



HIV-Related Stigma Among Black Mothers in Two North American and One African Cities

Josephine Etowa¹ · Jean Hannan² · Seye Babatunde³ · Egbe B. Etowa¹ · Paul Mkandawire⁴ · J. Craig Phillips¹

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Abstract

HIV-related stigma is a negative attitude or behaviour towards persons living with HIV, and is detrimental to effective care, management, and treatment of HIV. Using a revised 10-item stigma scale, we compared levels of HIV-related stigma and its correlates among Black women living with HIV in Ottawa, Canada, and Miami, FL, USA, with those in Port Harcourt, Nigeria. HIV-related stigma scores were calculated, with a maximum score of 10 and averaged 4.71 in Ottawa, 5.06 in Miami, and 3.78 in Port Harcourt. No significant difference in HIV-related stigma scores between Ottawa and Miami. HIV-related stigma was significantly ($p < 0.05$) higher among women in the North American cities compared with women in the African city. Hierarchical linear modelling shows that psychosocial variables contributed to variations in HIV-related stigma in Ottawa (22.3%), Miami (36.3%), and Port Harcourt (14.1%). At $p < 0.05$, discrimination was a significant predictor of increased HIV-related stigma in Ottawa ($\beta = 0.077$), Miami ($\beta = 0.092$), and Port Harcourt ($\beta = 0.068$). Functional social support had a significant diminishing effect on HIV-related stigma in Miami ($\beta = -0.108$) and Port Harcourt ($\beta = -0.035$). Tackling HIV-related stigma requires sociocultural considerations within specific regional and national contexts.

Keywords Black mothers · Cross-national cities · HIV · North-south comparison · Stigma

Introduction

Stigma due to HIV is the negative assumptions, beliefs, feelings, attitudes, abuse, and maltreatment directed towards individuals or groups of persons living with the disease, groups associated with people living with HIV (PLWH), and other populations at higher risk of HIV infection [1]. This definition is consistent with the theory of social stigma, which defined stigma as an attribute, behaviour, or reputation socially discrediting in a particular way, causing a person to feel undesirable [2]. In its most inescapable and deleterious form,

HIV-related stigma, occurs when a person living with HIV integrates negative attitudes into their own self-concept [3–7].

Stigma affects the life and well-being of PLWH. Studies have shown that the relative lack of social acceptance of PLWH is particularly detrimental to the fight against HIV/AIDS, because it undermines uptake of voluntary HIV testing [8], disclosure of serostatus [9], retention in care, and adherence to anti-retroviral therapy [4, 10].

Women are especially susceptible to HIV-related stigma [11–14]. This, in part, is because of gendered discourses that portray women as ‘vectors’, ‘diseased’, and ‘prostitutes’ [15, 16]. Pregnant and parenting women living with HIV also often encounter higher and more intense levels of stigma due to judgemental opinions about HIV transmission during pregnancy. While HIV treatment reduces the risk of transmission of the virus to the foetus to as low as 1% or less, the feeling of being judged prevents pregnant women living with HIV from seeking and utilizing services that avert vertical HIV transmission from the mother to the unborn child [6]. When a woman living with HIV becomes pregnant, stigma can lead to rejection from friends, family, and society, or can lead to feelings of uncertainty and loss, low self-esteem, fear, anxiety, and depression [3–5, 17, 18].

✉ Josephine Etowa
jetowa@uottawa.ca

¹ School of Nursing, Faculty of Health Sciences, University of Ottawa, 451 Smyth Road, Ottawa, ON K1H 8M5, Canada

² Nicole Wertheim College of Nursing and Health Sciences, Florida International University, Miami, FL, USA

³ Centre for Health and Development, University of Port Harcourt, Port Harcourt, Nigeria

⁴ Institute of Interdisciplinary Studies, Carleton University Ottawa, Ottawa, Canada

With advancement in HIV prevention and treatment, infant feeding guidelines for HIV-positive women have evolved over the years. In 2010, WHO recommended exclusive breastfeeding for the first six months, provided the HIV-positive mother and/or baby are taking antiretroviral therapy (ART) during the same time period [19]. However, this guideline still recommended avoiding breastfeeding if formula feeding is acceptable, feasible, affordable, sustainable and safe (AFASS) [19]. Consequently, implementation of the guidelines varies globally. For instance, while western countries like Canada and the USA recommend exclusive formula feeding (EFF) [20, 21], low middle income countries like Nigeria recommend exclusive breastfeeding [19, 22]. In 2016, WHO guidelines recommended that HIV-positive mothers who adhere to ART can breastfeed for at least 12 months and may continue breastfeeding for up to 24 months or longer [23]. Conflicting guidelines creates a lot of tension for Black women especially those living in western countries because of the significant influence of cultural norms on infant feeding choices. For instance, when women living with HIV opt for formula feeding instead of breastfeeding as a way of adhering to national guidelines, they may experience stigma [24]. If they choose to breastfeed, they may also experience stigma [25, 26]. These factors make HIV stigma a more complex issue among migrant women of African Caribbean descent relative to non-migrant populations.

Many studies have examined the psychosocial and public health impacts of HIV-related stigma [3, 5–7]. Studies that compared levels of HIV-related stigma and its determinants across cities in different countries are rare; we identified one study that compared HIV-related stigma in four countries [27]. However, this study compared four countries from the Global South. In contrast, our study compared cities in two countries in the Global North (Canada and USA) with a city in a country in the Global South (Nigeria). Although these three cities have their unique place-based characteristics such as their sizes and the organization of the healthcare systems, they also have similar elements such as migration patterns that make sites comparison necessary. As a result of these place-based characteristics, there may be differences in the set of factors influencing stigma in each city, necessitating separate model of analysis for each city.

Although HIV-related stigma is universal, the magnitude or intensity of negative attitudes towards PLWH varies across societies. In addition, the ways in which HIV-related stigma is manifested and interpreted may vary across cultural and historical contexts. As a social construct, HIV-related stigma takes different shapes and forms across place, time and space. We could not find studies that compared experiences of HIV-related stigma in the ‘North-South’ perinatal and global health contexts. This paucity of cross-national studies of HIV-related stigma is a significant knowledge gap that may impede evidence-based care for this population. The purpose of this

study was to compare levels of HIV-related stigma and examine its predictors with particular focus on Black mothers who self-identified as living with HIV in Ottawa, Canada; Port Harcourt, Nigeria; and Miami, FL, USA. These mothers were reached at specific venues of their events using established social networks to seek their informed consents.

Methodology

This paper is based on data from a larger Canadian Institute of Health Research (CIHR) funded mixed-method study informed by community-based participatory research (CBPR) approach. CBPR is increasingly recognised as an interdisciplinary mixed method research design [28], with an epistemological stance that embraces community members as a collaborative partner and knowledge co-creators, and owners [29]. This design facilitated authentic engagement of the communities and helped the team to establish rapport and trust prior to survey administration. The research questions originated from women living with and impacted by HIV in the ACB community. Some of these women were research team members and participated in all phases of the research planning and implementation.

Study Sites Description

Three study sites were selected to capture the perspectives of Black women from diverse geographical and ethno-cultural backgrounds in the global North and South, which are influenced by differing patterns and histories of HIV infection, and infant feeding traditions. Ottawa, Canada, is a large metropolitan region with a long history of hosting foreign embassies (nation’s capital) and diverse immigrant groups. Of the visible minority population in Canada, 54% make Ontario their home and account for about 19.1% of the population of the province [30]. In Ontario, ACB people infected with HIV through heterosexual contact account for over 18% of the estimated total of all HIV-positive people, even though ACB people as a whole make up only 4.3% of the province’s population [31]. About 40% of the estimated numbers of ACB people infected with HIV through heterosexual contact are women [31]. Port Harcourt, Nigeria, is the capital of Rivers State in the South-South region of Nigeria with a predominantly Black population and carries a heavy burden of HIV and AIDS. The state has a projected population of 6.2 million, prenatal HIV prevalence of 6.0%, and population prevalence of 3.6% [32]. Also, occurrence of high-risk sexual behaviour and transactional sex in the state is rated third highest in the country [32, 33]. The state is well known for its booming oil industry and high commercial activities, which attracts continuous influx of sex workers (brothel-based and non-brothel-based). Sex worker camps often spring up around land oil rigs and oil-

bearing communities, and there is increasing spread of brothels and club houses to the rural areas. HIV prevalence among the female sex workers was 17% for brothel-based and 27% non-brothel based. Miami, Florida, has one of the largest Black African populations in the USA. It is a renown multi-cultural hub of Florida and the Americas with the largest percentages of those who claim a foreign ancestry living its communities such as Miami-Dade [34, 35]. Women of colour, particularly Black women, are disproportionately affected by HIV, accounting for the majority of new HIV infections, women living with HIV, and HIV-related deaths among women in the USA [36]. In 2013, 20% ($N = 9278$) of all new HIV infections diagnosed in the USA were women [37], and Black women were 13 times more likely to be HIV-infected than White women; Black women accounted for nearly two-thirds (64%) of all estimated new HIV infections among women in the USA [38].

In Canada and the USA, where formula is AFASS, perinatal guidelines advice against breastfeeding while exclusive breastfeeding is recommended in low-resource setting like Nigeria. Despite these WHO-based guidelines, there are cultural tensions for Black women especially those who feel striped of sense of motherhood because they are not allowed to breastfeed. There are also others who experience ethical tension between the women's right to make the personal and informed decision about infant feeding choice and the infant's right to reduce the risk of acquiring HIV through breastfeeding. These diverse viewpoints highlight important comparative dimensions with respect to the ethno-cultural groups and healthcare access. And these have implications for future programming and interventions that would reach a wider audience.

Data Collection

Due to the sensitive nature of HIV and difficulty of the Black women self-identifying as persons living with HIV as well as the relatively small population of ACB people in Ottawa, it was problematic to use random sampling. Therefore, venue-based sampling was employed to recruit participants from venues and social events where Black women would normally gather from November 2016 to March 2018. These included churches and mosques, community resource centres, public health facilities, AIDS service organizations, immigrant support agencies, pre-schools, physician offices, family gatherings, and other community events. Recruitment were conducted through intermediaries, in many cases with our collaborators and their staff (under guidance) introducing the study and gaining consent for subsequent contact by a study team member. In addition, our team members used existing community research networks that had been established over several years.

Ethics approvals from affiliated institutions such as the University of Ottawa Research Ethics Board (REB), Florida International University Institute of Research Services (IRS), and University of Port Harcourt Research Committee were obtained. This was followed by the research survey conducted through the support of the project's trained research coordinators, graduate students and research assistants who administered the surveys using paper or electronic format based on participants' preference. All study information materials were translated into French for Ottawa site, and interpreters were used when necessary to obtain informed consent and ensure ease of communication. For confidentiality and anonymity, all participant data were given pseudonyms using study-generated identification. Overall, sample size comprised of a cross-sectional multi-country survey of the following numbers of Black mothers living with HIV between the ages 18 and 49 years—Ottawa, $n = 89$; Miami, $n = 201$; and Port Harcourt, $n = 400$. All the women/mothers were of the African descent either living in the continent (Port Harcourt, Nigeria) or in the African diaspora (specifically in Ottawa, Canada and Miami, Florida, USA).

Measures of Psychosocial Variables

We used a revised 10-item HIV-related stigma scale to capture various components of stigma among Black mothers living with HIV [39]. The 10 items adapted include the following: (1) I have been hurt by how people reacted to learning I have HIV, (2) I have stopped socializing with some people because of their reactions to me having HIV, (3) I have lost friends by telling them I have HIV, (4) I am very careful who I tell that I have HIV, (5) I worry that people who know I have HIV will tell others, (6) I am not as good a person as others because I have HIV, (7) Having HIV makes me unclean, (8) Having HIV makes me a bad person, (9) Most people believe that a person with HIV is disgusting, and (10) Most people with HIV are rejected when others find out. These were categorised into four major components of the HIV-related stigma: personalised stigma (items 1–3), worries about disclosure of status (items 4–5), negative self-image (items 6–8), and sensitivity to public reactions about HIV status (items 9–10) [39]. The original scale used a 5-point Likert type response scheme [39, 40]. We modified responses to 'yes' (1 point) or 'no' (0 points) to determine presence of the item in the respondent's life. A maximum stigma score of 10 points was possible for our scoring approach. Participants could also respond 'I don't know' or 'prefer not to answer'. These particular responses were very few ($n = 15$, 2.2%) and therefore excluded from the data analyses.

The adapted functional social support (FSS) scale [41] was computed using respondent's scores on seven key attributes as follows: I have people who care about what happens to me; I

have chances to talk to someone I trust about my health; I have chances to talk to someone I trust about challenges I face as a mother living with HIV; I have chances to talk to someone I trust about challenges I face with feeding my baby as a mother living with HIV; I get invited to go out and do things with other people including mothers living with HIV; I get useful advice about things that are important to me as a mother living with HIV; I get help when I am sick in bed. Responses were based on a five-point Likert type scale of much less than I would like = 1, less than I would like = 2, some but would like more = 3, almost as much as I would like = 4, as much as I would like = 5. Hence, maximum score attainable on the scale was 35.

The adapted discrimination scale [42] was computed using responses on the following 10 key attributes: you have been treated with less courtesy than other people; you have been treated with less respect than other people; you have received poorer service than other people at restaurants or stores; people have acted as if you are not smart; people have acted as if they are afraid of you; people have acted as if you are dishonest; people have acted as if they are better than you are; you have been called names or insulted; you have been harassed or threatened; you have been followed around in stores. Responses were based on a five-point Likert type scale of less than once a year = 1, a few times a year = 2, a few times a month = 3, at least once a week = 4, almost every day = 5. Thus, a maximum of score of 50 was attainable on the discrimination scale. Measures of other variables included in the model are specified on results Table 4.

Analytical Strategy

Using the independent samples *t* test, we compared stigma levels on the full-scale and the four sub-scales between mothers living with HIV in Ottawa and Miami. Then, HIV-related stigma scores on the full-scale and the four sub-scales of the mothers in the North American cities were compared with those in Port Harcourt (Africa). After testing for homogeneity of variances and equality of means in the stigma scores for women in the North American cities, a second level of stigma comparison was carried out. That is, we combined the North American (Miami and Ottawa) samples, obtained mean scores, and compared these with mean scores of Port Harcourt mothers. This analysis explicated the degree of ‘North-South’ difference between scores of overall stigma and the four levels of stigma. In addition, this analysis revealed difference in levels of stigma experienced by migrant versus non-migrant Black women living with HIV.

Effect size for the *t*-statistics was determined using the Hedges *g*. Like the Cohen *d*, the Hedges *g* for effect size was used to estimate the margin of difference between the two groups being compared. It is calculated as the difference in means between the groups divided by the groups pooled

and weighted standard deviation [43]. The Hedges *g* differs from Cohen *d* because it employs weighted standard deviations. We chose Hedges *g* over Cohen *d* because it accounts for difference in samples sizes and unequal variances between groups which were inherent in our data.

Hierarchical linear modelling (HLM) in SPSS 25 was used to determine predictors of HIV-related stigma in each study site. Prior to the analysis, the data were assessed for missing values. There were no missing values on the outcome variable, and the proportion of missing values in the independent variables are small resulting in a list-wise deletion of only 9.9% of the cases. Given that the missing values in each of the independent variables were uncorrelated with the outcome variable (HIV-related stigma score), a plausibility of missing completely at random (MCAR) or missing at random (MAR) in the data as opposed to missing not at random (MNAR) were assumed for each HLM. Given all these reasons, the missing values in the data became negligible in the HLMs analyses.

In the HLMs, contributory effects of 3 blocks of variables on the stigma rating of mothers living with HIV were determined. In order to control for their effects on stigma, sociodemographic variables were entered into block 1. Sociodemographic variables included marital status, number of children born after testing HIV+, household size, years of formal education, and employment status. Psychosocial variables including functional social support and discrimination were entered into block 2 to establish the level of their joint influence on the model. Finally, sociocultural variables were entered into block 3. Sociocultural variables included adherence to infant feeding guidelines, disclosure of HIV status to family, congruency of cultural beliefs with infant feeding guidelines, and self-rated view that health providers are supportive of infant feeding guidelines.

Results

Descriptive statistics of the sociodemographic characteristics of the Black mothers living with HIV who participated in the study are presented in Table 1. In Ottawa, the majority ($n = 57$, 66.5%) of mothers living with HIV were either single, separated, divorced, or widowed. In Miami ($n = 121$, 60.8%) and Port Harcourt ($n = 340$, 85.2%), most of the mothers were married. In Ottawa and Miami, the women gave birth to fewer [1 to 3] children than in Port Harcourt [1 to 5] after testing positive for HIV.

The average duration since HIV diagnosis were ($M = 12.7$, $SD = 6.4$) years, ($M = 10.9$, $SD = 7.3$) years, and ($M = 6.3$, $SD = 3.5$) years in Ottawa, Miami, and Port Harcourt, respectively. Most Black mothers living with HIV in Ottawa ($n = 50$, 56.8%) had some college or university education, whereas in Miami, the majority ($n = 131$, 65.8%) had some high school, technical, or vocational education. Similarly, in Port Harcourt,

Table 1 Sociodemographic characteristics of the study population

Characteristics	Ottawa, Canada <i>n</i> (%)	Miami-FL, USA <i>n</i> (%)	Port Harcourt, Nigeria <i>n</i> (%)	All sites <i>n</i> (%)	1-Way ANOVA <i>F</i>
Number of participants (<i>N</i>)	89	201	400	690	
Mothers age, <i>M</i> ± <i>SD</i>	36.6 ± 6.4	32.4 ± 5.8	34.7 ± 5.7	34.3 ± 5.9	8.0**
Relationship status (married = 1, not married = 0)					62.0**
Single/separated/divorced/widowed	57 (66.5)	61 (35.7)	57 (14.3)	185 (27.0)	
Married	29 (33.3)	121 (60.8)	340 (85.2)	490 (71.5)	
Number of persons in household, <i>MD</i> (<i>R</i>)	4 (1–7)	3 (1–8)	4 (1–11)	4 (1–11)	3.2*
HIV-related information:					
Number of children born after HIV+, <i>MD</i> (<i>R</i>)	2 (1–3)	1 (1–3)	2 (1–5)	1 (1–5)	5.4**
Number of years since HIV+, <i>M</i> (<i>SD</i>)	12.7 ± 6.4	10.9 ± 7.3	6.3 ± 3.5	8.1 ± 5.6	85.7**
Education (years of formal education)					71.6**
Primary school	1 (1.1)	0 (0.0)	42 (10.7)	43 (6.3)	
High school, technical or vocational school	34 (38.6)	131 (65.8)	250 (63.5)	415 (60.9)	
College or university	50 (56.8)	66 (33.2)	102 (25.9)	268 (39.4)	
Employment status (employed = 1, unemployed = 0)					70.0**
Employed (full time or part time)	51 (57.3)	65 (32.7)	320 (87.9)	436 (66.9)	
Unemployed	38 (42.7)	134 (67.3)	44 (12.1)	216 (33.1)	

* $p < 0.05$, ** $p < 0.01$

most of the women ($n = 250$, 63.5%) had high school, technical or vocational education. Most of the women in Ottawa ($n = 51$, 57.3%) and Port Harcourt ($n = 320$, 87.9%) were on part-time or full-time employment. In contrast, most of the women in Miami ($n = 134$, 67.3%) were unemployed and received government insurance.

Tables 2 and 3 show the descriptive and *t* test statistics for HIV-related stigma scores of mothers from the three sites. The results compare scores on the full stigma scale and those on the sub-stigma scales including personalised stigma, HIV status disclosure-related stigma, negative self-image, and sensitivity to public reactions about HIV status. The average HIV-related stigma score was highest in Miami ($M = 5.06$, $SD = 2.57$), with the next highest ($M = 4.71$, $SD = 1.89$) observed in Ottawa (Table 2). Relative to the two North American cities, HIV-related stigma is lowest ($M = 3.78$, $SD = 1.62$) among mothers living with HIV in Port Harcourt.

Results of the *t* test in Table 2 show no statistically significant mean difference in HIV-related stigma between mothers living with HIV in Ottawa and those in Miami. Furthermore, the Hedges *g* of 0.3 (Table 2) indicates a non-visible difference in HIV-related stigma between the two groups. Thus, the mean differences of stigma scores observed in Ottawa ($M = 4.71$, $SD = 1.89$) and Miami ($M = 5.06$, $SD = 2.57$) can be attributed to chance.

Although means of HIV status disclosure-related stigma scores were not significantly different in the two groups, there were significant ($p < 0.05$) differences in the means of three of the four stigma sub-scale scores. Personalised stigma ($t = -3.51$, $df = 288$), negative self-image ($t = -2.17$, $df = 211.2$),

and sensitivity to public reactions about HIV status ($t = 3.45$, $df = 211.8$) were significantly different between Ottawa and Miami.

Of all these significant differences, only personalised stigma with Hedges' *g* of 0.5 was at least medium-sized or had up to one-half a standard deviation difference between the two groups. This is because decision criteria for Hedges' *g* are the same as those of Cohen's *d* for effect size. Thus, by Cohen's criteria, the Hedges' *g* of 0.5–0.8 as we observed for personalised stigma would imply a moderate or medium mean difference between groups; Hedges' $g < 0.5$ implies a small effect size and $g > 0.8$ implies a large effect size [43].

Results of the *t* test presented in Table 3 show a statistically significant ($p < 0.05$) mean difference in HIV-related stigma between mothers living with HIV in the two North American cities and those in the African city. Mothers living with HIV in Ottawa and Miami ($M = 4.95$, $SD = 2.38$) experienced greater levels of HIV-related stigma compared with those residing in Port Harcourt ($M = 3.78$, $SD = 1.62$). Effect size analysis showed a Hedges' $g = 0.6$, implying a moderate or medium mean difference between stigma in the North American cities and in the African city.

There were significant ($p < 0.05$) differences in each of the stigma sub-scale scores (Table 3). However, with Hedges' $g = 1.1$, only personalised stigma had a large difference between mothers in the North American cities ($M = 1.65$, $SD = 1.28$) compared with those in Port Harcourt ($M = 0.54$, $SD = 0.83$) at $p < 0.05$. Hedges' g of 0.5 (Table 3) indicated a medium-sized difference in the expression of negative self-image between mothers in the North American cities ($M = 0.63$, $SD =$

Table 2 Results of *t*-test comparing HIV-related Stigma scores between Ottawa and Miami

City of residence	Mean score (M)	Std. deviation	<i>t</i> value	df	Hedges' <i>g</i>	95% CI for mean difference
HIV-related stigma (full scale)						
Ottawa	4.71	1.89	- 1.3	224.64	0.3	- 0.88, 0.18
Miami	5.06	2.57				
Personalised stigma						
Ottawa	1.26	1.23	- 3.51*	288	0.5	- 0.88, - 0.24
Miami	1.82	1.27				
Worries about disclosure of HIV status						
Ottawa	1.57	0.56	1.17	207.6	0.1	- 0.06, 0.24
Miami	1.48	0.7				
Negative self-image						
Ottawa	0.48	0.69	- 2.17*	211.2	0.3	- 0.40, - 0.02
Miami	0.69	0.88				
Sensitivity to public reactions about their HIV status						
Ottawa	1.39	0.69	3.45*	211.8	0.4	0.14, 0.52
Miami	1.07	0.87				

Satterthwaite approximation employed due to unequal group variances, except for personalised stigma with equal group variances

**p* < 0.05

0.83) and those in Port Harcourt (M = 0.27, SD = 0.66) at *p* < 0.05.

Table 4 presents results of the HLM analysis of predictors of HIV-related stigma among mothers living with HIV in Ottawa, Miami, and Port Harcourt. Overall, the results show that all variables included have statically significant joint effects on HIV-related stigma in each of the cities. These are shown with the final block 3 *R*-squared values (Ottawa =

0.469, Miami = 0.459, and Port Harcourt = 0.191) that were significant at *p* < 0.01.

Block 1 (sociodemographic variables) had no significant (*p* > 0.05) joint and independent effects on HIV-related stigma in each of the three study sites. However, the block contributed 15.1%, 7.7%, and 2.4% to total variation of stigma in Ottawa, Miami, and Port Harcourt, respectively. Psychosocial factors (block 2) significantly (*p* < 0.05) accounted for 22.3%,

Table 3 Results of *t* test comparing stigma scores in Ottawa and Miami with those in Port Harcourt

City of residence	Mean score (M)	Std. deviation	<i>t</i> value	df	Hedges' <i>g</i>	95% CI for mean difference
HIV-related stigma (full scale)						
Ottawa & Miami	4.95	2.38	7.26*	224.64	0.6	0.86, 1.49
Port Harcourt	3.78	1.62				
Personalised stigma						
Ottawa & Miami	1.65	1.28	12.94*	460.52	1.1	0.94, 1.28
Port Harcourt	0.54	0.83				
Worries about disclosure of HIV status						
Ottawa & Miami	1.51	0.66	0.77	564.41	0.1	- 0.13, 0.06
Port Harcourt	1.55	0.57				
Negative self-image						
Ottawa & Miami	0.63	0.83	6.08*	529.50	0.5	0.24, 0.47
Port Harcourt	0.27	0.66				
Sensitivity to public reactions about their HIV status						
Ottawa & Miami	1.17	0.83	- 4.31*	558.00	0.3	- 0.38, - 0.14
Port Harcourt	1.43	0.7				

Satterthwaite approximation employed due to unequal group variances

**p* < 0.05

Table 4 Results of hierarchical linear modelling showing predictors of internalised stigma by country

Independent variables	Ottawa, Canada	Miami, Florida, USA	Port Harcourt, Nigeria
	Standardised beta coefficients (β) from the final model		
Block 1: sociodemographic variables			
Marital status (1 = married, 0 = not married)	-0.259	0.438	-0.220
Number of Children born after being diagnosed HIV+	0.026	0.029	-0.013
Number of persons in households	-0.201	-0.272	0.036
Years of formal education	-0.025	0.125	-0.028
Employment status (Employed = 1, unemployed =0)	-0.213	1.172	0.181
R-squared	0.151	0.077	0.024
Block 2: psychosocial variables			
Functional social support (psychometric scale score)	0.041	-0.108**	-0.035*
Discrimination (psychometric scale score)	0.077**	0.092**	0.068**
R-squared	0.373**	0.439**	0.165**
R-squared change	0.223**	0.363**	0.141**
Block 3: sociocultural variables			
Disclosure of HIV status to family (yes = 1, no =0)	-0.218	0.223	-0.170
Adhered to infant feeding guideline (yes = 1, no = 0)	-2.726*	0.899	-0.350
Cultural beliefs do not oppose guideline (yes = 1, no = 0)	-0.611	-0.087	0.949
Health providers support the guideline (yes = 1, no =0)	1.849	-1.953	0.172
Constant	4.592	8.603	4.398**
R-squared	0.469**	0.459**	0.191**
R-squared change	0.095	0.019	0.026

* $p < 0.05$, ** $p < 0.01$

36.3%, and 14.1% of the variation in HIV-related stigma in Ottawa, Miami, and Port Harcourt, respectively. Analyses of the independent effects of block 2 variables (Table 4) show that only discrimination had a significant and increasing effect on HIV-related stigma in each of the three cities. FSS was significantly associated with stigma in Miami and Port Harcourt, but not in Ottawa. High levels of FSS corresponded with low levels of HIV-related stigma in Miami and Port Harcourt.

Like the sociodemographic variables, sociocultural factors (block 3) did not significantly ($p > 0.05$) account for variation of stigma in the three cities. However, among the independent sociocultural variables, we found that when mothers reported infant feeding practices that were congruent with their national guidelines, they reported significantly ($p < 0.05$) lower levels of HIV-related stigma in Ottawa. In other words, adherence to national infant feeding guidelines was associated with reduced HIV-related stigma in Ottawa.

Discussion and Conclusions

Overall, the findings suggest that HIV-related stigma was highest in Miami, followed by Ottawa and Port Harcourt. Although the levels of stigma vary more in Miami than Ottawa, there was no significant difference in the stigma experience of women between the two cities. However, levels of

HIV-related stigma among women living with HIV in these North American cities were moderately higher than those of mothers living in Port Harcourt. The relatively higher level of stigma in Ottawa and Miami may be because, despite being a public health concern, HIV is still relatively less prevalent in both of these cities when compared with Port Harcourt. Although stigma remains prevalent in countries with high and generalised levels of HIV/AIDS, the problem is decreasing because awareness is improving, especially in the wake of increasing access to antiretroviral therapy [44–46]. In addition, the degree of demographic homogeneity is likely to affect the extent to which mothers living with HIV experience stigma in their communities of origin. Port Harcourt, for instance, is predominantly African and mothers living with HIV may be less likely to feel isolated in a context where most people are culturally similar. This might provide protection against stigma. On the contrary, Black mothers living with HIV in Ottawa and Miami live in culturally diverse and heterogeneous societies where social differences are already pronounced, a situation that may exacerbate HIV-related stigma.

In addition, as women in the qualitative component of this study indicated, HIV is more mainstreamed in the African context where HIV is commonly discussed in most media platforms including billboards and television. In contrast, in the North American countries, HIV is a topic mostly discussed by specialized people in AIDS service organizations, and in

health and social service facilities. The lack of cultural competence and safety in HIV services is a major healthcare barrier for Black women, especially those requiring HIV/AIDS care [47–49]. HIV prevention services in Canada are often not culturally tailored to appropriately address needs of ethno-culturally diverse people [47]. This has implications of HIV programming and policy decisions that affect prevention and intervention strategies. In addition, there may be different interpretations of the study questions and scales in these different cultural contexts, which may impact on the women's interpretation of stigma.

The findings of the study also showed that FSS and discrimination are major predictors of stigma among Black women living with HIV in Ottawa, Miami, and Port Harcourt. However, these factors do not operate uniformly across the three cities. In respect to FSS, the findings indicated that being able to obtain emotional support when in difficult life situations or being able to get help or advice from friends or family can reduce stigma among mothers living with HIV in Miami and Port Harcourt. This finding is generally consistent with studies that have indicated that, overall, FSS can improve mental and physical health outcomes, including reducing vulnerability to sexually transmitted diseases such as HIV/AIDS [50]. However, this study found that the effect of FSS on HIV-related stigma among mothers living with HIV varies significantly across the cities studied. Its effect was more than two times higher in Miami than Port Harcourt. This means that although FSS can generally shield mothers living with HIV from negative social attitudes in Miami and Port Harcourt, its relative absence (presence) will be more detrimental (beneficial) to the psychosocial functioning of mothers living with HIV in Miami than in Port Harcourt.

This study also demonstrated that discrimination had a significant effect on HIV-related stigma among mothers living with HIV in all three cities. Feeling unfairly treated, disrespected, or treated with discourtesy can fuel internalised stigma among mothers living with HIV. However, the relative importance of discrimination in respect to internalised stigma among mothers living with HIV varies significantly across the three cities. In fact, there appears to be a gradient across these three cities. Internalized HIV stigma is most acute among mothers living with HIV who report discrimination in Ottawa, followed by mothers in Miami, and then their counterparts in Port Harcourt. Mothers living with HIV in Ottawa who experience discrimination report internalised HIV stigma levels almost double the magnitude of their counterparts in Port Harcourt.

The disproportionate effect of discrimination on HIV-related stigma in Ottawa and Miami may be because of the multi-ethnic and multi-cultural social character of these two cities. As such, discrimination operates at multiple levels, which can lead to stigmatisation first because of HIV+ status, and second, by virtue of the fact that Black women in the West are members of a historically oppressed or disadvantaged

group. Studies show that Black women living with HIV belong to already marginalised groups of African, Caribbean, and Black people, which leads to overlapping forms of stigma resulting in high internalised HIV stigma scores [51, 52]. Studies have also demonstrated that the impact of HIV-related stigma is especially heavy on Black women living in the West [53, 54].

HIV-related policies should be more tailored to social support programs that links Black women to their unique multi-layered identities thereby reducing stigma and promoting their overall long-term mental and physical health. HIV prevention programs and policies need to examine and address the root causes and social determinants of HIV [48]. This includes ensuring authentic involvement of historically marginalised communities like Black women in the formulation and implementation of policy intervention. In addition, HIV and cultural competence education needs to be integrated into the curriculum of health and social service education of professionals to strengthen the healthcare system to eliminate stigma towards Black women living with HIV. Furthermore, promoting adherence to treatment through better access to medications and functional social support as well as counselling about infant feeding options and guidelines are necessary to reduce HIV-related stigma in this population.

In conclusion, this study examined the magnitude and correlates of HIV-related stigma and found cross-national variations in the level of stigma and relative importance of factors associated with it. Readers should interpret this study's findings with caution because of the use of cross-sectional data, which prevents us from drawing a definitive causal relationship between HIV-related stigma, functional social support, and discrimination. In addition, readers should interpret the findings with caution, because data were collected from self-reports that are vulnerable to social desirability bias. However, overall, this study represents an important step towards understanding how HIV-related stigma manifests in different national and policy contexts in the North and South. Findings of this study may stimulate qualitative research on contextual factors that account for cross-national variations in the level of and factors associated with HIV-related stigma.

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Data Availability Data analysis activities are currently underway. To request access to study data, please contact JE, the principal investigator for the project.

Compliance with Ethical Standards

Ethical Approval and Consent to Participate The study was approved by the Health Sciences and Science Research Ethics Board at the

University of Ottawa (certificate #H08–16-27), the Carleton University Research Ethics Board-A (CUREB-A, certificate #106300), the Social and Behavioural Institutional Review Board at Florida International University (certificate #105160), and the Research Ethics Committee at the University of Port Harcourt (certificate #UPH/CEREMAD/REC/04). Additionally, permission was obtained from each of the community partner sites where participants were recruited.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Competing Interests The authors declare that they have no competing interests.

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