

# Disclosure of HIV Status to Sexual Partners Among People With HIV in Singida Regional Referral Hospital of Tanzania: A Cross-Sectional Study

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## Abstract

HIV status nondisclosure to sexual partners remains a major challenge in Tanzania's health system. This hospital-based, descriptive, cross-sectional study design recruited 380 people living with HIV (PLWH) to assess voluntary HIV status disclosure to sexual partners, the associated factors, and outcomes among PLWH in Tanzania. Approximately 78% ( $n = 297$ ) of the study participants reported disclosing their HIV status to their sexual partners. Adjusted multivariable logistic regression analysis revealed that HIV status disclosure to sexual partners was significantly associated with living with a sexual partner (adjusted odds ratio [AOR] = 3.91, 95% CI [1.43–10.72]), knowledge of HIV disclosure (AOR = 11.71, 95% CI [2.88–47.63]), known serostatus of the sexual partner (AOR = 40.20, 95% CI [15.31–105.56]), and HIV disclosure-related stigma (AOR = 0.92, 95% CI [0.85–0.99]). Addressing these significant factors will maximize the magnitude of voluntary disclosure to sexual partners.

**Key words:** cross-sectional study, HIV status, HIV voluntary disclosure, people living with HIV, sexual partner

HIV remains a major challenge in Tanzania's health system, as it is for other sub-Saharan countries, because the prevalence is still unacceptably high, and many new HIV infections occur in the country. Recently, UNAIDS estimated that the HIV prevalence in the general population of Tanzania is 4.7%, which corresponds to 1.4 million people living with HIV in Tanzania (National AIDS Control Programme [NACP], 2020; UNAIDS, 2018). In 2018, there were 65,000 new HIV

cases diagnosed in Tanzania (NACP, 2020; UNAIDS, 2018). The Tanzanian NACP 2020 report revealed that the Singida region, located in the central part of Tanzania, had an HIV prevalence of 3.6% and a high rate of new HIV infection (PEPFAR, 2019). This high rate of HIV infection is linked to heterosexual transmission, which accounts for up to 80% of HIV transmission among Tanzanian couples, a population known to have a high prevalence of HIV-voluntary nondisclosure (Colombe et al., 2019).

HIV disclosure is self-avoided among many heterosexual people living with HIV (PLWH; Colombe et al., 2019). However, disclosing one's HIV status to one's sexual partners remains an integral component of curtailment of the HIV pandemic. Therefore, understanding the context of disclosure is essential in both the prevention of HIV and the mitigation of its impacts on both individuals and communities (Hallberg et al., 2019). Lack of voluntary disclosure among serodiscordant heterosexual couples remains one of the main factors associated with new infections among married couples and those in stable relationships in Tanzania (Colombe et al., 2019; Hallberg et al., 2019). These groups of HIV nondisclosing sexual partners need special attention to slow the rate of HIV transmission.

Prevention of new HIV infections is a significant component of the fight against HIV. Preventing new HIV infections can be achieved by early HIV testing and early serostatus disclosure (Hallberg et al., 2019; Mokhele et al., 2021). Both early HIV detection and

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voluntary disclosure of HIV status are important for the sustainable decline of HIV transmission (Mekonnen et al., 2019). Early disclosure of HIV-positive serostatus to prospective sex partners decreases the likelihood of unsafe sex, which leads to a reduction in HIV transmission (Pinkerton & Galletly, 2007). The HIV-disclosure event is defined as “the verbal communication that occurs between a discloser with HIV and a confidant regarding the discloser’s HIV status” (Chaudoir et al., 2011, p. 1618).

Voluntary HIV disclosure has not been achieved across sub-Saharan countries (Damian et al., 2019; Matovu, 2010). In previous studies in sub-Saharan Africa, voluntary disclosure prevalence was reported to range from 57% to 95% (Adeniyi et al., 2017; Damian et al., 2019; Deribe et al., 2008; Matthew et al., 2014; Ngocho et al., 2019; Obionu et al., 2021; Seid et al., 2012; Taylor et al., 2020; Tesfaye et al., 2018; Vu et al., 2012). Notably, all parts of sub-Saharan Africa have countries with a low prevalence of HIV disclosure. Studies conducted in Nigeria, Mozambique, Togo, and Ethiopia revealed that the prevalence of HIV disclosure to sexual partners varied between 21% and 65% (Hallberg et al., 2019; Obionu et al., 2021; Taylor et al., 2020; Tegegne, 2022; Yaya et al., 2015).

Despite the paucity of research on voluntary disclosure of HIV status to sexual partners in Tanzania, a study by Damian et al. (2019) revealed that the prevalence of serostatus disclosure of women living with HIV to their partners was 66% (Damian et al., 2019). In a similar study, Ngocho et al. (2019) identified that the prevalence of HIV disclosure of pregnant women in the Kilimanjaro region to their sexual partner was 84% (Ngocho et al., 2019). Participants in the latter study were more likely to reveal their HIV status than the women with HIV who were not pregnant.

Several factors seem to be highly associated with voluntary HIV disclosure. Studies have shown that factors such as being educated with a primary or higher education level, being female, knowing the status of one’s sexual partner, receiving pretest or post-test HIV counseling, and being middle-aged or older were leading factors associated with voluntary HIV disclosure (Benayew Shifraew et al., 2021; Chaudoir et al., 2011; Damian et al., 2019; Gultie et al., 2015; Obionu et al., 2021). Moreover, in Ethiopia, Gultie et al. (2015) showed that partner-related factors, such as knowing the partner’s HIV status, increased the chance of voluntary disclosure almost fortyfold (Gultie et al., 2015). Both person-related and partner-related factors play a major role in HIV disclosure to sexual partners.

Voluntary self-disclosure among sexual partners is crucial and has various advantageous effects. Voluntary disclosures help PLWH to ask for and receive crucial social support, have safer sex, and it frequently helps get the sexual partner into care and treatment (Dessalegn et al., 2019; Dessie et al., 2019; Knettel et al., 2019; Qiao et al., 2016). Some studies have shown that voluntary self-disclosure usually improves mental health, fosters anti-retroviral therapy (ART) adherence, and prevents the seroconversion of the person without HIV in a sexual relationship (Chaudoir et al., 2011; Dessie et al., 2019; Stirratt et al., 2006). A study by Dessalegn et al. (2019) revealed that 68% of participants reported receiving social support after disclosure, and two thirds of participants discussed safer sex with their sexual partners after disclosure (Dessalegn et al., 2019). Another study conducted in Ethiopia by Dessie et al. (2019) revealed that adults with HIV who disclosed their status had 64% higher odds of having good ART adherence compared with participants who did not disclose (Dessie et al., 2019). In addition, people who disclosed their HIV status before and soon after initiation of ART had not only better adherence but also better viral load suppression (VLS) outcomes; viral suppression was found to be four times higher in individuals who disclosed their status than those who did not (Buma et al., 2015). These potential benefits of disclosing are what may help an individual with HIV decide to tell his or her sexual partners about his or her HIV status.

Despite positive outcomes, HIV disclosure is also associated with several negative outcomes. Recently, studies have shown a slight increase in the magnitude of negative outcomes of HIV disclosure, which can explain why there has been a decline in HIV disclosure in some areas (Damian et al., 2019; Yonah et al., 2014). Participants in several studies reported being blamed, discriminated against, depressed, divorced, and verbally abused after disclosure (Damian et al., 2019; Dessalegn et al., 2019). These negative outcomes limit voluntary HIV disclosure among sexual partners (Damian et al., 2019; Dessalegn et al., 2019). When seeking to encourage sexual partners to disclose their HIV status, policymakers and health care professionals should consider these adverse effects.

Tanzania is transitioning toward implementing the U=U campaign (undetectable viral load is equivalent to the untransmissible; Thomford et al., 2020). However, this campaign does not justify not disclosing due to the following reasons: First, the most recent HIV Impact Survey highlighted that there was a low proportion of VLS among people living with HIV in Tanzania, where VLS was 47%, 51%, and 50% among never-married,

married, and divorced PLWH, respectively (PHIA Project, 2018). Second, the newly diagnosed index person's viral load becomes undetectable up to 6 months after starting HIV medications and only if there is optimal medication adherence; thus, during this period, there is the potential for HIV transmission to be carried to another person (Eisinger et al., 2019; Stürmer et al., 2008). Notably, the principles of U=U are only achieved if there is sustained HIV suppression through optimal ART adherence and HIV is rendered untransmittable. Unfortunately, when ART adherence is suboptimal and HIV is not fully suppressed, U=U does not resolve issues of HIV disclosure to sexual partners (Kalichman et al., 2021). We should also incorporate other preventive methods such as early disclosure and having safe sex (Matovu, 2010). It is evident that the disclosure drivers may differ due to location, motives, and population mix. It is also important to understand the prevalence and drivers at other locations with different populations mixed by religion, rurality, urbanness, and others to develop locally relevant and effective interventions.

The modified virtuous cycle of HIV illness disclosure is the model that guided this study (Hatala et al., 2018). This model describes the process of HIV disclosure as interconnected with several influencing and influenced factors that are important for people living with HIV to voluntarily disclose (Hatala et al., 2018). The model displays that voluntarily disclosing HIV status usually increases the general support received by a person with HIV, increases personal knowledge of someone living with HIV, and lowers HIV-related stigma, which in turn

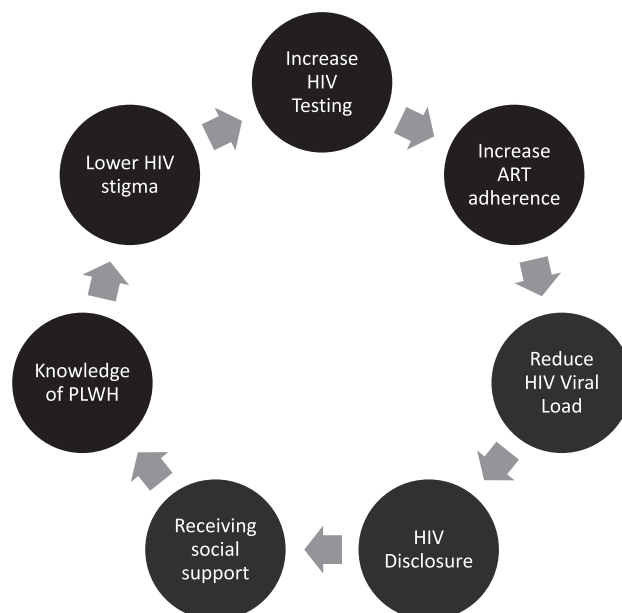
increases the likelihood of HIV testing for sexual partners and makes a person adhere to their medication, which leads to a reduction in HIV viral load (Hatala et al., 2018). This model was modified to include the VLS and ART adherence variables. Please refer to Figure 1 for this model of the “modified virtuous cycle of HIV illness disclosure.”

There is a knowledge gap regarding the magnitude of HIV disclosure in hyperendemic areas with high HIV prevalence, including Tanzania (Yonah et al., 2014). A literature review did not identify any studies examining the factors and consequences of HIV disclosure to sexual partners in Tanzania (Benayew Shifraew et al., 2021; Taylor et al., 2020; Yonah et al., 2014). Moreover, many studies which were conducted in Tanzania included HIV disclosure to the general population as compared with this study, which included voluntary HIV disclosure to sexual partners, and few previous studies were specific to sexual partners (Hallberg et al., 2019; Yonah et al., 2014). To accelerate the World Health Organization's (WHO) goal of zero new HIV infections among discordant couples, this study focused on a geographic region not previously studied. Specifically, this study was designed to assess the level of HIV disclosure to sexual partners, factors associated with HIV disclosure, and its outcomes among women and men with HIV in Tanzania.

## Methods

### Study Design and Study Area

A hospital-based, cross-sectional study was designed. Data were collected between June and August 2022 at



**Figure 1.** Modified virtuous cycle of HIV illness disclosure (Adapted from Hatala et al., 2018).

Singida Regional Referral Hospital in the Singida region of the United Republic of Tanzania. Singida region has seven districts, and among these districts, Singida Municipal Council was the least populous council, with 150,379 per the 2012 population census. However, this district had the highest rate of new HIV cases in the most recent report of 2016 (The United Republic of Tanzania, 2015). Singida Region Referral Hospital is the only public hospital in Singida Municipal Council, and it has 6,937 cumulative individuals enrolled in HIV care at the facility up to June 2022, of which 67% were females.

### Study Population and Sampling

This study recruited PLWH, who were followed up with at Singida Regional Hospital's Care and Treatment Center (CTC). Nonprobability convenience sampling was used to recruit PLWH ages 18 years and older who received ART for at least 3 months. To be included in this study, those reporting ever having a sexual partner since being diagnosed with HIV were eligible. PLWH who mutually tested for HIV with their sexual partners were excluded from this study. The sample size was calculated using the Kish and Leslie formula provided below (John Wiley & Sons, 1965).

$$N = Z^2P(1-P)/d^2$$

Where  $N$  = sample size;  $Z$  = score for 95% Confidence Interval which is 1.96;  $P$  = proportion of HIV disclosure to sexual partners in Tanzania was 66%<sup>9</sup>;  $d$  = degree of precision was set at 5%. Therefore  $N = 345$ .

With an assumption of a 10% nonresponse rate (Dessalegn et al., 2019), the total sample size required was 380.

### Data Collection

Structured and pretested interviewer-administered questionnaires were used to collect data. Training on the study's purpose, questionnaire content, particularly on issues related to the confidentiality of the responses, and the rights of participants was provided to the three research assistants on two consecutive days by the lead author of this study. The interviewers were proficient in Kiswahili, and they were staff members at the CTC clinic. To reduce social desirability bias, female participants were interviewed by the female interviewer and male participants by male interviewers. The questionnaire was first prepared in English, then translated into Kiswahili, and then translated back to English to check for consistency of the questions. The final version of the questionnaire was reviewed by a three-member expert

panel (HIV disease and HIV-related stigma experts) to establish content validity. Participants were recruited consecutively at the CTC clinic during their follow-up visits.

Potential study participants were identified with screening interviews when individuals came for a scheduled CTC appointment. Either the principal investigator or the study research assistants approached the individual before their scheduled appointments and provided information about the purpose of the study. Those individuals who consented to participate provided written informed consent and were interviewed after completing the CTC appointment activities. For research participants who could not read or write, a hand-signature method mark on the document was applied to indicate their informed consent.

### Measurement

The primary outcome variable for this study was self-reported HIV status disclosure recorded as *yes* or *no*. Explanatory variables included self-reported person-related factors such as age, sex, and education level (i.e., no school, primary, secondary, or postsecondary), marital status (i.e., never married or current relationship status [i.e., primary partner, casual partner, or a combination of casual and primary partners]), and occupation. Partner-related factors included the partner's HIV status (as reported by the participant), and participants' clinical-related factors included health status at the time of HIV diagnosis, which was self-reported as sick or well, duration of ART follow-up care, WHO HIV stage at the time of diagnosis, and type of HIV test used during diagnosis (whether it was voluntary counseling and testing or provider-initiated testing and counseling, both of which were obtained from the participant's CTC card; Benayew Shifraew et al., 2021; Deribe et al., 2008).

Another measured variable was HIV-related stigma, assessed using 29 items adapted from Sayles' Multidimensional Measure of Internalized HIV Stigma instrument (Sayles et al., 2008), developed by Relf et al. (M. Relf, personal communication, September 2021). This new questionnaire has an internal reliability of 0.92 for the same population, and it forms subscales with a five-point Likert-type response that includes *none of the time*, *a little bit of the time*, *some of the time*, *most of the time*, and *all of the time*. The scores are scaled in the positive direction, implying that the higher the score, the higher the level of stigma. This instrument yields a total score for HIV-related stigma (range 29–123) and subscale scores in the following HIV-related stigma domains: *disclosure stigma* (range 3–15), *perceived*

*stigma* (range 9–45), *anticipated stigma* (range 5–25), *internalized stigma* (range 6–30), *health-sector stigma* (range 3–11), and *experienced stigma* (range 3–15).

We also assessed knowledge of disclosure through 6 questions. The maximum score for those questions was 6, and those participants with scores  $\geq 5$  had high knowledge, 4 to 3 had moderate knowledge, and those with scores below 3 had low knowledge of disclosure (Hallberg et al., 2019). Furthermore, we assessed engaging in high-risk sexual practices before disclosure to sexual partners by asking the participant to report any unsafe sex with their sexual partner before disclosure. The positive outcome of voluntary HIV disclosure was assessed by evaluating whether the participant reported having received social support, discussed safer sex with her/his partner, reported his/her partner has been tested after he/she voluntarily disclosed, and checked whether the participant had good adherence to ART medication after voluntary HIV status disclosure to their sexual partner (Dessalegn et al., 2019; Yaya et al., 2015).

The self-reported AIDS Clinical Trials Group (ACTG) adherence questionnaire was used to assess adherence as one of the positive outcomes of disclosure. Adherence was treated as a continuous variable, and three questions from this questionnaire were used, and the score for adherence ranged from 0% to 100% (Wilson et al., 2014). To know how many individuals were adherent to ART medications, the data that were obtained from this section on adherence from the ACTG were dichotomized into adherent ( $> 90\%$  of the total score) and nonadherent ( $\leq 90\%$  of the total score; Badiee et al., 2012; O'Halloran Leach et al., 2021; Wilson et al., 2014). In addition, we examined participants' most recent HIV viral load after the voluntary disclosure by recording it from the client's CTC card. The client was considered to have a suppressed viral load count if they had HIV-1 RNA copies less than 50 copies/ml after disclosure (Buma et al., 2015). The assessment of negative outcomes focused on whether the participant reported separation from the sexual partner, being blamed or beaten, generally confused/depressed, stigmatized by his/her sexual partner, or verbally abused by his/her sexual partner after disclosure of their serostatus.

### **Ethical Considerations**

The Duke University Institutional Review Board approved the study with the Approval Number Pro00111825-INT-1.0. Ethical approval to conduct this research in the Republic of Tanzania was obtained from the Kilimanjaro Christian Medical University ethical committee and the National Institute of Medical

Research (NIMR), NIMR/HQ/R.8a/Vol. IX/4025. After obtaining all ethical clearances, permission to conduct the study at Singida Regional Referral Hospital was obtained from the Tanzanian Ministry of Health. Written informed consent was obtained from the study respondents individually. The right of the respondent to withdraw from the interview or not to participate at all was assured. To maintain participant confidentiality, the interviews were conducted in a private room with the door closed, and all the documents with participants' information were well-protected in a locked cabinet; only the principal investigator had access to the key.

### **Data Analysis**

The analyses consisted of univariate analysis followed by bivariate and multivariate logistic regression analyses. Univariate analyses were conducted to examine the distribution of the sociodemographic, sexual behavior, and HIV-related variables. The frequency percentage of the data was presented in tables, and the chi-square was used to test the relationship between two or more categorical variables at a 0.05 level of significance. Second, bivariate analyses were conducted with the disclosure and sociodemographic 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 voluntary HIV serostatus disclosure to sexual partners. Stepwise multivariate logistic regression was used to identify the independent variables that could fit the final model. Multicollinearity was examined, and all significant variables were introduced in a logistic regression model to derive the adjusted odds ratio of each dichotomous dependent variable. A 95% level of confidence was applied throughout, and a probability ( $p$ ) value of  $\leq .05$  was considered statistically significant. IBM SPSS for Mac, version 27.0, was used for this data analysis.

## **Results**

### **Sociodemographic Characteristics of Study Participants**

A total of 380 PLWH receiving care and treatment from the Singida Regional Referral Hospital were approached and invited to participate in this study. Female participants constituted 69.2% ( $n = 263$ ) of the study participants, and 51.8% ( $n = 196$ ) were ages 45 years and older. Married and Muslim respondents were 41.3% ( $n = 157$ ) and 50.5% ( $n = 192$ ), respectively. Singida

Regional Referral Hospital has a large Muslim community living with HIV, and 51.3% ( $n = 195$ ) of the total participants were in primary sexual relationships. Most participants had completed primary education: 71.8% ( $n = 273$ ), and 74.2% ( $n = 282$ ) were self-employed. Please refer to Table 1 for the sociodemographic characteristics of study participants.

**Clinical Condition, Partner, and Social-Related Factors**

Of the study participants, 52.6% ( $n = 200$ ) were well at the time of HIV diagnosis, and 62.1% ( $n = 236$ ) were in WHO’s clinical stage I–II. Seventy-one percent ( $n=270$ ) of the study participants knew the serostatus of their partners, and 69% ( $n = 204$ ) reported having risky sexual practices before disclosure to their sexual partners. Similarly, most of the study participants, 95.3% ( $n = 362$ ), reported having prior discussions on the

importance of HIV disclosure to partners with medical personnel, and 79% ( $n = 300$ ) had good medication adherence. Please refer to Table 2 for clinical condition-, partner, and social-related factors.

**Prevalence of Voluntary HIV Disclosure, HIV-Related Stigma, and Knowledge of Disclosure Importance**

In this study, 78.2% ( $n = 297$ ) of the study participants voluntarily disclosed their HIV status to a sexual partner; of these, 72% ( $n = 213$ ) disclosed within 1 month of their initial HIV diagnosis. The rate of voluntary disclosure was 2.37 times higher in men than in women. Many participants (81.1%,  $n = 308$ ) had high knowledge of the importance of voluntary HIV disclosure. Most of the participants (53%,  $n = 157$ ) reported having first disclosed to their relatives instead of their sexual partners. The average score on the HIV-related stigma

**Table 1. Sociodemographic Characteristics of Respondents**

Variables	Category	N (%)
Sex	Male	117 (30.8)
	Female	263 (69.2)
Age	18–24	10 (2.6)
	25–34	70 (18.4)
	35–44	104 (27.4)
	45–54	121 (31.8)
	> 55	75 (19.7)
Marital status	Never married	111 (29.2)
	Married/cohabiting	157 (41.3)
	Divorced/separated	49 (12.9)
	Widowed	63 (16.6)
Religion	Islamic	192 (50.5)
	Christian	185 (48.7)
	Others	3 (0.8)
Educational status	No school (unable to read/write)	50 (13.2)
	Primary	273 (71.8)
	Secondary/vocational college	47 (12.4)
	Postsecondary	10 (2.6)
Occupation	Employed/retired	57 (15)
	Self-employed	282 (74.2)
	Unemployed	41 (10.8)

**Table 2. Clinical Condition, Partner, and Social-Related Factors**

Variable	Category	Frequency	%
Health status at HIV diagnosis	Sick	180	47.4
	Well	200	52.6
Baseline WHO stages of the disease	Stage 1	84	22.1
	Stage 2	152	40.0
	Stage 3	122	32.1
	Stage 4	22	5.8
Type of HIV testing	PITC	156	41.1
	VCT	224	58.9
Knowing partner's HIV status	No	110	28.9
	Yes	270	71.1
HIV status of your partner	With HIV	182	47.9
	Without HIV	91	23.9
	Unknown	107	28.2
How did you know your partner's HIV status	From the partner	129	33.9
	From other people	145	38.2
	Do not know	106	27.9
Having risky sexual practices before disclosure to sexual partner	No	204	68.7
	Yes	93	31.3
ART adherence status	Poor ( $\leq 90\%$ )	80	21.1
	Good ( $> 90\%$ )	300	78.9
Duration of ART follow-up care in years	$\leq 2$ years	75	19.7
	$> 2$ years	305	80.3
Prior discussion on HIV testing with partner	No	6	1.6
	Yes	374	98.4
Prior discussion on importance of HIV disclosure to partner with a medical provider	No	14	3.7
	Yes	366	95.3
Being a member of anti-HIV/AIDS club	No	284	74.7
	Yes	96	25.3

*Note.* ART = antiretroviral therapy; PITC = provider-initiated testing and counseling; VCT = voluntary counseling and testing; WHO = World Health Organization.

scale was  $49 \pm 19$ , which indicates moderate HIV-related stigma.

### **Reasons for Disclosing and Nondisclosing**

Nearly two thirds of study participants (62%,  $n = 184$ ) reported having voluntarily disclosed their status to

a sexual partner because they wanted their partner to be tested for HIV. Other reasons for voluntary disclosure included not transmitting the disease, which was mentioned by 49.2% ( $n = 146$ ) of the participants. Fear of divorce was a leading reason given by 30.1% ( $n = 25$ ) of participants who had not disclosed their status.

Eighty-four percent of participants ( $n = 21$ ) who reported fear of divorce as the reason not to voluntarily disclose were females.

### **Predictors of HIV Status Disclosure to Sexual Partners**

We used previous studies to select the following variables to include in bivariate analyses: age, sex, educational status, marital status, employment status, living with sexual partners, knowledge of HIV disclosure, ART medication adherence, serostatus of sexual partner, type of HIV testing, member of the anti-HIV club, prior discussion about HIV testing, knowing sexual partner's HIV status, viral load, number of sexual partners, and subdomains of HIV-related stigma were candidates for multivariable analysis (previous literature review; Gultie et al., 2015). Then, the variables that were significant at a  $p < .05$  level in the bivariate analyses were included in the multivariate logistic regression models to examine predictors of voluntary HIV serostatus disclosure to sexual partners.

When keeping other variables constant in the final model, the likelihood of disclosing HIV status was 3.91 times higher among participants living with their sexual partners than in those who did not live with their sexual partners (adjusted odds ratio [AOR] = 3.91, 95% CI [1.43–10.72]). Study participants who had high knowledge of HIV disclosure were 12 times more likely to disclose than those who had low knowledge of disclosure (AOR = 11.71, 95% CI [2.88–47.63]). The odds of HIV status disclosure to sexual partners were 40 times more likely in participants whose sexual partners were positive than those who did not know the status of their sexual partners (AOR = 40.20, 95% CI [15.31–105.56]), and the likelihood of disclosing HIV status was 8% less among participants who had experienced HIV disclosure-related stigma than those who had not (AOR = 0.92, 95% CI [0.85–0.99]). Please refer to Table 3 for predictors of HIV status disclosure to sexual partners among ART clinic attendees.

### **HIV Disclosure Outcomes**

We found that 70% ( $n = 210$ ) of those who disclosed their status reported having received social support from their partners; 90% ( $n = 267$ ) of their partners were tested after their disclosure, and 87% ( $n = 259$ ) discussed safer sex with their sexual partner after disclosure. Participants who had disclosed their HIV status and reported having depression were 62% ( $n = 184$ ), those who reported being blamed or beaten were 20% ( $n = 59$ ), those who reported being divorced were 18% ( $n = 54$ ), and those who reported being stigmatized were 12% ( $n = 35$ ).

### **Discussion**

This study revealed that more than three quarters of participants had voluntarily disclosed their HIV status to a sexual partner. This finding is similar to two other studies conducted in Moshi, Tanzania, where disclosure rates of 66% and 84% were identified (Damian et al., 2019; Ngocho et al., 2019). However, these studies differed in study population characteristics; this study included both female and male participants, while the previous studies included only female participants. Moreover, HIV disclosure was higher in our study than that observed in three studies conducted in Nigeria (Obionu et al., 2021), Ethiopia (Gultie et al., 2015), and Mozambique (Taylor et al., 2020), where the prevalence of HIV disclosure to sexual partners were 52%, 57%, and 58%, respectively. The possible reason for the discrepancy might be the difference in time since the studies were conducted. There has been a progressive improvement in the acceptance of HIV with time (Yonah et al., 2014).

We also observed that living with a sexual partner, knowledge of HIV disclosure, HIV disclosure-related stigma, and serostatus of the sexual partner were significant factors associated with the disclosure of HIV status to sexual partners after adjusting for confounding variables. Participants living with their sexual partners were 3.91 times more likely to disclose their HIV status. The finding that living with partners was related to higher disclosure was consistent with studies conducted in Ethiopia and Morocco (Gultie et al., 2015; Loukid et al., 2014). The intimacy of partners could explain this increment in disclosure rate among participants living with their sexual partners, the confidence they have with each other, the strength of their relationship, and the feeling of responsibility that might facilitate open and close communication, which in turn made them more easily disclose their HIV status (Gultie et al., 2015).

The level of knowledge of the importance of HIV disclosure was associated with voluntary HIV disclosure; respondents with high knowledge of the importance of HIV disclosure were 12 times more likely to voluntarily disclose their HIV status compared with those with low knowledge of the importance of HIV disclosure. Notably, the level of knowledge of the importance of voluntary HIV disclosure was high among the participants in this study. This finding is concordant with a study conducted in Ethiopia, which also reported a high level of knowledge of the importance of disclosure (Berhane Alema, 2015).

We observed that there was a significant association between the serostatus of the sexual partner and HIV disclosure, whereby participants with sexual partners with HIV were 40 times more likely to disclose than those



**Table 3. Predictors of HIV Status disclosure to Sexual Partners Among ART Clinic Attendees**

Variable	Category	Disclosure Status		COR (95% CI)	AOR <sup>a</sup> (95% CI)	p-Value
		Yes, N (%)	No, N (%)			
Sex	Female	195 (74.1)	68 (25.9)	1		
	Male	102 (87.2)	15 (12.8)	2.37 (1.29–4.36)		
Marital status	Never married	68 (61.3)	43 (38.7)	1		
	Ever married	229 (85.1)	40 (14.9)	3.62 (2.17–6.02)		
People living with sexual partner	No	149 (66.8)	74 (33.2)	1	1	.015
	Yes	148 (94.3)	9 (5.7)	8.16 (3.94–16.92)	3.91 (1.42–10.72)	
Knowledge on importance of disclosure	Low	5 (20)	20 (80)	1	1	<.001
	Moderate	24 (51.1)	23 (48.9)	4.17 (1.34–12.98)	1.69 (1.35–8.24)	
	High	268 (87)	40 (13)	26.8 (9.52–75.43)	11.71 (2.88–47.63)	
Serostatus of sexual partner	Positive	175 (96.2)	7 (3.8)	51.42 (21.83–121.12)	40.2 (15.31–105.56)	<.001
	Negative	87 (95.6)	4 (4.4)	44.78 (15.18–131.42)	36.03 (10.86–119.52)	
	Unknown	35 (32.7)	72 (67.3)	1	1	
ART adherence status	Poor	55 (68.8)	25 (31.3)	1		
	Good	242 (80.7)	58 (19.3)	1.9 (1.1–3.3)		
HIV disclosure-related stigma (Mean ± SD)		8.3	10.5	0.92 (0.88–0.96)	0.92 (0.85–0.99)	<.029
Number of sexual partners	One/no	227 (81.7)	51 (18.3)	1		
	Many	70 (68.6)	32 (31.4)	0.49 (0.29–0.82)		
Duration of ART follow-up care in years	≤ 2 years	51 (68)	24 (32)	1		
	> 2 years	246 (80.7)	59 (19.3)	1.96 (1.11–3.44)		

Note. AOR = adjusted odds ratio; ART = antiretroviral therapy; COR = crude odds ratio.

<sup>a</sup>Adjusted for sociodemographic, partner-related, and clinical-related variables.

whose sexual partner's status was unknown. This is consistent with the Deribe et al. (2008) study, which showed a similar significant association in which respondents who reported not knowing their partner's HIV status were 98% less likely to voluntarily disclose to a sexual partner in comparison with those who did know their partner's status (Deribe et al., 2008). Generally, we observed that PLWH who had a sexual partner without HIV or unknown serological status were less likely to expose their status than those who had a partner with HIV.

One fifth of disclosed participants reported being blamed or beaten, and 18% reported getting divorced after disclosing their HIV status. These results were inconsistent with a study conducted in Tanzania, which claimed that 11% of disclosed participants living with HIV claimed to be beaten or blamed by their sexual

partners after the disclosure, while 7.3% reported that their partners ran away (Damian et al., 2019). The increase in the magnitude of the negative outcomes may partially explain why there has been no significant improvement in HIV disclosure to sexual partners to date.

The results of this study support our theoretical model that postulates that disclosing HIV status usually, but not always, increases general support received by a person living with HIV, that disclosure increases personal knowledge of someone living with HIV, and this lowers HIV-related stigma, which in turn increases the likelihood of HIV testing. Early testing and disclosure can increase adherence to ART medication, which reduces the HIV viral load (Hatala et al., 2018).

The findings of this study uniquely fill the significant gaps that were revealed in the previous studies in the

following ways: First, our findings revealed the current magnitude of voluntary HIV disclosure to sexual partners among both women and men with HIV in the Singida region of Tanzania as one of the hyperendemic areas; second, this study has identified independent factors for voluntary HIV disclosure, such as living with a sexual partner, knowledge of HIV disclosure, HIV disclosure-related stigma, and serostatus of the sexual partner; and finally, Singida Regional Referral Hospital has a large Muslim community living with HIV, and therefore, these results will be relevant to intervention designs that consider the influence of religion. In general, these results provide insight to implementation scientists and policymakers about appropriate factors to take into account when developing and/or implementing the best evidence-based intervention to boost PLWH's voluntary HIV disclosure as one of the strategies to prevent HIV transmission to sexual partners.

### **Strengths and Limitations**

This study provided information from a large CTC in the Singida region, which is representative of people living with HIV in the region. The large sample size ( $N = 380$ ) and the 100% response rate enabled sufficient power to investigate the multifactorial nature of disclosure and find several independent factors. To overcome coercive pressures related to the repercussions of participation or refusal, participation in this study was not linked to receiving treatment or care services at CTC. A small incentive equivalent to 2 USD was provided to each participant for transport expenses; there was no other direct benefit to participants, reducing the likelihood of reporting bias. Nondisclosed participants were referred for counseling.

This study has limitations, such as the fact that disclosure status was assessed through self-reporting questions, which may have overestimated or underestimated disclosure status because of social desirability bias. Furthermore, this study used a cross-sectional study design, which made it difficult to establish a causal relationship between the outcome and predicting variables. We did not consider important explanatory variables such as substance use, family income, and residence; some participants were coming from faraway villages because they were afraid to be registered in their nearby CTCs, which could have implications for the disclosure process. It is possible that the rate of disclosure may be lower in this sample than in those enrolled in their home communities. Moreover, using only participants who were enrolled in CTCs could potentially bias the sample of those who are engaged.

### **Conclusion**

Addressing certain factors such as living with a sexual partner, knowledge of HIV disclosure, known serostatus of a sexual partner, and HIV disclosure-related stigma will maximize the amount of voluntary HIV disclosure to sexual partners. This study provides context for voluntary HIV disclosure to sexual partners in one region of Tanzania. Notably, the delay in voluntary disclosure, the significant proportion of participants who had not disclosed, and the presence of moderate HIV-related stigma send an important message to the players in the fight against HIV to raise community awareness of the impact of HIV-related stigma and ways to mitigate the negative consequences of voluntary HIV disclosure. HIV prevention strategies in the country should continue targeting voluntary HIV disclosure to sexual partners, and all intervention programs that are used to maximize voluntary disclosure to sexual partners need to consider these significant factors. Further research, particularly mixed methods research, needs to be designed to fully understand the complex issue of voluntary HIV disclosure and the trend of prompt voluntary HIV disclosure to heterosexual partners among a cohort of newly diagnosed people living with HIV and their experiences in this area. Owing to the significant number of PLWH who have not disclosed their HIV status, it is essential to assess the utilization of partner notification services and to explore the barriers and facilitators in improving HIV disclosure through the use of partner notification services among PLWH.

### **Data Accessibility Statement**

Data may be available on request to the corresponding author, depending upon privacy/ethical/embargo restrictions.

### **Author Contributions**

All authors on this paper meet the four criteria for authorship as identified by the International Committee of Medical Journal Editors (ICMJE); all authors have contributed to the conception and design of the study, drafted or have been involved in revising this manuscript, reviewed the final version of this manuscript before submission, and agree to be accountable for all aspects of the work. Specifically, using the CRediT taxonomy, the specific contributions of each author is as follows: Conceptualization: A. G. Alexander and C. Muiruri; Design and Methodology: A. G. Alexander, H. Bosworth, C. Muiruri, and M. Relf; Formal analysis and investigation: A. G. Alexander, C. Muiruri, H.

Bosworth, and B. T. Mmbaga; Reviewing and editing the manuscript: A. G. Alexander, C. Muiruri, H. Bosworth, and M. Relf; Funding acquisition: A. G. Alexander, C. Muiruri, and B. T. Mmbaga.

## Disclosures

The authors report no real or perceived vested interests related to this article that could be construed as a conflict of interest.

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## Key Considerations

- There is still a significant proportion of people living with HIV who have not disclosed their status to their sexual partners.
- The act of voluntarily disclosing HIV to sexual partners is not prompt, as it is delayed among those who voluntarily disclose.
- The presence of moderate HIV-related stigma in this population sends an important message to the players in the fight against HIV.
- The main factors that influence voluntary HIV disclosure to sexual partners include living with a sexual partner, knowledge of HIV disclosure, known serostatus of a sexual partner, and HIV disclosure-related stigma.

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