

Determinants of HIV Serostatus Disclosure to Sexual Partner Among HIV-Positive Alcohol Users in Haiti

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Abstract This study examined the relationship between antiretroviral therapy use, participants' knowledge of partner's HIV serostatus, number of sex partners, perceived infectivity and HIV disclosure to a main sexual partner among 258 HIV-positive Haitian alcohol users. Only 38.6 % had disclosed their HIV serostatus to sexual partners. Logistic regression analyses revealed that participants who self-reported having an HIV-negative partner (OR = 0.36, 95 % CI 0.13–0.97) or a partner of unknown HIV status (OR = 0.09, 95 % CI 0.04–0.22) were less likely to disclose their HIV serostatus than participants who self-reported having an HIV-positive partner. Participants who had more than one sexual partner in the past 3 months (OR = 0.41, 95 % CI 0.19–0.90) were also less likely to disclose than participants who had one partner. These findings suggest the need for couples-based programs to assist people living with HIV (PLWH) with the disclosure process, especially among PLWH who have more than one sexual partner and/or are in serodiscordant relationships.

Keywords HIV serostatus · Disclosure · Intervention · Haiti

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Introduction

Disclosure of HIV serostatus to sexual partners is a cornerstone of the public health efforts to prevent new HIV infections [1]. People living with HIV (PLWH) who do not disclose their HIV serostatus to their sex partners and engage in unprotected intercourse place their sex partners at risk of acquiring HIV [2]. Some developed countries require PLWH to disclose their HIV serostatus to their current and prospective sexual partners [3, 4]. In the absence of such laws, a substantial proportion (17–86 %) of PLWH living in developing countries do not disclose their HIV serostatus to their sexual partners in fear of being abandoned, rejected, and physically and verbally abused [4–8]. Although studies have examined HIV serostatus disclosure among PLWH in developing countries, little research has been conducted on this topic in Haiti. Prior to the earthquake, Haiti had the highest rate of PLWH in the Caribbean with an estimated 120,000 PLWH [9]. A number of researchers have begun to document the immediate structural and psychological effect of the earthquake on Haitians living with HIV/AIDS, including on substance use, access and adherence to treatment, however the long term effects of the earthquake on the country's HIV/AIDS trajectory may not be fully understood for many years [10–14].

A review of the literature revealed only one study conducted in Haiti describing the factors associated with HIV serostatus disclosure to sex partners [15]. Fitzgerald et al. [15] used case histories of HIV-positive clients who received voluntary counseling and testing (VCT) at the center of Groupe Haitien d'Etude du Sarcome de Karposi et des infections Opportunistes (GHESKIO) in Port-au-Prince, Haiti between 1997 and 1998. Similar to other studies, the case histories indicate that the Haitian clients expressed shock or denial after learning of their positive HIV

serostatus. Women did not disclose their HIV serostatus to their sexual partners in fear of being beaten, abandoned, or because they wanted to become pregnant. In one case, a man left his family and sexual partner after learning of his diagnosis because he did not want his family to pay for his burial. Further quantitative analyses from the same study revealed that poor women were afraid to disclose to their sexual partners or to end a sexual relationship with a known HIV infected partner because they were financially dependent on their sexual partner. In addition, Haitians who believed in magical causes of HIV were more likely to refuse to disclose to their sexual partners. The authors suggested that poor HIV-positive Haitian women who are afraid of domestic violence may choose to believe in magical explanations in order to avoid disclosing their HIV serostatus to their sexual partners. As illustrated in this Haitian study, the process of HIV serostatus disclosure to sex partners among PLWH is complex and influenced by a myriad of factors including gender, anticipated support and the sociocultural context.

According to Social Cognitive Theory, health-related behaviors, such as disclosure of one's HIV serostatus to a sexual partner, is influenced in part by anticipated support or fear of rejection and individuals are less likely to engage in behaviors that they believe will have negative consequences [16]. Lack of support and fear of rejection may reduce the chances of disclosure, decrease the use of protection during sex (due to fears that questions will be asked about the need for condoms) and thereby potentially increase HIV prevalence [5]. According to this theory, a positive outcome of disclosure in Haiti may be changes in sexual practices which could prevent HIV transmission while negative outcomes may be increases in HIV-related stigma, rejection, physical abuse, and abandonment [15]. With regard to alcohol use and the associated "alcohol myopia," Social Cognitive Theory posits that alcohol use may lead to impaired cognition which in turn might amplify immediate positive behavior cues, such as the prospect of sexual intercourse, and impair one's perception of negative consequences, such as HIV transmission, or sex without disclosure [17]. Researchers have reported that cumulative stressors contribute significantly to alcohol use in Haiti and that smoking and risky sexual behavior were positively associated with alcohol use [18]. More specifically, Haitian youths who experimented with and regularly used alcohol were more likely to have had multiple sexual partners than those who were abstainers [18].

Studies have also shown that alcohol use is associated with domestic violence in Haiti [18]. In a national survey conducted in Haiti, it was reported that 16 % of women who were currently married or in a cohabiting union experienced sexual violence and that alcohol use by the cohabiting male partner was a risk factor for partner sexual abuse [18]. Studies on the relationship between alcohol use

and HIV serostatus disclosure to a sexual partner is somewhat limited in Haiti and other developing countries [16]. Evidence exists of the influence of alcohol on HIV serostatus disclosure and on increased engagement in sexually risky behaviors, thereby increasing the spread of HIV in the Caribbean and sub-Saharan Africa [19–22]. For example, a study examining HIV serostatus disclosure in recently diagnosed patients in South Africa found that individuals who used alcohol heavily before sex were less likely to disclose their HIV serostatus [23].

From a public health perspective, disclosure of HIV serostatus to a sexual partner is not only important for reducing risky sexual behavior but is also vital in helping HIV infected individuals access the support and care needed to adhere to their antiretroviral therapy (ART) and prevent further HIV infection [10]. The beliefs HIV-positive individuals have about ART also influences whether they disclose their HIV serostatus to their partners. For example, a study conducted in Cameroon found that women who believed that ART can cure HIV or that someone treated with ART cannot transmit the virus were more likely to conceal their positive HIV serostatus from their main partner [24]. Considering that the only study in Haiti that examined HIV serostatus disclosure was conducted before ART was introduced at GHESKIO and that public awareness of HIV has increased in Haiti, more research on the factors influencing HIV serostatus disclosure is needed in Haiti to determine how best to intervene and assist HIV-positive individuals with the disclosure process [15]. Therefore, the purpose of this study is to investigate the relationship between ART use, participants' knowledge of partner's HIV serostatus, number of sexual partners in the past 3 months, perceived HIV infectivity and HIV serostatus disclosure to a main sexual partner among HIV-positive Haitian adults with a history of alcohol consumption.

Methods

Data for this study were collected from a parent study baseline survey of a randomized trial of a cognitive-behavioral stress management (CBSM) intervention designed to enhance safe sex practices and adherence to antiretroviral therapy, and reduce alcohol and other drugs use among HIV-positive Haitians in Port-au-Prince, Haiti [25]. The study was performed at GHESKIO, the primary service, research, and training center in Haiti for HIV-related work [26]. GHESKIO has been providing HIV VCT services in Haiti since the outbreak of the epidemic and was the first center founded in a developing country to address the HIV epidemic [27].

Participants were included in the study if they met the following criteria: >18 but <60 years of age; fluency in spoken Haitian Creole, which was required to complete

assessments and participate in the intervention groups; documentation of HIV seropositivity; at least one episode of unprotected anal or vaginal sex in the past 90 days; recent alcohol consumption by self report; currently not cognitively impaired since cognitive impairment may compromise the ability to comprehend and participate in the assessment and intervention; currently not showing symptoms of a major psychiatric disorder, including psychosis, or at high risk for suicidality since these conditions might compromise participants' ability to comprehend and participate in the assessment and intervention.

Based on the aforementioned criteria, 258 participants were recruited for the parent study between 2009 and 2011. This sample represented all the completed baseline assessments that had been collected through August 2011. The baseline survey was administered before the randomization of the parent study. The sample used for the analysis in this manuscript is the same sample as the parent study, no separate recruitment was done. For the parent study, participants were offered reimbursement for transportation costs and small gifts such as telephone cards or coupons for grocery stores. In order to conform to local cultural norms for research participation, and at the request of the GHESKIO Ethics Committee, the specific monetary value of incentives received for study participation was not included in the consent document. The consent included general information that reimbursement for travel, refreshments, and other incentives such as phone cards or food coupons would be provided. Incentives for subject participation were provided immediately upon completion of each follow-up assessment and group session to provide further incentive for timely participation. Any participant who initiated withdrawal from the study was paid for only those assessments and intervention sessions they completed. All interested participants were asked to sign a consent form.

The measures used in the project were translated into Haitian Creole and back-translated by bilingual individuals at Florida International University and the GHESKIO Centers in Haiti with experience and knowledge of psychological interventions. The translated instruments were reviewed by a Cultural/Linguistic Planning group to ensure that intended meanings were conveyed. The group was composed of three clinician-researchers, all of whom were of Haitian descent and native speakers of Haitian Creole. The study was approved by the GHESKIO Ethics Committee and the Institutional Review Board at Florida International University.

Variables

Based on the literature, the study's primary hypothesis was that participants who self-reported having an HIV-positive

sex partner will be more likely to disclose their HIV serostatus to a sex partner than participants who self-reported having an HIV-negative sex partner, or a sex partner of unknown HIV status [1]. The primary dependent variable in these analyses was disclosure of an individual's HIV serostatus to their sex partner and was assessed by the following question: "Have you told your partner your HIV status?" The independent variables derived from the literature included socio-demographic and sexual behavior variables, participants' knowledge of main sex partner's HIV status, current use and beliefs of antiretroviral medication and alcohol, and perceived infectivity [1, 16, 24].

The socio-demographic variables included gender, age, education, and marital status. The age variable was categorized as 17–29, 30–39, and 40–56 years. The education variable consisted of the following two categories: (1) 6th grade or less, and (2) 7th grade or more. Marital status referred to being married, cohabiting, single, or separated. Sexual behavior questions asked about the number of sex partners and participants' knowledge of partner's HIV status. The number of sex partners was assessed by asking: "How many different people have you had sex with in the past 3 months?" ART use was determined by asking: "Are you currently taking any antiretroviral medications?" Participants' knowledge of partner's HIV serostatus was measured by asking: "Do you know your partner's HIV status?" The categories for participants' knowledge of partner's HIV status included: (1) HIV-positive; (2) HIV-negative; and (3) unaware. Participants who reported having multiple sex partners were asked if they knew the HIV status for each sex partner they reported. However, the analyses for this study focused on participants' knowledge of their main sex partner's HIV status. We did not interview the main sex partners of the participants, therefore the question measuring "knowledge of their partner's HIV serostatus" only recorded the participant's knowledge of their main sex partner's HIV status and not actual partner's HIV status. The categories used for participants' knowledge of their main sex partner's HIV status represent if the participants self-reported that they knew their main sex partner to be: (1) HIV-positive, (2) HIV-negative, or (3) did not know/or were unaware of their main sexual partner's HIV status.

Participants were also asked if they agreed or disagreed with the following statement: "Have you begun to be more open with people about being HIV-positive since the news about the HIV medications." To ascertain participants' perceived HIV infectivity, they were asked the following questions: (1) "If an HIV-positive person's viral load is undetectable, they can't give HIV to anybody." and (2) "If an HIV-positive person has sex with another HIV-positive person they don't need to use condom." Other independent variables were related to alcohol use included the following

Table 1 Demographic characteristics of participants enrolled in the cognitive-behavioral stress management intervention

	Frequency (n = 258)	%
Gender		
Male	98	38
Female	160	62
Age range		
17–29	68	26.4
30–39	112	43.4
40–56	78	30.2
Education		
6th grade or less	152	61
7th grade or more	97	39
Marital status		
Married	28	10.9
Cohabiting	123	47.7
Single	66	25.6
Separated	41	15.9
Number of sex partners		
One	163	63.4
Two or more	94	36.6
Knowledge of partner's HIV status		
HIV-positive	62	24.4
HIV-negative	46	18.1
Unaware	146	57.5
Disclosure of status to partner		
No	154	61.4
Yes	97	38.6
ART therapy		
No	64	24.8
Yes	194	75.2
Have begun to be more open with people about being HIV-positive since the news about the HIV medications?		
Agree	119	46.3
Disagree	138	53.7
Perceived HIV infectivity		
An HIV-positive person with an undetectable viral load cannot infect another person		
Not true	132	55.5
True	106	41.1
Two HIV-positive people don't need to use condom		
Not true	175	70
True	75	30
Alcohol use		
Living with someone that drinks alcohol		
No	119	47.4
Yes	132	51.2
Does your partner drink alcohol?		
No	49	32.5
Yes	102	67.5

questions: (1) “Does anyone living with you drink alcohol?” and (2) “Does your partner drink alcohol?” Although both males and females were asked if their partner drank alcohol, only the responses from females were included in this study since the literature indicates that male drinking is associated with domestic violence in Haiti [18].

Statistical Analyses

The analyses consisted of univariate, bivariate, and multivariate analyses. We conducted univariate analyses to examine the distribution of the socio-demographic, sexual behavior alcohol use, and HIV-related variables. Second, bivariate analyses were conducted with the disclosure variable and the socio-demographic, alcohol use, and HIV-related variables. The variables that were significant in the bivariate analyses were included in the multivariate logistic regression models to examine predictors of HIV serostatus disclosure to sexual partner. SPSS for Windows, version 20.0 (SPSS Inc., Chicago, Illinois) was used for the analysis. Preliminary analyses indicated that other variables assessing relationship power, personal and public HIV-related stigma, alcohol use behaviors, condom use, and opinions about ART were not statistically significantly associated with HIV serostatus disclosure and therefore not reported.

Results

The sample consisted of 258 HIV-positive alcohol users (38 % males vs. 62 % females), with an average age of 35 years (Table 1). The majority (61 %) of the sample had a 6th grade education or less. Approximately 48 % of the sample cohabited and 10.9 % were married. More than half (63.4 %) engaged in sexual intercourse with only one person in the past 3 months. Similarly, more than half (57.5 %) self-reported no knowledge of their sex partners' HIV serostatus and 61.4 % did not disclose their HIV serostatus to their sex partner. The majority of the participants (75.2 %) were on ART and 46.3 % reported they started being more open with people about being HIV-positive since the news about how HIV medications could potentially control symptoms of the disease.

Regarding perceived HIV infectivity, almost half (41.1 %) believed if an HIV-positive person's viral load was undetectable, they could not transmit HIV to anyone. Approximately 30 % believed if an HIV-positive person engaged in sexual intercourse with another HIV-positive person they did not need to use a condom. More than half (51.2 %) of the sample reported they presently live with at least one person who drinks alcohol and 67.5 % of the women reported their partner drank alcohol.

Table 2 Characteristics of participants by disclosure of HIV serostatus to sex partner

	Disclosure to sex partner Yes
Gender	
Male	46 (47.4)
Female	51 (33.1)
	$\chi^2 = 5.14, P < 0.05$
Age range	
17–29	30 (45.5)
30–39	30 (27.3)
40–56	37 (49.3)
	$\chi^2 = 10.90, P < 0.001$
Education	
6th grade or less	55 (36.9)
7th grade or more	38 (40.9)
	Not significant
Marital status	
Married	19 (73.1)
Cohabiting	56 (46.7)
Single	13 (20.3)
Separated	9 (22)
	$\chi^2 = 30.15, P < 0.001$
Number of sex partners	
One	76 (46.6)
Two or more	21 (24.1)
	$\chi^2 = 12.08, P < 0.01$
Knowledge of partner's HIV status	
HIV-positive	44 (74.6)
HIV-negative	24 (53.3)
Unaware	29 (20.3)
	$\chi^2 = 56.19, P < 0.001$
ART therapy	
No	25 (39.1)
Yes	72 (38.5)
	Not significant
Have begun to be more open with people about being HIV-positive since the news about the HIV medications?	
Agree	45 (38.8)
Disagree	52 (38.8)
	Not significant
Perceived HIV infectivity	
An HIV-positive person with an undetectable viral load cannot infect another person	
Not true	43 (32.8)
True	46 (46)
	$\chi^2 = 4.18, P < 0.05$
Two HIV-positive people don't need to use condom	
Not true	60 (34.9)
True	35 (49.3)
	$\chi^2 = 4.38, P < 0.05$

Table 2 continued

	Disclosure to sex partner Yes
Alcohol use	
Living with someone that drinks alcohol	
No	54 (47.4)
Yes	42 (32.3)
	$\chi^2 = 5.77, P < 0.05$
Does your partner drink alcohol?	
No	18 (36.7)
Yes	30 (29.4)
	Not significant

Bivariate analyses revealed gender ($P < 0.05$), age ($P < 0.001$), marital status ($P < 0.001$), number of sex partners in the past 3 months ($P < 0.01$), and participants' knowledge of partners' HIV serostatus ($P < 0.001$) were associated with HIV serostatus disclosure (Table 2). Other variables associated with HIV serostatus disclosure were the beliefs an HIV-positive person with an undetectable viral load cannot infect another person ($P < 0.05$), and that two HIV-positive people don't need to use condom ($P < 0.05$). Individuals who were not living with someone who consumed alcohol were more likely (47.4 %) to have disclosed their HIV-serostatus to their sex partner compared to individuals who lived with someone who drinks alcohol ($P < 0.05$).

When controlling for other variables significant in the bivariate analyses, the multivariate logistic regression model showed age, marital status, participants' knowledge of partner's HIV serostatus, and number of sex partners remained significant predictors of HIV serostatus disclosure (Table 3). Participants in the 30- to 39-year-old category were significantly less likely to disclose their HIV serostatus to a sex partner than participants in the 17- to 29-year-old category (OR = 0.30, 95 % CI 0.12–0.76). Compared to married individuals, single individuals were significantly less likely to disclose their HIV serostatus to a sex partner (OR = 0.15, 95 % CI 0.04–0.58). The strongest predictor of HIV serostatus disclosure was participants' knowledge of partner's HIV status. Participants who self-reported having a sex partner of HIV-negative or unknown HIV status were significantly less likely to disclose their HIV serostatus than participants who self-reported having a sex partner of HIV-positive status (OR = 0.36, 95 % CI 0.13–0.97; OR = 0.09, 95 % CI 0.04–0.22, respectively). Lastly, participants who engaged in sexual intercourse with more than one person in the past 3 months were also less likely to disclose their HIV serostatus to their sexual partner (OR = 0.41, 95 % CI 0.19–0.90).

Table 3 Multivariate logistic regression analyses of disclosure to a sex partner

	Unadjusted odds ratio	Adjusted odds ratio	<i>p</i> value
Gender			0.31
Male	1	1	
Female	0.55 (0.33–0.92)	0.66 (0.30–1.47)	
Age range			<0.05
17–29	1	1	
30–39	0.45 (0.24–0.85)	0.30 (0.12–0.76)	
40–56	1.12 (0.60–2.27)	0.52 (0.18–1.51)	
Marital status			<0.01
Married	1	1	
Cohabiting	0.32 (0.13–0.82)	0.68 (0.20–2.37)	
Single	0.09 (0.03–0.27)	0.15 (0.04–0.58)	
Separated	0.10 (0.03–0.32)	0.16 (0.03–0.73)	
Knowledge of partner's HIV status			<0.001
HIV-positive	1	1	
HIV-negative	0.39 (0.17–0.89)	0.36 (0.13–0.97)	
Unaware	0.09 (0.04–0.18)	0.09 (0.04–0.22)	
Number of sex partners			<0.05
One	1	1	
Two or more	0.36 (0.20–0.65)	0.41 (0.19–0.90)	
Perceived HIV infectivity			
Need to use condom use with HIV-positive partner			
Not true	1	1	0.59
True	1.82 (1.04–3.18)	1.25 (0.55–2.85)	
An HIV-positive person with an undetectable viral load can't infect another person			0.16
Not true	1	1	
True	1.74 (1.02–2.98)	1.72 (0.81–3.68)	
Alcohol use			
Living with someone that drinks alcohol			0.76
No	1	1	
Yes	0.53 (0.32–0.89)	1.12 (0.53–2.38)	

Discussion

The purpose of this study was to examine the predictors of HIV serostatus disclosure to a sexual partner among HIV-positive adults in Haiti who have a history of alcohol consumption. Overall, 38.6 % of the participants disclosed their HIV serostatus to their sexual partner. The low rate of HIV serostatus disclosure found in this study is similar to the rates reported in other developing countries [11, 13]. Approximately 75 % of the participants were receiving ART and 50 % reported that they started being more open about their HIV serostatus after learning about the beneficial effects of HIV medication. It was anticipated that there would be a significantly positive association between ART use and HIV disclosure, however this relationship was not found in these

analyses. Similar to our study, a study conducted among 114 PLWHI in Johannesburg, South Africa revealed no relationship between ART and HIV serostatus disclosure [12]. In contrast, a more recent study with a larger sample size of 630 PLWH in Cape Town, South Africa reported that people who were on ART were more likely to disclose their HIV serostatus to a sexual partner [28]. One potential explanation for our finding may be that efforts to promote HIV VCT combined with the expansion of ART in Haiti may promote HIV serostatus disclosure regardless of whether the participants were using ART or not. It may also be the case individuals who were not on ART were expecting to receive ART in the near future and felt comfortable enough to inform their significant other about their HIV serostatus knowing that their health would eventually improve with the medication.

We did not find a significant association between alcohol use by partner, living with someone that uses alcohol and HIV serostatus disclosure. Preliminary analyses revealed no relationship between participants' number of drinks, the effects of drinking on participants' behavior in the past year and HIV serostatus disclosure. These findings support a recent study that examined disclosure among HIV-infected risky drinkers in St. Petersburg, Russia [16]. The authors found no relationship between disclosure to a sexual partner and alcohol dependence, risky alcohol use, or alcohol use at time of sex. However, the authors reported that people who used alcohol at time of sex were more likely to disclose their HIV serostatus to a seroconcordant and casual sexual partner than those who did not [16]. One explanation the authors offered for this finding was that alcohol use in the context of a sexual encounter might disinhibit one's hesitation about disclosing, transiently mitigating the perception of a potential negative reaction to disclosure (e.g., the partner not agreeing to have sex) [16]. In another study that investigated HIV serostatus disclosure among youth in the United States, there was no relationship between alcohol use and disclosure to a sexual partner [29]. In Haiti, alcohol use among male adolescents and emerging adults in Haiti have been associated with multiple factors including life-time smoking, and multiple sexual partnerships [18]. Since all of the participants in our study had a history of alcohol use we were not able to compare disclosure patterns between alcohol users and abstainers.

The relationship between age and HIV serostatus disclosure remained statistically significant after controlling for other variables. Participants in the 30- to 39-year-old category were significantly less likely to disclose their HIV serostatus to a sex partner compared with younger individuals. This finding differs from other studies which found no difference in HIV serostatus disclosure patterns between younger and older individuals [30, 31]. One study of HIV-positive men and casual sexual partners conducted by Serovich and Mosack (2003) found that age did not influence whether a respondent disclosed the status to all, some or none of their sexual partners [32]. Other studies have reported that both younger and older individuals were more likely to disclose to a main sex partner than to a casual sex partner [1, 28, 29]. The tendency for people of all ages to disclose to their main sex partner supports our finding that both married individuals and those who had sex with only one person in the past 3 months were more likely to disclose their HIV serostatus compared with non-married individuals and those who had sex with more than one person in the past 3 months. This finding may be due to the trust and foundation that married individuals and those with a steady sexual partner have with their partner [28].

The strongest predictor of HIV serostatus disclosure to a sex partner was participants' knowledge of their main sex

partner's HIV status ($P < 0.001$). This finding supports research conducted in developed and developing countries [1, 33–36]. In the current study, individuals who self-reported having an HIV-negative partner or a partner of unknown HIV serostatus were significantly less likely to have disclosed their HIV serostatus to their sex partner compared with individuals who self-reported having an HIV-positive sex partner. The higher rate of disclosure among individuals with HIV-positive sex partners indicate that these individuals may have serosorted, a practice whereby individuals seek sex partners of the same HIV serostatus in order to reduce HIV infection [37]. An alternative explanation is disclosure may have promoted sex partners to seek HIV testing and learn of their positive serostatus. The finding that individuals who knew their sex partners were HIV-negative were less likely to disclose is alarming because of the possibility of transmission risk if condoms are not used [38]. It is also worth noting that 58 % of the participants were unaware of their sex partner's HIV serostatus, which may explain the high rate (61.4 %) of nondisclosure found in this study. Being unaware of one's sex partner's HIV serostatus may also be associated with unprotected sex because research has shown that HIV-positive individuals unaware of their sex partner's HIV serostatus are less likely to use condoms than those who are aware [39].

One of the strengths of our study is the examination of HIV serostatus disclosure by ART use. As ART becomes more readily available in developing countries, it is important to monitor how its use and the beliefs of the patients towards ART may influence their sexual behaviors and disclosure patterns [12]. The limitations of our study must be considered in interpreting the results. As previously stated, the sample was selected from among individuals receiving services at GHESKIO and therefore the findings may not be generalizable to Haiti's population. Second, although all the participants had a history of alcohol use, we did not inquire about alcohol use before sexual intercourse. Third, the sensitive nature of HIV may have led to social desirability bias in the responses. The use of client's self-report for HIV serostatus disclosure and knowledge of partner's HIV serostatus is limited because the partners were not interviewed to confirm whether the responses were congruent. Although several studies have examined HIV serostatus disclosure to a sexual partner, few studies have included the participants' partners to ensure concordance of participants' responses. Future research should attempt to interview both sexual partners within the relationship as a means of establishing perceived knowledge of partner HIV status, determining the relationship between perception and reality, encouraging communication on this topic, and potentially reducing transmission.

The findings of this study suggest the need for VCT workers to target PLWH who have more than one sexual partner, are older, single and in relationship with sex partners of HIV-negative or unknown status for disclosure intervention. The low rate of HIV serostatus disclosure to sex partners found in this study also indicate the need for counselors and health care workers to initiate discussion with PLWH about disclosure and determine the best disclosure approach for each individual. Given the strong association between participants' knowledge of partner's HIV status and HIV serostatus disclosure ($P < 0.001$), more widespread promotion of couples-based voluntary counseling and testing (CVCT) are needed in Haiti in order to increase HIV serostatus disclosure and prevent new HIV infections. Research has shown that CVCT is cost effective in helping couples learn about their and their partner's HIV serostatus with the assistance of a professional and leads to higher levels of protected sexual intercourse when compared with individual HIV VCT [40–42]. In one study that employed a facilitated couples counseling approach to disclosure in Uganda, it was reported that 81.3 % of the HIV-positive males and 80.2 % of the HIV-positive females disclosed their HIV serostatus to an HIV uninfected partner [31]. Recommendations to increase acceptance of CVCT include community mobilization, offering home-based VCT, expanding clinic hours to accommodate individuals with conflicting work schedules, and providing more couple-friendly services in general [40].

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