



# Love with HIV: A Latent Class Analysis of Sexual and Intimate Relationship Experiences Among Women Living with HIV in Canada

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## Abstract

Love remains hidden in HIV research in favor of a focus on risk. Among 1424 women living with HIV in Canada, we explored (1) whether eight facets of sex and intimacy (marital status, sexual activity, physical intimacy, emotional closeness, power equity, sexual exclusivity, relationship duration, and couple HIV serostatus) may coalesce into distinct relationship types, and (2) how these relationship types may be linked to love as well as various social, psychological, and structural factors. Five latent classes were identified: no relationship (46.5%), relationships without sex (8.6%), and three types of sexual relationships—short term (15.4%), long term/unhappy (6.4%), and long term/happy (23.2%, characterized by equitable power, high levels of physical and emotional closeness, and mainly HIV-negative partners). While women in long-term/happy relationships were most likely to report feeling love for and wanted by someone “all of the time,” love was not exclusive to sexual or romantic partners and a sizeable proportion of women reported affection across latent classes. Factors independently associated with latent class membership included age, children living at home, sexism/genderism, income, sex work, violence, trauma, depression, HIV treatment, awareness of treatment’s prevention benefits, and HIV-related stigma. Findings reveal the diversity of women’s experiences with respect to love, sex, and relationships and draw attention to the sociostructural factors shaping intimate partnering in the context of HIV. A nuanced focus on promoting healthy relationships and supportive social environments may offer a more comprehensive approach to supporting women’s overall sexual health and well-being than programs focused solely on sexual risk reduction.

**Keywords** Love · Sex · Relationships · Power · Feminism · Women · HIV

## Introduction

Positive aspects of sexual experience such as love are often invisible in the context of HIV. Silenced by public health discourses of danger and disease, existing research on sexuality among women living with HIV has primarily centered on preventing the transmission of HIV to sexual partners. When other aspects of women’s sexual lives are considered, physical aspects of sexual health such as sexual behaviors and dysfunctions are prioritized over emotions and intimate relationships (Carter, Greene, et al., 2017). The right to love, however, has been taken up by affected communities on a global scale (AIDES, 2016; Becker, 2014; Caballero,

2016; Cardinal et al., 2014; Fratti, 2017; Life and Love with HIV, 2017; McClelland & Whitbread, 2016; Nicholson, Sanchez, Webster, & Carter, 2016; Petretti, 2017; Sanchez, Webster, Salters, Kaida, & Carter, 2017), most recently through #LovePositiveWomen, an annual social media campaign, started in 2013 by Jessica Whitbread, a woman living with HIV in Toronto, to engage in acts of love and appreciation for women living with HIV in the first 14 days of February (Whitbread, 2017). In this analysis, which was guided by critical feminist quantitative epistemology (Harnois, 2013; Sprague, 2016), we sought to support community efforts in shifting HIV and sexual health discourse to a more affirming place by highlighting the diverse experiences of love, sex, and relationships among a cohort of 1424 women living with HIV in Canada.

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52 **Conceptual Analysis**53 **What Constitutes Love, Sex, and Relationships?**

54 Love, sex, and relationships can mean different things between  
 55 (and among) different men and women (Faulkner, 2003; Peter-  
 56 son & Muehlenhard, 2007; Rule-Groenewald, 2013; Wentland  
 57 & Reissing, 2011, 2014). Often, these constructs are viewed  
 58 dichotomously, whereby love is thought of as an emotion (Rule-  
 59 Groenewald, 2013) and sex a physical act (Peterson & Mue-  
 60 hlenhard, 2007). The expression of both, however, can involve  
 61 a range of emotional and physical experiences (e.g., kissing,  
 62 cuddling, feeling wanted) that contribute to various kinds of rela-  
 63 tionships—sexual, platonic, committed, unattached, familial,  
 64 and so forth (Floyd, 2002; Gulledge, Gulledge, & Stahmann,  
 65 2003; Sassler, 2010). Within the context of intimate relation-  
 66 ships, however, love has been described as “different,” “intense,”  
 67 and, at times, “irrational” (Reis & Aron, 2008). While often  
 68 coupled with positive dynamics such as intimacy and passion,  
 69 love can also intersect with power, poverty, and violence (Bhana,  
 70 2013; Haysom, 2013; Holland, Ramazanoglu, et al., 1992; Rule-  
 71 Groenewald, 2013; Schäfer, 2008), making how we experience  
 72 love and intimate relationships multidimensional. This is also  
 73 the reason why feminist scholars, while committed to legitimiz-  
 74 ing research on love and its possibilities, remain simultaneously  
 75 focused on interrogating the potential risks of love through its  
 76 connection to power and patriarchy.

77 **Theorizing Experiences Within the Larger Social Context**  
78 **of Women's Lives**

79 For women, love is often idealized and marriage expected  
 80 (Msibi, 2011) owing to gender expectations about relation-  
 81 ships. For instance, Moran and Lee (2014a), writing in the  
 82 context of non-romantic sex among women, stressed how it  
 83 is frequently assumed that “everyone is in, or seeking, a life-  
 84 long, exclusive, committed, and loving relationship” (p. 221),  
 85 one that is stereotypically heterosexual. Without negating the  
 86 importance of long-term romantic relations for many women,  
 87 including those living with HIV (Squire, 2003), early feminist  
 88 scholars have argued that gender-based oppression on a struc-  
 89 tural level has the potential to be reflected in heterosexual love  
 90 relationships (Holland, Ramazonoglu, et al., 1992). Thus, a  
 91 feminist approach to research on this topic demands challenging  
 92 gender inequality and unearthing women’s expansive choices  
 93 around sexual pleasure (Fahs, 2014) and intimate relationships  
 94 (Bowleg, Lucas, & Tschann, 2004; Farvid & Braun, 2016),  
 95 including the decision to not have sex (Hayfield & Clarke,  
 96 2012) and to not date anyone (Bay-Cheng & Goodkind, 2016).

97 In the social context of HIV, these decisions are particularly  
 98 constrained for some women. This is, in part, because of histori-  
 99 cal discourses and criminal laws that have stigmatized love and

sex with HIV, positioning it as dirty, dangerous, and, under par-  
 ticular circumstances, even illegal (International Community  
 of Women Living with HIV/AIDS, 2015; Sontag, 1988). These  
 structural forms of oppression—together with heteronorma-  
 tive assumptions around gender, relationships, and sexuality—  
 carve out very specific conditions in HIV-positive women’s  
 sexual lives. Research by Gurevich, Mathieson, Bower, and  
 Dhayanandhan (2007), for example, highlighted many of these  
 impacts in terms of diminished sexual desire, satisfaction, and  
 freedom. Yet, this climate is at odds with recent policy state-  
 ments emphasizing the importance of sexual rights (World  
 Association for Sexual Health, 2014) and a growing body of  
 scientific literature showing that people who take combination  
 antiretroviral therapy (cART) as prescribed and achieve and  
 sustain viral load (VL) suppression have effectively no risk of  
 transmitting HIV to their HIV-negative partners (Prevention  
 Access Campaign, 2017; Rodger et al., 2016; Vernazza & Ber-  
 nard, 2016; Vernazza, Hirschel, Bernasconi, & Flepp, 2008). **AQ1**

**Literature Review: Key Findings and Issues**  
**Identified by Different Perspectives****Qualitative Research: Barriers to the Pursuit of Love, Sex,**  
**and Relationships**

Across diverse countries, ethnicities, and ages, a desire to find  
 love figures prominently in the narratives of women living with  
 HIV (Balaile, Laisser, Ransjo-Arvidson, & Hojer, 2007; Cooper,  
 Moore, & Mantell, 2013; Doyal & Anderson, 2005; Fair &  
 Albright, 2012; Grodensky et al., 2015; Gurevich et al., 2007;  
 Jarman, Walsh, & De Lacey, 2005; Keegan, Lambert, & Petrak,  
 2005; Nevedal & Sankar, 2015; Siegel, Schrimshaw, & Lekas,  
 2006; Squire, 2003). Sex also occupies an important place in  
 many, though not all, women’s lives (Gurevich et al., 2007;  
 Keegan et al., 2005; Siegel et al., 2006; Taylor et al., 2016).  
 However, findings from qualitative studies suggest women face a  
 number of interconnected barriers to pursuing pleasure (Closson  
 et al., 2015; Cooper et al., 2013; Cranson & Caron, 1998; Fair  
 & Albright, 2012; Gurevich et al., 2007; Jarman et al., 2005;  
 Keegan et al., 2005; Lawless, Crawford, et al. 1996; Lawless,  
 Kippax, et al., 1996; Maticka-Tyndale, Adam, & Cohen, 2002;  
 Mazanderani, 2012; Nevedal & Sankar, 2015; Persson, 2005;  
 Siegel et al., 2006; Siegel & Schrimshaw, 2003).

Despite medical advances, many women describe avoiding  
 sexual relationships or even flirting with others (which can often  
 give rise to gendered expectations of sex) because of persistent  
 fears of transmitting HIV to others (Closson et al., 2015; Cran-  
 son & Caron, 1998; Keegan et al., 2005; Nevedal & Sankar,  
 2015; Persson, 2005; Wamoyi, Mbonye, Seeley, Birungi, &  
 Jaffar, 2011). Disclosure to sexual partners and their possible  
 reactions, including stigma, abuse, rejection, and breach of  
 privacy, is also a source of tremendous anxiety (Closson et al.,  
 2015; Cooper et al., 2013; Doyal & Anderson, 2005; Fair &

- 150 Albright, 2012; Greenhalgh, Evangelini, Frize, Foster, & Fidler,  
151 2016; Gurevich et al., 2007; Jarman et al., 2005; Keegan et al.,  
152 2005; Maticka-Tyndale et al., 2002; Nevedal & Sankar, 2015;  
153 Persson, 2005; Psaros et al., 2012; Siegel et al., 2006; Siegel &  
154 Schrimshaw, 2003). This, combined with socially imposed feel-  
155 ings of undesirability, can lead some women to settle for less in  
156 current relationships (Gurevich et al., 2007; Jarman et al., 2005;  
157 Lawless, Crawford, et al. 1996). Importantly, however, other  
158 studies have highlighted positive counter-narratives, debunk-  
159 ing cultural myths that sex and romance is incompatible, even  
160 impossible, with HIV (Cooper et al., 2013; Grodensky et al.,  
161 2015; Psaros et al., 2012; Seeley et al., 2009; Siegel et al., 2006;  
162 Squire, 2003).
- 163 **Quantitative Research: Hidden Complexities of Intimate**  
164 **Relations Embedded in Social Context**
- 165 Quantitative research among women living with HIV, on the  
166 other hand, has tended to ignore love and the historical, cul-  
167 tural, and structural factors that may play a role in shaping its  
168 expression (Carter, Greene, et al., 2017). Additionally, and of  
169 particular relevance to current analysis, most studies have over-  
170 simplified the complexity of women's intimate relationships,  
171 reducing their experiences to a single construct (Carter, Greene,  
172 et al., 2017)—usually women's marital status or couple dynam-  
173 ics assumed to involve sexual risk, such as regular versus casual  
174 partners (Hankins, Gendron, Tran, Lamping, & Lapointe, 1997;  
175 Kaida et al., 2015) or mixed-status versus same-status relation-  
176 ships (Peltzer, 2011; Wessman et al., 2015). Very rarely have  
177 studies focused on pleasure, nor the risks women face from inti-  
178 mate partners, such as violence and unequal power dynamics  
179 (Beckerman & Auerbach, 2002; Gurevich et al., 2007; Persson,  
180 2005; Squire, 2003). To the best of our knowledge, the quanti-  
181 tative literature has also elided the issue that relationships are  
182 multidimensional, encompassing many dynamics—sexually,  
183 emotionally, socially, economically, corporeally, and spiritu-  
184 ally—all at once (Bowleg et al., 2004; Devries & Free, 2011;  
185 Farvid & Braun, 2016; Longfield, 2004; Moran & Lee, 2014a,  
186 2014b; Nelson, Morrison-Beedy, Kearney, & Dozier, 2011;  
187 Robertson et al., 2013; Sessler, 2010; Wentland & Reissing,  
188 2014).
- 189 While full heterogeneity in relationships is difficult to cap-  
190 ture statistically, one way to model how multiple dimensions  
191 of relationship context may intersect in meaningful ways is to  
192 use a person-centered approach like latent class analysis (LCA)  
193 (Lanza, Bray, & Collins, 2013). LCA is a statistical method that  
194 can uncover unobserved subgroups of people (i.e., latent classes)  
195 using multiple observed variables (i.e., data collected in ques-  
196 tionnaires) (Lanza et al., 2013). Unlike studies that use single  
197 measures, LCA offers a more holistic approach to understanding  
198 relationships by exploring the entire spectrum of sexual and  
199 intimate dynamics concurrently. This has been endeavored in  
200 a small number of studies outside the HIV field, though only
- among adolescents and young adults and solely in relation to  
sexual risk behaviors (Espinosa-Hernández & Vasilenko, 2015;  
Manlove, Welti, Wildsmith, & Barry, 2014; Vasilenko, Kugler,  
Butera, & Lanza, 2014; Vasilenko, Kugler, & Lanza, 2015).  
While there have been previous LCA studies among women  
living with HIV, including our own investigating patterns of sub-  
stance use (Carter, Roth, et al., 2017; Clum, Chung, Ellen, & The  
Adolescent Medicine Trials Network for HIV/AIDS Interventions,  
2009), to the best of our knowledge, no LCA studies have  
been conducted on sexual and intimate relationship patterns, let  
alone for the purposes of exploring positive aspects of sexuality.
- Analysis Objectives**
- The current analysis had two specific objectives. Using LCA  
applied to a cohort of 1424 women living with HIV in Canada,  
we explored (1) whether eight facets of sex and intimacy may  
coalesce into distinct relationship types; and (2) how these rela-  
tionship types may be linked to love as well as various social,  
psychological, and structural factors. In light of prior research  
and consistent with a feminist lens, we paid particular atten-  
tion to how sociostructural inequality may influence whether or  
not women were in relationships as well as the different types  
of relationships they experience. We had no prior hypotheses  
regarding latent class structure since LCA depends largely on  
model fit to the data. Further, while previous literature has illu-  
minated some of the ways in women's relational lives may be  
intertwined with love and social and cultural forces, these stud-  
ies did not examined predictors of latent classes.
- Method**
- Study Design**
- Data for this analysis came from the baseline questionnaire  
of the Canadian HIV Women's Sexual and Reproductive  
Health Cohort Study (CHIWOS, [www.chiwos.ca](http://www.chiwos.ca)). CHIWOS  
is grounded in community-based research principles (Israel,  
Schulz, Parker, & Becker, 1998), involving women living  
with HIV, academic researchers, care providers, and commu-  
nity agencies in all aspects of the research, from questionnaire  
design to data collection to publishing of results (Abelsohn et al.,  
2014; Kaida et al., 2014; Loutfy et al., 2016). Study inclusion  
was defined as cis, trans, and gender-diverse women living  
with HIV aged  $\geq 16$  years from British Columbia, Ontario, and  
Quebec, the three provinces where the majority (81%) of the  
16,600 women with HIV in Canada live (Public Health Agency  
of Canada, 2014).
- Between August 2013 and May 2015, 1424 women living  
with HIV were recruited into the study. To ensure diversity of  
lived experiences, we used a variety of recruitment methods:

247 35% were recruited from peers, 34% from HIV clinics, 19%  
 248 AIDS Service Organizations and non-HIV locations (e.g.,  
 249 shelters), and 12% from word of mouth, online networks (e.g.,  
 250 [www.facebook.com/CHIWOS](http://www.facebook.com/CHIWOS); [www.twitter.com/CHIWO](http://www.twitter.com/CHIWO)  
 251 [Sresearch](http://www.Sresearch.com)), and other methods (Webster et al., 2018). Follow-  
 252 ing screening and informed consent, Peer Research Associates  
 253 (women living with HIV with research training) administered  
 254 online questionnaires in English or French using FluidSurveys™  
 255 software. Baseline study visits lasted a median time of 120 min  
 256 (IQR 90–150) and took place either at clinic/community sites,  
 257 women's homes, or via phone/Skype. Participants received \$50  
 258 cash for their involvement. The study received ethical approval  
 259 from Simon Fraser University, University of British Columbia/  
 260 Providence Health Care, Women's College Hospital, and McGill  
 261 University Health Centre, as well as recruiting hospitals and  
 262 AIDS Service Organizations where required.

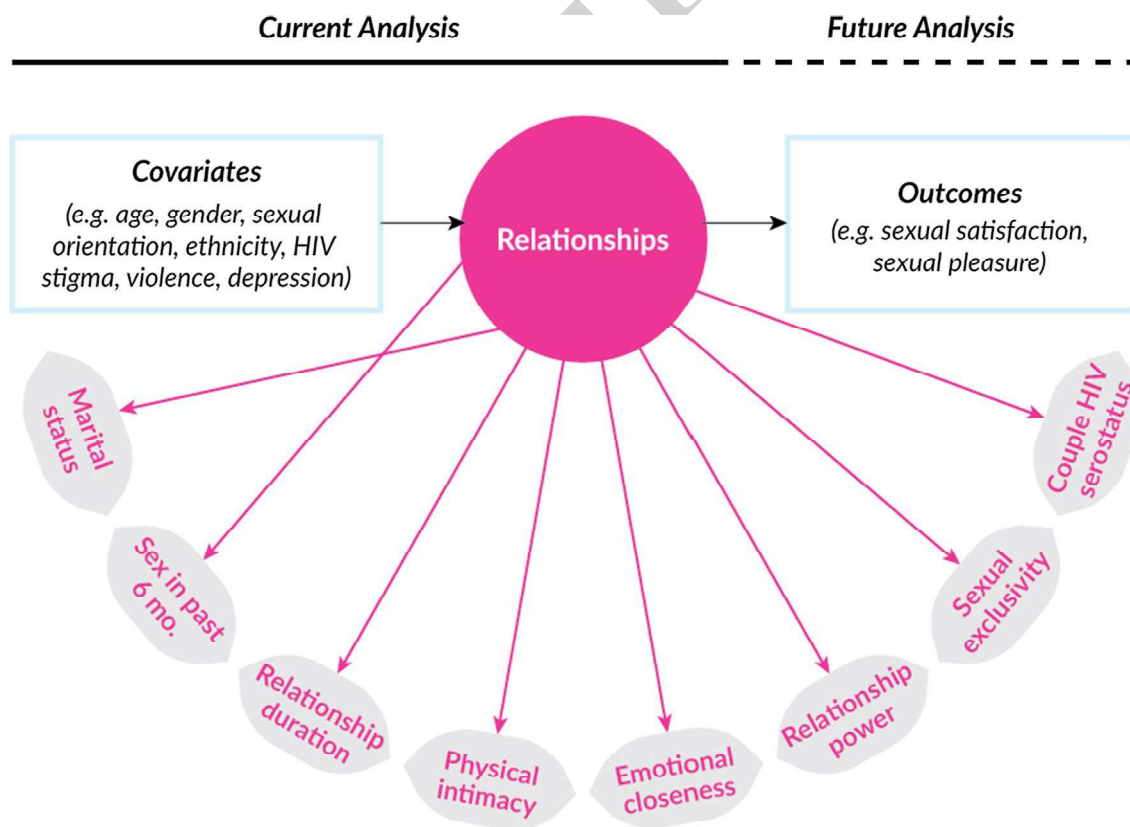
## 263 Analysis Variables

264 Figure 1 depicts the conceptual relationships between all  
 265 variables in this analysis, including the indicators and cor-  
 266 relates of latent class membership.

## Indicators of Latent Class Membership

267 We used seven sex and relationship measures for LCA, derived  
 268 from eight variables (Table 1). The first indicator was sexual  
 269 relationship status, resulting from a cross between two vari-  
 270 ables: current legal relationship status (single, separated,  
 271 divorced, or widowed vs. married, common law, or living-  
 272 apart relationship) and consensual oral, vaginal, or anal sex  
 273 with a regular partner of any gender in the past 6 months (no vs.  
 274 yes). In crossing these variables, we derived the four groupings  
 275 shown in Table 1, which, for simplicity, we called: no rela-  
 276 tionship (i.e., single, separated, divorced, or widowed and not  
 277 sexually active), relationship without sex (i.e., married, com-  
 278 mon law, or living-apart relationship and not sexually active),  
 279 unlabeled sexual relationship (i.e., single, separated, divorced,  
 280 or widowed and sexually active), and labeled sexual rela-  
 281 tionship (i.e., married, common law, or living-apart relationship  
 282 and sexually active).

283 The next two indicators measured contentment with physical  
 284 intimacy (“I feel content with how often I have sexual intimacy,  
 285 kissing, intercourse, etc. in my life”) and emotional closeness  
 286 (“I often feel I don't have enough emotional closeness in my  
 287 sex life”). Both items were from the Sexual Satisfaction Scale  
 288



**Fig. 1** A conceptual portrayal of latent class analysis of sexual and intimate relationship experiences among women living with HIV enrolled in CHIWOS, showing indicators (pink) and covariates (left

blue box) of latent class membership for the current analysis as well as positive and rewarding aspects of sexuality to be explored in a forthcoming analysis (right blue box)

**Table 1** Indicators of latent class membership, among women living with HIV enrolled in CHIWOS ( $N = 1334$ )

Variable	Code	Label	$n$ (%)
Sexual relationship status			
	1	No relationship	621 (47.7)
	2	Relationship without sex	112 (8.6)
	3	Unlabeled sexual relationship	249 (19.1)
	4	Labeled sexual relationship	320 (24.6)
	.	Missing	37
Content with sexual intimacy (kissing, intercourse, etc.)			
	1	Agree	461 (34.9)
	2	Disagree	238 (18.0)
	3	No relationship	621 (47.1)
	.	Missing	19
Not enough emotional closeness in sex life			
	1	Agree	370 (27.9)
	2	Disagree	334 (25.2)
	3	No relationship	621 (46.9)
	.	Missing	14
Duration of sexual relationship*			
	1	< 1 year	120 (9.3)
	2	1 year to < 3 years	118 (9.1)
	3	3 years or more	321 (24.8)
	4	Not asked	735 (56.8)
	.	Missing	45
Couple HIV serostatus*			
	1	Same-status	156 (12.0)
	2	Mixed-status (i.e., partner's status is HIV-negative/unknown)	410 (31.5)
	3	Not asked	735 (56.5)
	.	Missing	33
Sexual exclusivity in the past 6 months*			
	1	Multiple partners	118 (9.1)
	2	Monogamous	442 (34.3)
	3	Not asked	735 (56.7)
	.	Missing	44
Sexual relationship power*			
	1	High/Medium	326 (25.0)
	2	Low	114 (8.8)
	3	Not asked	863 (66.2)
	.	Missing	36

CHIWOS: Canadian HIV Women's Sexual and Reproductive Health Cohort Study. No relationship: Single/separated/divorced/widowed, and no consensual sex with a regular sexual partner in the past 6 months. Relationship without sex: Married/common law/living-apart relationship, and no consensual sex with a regular sexual partner in the past 6 months. Unlabeled sexual relationship: Single/separated/divorced/widowed, and consensual sex with a regular sexual partner in the past 6 months. Labeled sexual relationship: Married/common law/living-apart, and consensual sex with a regular sexual partner in the past 6 months. Items with an asterisks (\*) were only asked to those with a regular sexual partner, and sexual relationship power was further limited to those who had sex in the past 1 month

for Women (SSS-W) (Meston & Trapnell, 2005). Responses were dichotomized into "agree" versus "disagree" and a third level created for those in no relationship (as derived in the first indicator).

The remaining four indicators were only asked of those reporting a regular partner, defined elsewhere (Kaida et al., 2015). These indicators included: relationship duration (< 1 year vs. 1 to < 3 years vs. 3 years or more); sexual exclusivity (monogamous vs. multiple partners); couple HIV serostatus (mixed-status vs. same-status); and power equity (high/medium vs. low), measured via the 15-item relationship control subscale of the Sexual Relationship Power Scale (SRPS) (Pulerwitz, Gortmaker, & DeJong, 2000). Total SRPS scores ranged from 15 to 60 (Cronbach's  $\alpha = .92$ ) and were categorized to demarcate the lower third ("low") from the upper two-thirds ("high/medium") of the score distribution. Regarding sexual exclusivity, women were coded as having multiple partners if, in addition to their regular partner, they also reported sex with a casual or paying sex partner, defined elsewhere (Kaida et al., 2015).

### Correlates of Latent Class Membership

Love was assessed by the following question: "How often do you have available someone to love and make you feel wanted?" This item was taken from the four-item scale of the Medical Outcome Study–Social Support Survey (MOS–SSS) (Gjesfjeld, Greeno, & Kim, 2007). Responses were on a five-point Likert scale, ranging from "all of the time" to "none of the time."

We also considered several other variables as correlates of latent class membership (see tables for full derivations and cited literature for scoring instructions). These were selected and grouped into three categories based on prior literature (Carter, Greene, et al., 2017; Tiefer, 2001).

At the level of the individual body, medical and physical health factors included: history of cART; most recent VL (Carter, de Pokomandy, et al., 2017); most recent CD4 cell count; and physical health-related quality of life, estimated using the SF-12 (score range 0–100, Cronbach's  $\alpha = .82$ ), with higher scores indicating higher physical health status (Carter, Loutfy, et al., 2017).

Psychological factors included: mental health-related quality of life, likewise estimated using the SF-12 (score range 0–100, Cronbach's  $\alpha = .82$ ); depression, assessed via the 10-item Centre for Epidemiologic Studies Depression Scale (CES-D 10), which scores depressive symptoms (e.g., "I felt depressed") in the past week on a three-point scale (score range 0–30 and a cut-off of  $\geq 10$  suggesting probable depression, Cronbach's  $\alpha = .74$ ) (Radloff, 1977; Zhang et al., 2012); posttraumatic stress disorder (PTSD), assessed using the six-item PTSD Checklist, which measures trauma symptoms (e.g., "repeated, disturbing memories, thoughts, or images of a stressful experience from the past") in the past month on a five-point scale (score range

339 6–30 and a cutoff of  $\geq 14$  indicating likely PTSD, Cronbach's  
340  $\alpha = .91$  (Lang & Stein, 2005; Lang et al., 2012); and any type  
341 of violence as an adult, child, or during war/violent conflict.

342 Finally, factors relating to social identity, economic status,  
343 and larger political contexts included: age; sexual orientation;  
344 gender; ethnicity; annual personal income; education; current  
345 transactional sex (i.e., exchanged sex for money, drugs, shel-  
346 ter, food, gifts, or other items); history of illicit drug use (i.e.,  
347 street drugs or prescription medications taken in excess of the  
348 directions); presence of biological children at home; time liv-  
349 ing with HIV; mode of HIV acquisition; provider discussions  
350 about and personal perceptions of how VL/cART changes HIV  
351 transmission risk; and three scales: sexism/genderism, racism,  
352 and HIV stigma.

353 Sexism/genderism (score range 8–48, Cronbach's  $\alpha = .94$ )  
354 and racism (score range 8–48, Cronbach's  $\alpha = .95$ ) were  
355 assessed by the Everyday Discrimination (EDD) Scale (Wil-  
356 liams, Yan, Jackson, & Anderson, 1997), which measure on  
357 6-point scale how often (“never” to “almost everyday”) sexist  
358 or racist events occur because of their gender or race (e.g.,  
359 “You are treated with less courtesy,” “You receive poorer ser-  
360 vice”). HIV stigma was measured over one's lifetime via the  
361 validated 10-item HIV Stigma Scale (HSS), with items scored  
362 on a scale of 1–5 (“Strongly disagree” to “Strongly agree”) and  
363 summed and scaled to range from 0 to 100 (Cronbach's  
364  $\alpha = .84$ ), with higher scores indicating higher stigma (Berger,  
365 Ferrans, & Lashley, 2001; Wright, Naar-King, Lam, Templin,  
366 & Frey, 2007). Both the overall scale and subscale compo-  
367 nents were examined. Subscales included: personalized or  
368 enacted stigma (e.g., “I have stopped socializing with some  
369 people because of their reactions to my having HIV”), inter-  
370 nalized stigma (e.g., “I feel that I am not as good a person as  
371 others because I have HIV”), disclosure concerns (e.g., “I am  
372 very careful who I tell that I have HIV”), and public attitudes  
373 (e.g., “Most people think that a person with HIV is unclean”).

## 374 Analysis Plan

### 375 Final Analytic Sample

376 Of the 1424 women living with HIV enrolled in CHIWOS,  
377 we excluded 85 participants who chose to not complete the  
378 sexual health section of the questionnaire and 5 without at least  
379 one valid response to the indicators of latent class membership  
380 described above. This resulted in a final analytic sample of 1334  
381 for LCA (96% of total sample). For the subsequent multivari-  
382 able analyses, only those with complete data for all covariates  
383 were included ( $n = 1099$ ).

### 384 Latent Class Analysis

385 Based on the sex and relationship indicators described above, we  
386 modeled latent classes using the PROC LCA software package

in SAS (<https://methodology.psu.edu>) (Lanza, Collins, Lem- 387  
mon, & Schafer, 2007; Lanza, Dziak, Huang, Xu, & Collins, 388  
2015). We considered solutions with two to seven latent classes, 389  
and assessed model identification for each using an expecta- 390  
tion–maximization (EM) algorithm (Dempster, Laird, & Rubin, 391  
1977; Lanza et al., 2007). The maximum number of iterations 392  
through which the EM algorithm was allowed to proceed was set 393  
to 5000. We performed 1000 repetitions of model estimation for 394  
each solution, using 1000 random sets of starting values to find 395  
the global maximum log-likelihood (ML) solution (Lanza et al., 396  
2007). In selecting the final model, we relied on information cri- 397  
teria indicating relative model fit including Akaike information 398  
criterion (AIC) (Akaike, 1987), Bayesian information criterion 399  
(BIC) (Schwarz, 1978), consistent AIC (CAIC) (Bozdogan, 400  
1987), and adjusted BIC (aBIC) (Sclove, 1987) (Lanza et al., 401  
2007). We also examined the percentage of starting values that 402  
converged to the ML solution (i.e., solution stability, which indi- 403  
cates adequacy of model identification) and the quality of latent 404  
class separation (i.e., entropy) (Lanza et al., 2007). 405

406 As shown in Table 2, entropy was high across all models and 407  
model identification was adequate until the seven-class solu- 408  
tion. Fit statistics indicated the four- or five-class models were 409  
optimal. After comparing the interpretability of the classes, 410  
we selected the five-class solution as two conceptually distinct 411  
classes of relationships defined by longer duration emerged, 412  
whereas in the four-class solution these groups were combined. 413  
Using this model, we assigned women to one latent class based 414  
on posterior class membership probabilities. Assignments were 415  
highly accurate (i.e., two classes had mean posterior probabili- 416  
ties of 1 and the others had probabilities of .86, .88, and .76). 417  
While this can attenuate associations, it allowed for multivari- 418  
able regression modeling with numerous covariates without 419  
affecting the LCA structure, unlike the one-step approach that 420  
combines LCA with regression into a joint model (Vermunt, 421  
2010).

## 422 Descriptive, Bivariable, and Multivariable Analyses

423 We described baseline characteristics for the cohort overall 424  
using frequencies ( $n$ ) and proportions (%) for categorical varia- 425  
bles, and medians and interquartile ranges (IQR) for continuous 426  
measures. We then examined the prevalence of love and other 427  
correlates across the latent classes, using Chi-square or Fisher's 428  
exact test (categorical) and Kruskal–Wallis test (continuous) to 429  
test for significant differences. Finally, we used unadjusted and 430  
adjusted multinomial logistic regression to examine independ- 431  
ent correlates of latent class membership (UCLA Institute for 432  
Digital Research and Education, 2015a, 2015b). For this step, 433  
bivariable results were used to screen variables (Rentsch et al., 434  
2014), excluding ones from further examination if their crude 435  
association's  $p$  value with the latent classes was  $> .2$  (Kaida 436  
et al., 2015). As some variables were highly correlated (age and 437  
time living with HIV; perception of how cART impacts HIV

**Table 2** Fit statistics for latent class analysis models of sexual and intimate relationship experiences with two through seven classes, among women living with HIV enrolled CHIWOS ( $N=1334$ )

Number of classes	$G^2$	AIC	BIC	CAIC	aBIC	Entropy	Solution stability (%)
2	1927.05	1993.05	2164.54	2197.54	2059.71	1.00	93.4
3	686.02	786.02	1045.85	1095.85	887.02	0.99	61.8
4	403.12	537.12	885.29	952.29	672.46	0.92	72.4
<b>5</b>	<b>333.51</b>	<b>501.51</b>	<b>938.03</b>	<b>1022.03</b>	<b>671.2</b>	<b>0.90</b>	<b>50.4</b>
6	303.43	505.43	1030.29	1131.29	709.46	0.89	19.7
7	278.49	514.49	1127.7	1245.7	752.86	0.85	5.6

CHIWOS: Canadian HIV Women's Sexual and Reproductive Health Cohort Study. AIC Akaike Information Criteria; BIC Bayesian Information Criteria; CAIC Consistent Akaike Information Criteria; aBIC Adjusted Bayesian Information Criteria; Solution % is the percentage of times the solution was selected out of a 1000 random sets of starting values. The bolded class solution indicates the selected model

438 transmission risk and discussed this with provider; depression  
439 and mental health quality of life), only the former variable of  
440 each set were examined. All remaining variables were com-  
441 bined in the multivariable model. Model selections were then  
442 conducted using a backward stepwise elimination technique  
443 based on two criteria (AIC and Type III  $p$  values), with the  
444 least significant variable dropped until the final model had the  
445 optimum (minimum) AIC while maintaining covariates with  
446 type III  $p$  values below .2 (Akaike, 1974).

## 447 Results

### 448 Participants' Social Circumstances

449 Of the 1334 participants included in this analysis (Table 3),  
450 the median age was 42 years (IQR 35, 50; range 16–74) and  
451 4.3% identified as trans and gender diverse, 12.5% as lesbian,  
452 gay, bisexual, two-spirited, or queer, and 22.3% as Indigenous,  
453 28.9% as African, Caribbean, or Black, and 41.2% as White.  
454 With regard to social and economic conditions, 71.3% reported  
455 an annual personal income < \$20,000 CAD, 18.1% reported  
456 current use of illicit drugs, and 6.2% reported transactional sex  
457 in the past 6 months. Depression (48.6%) and PTSD (47.7%)  
458 were common, and most reported experiencing violence as a  
459 child (68.7%) or adult (81.4%), with 15.3% of women recount-  
460 ing experiences of violence at war. While many had been diag-  
461 nosed with HIV more than a decade ago (median 10.8 years;  
462 IQR 5.9, 16.8 years), the cohort included some women who  
463 were newly diagnosed and others who were long-term survi-  
464 vors (range 1 month to 33.7 years). Most were currently taking  
465 cART (82.8%) and had an undetectable VL (77.3%) and, overall,  
466 66.5% believed treatment made the risk of transmitting HIV “a  
467 lot lower.”

### 468 Latent Classes of Sexual and Intimate Relationship 469 Experiences

470 The relationship patterns associated with the five-class model  
471 are displayed in Table 4. These included: no relationship (46.5%  
472 of sample,  $n=621$ ), relationships without sex (8.6%,  $n=115$ ),  
473 and three types of sexual relationships: short term (15.4%,  
474  $n=205$ ), long term/unhappy (6.4%,  $n=85$ ), and long term/  
475 happy (23.1%,  $n=308$ ). The first latent class was comprised  
476 of women who reported being single, separated, widowed, or  
477 divorced and had not engaged in any oral, vaginal, or anal sex  
478 with a regular partner in the past 6 months. The second latent  
479 class likewise consisted of women who had no recent sex with  
480 a regular partner but were married, common law, or in a non-  
481 cohabiting relationship. Of note, the vast majority of women  
482 not having sex with a regular partner were simply not sexually  
483 active with anyone ( $n=671/735$ , or 91%). Sixty-four women,  
484 however, reported having sex but not with a regular partner (i.e.,  
485 with a casual or paying sex partner); most (i.e., 58) fell into the  
486 “no relationship” latent class, reflecting how sex can happen  
487 without a relationship, while few (i.e., 6) were classified under  
488 relationships without sex. This shows some misclassification  
489 error, which may tend to bias estimates toward the null.

490 The final three latent classes represented distinct types of con-  
491 sensual sexual relationships with a regular partner. Relative to  
492 women in short-term relationships, women in the longer-term  
493 latent classes had much higher probabilities of reporting that they  
494 were in a sexually monogamous relationship (88%—happy vs.  
495 90%—unhappy vs. 60%—short term), were married, common  
496 law, or non-cohabiting (72%—happy vs. 100%—unhappy vs.  
497 15%—short term) and had been with their partner for  $\geq 3$  years  
498 duration (62%—happy vs. 89%—unhappy vs. 35%—short term).  
499 All classes including those in long-term relationships diverged,  
500 however, on contentment with physical intimacy (97%—happy  
501 vs. 44%—unhappy vs. 46%—short term vs. 43%—relationships

**Table 3** Baseline characteristics of women living with HIV enrolled CHIWOS ( $N=1334$ )

Variables	$n$ (%) or Median ( $Q1$ , $Q3$ )
<i>Social, cultural, political, and economic factors</i>	
Factors beyond HIV	
Age (years), continuous	42.0 (35.0, 50.0)
Sexual orientation	
Heterosexual	1163 (87.5)
Lesbian, gay, bisexual, two-spirited, queer (LGBTQ)	166 (12.5)
Gender identity	
Cisgender women	1277 (95.7)
Trans and gender-diverse women	57 (4.3)
Genderism/sexism, continuous	17.0 (10.0, 28.0)
Ethnicity	
White	550 (41.2)
Indigenous	298 (22.3)
African, Caribbean, Black	386 (28.9)
Other/multiple ethnicities	100 (7.5)
Racism, continuous	16.0 (8.0, 28.0)
Annual personal income (CAD)	
Less than \$20,000	929 (71.3)
\$20,000 to less than \$40,000	233 (17.9)
\$40,000 or more	140 (10.8)
Education	
Lower than high school	202 (15.2)
High school	573 (43.2)
Higher than high school	552 (41.6)
Transactional sex in the past 6 months	
No	1227 (93.8)
Yes	81 (6.2)
Illicit drug use history	
Never	708 (53.9)
Previously	366 (27.9)
Currently (past 3 months)	238 (18.1)
Have biological children at home	
Yes	305 (22.8)
No	562 (42.1)
No biological children	415 (31.1)
Not biologically female	52 (3.9)
Factors related to HIV	
Time living with HIV (years), continuous	10.8 (5.9, 16.8)
Transmission risk category	
Consensual sex	649 (48.7)
Non-consensual sex	205 (15.4)
Sharing needles	259 (19.4)
Perinatal exposure	49 (3.7)
Blood transfusion or other	74 (5.5)
Don't know or prefer not to answer	98 (7.3)
Discussed with provider how viral load impacts HIV transmission risk	
Yes	906 (68.8)
No	411 (21.2)
Perception of how treatment changes HIV transmission risk	
Makes the risk a lot lower	881 (66.5)
All other responses (i.e., a little lower, no difference, higher, don't know)	443 (33.5)
HIV stigma scale (HSS), continuous	57.5 (42.5, 70.0)



Table 3 (continued)

Variables	n (%) or Median (Q1, Q3)
Subscale 1 (personalized stigma), continuous	20 (12.5, 25.0)
Subscale 2 (disclosure), continuous	15 (12.5, 20.0)
Subscale 3 (internalized stigma), continuous	7.5 (2.5, 15.0)
Subscale 4 (public attitudes), continuous	15 (10.0, 17.5)
<i>Mental health and violence factors</i>	
Mental health-related quality of life, continuous	42.2 (31.4, 52.5)
Posttraumatic stress disorder, categorical	
Score < 14	692 (52.3)
Score ≥ 14 (likely PTSD)	632 (47.7)
Depression, categorical	
Score < 10	662 (51.3)
Score ≥ 10 (depressive symptoms)	628 (48.6)
Any violence as an adult	
Never	251 (19.6)
Previously	754 (58.7)
Currently (past 3 months)	278 (21.7)
Any violence as a child	
No	399 (31.3)
Yes	876 (68.7)
Any violence at war	
No	1083 (84.7)
Yes	196 (15.3)
<i>Physical health factors</i>	
Physical health-related quality of life, continuous	47.9 (33.6, 55.5)
History of antiretroviral therapy	
Never	168 (12.6)
Previously	61 (4.6)
Currently	1099 (82.8)
Most recent viral load	
Undetectable	1031 (77.3)
Detectable	193 (15.5)
Never accessed medical care/never received results	42 (3.2)
Don't know	68 (5.1)
Most recent CD4 cell count	
< 200	72 (5.4)
200 to < 500	360 (27.0)
500 or more	665 (49.9)
Never accessed medical care/never received results	37 (2.8)
Don't know	198 (14.9)

CHIWOS: Canadian HIV Women's Sexual and Reproductive Health Cohort Study

502 without sex), satisfactory emotional closeness (86%—happy vs.  
 503 24%—unhappy vs. 16%—short term vs. 27%—relationships with-  
 504 out sex), power equity (among those who had sex in past 1 month:  
 505 93%—happy vs. 52%—unhappy vs. 51%—short term), and mixed  
 506 HIV status (71%—happy vs. 59%—unhappy vs. 81%—short  
 507 term). In ad hoc analyses (data not shown), disclosure was high  
 508 across all sexual relationships but less common for those of shorter  
 509 length (86% vs. longer term 95–97%). Also, 37% of shorter-term

relationships had ended at time of interview, while most relation- 510  
 ships classified as longer-term were currently ongoing (96–99%). 511

### Patterns of Love and Social and Structural Factors by Latent Classes 512 513

Women reported a range of experiences with love, both 514  
 between and within latent classes (Table 5). Women in long- 515  
 term/happy sexual relationships (66.8%) and relationships 516

**Table 4** Latent class membership- and item-response probabilities for the five-class model of sexual and intimate relationship experiences, among women living with HIV enrolled in CHIWOS ( $N=1334$ )

	No relationship ( $n=621$ , 46.5%)	Relationship without sex ( $n=115$ , 8.6%)	Short-term sexual relationship ( $n=205$ , 15.4%)	Long-term “unhappy” sexual relationship ( $n=85$ , 6.4%)	Long-term “happy” sexual relationship ( $n=308$ , 23.1%)
Class membership probabilities	0.465	0.086	0.154	0.064	0.231
Item-response probabilities					
Sexual relationship status					
No relationship	<b>1.00</b>	0.00	0.00	0.00	<b>0.00</b>
Relationship without sex	0.00	<b>1.00</b>	0.00	0.00	<b>0.00</b>
Unlabeled sexual relationship	0.00	0.00	<b>0.85</b>	0.00	0.28
Labeled sexual relationship	0.00	0.00	0.15	<b>1.00</b>	<b>0.72</b>
Content with sexual intimacy (kissing, intercourse, etc.)					
Agree	0.00	0.43	0.46	0.44	<b>0.97</b>
Disagree	0.00	<b>0.57</b>	<b>0.54</b>	<b>0.57</b>	0.03
No relationship/not asked	<b>1.00</b>	0.00	0.00	0.00	0.00
Not enough emotional closeness					
Agree	0.00	<b>0.73</b>	<b>0.84</b>	<b>0.76</b>	0.14
Disagree	0.00	0.27	0.16	0.24	<b>0.86</b>
No relationship/not asked	<b>1.00</b>	0.00	0.00	0.00	0.00
Duration of sexual relationship*					
< 1 year	0.00	0.00	0.40	0.00	0.16
1 year to < 3 years	0.00	0.00	0.25	0.11	0.22
3 years or more	0.00	0.00	0.35	<b>0.89</b>	<b>0.62</b>
No relationship/not asked	<b>1.00</b>	<b>1.00</b>	0.00	0.00	0.00
Couple HIV serostatus*					
Concordant	0.00	0.00	0.19	0.41	0.29
Discordant	0.00	0.00	<b>0.81</b>	<b>0.59</b>	<b>0.71</b>
No relationship/not asked	<b>1.00</b>	<b>1.00</b>	0.00	0.00	0.00
Sexual exclusivity in the past 6 months*					
Multiple	0.00	0.00	0.40	0.10	0.12
Monogamous	0.00	0.00	<b>0.60</b>	<b>0.90</b>	<b>0.88</b>
No relationship/not asked	<b>1.00</b>	<b>1.00</b>	0.00	0.00	0.00
Sexual relationship power*					
High/Medium	0.00	0.00	0.30	0.44	<b>0.82</b>
Low	0.00	0.00	0.29	0.40	0.06
No relationship/not asked	<b>1.00</b>	<b>1.00</b>	0.41	0.16	0.12

CHIWOS: Canadian HIV Women’s Sexual and Reproductive Health Cohort Study. Class membership probabilities estimate the prevalence of the latent classes within the entire sample. Item-response probabilities are class conditional, estimating the percentage of individuals who reported the responses indicated given membership in a particular latent class. Probabilities  $> .5$  are in bold to facilitate interpretation. No relationship: Single/separated/divorced/widowed, with no consensual sex with a regular sexual partner in the past 6 months. Relationship without sex: Married/common law/living-apart relationship, with no consensual sex with a regular sexual partner in the past 6 months. Unlabeled sexual relationship: Single/separated/divorced/widowed, with consensual sex with a regular sexual partner in the past 6 months. Labeled sexual relationship: Married/common law/living-apart, with consensual sex with a regular sexual partner in the past 6 months. Items with an asterisks (\*) were only asked to those with a regular sexual partner, and sexual relationship power was further limited to those who had sex in the past 1 month

without sex (50%) were most likely to report feeling love for and wanted by someone “all of the time” compared to women in long-term/unhappy sexual relationships (33.3%), short-term sexual relationships (24.8%), and no relationship (23.5%) ( $p < .0001$ ). Significant proportions also reported “most” or “some of the time.” Relatively fewer women across classes reported an absence of love (i.e., “none” or “a little of the time”), though this was most prevalent among those in no relationship (36.8%) and short-term sexual relationships (27.7%).

Bivariable analyses also indicated considerable heterogeneity in latent class membership along several social and structural factors (see Table 5 for complete description). For example, women in no relationship and relationships without sex had higher median ages (46.0 [IQR 38.0, 53.0] and 42.0 [IQR 36.0, 50.0], respectively) versus latent classes defined by sexual activity with a regular partner (i.e., long term/happy: 39.0 [IQR 32.0, 46.0]). While gender was not significant, sexism/genderism was, with median scores lowest for long-term happy relationships (16.0 [IQR 8.0, 26.0]) and highest for short-term (22.0 [IQR 13.0, 29.0]) and long-term/unhappy (22.5 [IQR 12.0, 30.0]) relationships. Race ( $p = .44$ ) and racism ( $p = .06$ ) showed similar patterns. The short-term (36.3%) and long-term/unhappy (40.9%) latent classes also demonstrated the highest proportions of current violence versus remaining classes (16.8–23.0%), while only those in short-term relationships were more likely to report current sex work (18.6%) and drug use (30%) relative to all other classes (2.6–4.7% and 15.6–19.1%, respectively).

Other factors that were significantly related to latent class membership in bivariable analyses included income, education, children at home, depression, PTSD, mental and physical health-related quality of life, provider discussions and personal perceptions about HIV transmission risk, and HIV-related stigma. For instance, women in long-term/happy relationships were most likely to believe that treatment makes the risk of HIV transmission “a lot lower” (77.1%) versus all other latent classes (60.0–65.9%). Women in long-term/happy relationships also reported the lowest median HIV stigma scores (i.e., 52.5 [IQR 40.0, 65.0] vs. short-term: 62.5 [IQR 47.5, 72.5]), with two subscales (i.e., enacted and internalized stigma) showing significant differences.

## Unadjusted and Adjusted Associations Between Latent Classes and Social Covariates

Table 6 presents the unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (CIs) between the latent classes and social covariates, with the largest class (“no relationship”) used as the reference. After controlling for the effects of all covariates shown, we found that for every 10-year increase in age, the odds of being in any kind of relationship reduced by 28–60%. Consistent with bivariable results, while age was significant across every class, the greatest effect was seen in the odds of membership in

the three types of sexual relationships (e.g., long term/happy: AOR: 0.40 [95% CI 0.33, 0.49] vs. relationships without sex: AOR: 0.72 [95% CI 0.56, 0.92]). Having no biological children at home was also significantly associated with being in any kind of relationship, as was higher personal incomes, though the effects of income were greatest for those in long-term/unhappy sexual relationships. Specifically, compared to women reporting incomes  $< \$20,000$  CAD, those with incomes at  $\$40,000$  or more had 4.03 higher adjusted odds of belonging to the long-term/unhappy latent class with effects ranging from 1.74 to 9.34.

Sexism/genderism was only associated with membership in long-term/unhappy relationships (1.50 [95% CI 1.02, 2.22], per 10-unit increase), while current sex work was significantly related to short-term relationships (AOR: 3.45 [95% CI 1.68, 7.07]). Current violence, depression, and PTSD, however, were significantly associated with all three types of sexual relationships. The magnitude of the association (and possible range of effects) between current violence and relationship type was strongest (and widest) for the short-term (AOR: 5.56 [2.61, 11.83]) and long-term/unhappy (AOR: 6.33 [2.26, 17.70]) latent classes, though nonetheless elevated for long-term/happy relationships (AOR: 2.49 [1.38, 4.51]). Also, for both depression and PTSD, adjusted ORs were increased (i.e., above 1) for the short-term and long-term/unhappy latent classes and reduced (i.e., below 1) for those in long-term/happy relationships, compared to women in no relationship.

In terms of HIV-related factors, those who believed cART made the risk of HIV transmission “a lot lower” had increased odds of membership in long-term/happy relationships (AOR: 1.49 [1.02, 2.17]). Additionally, for every 10-point increase in HIV stigma scores, the odds of membership in long-term/happy relationships, relative to no relationship, were reduced by 13% (AOR: 0.87 [0.79, 0.96]). Finally, current and previous cART users (vs. never) were more likely to be in the short-term latent class (vs. no relationship). All other variables including, for example, gender identity, sexual orientation, racism, violence as a child, and physical health-related quality of life were either not statistically significant (i.e., 95% CIs included the null value of “1”) or were not selected for in the final multiple-adjusted model.

## Discussion

Our results advance understandings of sexual and intimate relationships among women living with HIV by moving beyond a reductionist and risk-based lens toward an approach that characterizes relationship complexity and attends to love, diversity, and inequity. We found that nearly half of women living with HIV in Canada were not in relationships, and those who were could be described by four distinct profiles in LCA (i.e., relationships involving no sex and three relationships involving sex with a regular partner: short term, long term/unhappy, and long term/

**Table 5** Bivariable associations with relationship latent classes among women living with HIV enrolled in CHIWOS ( $N=1335$ ), with column percentages shown

Variables	No relationship ( $n=621$ , 46.5%)	Relationship with- out sex ( $n=115$ , 8.6%)	Short-term sexual relationship ( $n=205$ , 15.4%)	Long-term “unhappy” sexual relationship ( $n=85$ , 6.4%)	Long-term “happy” sexual relationship ( $n=308$ , 23.1%)	<i>p</i> value
	<i>n</i> (%) or <i>M</i> ( <i>Q1</i> , <i>Q3</i> )	<i>n</i> (%) or <i>M</i> ( <i>Q1</i> , <i>Q3</i> )	<i>n</i> (%) or <i>M</i> ( <i>Q1</i> , <i>Q3</i> )	<i>n</i> (%) or <i>M</i> ( <i>Q1</i> , <i>Q3</i> )	<i>n</i> (%) or <i>M</i> ( <i>Q1</i> , <i>Q3</i> )	
<i>Love</i>						< .0001
All of the time	143 (23.5)	56 (50.0)	50 (24.8)	28 (33.3)	203 (66.8)	
Most of the time	136 (22.3)	22 (19.6)	44 (21.8)	28 (33.3)	74 (24.3)	
Some of the time	106 (17.4)	15 (13.4)	52 (25.7)	18 (21.4)	19 (6.3)	
A little of the time	79 (13.0)	10 (8.9)	34 (16.8)	7 (8.3)	<5 (1.3)	
None of the time	145 (23.8)	9 (8.0)	22 (10.9)	<5 (3.6)	<5 (1.3)	
<i>Social, cultural, political, and eco- nomic factors</i>						
Factors beyond HIV						
Age (years), con- tinuous	46.0 (38.0, 53.0)	42.0 (36.0, 50.0)	40.0 (34.0, 46.0)	40.0 (34.0, 47.0)	39.0 (32.0, 46.0)	< .0001
Sexual orientation						.1206
Heterosexual	548 (88.7)	101 (87.8)	167 (81.9)	74 (87.1)	273 (88.9)	
Lesbian, gay, bisexual, queer, two-spirited (LGBTQ)	70 (11.3)	14 (12.2)	37 (18.1)	11 (12.9)	34 (11.1)	
Gender						.1178
Cisgender women	594 (95.7)	113 (98.3)	190 (92.7)	82 (96.5)	298 (96.8)	
Trans and gender- diverse women	27 (4.3)	<5 (1.7)	15 (7.3)	<5 (3.5)	10 (3.2)	
Genderism/Sexism, continuous	17.0 (8.0, 27.0)	17.0 (10.0, 29.0)	22.0 (13.0, 29.0)	22.5 (12.0, 30.0)	16.0 (8.0, 26.0)	.0001
Ethnicity						.4425
Indigenous	130 (20.9)	35 (30.4)	45 (22.0)	12 (14.1)	76 (24.7)	
African, Carib- bean, Black	186 (29.9)	30 (26.1)	63 (30.7)	28 (32.9)	79 (25.6)	
White	254 (40.9)	42 (36.5)	85 (41.5)	39 (45.9)	130 (42.2)	
Other/multiple	51 (8.2)	8 (7.0)	12 (5.9)	6 (7.1)	23 (7.5)	
Racism, continuous	16.0 (8.0, 27.0)	18.5 (9.0, 28.0)	19.0 (8.0, 31.0)	16.0 (8.0, 29.0)	14.5 (8.0, 26.0)	.0603
Annual personal income (CAD)						.0708
Less than \$20,000	454 (74.3)	81 (71.7)	143 (73.0)	49 (61.3)	202 (66.9)	
\$20,000 to less than \$40,000	95 (15.5)	25 (22.1)	34 (17.3)	17 (21.2)	62 (20.5)	
\$40,000 or more	62 (10.2)	7 (6.2)	19 (9.7)	14 (17.5)	38 (12.6)	
Education						.0253
Lower than high school	95 (15.4)	19 (16.5)	34 (16.6)	15 (17.7)	39 (12.8)	
High school	268 (43.3)	64 (55.7)	86 (41.9)	26 (30.6)	129 (42.3)	
Higher than high school	254 (41.2)	32 (27.8)	85 (41.5)	44 (51.8)	137 (44.9)	
Transactional sex in the past 6 months						< .0001
No	590 (95.3)	111 (97.4)	158 (81.4)	82 (97.6)	286 (96.3)	
Yes	29 (4.7)	<5 (2.6)	36 (18.6)	<5 (2.4)	11 (3.7)	

Table 5 (continued)

Variables	No relationship ( <i>n</i> = 621, 46.5%)	Relationship with- out sex ( <i>n</i> = 115, 8.6%)	Short-term sexual relationship ( <i>n</i> = 205, 15.4%)	Long-term “unhappy” sexual relationship ( <i>n</i> = 85, 6.4%)	Long-term “happy” sexual relationship ( <i>n</i> = 308, 23.1%)	<i>p</i> value
	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	
Illicit drug use history						< .0001
Never	363 (59.4)	63 (57.8)	81 (39.9)	41 (48.8)	160 (52.5)	
Previously	153 (25.0)	29 (26.6)	61 (30.0)	27 (32.1)	96 (31.5)	
Currently (past 3 months)	95 (15.6)	17 (15.6)	61 (30.0)	16 (19.1)	49 (16.1)	
Have biological children at home						.0180
Yes	144 (23.2)	20 (17.4)	46 (22.4)	19 (22.4)	76 (24.7)	
No	240 (38.7)	54 (47.0)	87 (42.2)	51 (60.0)	130 (42.2)	
No biological children	211 (34.0)	39 (33.9)	60 (29.3)	13 (15.3)	92 (29.8)	
Not biologically female	26 (4.2)	<5 (1.7)	12 (5.9)	<5 (2.4)	10 (3.3)	
Factors related to HIV						
Time living with HIV (years), continuous	11.5 (6.4, 17.3)	10.8 (4.1, 17.2)	10.4 (5.9, 16.8)	9.9 (6.0, 15.6)	10.4 (5.8, 16.1)	.1927
Transmission risk category						.6891
Consensual sex	306 (49.3)	53 (46.1)	103 (50.2)	45 (52.9)	142 (46.1)	
Non-consensual sex	96 (15.5)	19 (16.5)	28 (13.7)	13 (15.3)	49 (15.9)	
Sharing needles	119 (19.2)	27 (23.5)	47 (22.9)	13 (15.3)	53 (17.2)	
Perinatal expo- sure	23 (3.7)	<5 (1.7)	<5 (1.9)	<5 (2.4)	18 (5.8)	
Blood transfusion or other	33 (5.3)	7 (6.1)	8 (3.9)	7 (8.2)	19 (6.2)	
Don't know or prefer not to answer	44 (7.1)	7 (6.1)	15 (7.3)	5 (5.9)	27 (8.8)	
Discussed with provider how viral load impacts HIV transmis- sion risk						
Yes	377 (61.7)	73 (64.6)	144 (71.3)	65 (77.4)	247 (80.5)	< .0001
No	234 (38.3)	40 (35.4)	58 (28.7)	19 (22.6)	60 (19.5)	
Perception of how treatment changes HIV transmission risk						.0004
Makes the risk a lot lower	392 (63.7)	69 (60.0)	129 (63.2)	56 (65.9)	235 (77.1)	
All other responses (i.e., a little lower, no difference, higher, don't know)	223 (50.3)	46 (40.0)	75 (36.8)	29 (34.1)	70 (22.9)	
HIV stigma scale (HSS), contin- uous	57.5 (42.5, 72.5)	60.0 (45.0, 72.5)	62.5 (47.5, 72.5)	60.0 (42.5, 72.5)	52.5 (40.0, 65.0)	.0001

Table 5 (continued)

Variables	No relationship ( <i>n</i> = 621, 46.5%)	Relationship with- out sex ( <i>n</i> = 115, 8.6%)	Short-term sexual relationship ( <i>n</i> = 205, 15.4%)	Long-term “unhappy” sexual relationship ( <i>n</i> = 85, 6.4%)	Long-term “happy” sexual relationship ( <i>n</i> = 308, 23.1%)	<i>p</i> value
	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	
Subcale 1 (personalized stigma), con- tinuous	20.0 (12.5, 27.5)	22.5 (15.0, 22.5)	20.0 (15.0, 30.0)	20.0 (11.3, 28.8)	17.5 (10.0, 22.5)	.0002
Subcale 2 (disclo- sure), continu- ous	15.0 (12.5, 20.0)	15.0 (12.5, 20.0)	17.5 (12.5, 20.0)	17.5 (12.5, 20.0)	15.0 (12.5, 20.0)	.2618
Subcale 3 (inter- nalized stigma), continuous	7.5 (5.0, 15.0)	7.5 (5.0, 15.0)	7.5 (5.0, 15.0)	7.5 (5.0, 15.0)	7.5 (0, 12.5)	.0002
Subcale 4 (public attitudes), con- tinuous	15.0 (10.0, 17.5)	15.0 (10.0, 17.5)	15.0 (10.0, 17.5)	15.0 (10.0, 17.5)	15.0 (10.0, 15.0)	.3937
<i>Mental health and violence factors</i>						
Mental health- related quality of life	43.4 (32.0, 53.2)	41.8 (32.3, 51.8)	35.5 (27.9, 46.1)	37.7 (26.7, 48.6)	48.8 (37.0, 55.9)	<.0001
PTSD, categorical						<.0001
Score < 14	322 (52.3)	60 (52.2)	68 (33.5)	34 (40.0)	208 (30.1)	
Score ≥ 14 (likely PTSD)	294 (47.7)	55 (47.8)	135 (66.5)	51 (60.0)	97 (31.8)	
Depression, cat- egorical						<.0001
Score < 10	289 (48.3)	51 (45.5)	78 (39.0)	28 (34.2)	216 (72.7)	
Score ≥ 10 (depressive symptoms)	310 (51.8)	61 (54.5)	122 (61.0)	54 (65.9)	81 (27.3)	
Any violence as an adult						<.0001
Never	144 (24.2)	21 (18.6)	15 (7.8)	8 (9.6)	63 (21.1)	
Previously	354 (59.4)	66 (58.4)	108 (55.9)	41 (49.4)	185 (62.1)	
Currently (past 3 months)	98 (16.4)	26 (23.0)	70 (36.3)	34 (40.9)	50 (16.8)	
Any violence as a child						<.0001
No	214 (36.2)	24 (21.4)	38 (19.9)	20 (24.1)	103 (34.7)	
Yes	378 (63.8)	88 (78.6)	153 (80.1)	63 (75.9)	194 (65.3)	
Any violence at war						.6799
No	501 (84.1)	96 (86.5)	160 (83.3)	68 (81.9)	258 (86.9)	
Yes	95 (15.9)	15 (13.5)	32 (16.7)	15 (18.1)	39 (13.1)	
<i>Physical health factors</i>						
Physical health- related quality of life	45.9 (32.5, 54.9)	48.5 (30.6, 55.9)	46.9 (33.9, 55.6)	40.6 (32.8, 52.8)	52.3 (39.8, 56.7)	<.0001
History of antiret- roviral therapy						.1323
Never	81 (13.1)	16 (13.9)	22 (10.7)	7 (8.3)	42 (13.7)	
Previously	18 (2.9)	7 (6.1)	12 (5.9)	8 (9.5)	16 (5.2)	

Table 5 (continued)

Variables	No relationship ( <i>n</i> = 621, 46.5%)	Relationship with- out sex ( <i>n</i> = 115, 8.6%)	Short-term sexual relationship ( <i>n</i> = 205, 15.4%)	Long-term “unhappy” sexual relationship ( <i>n</i> = 85, 6.4%)	Long-term “happy” sexual relationship ( <i>n</i> = 308, 23.1%)	<i>p</i> value
	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	<i>n</i> (%) or <i>M</i> ( <i>Q</i> 1, <i>Q</i> 3)	
Currently	519 (84.0)	92 (80.0)	171 (83.4)	69 (82.1)	248 (81.1)	
Most recent viral load						.6506
Undetectable	483 (77.8)	83 (72.2)	158 (77.1)	69 (81.2)	239 (77.3)	
Detectable	85 (13.7)	20 (17.4)	30 (14.6)	14 (16.5)	44 (14.3)	
Never accessed medical care/ never received results	17 (2.7)	<5 (3.5)	8 (3.9)	0 (0.0)	13 (4.2)	
Don't know	36 (5.8)	8 (7.0)	9 (4.4)	<5 (2.3)	13 (4.2)	
Most recent CD4 cell count						.2848
<200	35 (5.7)	<5 (3.5)	10 (4.9)	8 (9.4)	15 (4.9)	
200 to <500	178 (28.8)	26 (22.6)	55 (26.8)	16 (18.8)	85 (27.6)	
500 or more	303 (49.0)	58 (50.4)	97 (47.3)	47 (55.3)	160 (52.0)	
Never accessed medical care/ never received results	14 (2.3)	<5 (3.5)	7 (3.4)	0 (0.0)	12 (3.9)	
Don't know	89 (14.4)	23 (20.0)	36 (17.6)	14 (16.5)	36 (11.7)	

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618 happy), marked by differences in marital status, sexual activity,  
619 physical intimacy, emotional closeness, power equity, sexual  
620 exclusivity, relationship duration, and couple HIV serostatus.  
621 Across all latent classes, a sizeable proportion of women reported  
622 experiences of love, including those in no relationship, though  
623 this varied considerably by relational contexts. Also, consistent  
624 with feminist theorizing around love, sex, and relationships, we  
625 uncovered several associations between latent class membership  
626 and factors related to sociostructural context, trauma, and mental  
627 health. As a whole, these findings demonstrate the utility of a  
628 critical feminist approach to quantitative sex and relationships  
629 research with women living with HIV and help to move knowl-  
630 edge forward in several important ways.

631 The finding that 46.5% of women were not in a relation-  
632 ship and that this was associated with HIV-related stigma but  
633 also reduced violence suggests that ongoing stigmatization  
634 of HIV remains a significant impediment to pursuing safe  
635 and healthy relationships for many women living with HIV.  
636 Enacted stigma and internalized stigma appeared to be driv-  
637 ing this effect. As noted in the Introduction, past qualitative  
638 research has documented the judgment, abuse, and rejection  
639 many women experience upon disclosure to partners (Closson  
640 et al., 2015; Cooper et al., 2013; Jarman et al., 2005; Keegan  
641 et al., 2005; Maticka-Tyndale et al., 2002; Nevedal & Sankar,  
642 2015; Persson, 2005; Psaros et al., 2012; Siegel et al., 2006;

Siegel & Schrimshaw, 2003), particularly in heterosexual 643  
communities where HIV knowledge is low and stigma is high 644  
(Persson, 2005). Prior research has also revealed that public 645  
discourses that depict women as vectors of transmission influ- 646  
ence women's self-esteem, ultimately inhibiting their desires 647  
to enter into relationships (Gurevich et al., 2007; Jarman et al., 648  
2005; Lawless, Crawford, et al. 1996; Lawless, Kippax, et al., 649  
1996). It is important to note, however, that not all women with 650  
HIV desire a relationship. From wanting to protect oneself from 651  
HIV non-disclosure laws (International Community of Women 652  
Living with HIV/AIDS, 2015; Kaida et al., 2017), to preventing 653  
the physical and emotional stresses and trauma of relationships 654  
with HIV (Psaros et al., 2012; Siegel et al., 2006), to concentrat- 655  
ing on other priorities (e.g., work, earning money, or furthering 656  
children's education) (Cooper et al., 2013; Psaros et al., 657  
2012; Seeley et al., 2009; Siegel & Schrimshaw, 2003), these 658  
alternative narratives demonstrate women's resistance against 659  
discriminatory structures and debunk broad cultural assump- 660  
tions that a romantic relationship is necessary for a happy life 661  
(Day, Kay, Holmes, & Napier, 2011; DePaulo & Morris, 2005). 662

663 In addition to HIV stigma, older women were less likely to be 664  
in any kind of relationship, especially sexually active relation- 665  
ships. Desexualization, or the forced imposition of nonsexual- 666  
ity (Kim, 2010), is a tool that has been used by societies for 667  
decades to control and marginalize older women's desire for

**Table 6** Unadjusted and adjusted odds ratios (OR and AOR) and 95% confidence intervals (95% CI) from multinomial logistic regression analysis assessing predictors of latent class membership, in reference to “no relationship,” among women living with HIV enrolled in CHI-WOS (N = 1099)

Variables	Relationship type							
	Relationship without sex		Short-term sexual relationship		Long-term “unhappy” sexual relationship		Long-term “happy” sexual relationship	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
<i>Social, cultural, political, and economic factors</i>								
Factors beyond HIV								
Age (years) (per 10-unit increase)	<b>0.58 (0.49, 0.70)</b>	<b>0.72 (0.56, 0.92)</b>	<b>0.82 (0.66, 1.01)</b>	<b>0.46 (0.37, 0.58)</b>	<b>0.62 (0.48, 0.79)</b>	<b>0.39 (0.28, 0.54)</b>	<b>0.53 (0.45, 0.62)</b>	<b>0.40 (0.33, 0.49)</b>
Sexual orientation								
Heterosexual	1	Not selected	1	Not selected	1	Not selected	1	Not selected
Lesbian, gay, bisexual, two-spirited, queer	0.91 (0.46, 1.81)		1.50 (0.92, 2.45)		1.26 (0.61, 2.60)		0.97 (0.61, 1.54)	
Gender								
Cisgendered women	1	Not selected	1	Not selected	1	Not selected	1	Not selected
Trans and gender-diverse women	0.22 (0.03, 1.64)		1.44 (0.67, 3.09)		0.65 (0.15, 2.81)		<b>0.34 (0.12, 0.99)</b>	
Genderism/Sexism (per 10-unit increase)	1.08 (0.87, 1.34)	0.96 (0.67, 1.36)	<b>1.26 (1.05, 1.51)</b>	1.21 (0.91, 1.60)	<b>1.35 (1.05, 1.74)</b>	<b>1.50 (1.02, 2.22)</b>	0.93 (0.79, 1.09)	1.15 (0.88, 1.49)
Racism (per 10-unit increase)	1.16 (0.96, 1.41)	1.11 (0.82, 1.51)	1.11 (0.95, 1.31)	0.86 (0.67, 1.09)	1.08 (0.86, 1.36)	0.75 (0.54, 1.05)	0.98 (0.85, 1.12)	0.96 (0.76, 1.21)
Annual personal income (CAD)								
Less than \$20,000	1	1	1	1	1	1	1	1
\$20,000 to less than \$40,000	<b>1.69 (1.00, 2.86)</b>	<b>2.37 (1.35, 4.15)</b>	1.08 (0.66, 1.75)	1.32 (0.77, 2.27)	1.64 (0.85, 3.15)	<b>2.74 (1.32, 5.68)</b>	<b>1.48 (1.00, 2.19)</b>	<b>1.63 (1.04, 2.55)</b>
\$40,000 or more	0.76 (0.33, 1.74)	1.20 (0.49, 2.96)	1.08 (0.60, 1.94)	1.64 (0.83, 3.22)	<b>2.34 (1.18, 4.66)</b>	<b>4.03 (1.74, 9.34)</b>	1.37 (0.85, 2.21)	1.52 (0.87, 2.67)
Education								
Lower than high school	1	1	1	1	1	1	1	1
High school	0.75 (0.45, 1.25)	1.04 (0.55, 1.95)	1.11 (0.61, 2.04)	0.91 (0.51, 1.60)	0.61 (0.28, 1.30)	0.55 (0.24, 1.24)	0.94 (0.60, 1.48)	0.85 (0.51, 1.42)
Higher than high school	0.63 (0.33, 1.21)	0.61 (0.30, 1.24)	0.80 (0.49, 1.32)	1.22 (0.67, 2.22)	1.08 (0.53, 2.17)	1.03 (0.46, 2.30)	1.08 (0.69, 1.68)	0.91 (0.53, 1.55)
Transactional sex in the past 6 months								
No	1	1	1	1	1	1	1	1
Yes	0.46 (0.11, 2.00)	0.29 (0.06, 1.34)	4.39 (2.41, 7.99)	<b>3.45 (1.68, 7.07)</b>	0.68 (0.16, 2.96)	0.39 (0.08, 1.96)	0.91 (0.42, 1.95)	0.66 (0.28, 1.58)



Table 6 (continued)

Variables	Relationship type							
	Relationship without sex		Short-term sexual relationship		Long-term “unhappy” sexual relationship		Long-term “happy” sexual relationship	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
<b>Illicit drug use history</b>								
Never	1	Not selected	1	Not selected	1	Not selected	1	Not selected
Previously	1.01 (0.61, 1.67)		<b>1.75 (1.14, 2.67)</b>		1.56 (0.88, 2.77)		1.28 (0.91, 1.79)	
Currently (past 3 months)	1.17 (0.64, 2.16)		<b>3.36 (2.13, 5.29)</b>		1.86 (0.94, 3.67)		1.33 (0.87, 2.04)	
<b>Have biological children at home</b>								
Yes	1	1	1	1	1	1	1	1
No	1.61 (0.90, 2.87)	<b>2.16 (1.15, 4.06)</b>	1.16 (0.73, 1.83)	<b>1.72 (1.02, 2.91)</b>	1.55 (0.83, 2.90)	<b>3.65 (1.77, 7.52)</b>	1.11 (0.76, 1.62)	<b>2.22 (1.42, 3.48)</b>
No biological children	1.12 (0.61, 2.08)	1.15 (0.60, 2.17)	0.80 (0.49, 1.30)	0.83 (0.48, 1.42)	0.51 (0.24, 1.13)	0.58 (0.25, 1.35)	0.79 (0.53, 1.19)	0.70 (0.45, 1.11)
Not biologically female	0.31 (0.04, 2.43)	0.49 (0.06, 4.07)	1.23 (0.51, 3.01)	0.71 (0.23, 2.18)	0.37 (0.05, 2.91)	0.82 (0.09, 7.52)	0.36 (0.12, 1.09)	0.49 (0.14, 1.70)
<b>Factors related to HIV</b>								
<b>Perception of how treatment changes HIV transmission risk</b>								
All other responses	1	1	1	1	1	1	1	1
Makes the risk a lot lower	0.81 (0.52, 1.25)	0.81 (0.51, 1.30)	1.13 (0.78, 1.64)	1.00 (0.66, 1.53)	1.09 (0.65, 1.86)	0.92 (0.51, 1.66)	<b>1.96 (1.40, 2.75)</b>	<b>1.49 (1.01, 2.17)</b>
HIV stigma scale (HSS) (per 10-unit increase)	1.04 (0.93, 1.16)	1.01 (0.88, 1.14)	1.06 (0.97, 1.16)	0.99 (0.89, 1.11)	1.08 (0.95, 1.23)	0.97 (0.83, 1.13)	<b>0.89 (0.82, 0.96)</b>	<b>0.87 (0.79, 0.96)</b>
<b>Mental health and violence factors</b>								
<b>PTSD, categorical</b>								
Score < 14	1	1	1	1	1	1	1	1
Score ≥ 14 (likely PTSD)	0.88 (0.57, 1.35)	0.62 (0.36, 1.07)	<b>2.02 (1.39, 2.92)</b>	<b>1.74 (1.07, 2.82)</b>	<b>1.89 (1.12, 3.18)</b>	1.05 (0.54, 2.06)	<b>0.55 (0.40, 0.75)</b>	0.85 (0.57, 1.28)
<b>Depression, categorical</b>								
Score < 10	1	1	1	1	1	1	1	1
Score ≥ 10 (depressive symptoms)	1.20 (0.78, 1.86)	1.25 (0.74, 2.12)	1.30 (0.91, 1.87)	0.69 (0.43, 1.10)	<b>2.07 (1.20, 3.56)</b>	1.52 (0.77, 3.01)	<b>0.37 (0.27, 0.51)</b>	<b>0.39 (0.26, 0.59)</b>
<b>Any violence as an adult</b>								
Never	1	1	1	1	1	1	1	1
Previously	1.36 (0.77, 2.39)	1.57 (0.85, 2.90)	<b>3.09 (1.63, 5.84)</b>	<b>3.12 (1.57, 6.20)</b>	2.24 (0.92, 5.50)	<b>2.76 (1.04, 7.29)</b>	<b>1.52 (1.03, 2.24)</b>	<b>2.43 (1.53, 3.85)</b>
Currently (past 3 months)	1.95 (0.99, 3.83)	2.01 (0.95, 4.28)	<b>7.49 (3.79, 14.76)</b>	<b>5.56 (2.61, 11.83)</b>	<b>7.62 (3.04, 19.09)</b>	<b>6.33 (2.26, 17.70)</b>	1.49 (0.91, 2.44)	<b>2.49 (1.38, 4.51)</b>
<b>Any violence as a child</b>								
No	1	Not selected	1	Not selected	1	Not selected	1	Not selected

Table 6 (continued)

Variables	Relationship type							
	Relationship without sex		Short-term sexual relationship		Long-term “unhappy” sexual relationship		Long-term “happy” sexual relationship	
	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
Yes	<b>1.96 (1.18, 3.25)</b>		<b>2.22 (1.45, 3.40)</b>		<b>2.61 (1.36, 4.99)</b>		1.15 (0.84, 1.58)	
<i>Physical health factors</i>								
Physical health-related quality of life (per 10-unit increase)	1.07 (0.92, 1.24)	Not selected	1.06 (0.94, 1.20)	Not selected	0.94 (0.79, 1.11)	Not selected	<b>1.23 (1.11, 1.38)</b>	Not selected
<i>History of antiretroviral therapy</i>								
Never	1	1	1	1	1	1	1	1
Previously	2.94 (0.99, 8.77)	2.55 (0.81, 8.08)	<b>4.10 (1.44, 11.67)</b>	<b>3.31 (1.04, 10.49)</b>	<b>5.46 (1.52, 19.58)</b>	2.77 (0.66, 11.53)	<b>2.39 (1.01, 5.66)</b>	2.38 (0.92, 6.15)
Currently	1.00 (0.53, 1.89)	0.93 (0.45, 1.93)	<b>1.89 (1.00, 3.59)</b>	<b>2.22 (1.08, 4.56)</b>	1.53 (0.64, 3.69)	1.17 (0.44, 3.12)	1.08 (0.69, 1.70)	1.26 (0.74, 2.15)

CHIWOS: Canadian HIV Women’s Sexual and Reproductive Health Cohort Study. Estimates with 95% CIs that exclude the null value of 1 are in bold

sex and entitlement to pleasure, among many other groups of women (Rheume & Mitty, 2008; Somes & Donatelli, 2012). As HIV activist Welbourn (2013) persuasively argued, HIV exacerbates this experience through “laws and practices which make us fearful of even thinking about our rights to sexual pleasure, let alone acting on them” (p. 157). Sexist and ageist ideas of how women “should” look are also intensified in the context of HIV for women, some of who report significant changes in body shape with menopause and cART as contributing to reduced desirability and a reason why partners have ended relationships (Psaros et al., 2012). However, these sexual stereotypes of older women with HIV as not desirous nor desired sexual beings are challenged when one considers that 17.2% of women in long term/happy, loving, intimate, and sexually active relationships in our study are over 50. This corroborates qualitative research with African American and Latina older women with HIV, who describe sexual pleasure as important and improving with age (Taylor et al., 2016).

Just as stigma and age may limit the possibility of pursuing a new relationship, our results also illustrate how knowledge about HIV and the circumstances of everyday life can impact dynamics within already established relationships. The prevalence of women in relationships without sex in this study was 8.6%. While knowledge about the impact of cART on HIV transmission was generally high, consistent with the latest science (Rodger et al., 2016), mixed perceptions were evident and its endorsement was lowest among this latent class. This, combined with discourses that position HIV-positive women as both irresponsible for acquiring HIV and responsible for preventing its

spread (Gurevich et al., 2007), may contribute to women’s fears of transmitting HIV to partners and may help to explain why some women in this latent class were in committed relationships but not having sex (Beckerman & Auerbach, 2002; Cranson & Caron, 1998; Keegan et al., 2005; Lawless, Crawford, et al. 1996; Nevedal & Sankar, 2015; Rispel, Metcalf, Moody, Cloete, & Caswell, 2011; Siegel & Schrimshaw, 2003; van der Straten, Vernon, Knight, Gomez, & Padian, 1998; VanDevanter, Thacker, Bass, & Arnold, 1999). However, these findings may also be explained by several other unrelated reasons. For example, some women in this latent class may be at the beginning of their relationship, which has not yet progressed to a sexual one. Others may have been together for some time and sexual inactivity may be situational (e.g., work, stress, kids, other illness, or long-distance relationships). Still, others may not want to have oral, vaginal, or anal intercourse, preferring and enjoying other forms of intimacy and connection, similar to the accounts of women without HIV (Hayfield & Clarke, 2012). Normalizing rather than exceptionalizing their experiences in important, and qualitative research on the intimate life of non-sexual couples is needed. Dating as a mother with HIV could also be explored in future analyses since our findings show that those with children living at home were less likely to be in this or any kind of relationship relative to those without children in the home.

Three distinct multidimensional classes of sexually active relationships with a regular partner were also uncovered in this analysis. First, nearly one-quarter of were in long-term/happy relationships, most commonly with HIV-negative partners (71%). These relationships were characterized by longer

726 duration (i.e.,  $\geq 3$  years), higher physical (97%) and emo-  
 727 tional (86%) intimacy, and equitable power (93%). They also  
 728 reported the greatest amount of love and affection compared to  
 729 all other relationship types. These findings challenge dominant  
 730 research narratives that position love in the context of HIV  
 731 as inherently negative, even dangerous, especially for mixed  
 732 HIV status couples, whose traditional name of serodiscordance  
 733 implies tension (Beckerman & Auerbach, 2002; Bun-  
 734 nell et al., 2005; Hughes & Truong, 2017; Lawless, Crawford,  
 735 et al. 1996; Miller, 2014; Patel et al., 2016; Rispel et al., 2011;  
 736 Siegel et al., 2006; van der Straten et al., 1998). On the con-  
 737 trary, there is evidence that women with HIV-negative partners  
 738 report greater sexual satisfaction (Peltzer, 2011) and feelings of  
 739 normalcy in such relationships (Keegan et al., 2005; Lawless,  
 740 Crawford, et al. 1996; Persson, 2005), as well as considerable  
 741 within-group diversity on the basis of many dynamics includ-  
 742 ing the timing and circumstances around diagnosis (Hughes  
 743 & Truong, 2017). Significantly, we also found that women in  
 744 long-term/happy relationships, compared to their counterparts  
 745 in no relationship, were less likely to experience stigma, PTSD,  
 746 and probable depression. It may be that longer-term, loving,  
 747 and sexually active relationships are protective against these  
 748 traumas, or that women facing more HIV stigma and coping  
 749 with PTSD and depression are less likely to pursue, establish,  
 750 and continue such romantic relationships. Regardless, these  
 751 findings add to the health literature cross-sectionally linking  
 752 love and intimacy to psychological well-being (Jakubiak &  
 753 Feeney, 2016).

754 Relatively fewer women in our cohort (6.4%) were in long-  
 755 term/unhappy sexual relationships, defined by lower levels of  
 756 power (52%) and physical (44%) and emotional (24%) inti-  
 757 macy. HIV-positive partners were also more likely in these  
 758 relationships. Whereas some research has shown HIV serocon-  
 759 cordance to be a source of support and reduced burdens in rela-  
 760 tion to disclosure, discrimination, and education of partners  
 761 (Cooper et al., 2013; Jarman et al., 2005; Keegan et al., 2005;  
 762 Lawless, Crawford, et al. 1996; Mazanderani, 2012; Seeley  
 763 et al., 2009; Wamoyi et al., 2011), other research has found  
 764 that some women may settle for less in such relationships out  
 765 of fears of the possible social consequences of being single.  
 766 Specifically, in addition to worries about loss of income and  
 767 increased loneliness, consistent with findings among women  
 768 without HIV (Spielmann et al., 2013), HIV-positive women  
 769 have also reported anxieties about the challenges of re-disclos-  
 770 ing, re-educating, and re-negotiating sex with a new partner  
 771 (Keegan et al., 2005; Lawless, Crawford, et al. 1996; Nevedal  
 772 & Sankar, 2015). Membership in this latent class was signifi-  
 773 cantly related to higher income, as well as sexism/genderism  
 774 and violence. While qualitative research should investigate  
 775 these links more deeply, these findings may suggest that the  
 776 benefits of economic power in terms of increasing women's  
 777 autonomy and choice (including the option to leave unhappy  
 778 and unsafe relationships) may be lessened in the context of

HIV and gendered pressures to conform to committed, love  
 relationships (Holland, Ramazanoglu, et al., 1992; Moran  
 & Lee, 2014a; Msibi, 2011; Rule-Groenewald, 2013; Singh,  
 2013).

Another 15% of our cohort was in shorter-term sexual rela-  
 tionships (i.e.,  $< 3$  years). They had similar levels of content-  
 ment with sexual intimacy as the previous latent class but were  
 less satisfied in terms of emotional closeness (16%). Our find-  
 ing that disclosure was less common among women in shorter  
 relationships is consistent with qualitative research (Keegan  
 et al., 2005; Lawless, Crawford, et al. 1996). While typically  
 constructed as sexually "risky," some women living with HIV  
 report preferring shorter relationships, as they allow for more  
 control over condom use, enabling them to avoid disclosure  
 and (some of) its associated risks (e.g., rejection) (Keegan  
 et al., 2005; Lawless, Crawford, et al. 1996; Maticka-Tyndale  
 et al., 2002). Women in these relational contexts, however,  
 along with those in long-term/unhappy arrangements, were  
 not immune to other harms and had the greatest odds (i.e.,  
 sixfold) of experiencing violence in the past 3 months. Sex  
 work also predicted membership in short-term relationships.  
 These findings suggest that women in positions of lower social  
 power are most likely to be navigating shorter relationships and  
 disproportionately impacted by violence. Those currently and  
 previously on cART (vs. never on cART) were also more likely  
 to be in this latent class. This may be because more marginal-  
 ized women are often connected to outreach services (Carter  
 et al., 2015), though these relationships warrant further study.

Finally, in addition to showing how relationships are mul-  
 tifaceted and embedded within diverse social contexts, a key  
 objective of this analysis was to make visible experiences of  
 love with HIV. Consistent with qualitative work (Grodensky  
 et al., 2015; Gurevich et al., 2007; Squire, 2003), many of the  
 women in our study reported giving and receiving love. Our  
 findings also revealed how love, sex, and intimate relationships  
 are not the same phenomenon, as love may be felt without either  
 sexual interaction or a romantic partner. For example, women  
 in relationships without sex reported higher levels of love than  
 those in some sexual relationships, and about one-quarter of  
 women in no relationship reported experiencing love "all of  
 the time." These findings are consistent with theories of love  
 as encompassing different components depending on the rela-  
 tionship context (Sternberg, 1986). They are also reflective of  
 qualitative reports from women living with HIV who describe  
 their children, grandchildren, and friends as important sources  
 of closeness, connectedness, and attachment (Grodensky et al.,  
 2015). While romantic love is certainly not wanted by all, past  
 studies have found that many women living with HIV report a  
 deep desire to love and be loved (Squire, 2003). Feminist schol-  
 ars (Gurevich et al., 2007; Persson, 2005; Squire, 2003) have  
 revealed, however, how discourses of HIV contradict discourses  
 of romance and can disrupt women's quests for love. While our  
 findings show some of that disruption, they also depart from

832 previous literature by demonstrating that many women living  
833 with HIV can and do find love and belonging in several differ-  
834 ent ways.

### 835 Limitations and Strengths

836 Our ability to construct meaningful relationship typologies was  
837 limited by the data collected. While we were able to employ sev-  
838 eral measures common in the literature, numerous other indica-  
839 tors warrant future study (e.g., interests shared, communication,  
840 affectionate touch, and intimacy outside of intercourse). Further,  
841 despite the heterogeneity shown, our LCA contained some mis-  
842 classification bias; specifically, we were unable to tease apart  
843 and separately study the experiences of women who reported  
844 non-relationship sex, which likely minimized the associations  
845 reported. While our analysis shows critical nuance among  
846 women reporting regular partners, future research employing  
847 LCA is needed in the realm of casual partnerships as well as  
848 intimate partnerships of sex workers. Further, our analysis also  
849 concealed the experiences of women in relationships without  
850 sex, as many of our survey questions (e.g., duration, power, cou-  
851 ple HIV serostatus) were only asked to those in sexual relation-  
852 ships, exposing a hidden bias that remains prominent within HIV  
853 research—namely, that relationships matter only insofar as they  
854 involve sexual risk. Finally, we missed critical nuance among  
855 women who were single and satisfied versus single and dissatis-  
856 fied, which also bares further study.

857 Although we operationalized intersectionality with regard  
858 to relationships, we were unable to investigate the multidim-  
859 sionality of love and how experiences of relationships  
860 and love were shaped by the whole of women's identities (e.g.,  
861 age, sexual orientation, and race simultaneously) (Bowleg,  
862 2008). Qualitative research could address this and improve  
863 understandings of the numerical data found in our study. It is  
864 also important to acknowledge that the cross-sectional nature  
865 of this analysis precluded us from understanding the direction-  
866 ality of the associations seen. This design also prevented us  
867 from exploring how women's relationships may change over  
868 time, and associated influences and impacts. Future research  
869 should investigate this through latent transition analysis  
870 (LTA), a longitudinal extension of LCA involving multiple  
871 waves of data collection (Lanza & Collins, 2008).

872 Even though we were unable to illuminate full relational  
873 diversity and complexity, the questions were informed, tested,  
874 and selected in collaboration with women living with HIV, which  
875 is not typical of quantitative research in this field (Carter, Greene,  
876 et al., 2017). Women also played a critical role in administering  
877 the questionnaire and framing the results, which may have reduced  
878 social desirability bias (Brizay et al., 2015) and improved analy-  
879 sis interpretations. In addition, this is the first study to analyze  
880 relationships patterns of women living with HIV using LCA and  
881 we hope the results, in combination with critical feminist theory,  
882 offer a new methodological direction for quantitative researchers

working in the area of HIV, sexual health, and even relationship  
883 science more broadly. 884

### 885 Implications

886 This study has important implications for women living with  
887 HIV, providers, and policy-makers. Perhaps most importantly,  
888 to support women's lives and relationships (for those who  
889 desire them), continued programmatic and policy efforts at  
890 the structural level aimed at de-stigmatizing HIV (Canadian  
891 HIV/AIDS Legal Network, 2014; International Community  
892 of Women Living with HIV/AIDS, 2015) and reducing and  
893 responding to violence against women living with the virus  
894 (Bair-Merritt et al., 2014; García-Moreno et al., 2015) are cru-  
895 cial. Clinical and community-based initiatives should also be  
896 prioritized in order to offer women compassionate, individual-  
897 ized, and contextualized supports around trauma, sexuality, and  
898 relationships, with referrals to specialists where needed (Taylor  
899 & Davis, 2006). Comprehensive peer-driven interventions in  
900 this area are also lacking and needed (Fernet et al., 2017). Pro-  
901 grams mustn't only target women, though. Sex and intimate  
902 relationships involve (at least) two people, and are shaped by  
903 broader historical, social, and cultural contexts. Thus, educat-  
904 ing current and prospective partners around gender equality,  
905 structural inequities, and sex and intimacy in the context of  
906 HIV is critical, including effectively no risk of transmission  
907 with consistent treatment and VL suppression and monitoring,  
908 among other safer sex strategies (Rodger et al., 2016). Creating  
909 more opportunities for women to connect with other women  
910 and couples affected by HIV, both in-person and online (Life  
911 and Love with HIV, 2017), is another important strategy. By  
912 making their stories (both happy and difficult) more visible, we  
913 can support women in their efforts to combat stigma, alleviate  
914 isolation, and find support in others' experiences (International  
915 Community of Women Living with HIV/AIDS, 2017).

### 916 Conclusions

917 As feminist scholar Squire (2003) once said, because of the  
918 stigma of HIV, "a romance told in the context of HIV is, in a  
919 sense, a story told *against* HIV" (p. 79). Without negating the  
920 challenges that an HIV diagnosis raises for women in their lives  
921 and in their relationships, there is a critical need to show more  
922 positive and holistic stories of women's experiences with rela-  
923 tionships and sexuality. By attempting just that in our analysis,  
924 we hope to offer women with HIV a new narrative that affirms,  
925 in the words of HIV activist and co-author Sanchez, "women  
926 are multidimensional beings and have the power and the rights  
927 to live fulfilling lives complete with love and intimacy, if they  
928 choose to." Enabling this, however, requires significant changes  
929 in society.

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