final multivariate model due to collinearity.

Items in italics are continuous measures

EDDs, erectile dysfunction drugs; GHB, gamma hydroxyl-butyrate.