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ORIGINAL PAPER

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 et al., 2017b). 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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Conceptual Analysis

What Constitutes Love, Sex, and Relationships?

Love, sex, and relationships can mean different things between (and among) different men and women (Faulkner, 2003; Peterson & Muehlenhard, 2007; Rule-Groenewald, 2013; Wentland & Reissing, 2011, 2014). Often, these constructs are viewed dichotomously, whereby love is thought of as an emotion (Rule-Groenewald, 2013) and sex a physical act (Peterson & Muehlenhard, 2007). The expression of both, however, can involve a range of emotional and physical experiences (e.g., kissing, cuddling, feeling wanted) that contribute to various kinds of relationships—sexual, platonic, committed, unattached, familial, and so forth (Floyd, 2002; Gulledge, Gulledge, & Stahmannn, 2003; Sassler, 2010). Within the context of intimate relationships, however, love has been described as "different," "intense," and, at times, "irrational" (Reis & Aron, 2008). While often coupled with positive dynamics such as intimacy and passion, love can also intersect with power, poverty, and violence (Bhana, 2013; Haysom, 2013; Holland et al., 1992a; Rule-Groenewald, 2013; Schäfer, 2008), making how we experience love and intimate relationships multidimensional. This is also the reason why feminist scholars, while committed to legitimizing research on love and its possibilities, remain simultaneously focused on interrogating the potential risks of love through its connection to power and patriarchy.

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

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

In the social context of HIV, these decisions are particularly constrained for some women. This is, in part, because of historical discourses and criminal laws that have stigmatized love and sex with HIV, positioning it as dirty, dangerous, and, under particular circumstances, even illegal (International Community of Women Living with HIV/AIDS, 2015; Sontag, 1988). These structural forms of oppression—together with heteronormative 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 statements 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 & Bernard, 2016; Vernazza, Hirschel, Bernasconi, & Flepp, 2008).

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 et al., 1996a, b; 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; Cranson & 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 &

Albright, 2012; Greenhalgh, Evangeli, Frize, Foster, & Fidler, 2016; Gurevich et al., 2007; Jarman et al., 2005; Keegan et al., 2005; Maticka-Tyndale et al., 2002; Nevedal & Sankar, 2015; Persson, 2005; Psaros et al., 2012; Siegel et al., 2006; Siegel & Schrimshaw, 2003). This, combined with socially imposed feelings of undesirability, can lead some women to settle for less in current relationships (Gurevich et al., 2007; Jarman et al., 2005; Lawless et al., 1996a). Importantly, however, other studies have highlighted positive counter-narratives, debunking cultural myths that sex and romance is incompatible, even impossible, with HIV (Cooper et al., 2013; Grodensky et al., 2015; Psaros et al., 2012; Seeley et al., 2009; Siegel et al., 2006; Squire, 2003).

Quantitative Research: Hidden Complexities of Intimate Relations Embedded in Social Context

Quantitative research among women living with HIV, on the other hand, has tended to ignore love and the historical, cultural, and structural factors that may play a role in shaping its expression (Carter et al., 2017b). Additionally, and of particular relevance to current analysis, most studies have oversimplified the complexity of women's intimate relationships, reducing their experiences to a single construct (Carter et al., 2017b)—usually women's marital status or couple dynamics assumed to involve sexual risk, such as regular versus casual partners (Hankins, Gendron, Tran, Lamping, & Lapointe, 1997; Kaida et al., 2015) or mixed-status versus same-status relationships (Peltzer, 2011; Wessman et al., 2015). Very rarely have studies focused on pleasure, nor the risks women face from intimate partners, such as violence and unequal power dynamics (Beckerman & Auerbach, 2002; Gurevich et al., 2007; Persson, 2005; Squire, 2003). To the best of our knowledge, the quantitative literature has also elided the issue that relationships are multidimensional, encompassing many dynamics—sexually, emotionally, socially, economically, corporeally, and spiritually—all at once (Bowleg et al., 2004; Devries & Free, 2011; Farvid & Braun, 2016; Longfield, 2004; Moran & Lee, 2014a, 2014b; Nelson, Morrison-Beedy, Kearney, & Dozier, 2011; Robertson et al., 2013; Sassler, 2010; Wentland & Reissing, 2014).

While full heterogeneity in relationships is difficult to capture statistically, one way to model how multiple dimensions of relationship context may intersect in meaningful ways is to use a person-centered approach like latent class analysis (LCA) (Lanza, Bray, & Collins, 2013). LCA is a statistical method that can uncover unobserved subgroups of people (i.e., latent classes) using multiple observed variables (i.e., data collected in questionnaires) (Lanza et al., 2013). Unlike studies that use single measures, LCA offers a more holistic approach to understanding relationships by exploring the entire spectrum of sexual and intimate dynamics concurrently. This has been endeavored in 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 substance use (Carter et al., 2017c; 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 relationship 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 attention 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 illuminated some of the ways in women's relational lives may be intertwined with love and social and cultural forces, these studies 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). CHIWOS is grounded in community-based research principles (Israel, Schulz, Parker, & Becker, 1998), involving women living with HIV, academic researchers, care providers, and community 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 ≥ 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: 35% were recruited from peers, 34% from HIV clinics, 19% AIDS Service Organizations and non-HIV locations (e.g.,

shelters), and 12% from word of mouth, online networks (e.g., www.facebook.com/CHIWOS; www.twitter.com/CHIWOSresearch), and other methods (Webster et al., 2018). Following screening and informed consent, Peer Research Associates (women living with HIV with research training) administered online questionnaires in English or French using FluidSurveys™ software. Baseline study visits lasted a median time of 120 min (IQR 90–150) and took place either at clinic/community sites, women's homes, or via phone/Skype. Participants received $50 cash for their involvement. The study received ethical approval from Simon Fraser University, University of British Columbia/Providence Health Care, Women's College Hospital, and McGill University Health Centre, as well as recruiting hospitals and AIDS Service Organizations where required.

Analysis Variables

Figure 1 depicts the conceptual relationships between all variables in this analysis, including the indicators and correlates of latent class membership.

Indicators of Latent Class Membership

We used seven sex and relationship measures for LCA, derived from eight variables (Table 1). The first indicator was sexual relationship status, resulting from a cross between two variables: current legal relationship status (single, separated, divorced, or widowed vs. married, common law, or living-apart relationship) and consensual oral, vaginal, or anal sex with a regular partner of any gender in the past 6 months (no vs. yes). In crossing these variables, we derived the four groupings shown in Table 1, which, for simplicity, we called: no relationship (i.e., single, separated, divorced, or widowed and not sexually active), relationship without sex (i.e., married, common law, or living-apart relationship and not sexually active), unlabeled sexual relationship (i.e., single, separated, divorced, or widowed and sexually active), and labeled sexual relationship (i.e., married, common law, or living-apart relationship and sexually active).

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

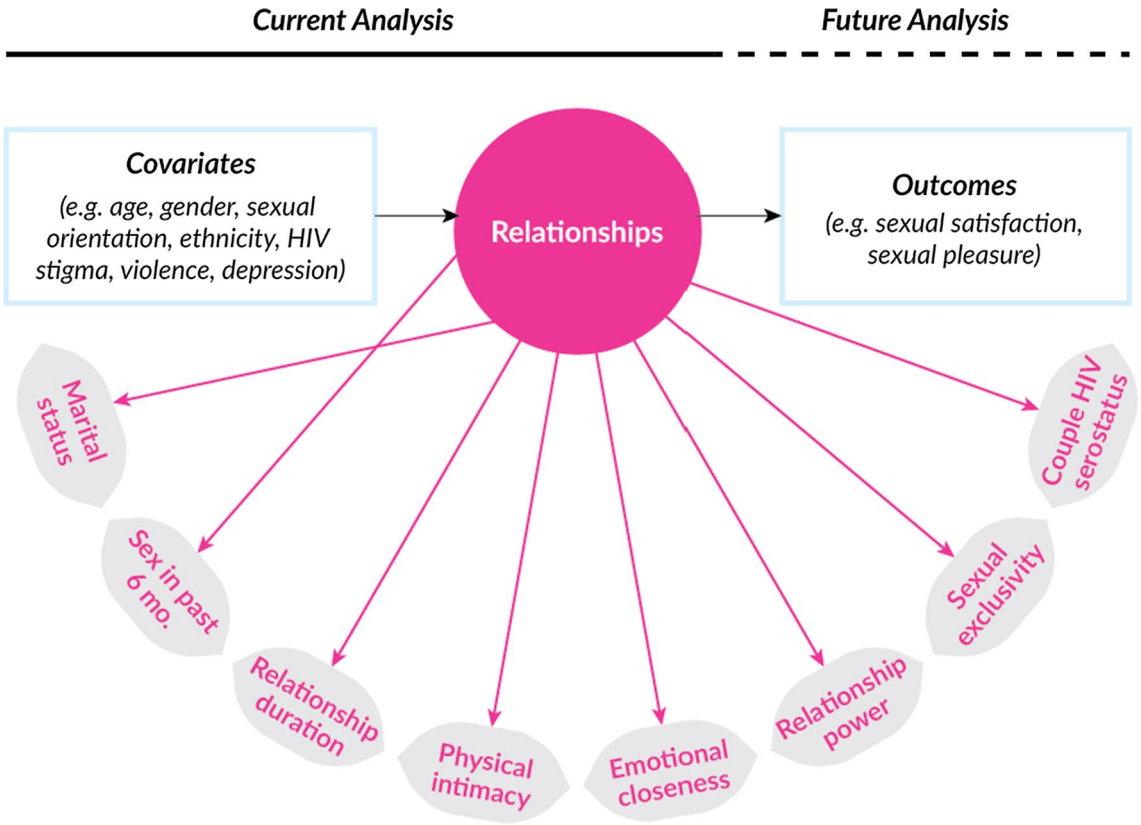

Fig. 1 A conceptual portrayal of latent class analysis of sexual and intimate relationship experiences among women living with HIV enrolled in CHIWOS, showing indicators (pink) and covariates (left blue box) of latent class membership for the current analysis as well as positive and rewarding aspects of sexuality that have been explored in a separate analysis (right blue box) (Carter et al., 2018a) (Color figure online)

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 et al., 2017b; Tiefer, 2001).

At the level of the individual body, medical and physical health factors included: history of cART; most recent VL (Carter et al., 2017a); 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 et al., 2018b).

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 ≥ 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 6–30 and a cutoff of ≥ 14 indicating likely PTSD, Cronbach's

$\alpha = .91$) (Lang & Stein, 2005; Lang et al., 2012); and any type of violence as an adult, child, or during war/violent conflict.

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

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

Analysis Plan

Final Analytic Sample

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

Latent Class Analysis

Based on the sex and relationship indicators described above, we modeled latent classes using the PROC LCA software package in SAS (https://methodology.psu.edu) (Lanza, Collins, Lemmon, & Schafer, 2007; Lanza, Dziak, Huang, Xu, & Collins, 2015). We considered solutions with two to seven latent classes, and assessed model identification for each using an expectation–maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977; Lanza et al., 2007). The maximum number of iterations through which the EM algorithm was allowed to proceed was set to 5000. We performed 1000 repetitions of model estimation for each solution, using 1000 random sets of starting values to find the global maximum log-likelihood (ML) solution (Lanza et al., 2007). In selecting the final model, we relied on information criteria indicating relative model fit including Akaike information criterion (AIC) (Akaike, 1987), Bayesian information criterion (BIC) (Schwarz, 1978), consistent AIC (CAIC) (Bozdogan, 1987), and adjusted BIC (aBIC) (Sclove, 1987) (Lanza et al., 2007). We also examined the percentage of starting values that converged to the ML solution (i.e., solution stability, which indicates adequacy of model identification) and the quality of latent class separation (i.e., entropy) (Lanza et al., 2007).

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

Descriptive, Bivariable, and Multivariable Analyses

We described baseline characteristics for the cohort overall using frequencies (n) and proportions (%) for categorical variables, and medians and interquartile ranges (IQR) for continuous measures. We then examined the prevalence of love and other correlates across the latent classes, using chi-square or Fisher's exact test (categorical) and Kruskall–Wallis test (continuous) to test for significant differences. Finally, we used unadjusted and adjusted multinomial logistic regression to examine independent correlates of latent class membership (UCLA Institute for Digital Research and Education, 2015a, 2015b). For this step, bivariable results were used to screen variables (Rentsch et al., 2014), excluding ones from further examination if their crude association's p value with the latent classes was $> .2$ (Kaida et al., 2015). As some variables were highly correlated (age and 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
5	**333.51**	**501.51**	**938.03**	**1022.03**	**671.2**	**0.90**	**50.4**
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

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

Results

Participants' Social Circumstances

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

Latent Classes of Sexual and Intimate Relationship Experiences

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

The final three latent classes represented distinct types of consensual sexual relationships with a regular partner. Relative to women in short-term relationships, women in the longer-term latent classes had much higher probabilities of reporting that they were in a sexually monogamous relationship (88%—happy vs. 90%—unhappy vs. 60%—short term), were married, common law, or non-cohabiting (72%—happy vs. 100%—unhappy vs. 15%—short term) and had been with their partner for ≥ 3 years duration (62%—happy vs. 89%—unhappy vs. 35%—short term). All classes including those in long-term relationships diverged, however, on contentment with physical intimacy (97%—happy 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 (*Q*1, *Q*3)
Social, cultural, political, and economic factors	
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)

Table 3 (continued)

Variables	*n* (%) or Median (*Q*1, *Q*3)
HIV stigma scale (HSS), continuous	57.5 (42.5, 70.0)
Subcale 1 (personalized stigma), continuous	20 (12.5, 25.0)
Subcale 2 (disclosure), continuous	15 (12.5, 20.0)
Subcale 3 (internalized stigma), continuous	7.5 (2.5, 15.0)
Subcale 4 (public attitudes), continuous	15 (10.0, 17.5)
Mental health and violence factors	
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)
Physical health factors	
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

without sex), satisfactory emotional closeness (86%—happy vs. 24%—unhappy vs. 16%—short term vs. 27%—relationships without sex), power equity (among those who had sex in past 1 month: 93%—happy vs. 52%—unhappy vs. 51%—short term), and mixed HIV status (71%—happy vs. 59%—unhappy vs. 81%—short term). In ad hoc analyses (data not shown), disclosure was high across all sexual relationships but less common for those of shorter length (86% vs. longer term 95–97%). Also, 37% of shorter-term relationships had ended at time of interview, while most relationships classified as longer-term were currently ongoing (96–99%).

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	**1.00**	0.00	0.00	0.00	0.00
Relationship without sex	0.00	**1.00**	0.00	0.00	0.00
Unlabeled sexual relationship	0.00	0.00	**0.85**	0.00	0.28
Labeled sexual relationship	0.00	0.00	0.15	**1.00**	**0.72**
Content with sexual intimacy (kissing, intercourse, etc.)					
Agree	0.00	0.43	0.46	0.44	**0.97**
Disagree	0.00	**0.57**	**0.54**	**0.57**	0.03
No relationship/not asked	**1.00**	0.00	0.00	0.00	0.00
Not enough emotional closeness					
Agree	0.00	**0.73**	**0.84**	**0.76**	0.14
Disagree	0.00	0.27	0.16	0.24	**0.86**
No relationship/not asked	**1.00**	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	**0.89**	**0.62**
No relationship/not asked	**1.00**	**1.00**	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	**0.81**	**0.59**	**0.71**
No relationship/not asked	**1.00**	**1.00**	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	**0.60**	**0.90**	**0.88**
No relationship/not asked	**1.00**	**1.00**	0.00	0.00	0.00
Sexual relationship power*					
High/Medium	0.00	0.00	0.30	0.44	**0.82**
Low	0.00	0.00	0.29	0.40	0.06
No relationship/not asked	**1.00**	**1.00**	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 astericks (*) 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

Patterns of Love and Social and Structural Factors by Latent Classes

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

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 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%)	*p* value
	n (%) or *M* (*Q*1, *Q*3)	*n* (%) or *M* (*Q*1, *Q*3)	*n* (%) or *M* (*Q*1, *Q*3)	*n* (%) or *M* (*Q*1, *Q*3)	*n* (%) or *M* (*Q*1, *Q*3)	
Love						< .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)	
Social, cultural, political, and economic factors						
Factors beyond HIV						
Age (years), continuous	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, Caribbean, 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 ($n=621$, 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%)	p value
	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	
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 exposure	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 transmission 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), continuous	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 ($n=621$, 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%)	p value
	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	
Subcale 1 (personalized stigma), continuous	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 (disclosure), continuous	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 (internalized 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), continuous	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
Mental health and violence factors						
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, categorical						< .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)	
Physical health factors						
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 antiretroviral 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 ($n=621$, 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%)	p value
	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	n (%) or M ($Q1$, $Q3$)	
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)	

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

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

The finding that 46.5% of women were not in a relationship and that this was associated with HIV-related stigma but also reduced violence suggests that ongoing stigmatization of HIV remains a significant impediment to pursuing safe and healthy relationships for many women living with HIV. Enacted stigma and internalized stigma appeared to be driving this effect. As noted in the Introduction, past qualitative research has documented the judgment, abuse, and rejection many women experience upon disclosure to partners (Closson et al., 2015; Cooper et al., 2013; Jarman et al., 2005; Keegan et al., 2005; Maticka-Tyndale et al., 2002; Nevedal & Sankar, 2015; Persson, 2005; Psaros et al., 2012; Siegel et al., 2006; Siegel & Schrimshaw, 2003), particularly in heterosexual communities where HIV knowledge is low and stigma is high (Persson, 2005). Prior research has also revealed that public discourses that depict women as vectors of transmission influence women's self-esteem, ultimately inhibiting their desires to enter into relationships (Gurevich et al., 2007; Jarman et al., 2005; Lawless et al., 1996a, b). It is important to note, however, that not all women with HIV desire a relationship. From wanting to protect oneself from HIV non-disclosure laws (International Community of Women Living with HIV/AIDS, 2015; Kaida et al., 2017), to preventing the physical and emotional stresses and trauma of relationships with HIV (Psaros et al., 2012; Siegel et al., 2006), to concentrating on other priorities (e.g., work, earning money, or furthering children's education) (Cooper et al., 2013; Psaros et al., 2012; Seeley et al., 2009; Siegel & Schrimshaw, 2003), these alternative narratives demonstrate women's resistance against discriminatory structures and debunk broad cultural assumptions that a romantic relationship is necessary

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 CHIWOS (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)
Social, cultural, political, and economic factors								
Factors beyond HIV								
Age (years) (per 10-unit increase)	**0.58 (0.49, 0.70)**	**0.72 (0.56, 0.92)**	**0.82 (0.66, 1.01)**	**0.46 (0.37, 0.58)**	**0.62 (0.48, 0.79)**	**0.39 (0.28, 0.54)**	**0.53 (0.45, 0.62)**	**0.40 (0.33, 0.49)**
Sexual orientation								
Hetero-sexual	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)		**0.34 (0.12, 0.99)**	
Genderism/ Sexism (per 10-unit increase)	1.08 (0.87, 1.34)	0.96 (0.67, 1.36)	**1.26 (1.05, 1.51)**	1.21 (0.91, 1.60)	**1.35 (1.05, 1.74)**	**1.50 (1.02, 2.22)**	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	**1.69 (1.00, 2.86)**	**2.37 (1.35, 4.15)**	1.08 (0.66, 1.75)	1.32 (0.77, 2.27)	1.64 (0.85, 3.15)	**2.74 (1.32, 5.68)**	**1.48 (1.00, 2.19)**	**1.63 (1.04, 2.55)**
$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)	**2.34 (1.18, 4.66)**	**4.03 (1.74, 9.34)**	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)	**3.45 (1.68, 7.07)**	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)
Illicit drug use history								
Never	1	Not selected	1	Not selected	1	Not selected	1	Not selected
Previously	1.01 (0.61, 1.67)		**1.75 (1.14, 2.67)**		1.56 (0.88, 2.77)		1.28 (0.91, 1.79)	
Currently (past 3 months)	1.17 (0.64, 2.16)		**3.36 (2.13, 5.29)**		1.86 (0.94, 3.67)		1.33 (0.87, 2.04)	
Have biological children at home								
Yes	1	1	1	1	1	1	1	1
No	1.61 (0.90, 2.87)	**2.16 (1.15, 4.06)**	1.16 (0.73, 1.83)	**1.72 (1.02, 2.91)**	1.55 (0.83, 2.90)	**3.65 (1.77, 7.52)**	1.11 (0.76, 1.62)	**2.22 (1.42, 3.48)**
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)
Factors related to HIV								
Perception of how treatment changes HIV transmission risk								
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)	**1.96 (1.40, 2.75)**	**1.49 (1.01, 2.17)**
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)	**0.89 (0.82, 0.96)**	**0.87 (0.79, 0.96)**
Mental health and violence factors								
PTSD, categorical								
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)	**2.02 (1.39, 2.92)**	**1.74 (1.07, 2.82)**	**1.89 (1.12, 3.18)**	1.05 (0.54, 2.06)	**0.55 (0.40, 0.75)**	0.85 (0.57, 1.28)
Depression, categorical								
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)	**2.07 (1.20, 3.56)**	1.52 (0.77, 3.01)	**0.37 (0.27, 0.51)**	**0.39 (0.26, 0.59)**
Any violence as an adult								
Never	1	1	1	1	1	1	1	1
Previously	1.36 (0.77, 2.39)	1.57 (0.85, 2.90)	**3.09 (1.63, 5.84)**	**3.12 (1.57, 6.20)**	2.24 (0.92, 5.50)	**2.76 (1.04, 7.29)**	**1.52 (1.03, 2.24)**	**2.43 (1.53, 3.85)**
Currently (past 3 months)	1.95 (0.99, 3.83)	2.01 (0.95, 4.28)	**7.49 (3.79,14.76)**	**5.56 (2.61, 11.83)**	**7.62 (3.04, 19.09)**	**6.33 (2.26,17.70)**	1.49 (0.91 2.44)	**2.49 (1.38, 4.51)**
Any violence as a child								
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	**1.96 (1.18, 3.25)**		**2.22 (1.45, 3.40)**		**2.61 (1.36, 4.99)**		1.15 (0.84, 1.58)	
Physical health factors								
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	**1.23 (1.11, 1.38)**	Not selected
History of antiretroviral therapy								
Never	1	1	1	1	1	1	1	1
Previously	2.94 (0.99, 8.77)	2.55 (0.81, 8.08)	**4.10 (1.44, 11.67)**	**3.31 (1.04, 10.49)**	**5.46 (1.52, 19.58)**	2.77 (0.66, 11.53)	**2.39 (1.01, 5.66)**	2.38 (0.92, 6.15)
Currently	1.00 (0.53, 1.89)	0.93 (0.45, 1.93)	**1.89 (1.00, 3.59)**	**2.22 (1.08, 4.56)**	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

for a happy life (Day, Kay, Holmes, & Napier, 2011; DePaulo & Morris, 2005).

In addition to HIV stigma, older women were less likely to be in any kind of relationship, especially sexually active relationships. Desexualization, or the forced imposition of nonsexuality (Kim, 2010), is a tool that has been used by societies for decades to control and marginalize older women's desire for sex and entitlement to pleasure, among many other groups of women (Rheaume & 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 et al., 1996a; 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 duration (i.e., ≥ 3 years), higher physical (97%) and emotional (86%) intimacy, and equitable power (93%). They also reported the greatest amount of love and affection compared to all other relationship types. These findings challenge dominant research narratives that position love in the context of HIV as inherently negative, even dangerous, especially for mixed HIV status couples, whose traditional name of serodiscordance implies tension (Beckerman & Auerbach, 2002; Bunnell et al., 2005; Hughes & Truong, 2017; Lawless et al., 1996a; Miller, 2014; Patel et al., 2016; Rispel et al., 2011; Siegel et al., 2006; van der Straten et al., 1998). On the contrary, there is evidence that women with HIV-negative partners report greater sexual satisfaction (Peltzer, 2011) and feelings of normalcy in such relationships (Keegan et al., 2005; Lawless et al., 1996a; Persson, 2005), as well as considerable within-group diversity on the basis of many dynamics including the timing and circumstances around diagnosis (Hughes & Truong, 2017). Significantly, we also found that women in long-term/happy relationships, compared to their counterparts in no relationship, were less likely to experience stigma, PTSD, and probable depression. It may be that longer-term, loving, and sexually active relationships are protective against these traumas, or that women facing more HIV stigma and coping with PTSD and depression are less likely to pursue, establish, and continue such romantic relationships. Regardless, these findings add to the health literature cross-sectionally linking love and intimacy to psychological well-being (Jakubiak & Feeney, 2016).

Relatively fewer women in our cohort (6.4%) were in long-term/unhappy sexual relationships, defined by lower levels of power (52%) and physical (44%) and emotional (24%) intimacy. HIV-positive partners were also more likely in these relationships. Whereas some research has shown HIV seroconcordance to be a source of support and reduced burdens in relation to disclosure, discrimination, and education of partners (Cooper et al., 2013; Jarman et al., 2005; Keegan et al., 2005; Lawless et al., 1996a; Mazanderani, 2012; Seeley et al., 2009; Wamoyi et al., 2011), other research has found that some women may settle for less in such relationships out of fears of the possible social consequences of being single. Specifically, in addition to worries about loss of income and increased loneliness, consistent with findings among women without HIV (Spielmann et al., 2013), HIV-positive women have also reported anxieties about the challenges of re-disclosing, re-educating, and re-negotiating sex with a new partner (Keegan et al., 2005; Lawless et al., 1996a; Nevedal & Sankar, 2015). Membership in this latent class was significantly related to higher income, as well as sexism/genderism and violence. While qualitative research should investigate these links more deeply, these findings may suggest that the benefits of economic power in terms of increasing women's autonomy and choice (including the option to leave unhappy and unsafe relationships) may be lessened in the context of HIV and gendered pressures to conform to committed, love relationships (Holland et al., 1992b; Moran & Lee, 2014a; Msibi, 2011; Rule-Groenewald, 2013; Singh, 2013).

Another 15% of our cohort was in shorter-term sexual relationships (i.e., < 3 years). They had similar levels of contentment with sexual intimacy as the previous latent class but were less satisfied in terms of emotional closeness (16%). Our finding that disclosure was less common among women in shorter relationships is consistent with qualitative research (Keegan et al., 2005; Lawless et al., 1996a). 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 et al., 1996a; 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 marginalized 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 multifaceted 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 relationship 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 scholars (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 previous literature by demonstrating that many women living with HIV can and do find love and belonging in several different ways.

Limitations and Strengths

Our ability to construct meaningful relationship typologies was limited by the data collected. While we were able to employ several measures common in the literature, numerous other indicators warrant future study (e.g., interests shared, communication, affectionate touch, and intimacy outside of intercourse). Further, despite the heterogeneity shown, our LCA contained some misclassification bias; specifically, we were unable to tease apart and separately study the experiences of women who reported non-relationship sex, which likely minimized the associations reported. While our analysis shows critical nuance among women reporting regular partners, future research employing LCA is needed in the realm of casual partnerships as well as intimate partnerships of sex workers. Further, our analysis also concealed the experiences of women in relationships without sex, as many of our survey questions (e.g., duration, power, couple HIV serostatus) were only asked to those in sexual relationships, exposing a hidden bias that remains prominent within HIV research—namely, that relationships matter only insofar as they involve sexual risk. Finally, we missed critical nuance among women who were single and satisfied versus single and dissatisfied, which also bares further study.

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

Even though we were unable to illuminate full relational diversity and complexity, the questions were informed, tested, and selected in collaboration with women living with HIV, which is not typical of quantitative research in this field (Carter et al., 2017a). Women also played a critical role in administering the questionnaire and framing the results, which may have reduced social desirability bias (Brizay et al., 2015) and improved analysis interpretations. In addition, this is the first study to analyze relationships patterns of women living with HIV using LCA and we hope the results, in combination with critical feminist theory, offer a new methodological direction for quantitative researchers working in the area of HIV, sexual health, and even relationship science more broadly.

Implications

This study has important implications for women living with HIV, providers, and policy-makers. Perhaps most importantly, to support women's lives and relationships (for those who desire them), continued programmatic and policy efforts at the structural level aimed at de-stigmatizing HIV (Canadian HIV/AIDS Legal Network, 2014; International Community of Women Living with HIV/AIDS, 2015) and reducing and responding to violence against women living with the virus (Bair-Merritt et al., 2014; García-Moreno et al., 2015) are crucial. Clinical and community-based initiatives should also be prioritized in order to offer women compassionate, individualized, and contextualized supports around trauma, sexuality, and relationships, with referrals to specialists where needed (Taylor & Davis, 2006). Comprehensive peer-driven interventions in this area are also lacking and needed (Fernet et al., 2017). Programs mustn't only target women, though. Sex and intimate relationships involve (at least) two people, and are shaped by broader historical, social, and cultural contexts. Thus, educating current and prospective partners around gender equality, structural inequities, and sex and intimacy in the context of HIV is critical, including effectively no risk of transmission with consistent treatment and VL suppression and monitoring, among other safer sex strategies (Rodger et al., 2016). Creating more opportunities for women to connect with other women and couples affected by HIV, both in-person and online (Life and Love with HIV, 2017), is another important strategy. By making their stories (both happy and difficult) more visible, we can support women in their efforts to combat stigma, alleviate isolation, and find support in others' experiences (International Community of Women Living with HIV/AIDS, 2017). That is why we created Life and Love with HIV (www.lifeandlovewithhiv.ca), a new global platform for positive, pleasure-focused storytelling.

Conclusions

As feminist scholar Squire (2003) once said, because of the stigma of HIV, "a romance told in the context of HIV is, in a sense, a story told *against* HIV" (p. 79). Without negating the challenges that an HIV diagnosis raises for women in their lives and in their relationships, there is a critical need to show more positive and holistic stories of women's experiences with relationships and sexuality. By attempting just that in our analysis,

we hope to offer women with HIV a new narrative that affirms, in the words of HIV activist and co-author Sanchez, "women are multidimensional beings and have the power and the rights to live fulfilling lives complete with love and intimacy, if they choose to." Enabling this, however, requires significant changes in society.

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